Initial Study and Mitigated Negative Declaration

Taft Sewer Improvement Project

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Acronyms

Acronym	Definition
AB	Assembly bill
BMPs	Best management practices
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
Cal Fire	California Department of Forestry and Fire Protection
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CDOC	California Department of Conservation
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	Methane
CHRIS	California Historical Resources Information System
CNEL	Community Noise Equivalent Level
CO	Carbon monoxide
CO_2	Carbon dioxide
Db	Decibel
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EO	Executive order
FEMA	Federal Emergency Management Agency
FHWA	US Department of Transportation Federal Highway Administration
FMP	Facilities Master Plan
FRAP	Fire Resources Assessment Program
FTA	Federal Transit Administration
GHG	Greenhouse gas
GSP	Groundwater sustainability plan

Acronym	Definition
GWP	Global warming potential
H_2S	Hydrogen sulfide
HUC	Hydrologic unit code
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
LRA	Local Responsibility Area
LST	Localized significance threshold
LUST	Leaking underground storage tank
MBTA	Migratory Bird Treaty Act
MH	Maintenance hole
MND	Mitigated Negative Declaration
MWD	Metropolitan Water District of Southern California
$MTCO_2e$	Metric tons of carbon dioxide equivalents
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP/HCP	Natural Community Conservation Plan/Habitat Conservation Plan
ND	Negative Declaration
N_2O	Nitrous oxide
NO_2/NO_X	Nitrogen dioxide
NO_X	Oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
OC San	Orange County Sanitation District
OCTA	Orange County Transit Agency
OCWD	Orange County Water District
O&M	Operations and maintenance
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
Pb	Lead
PEIR	Program Environmental Impact Report
PM	Particulate matter
PPV	Peak particle velocity

Acronym	Definition
PRC	Public Resources Code
PVC	Polyvinyl chloride
RCNM	Roadway Construction Noise Model
RMS	Root mean square
ROG	Reactive organic gas
RTP/SCS	Regional Transportation Plan and Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board
SO_2	Sulfur dioxide
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SGMA	Sustainable Groundwater Management Act
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SRA	State Responsibility Area
TAC	Toxic air contaminant
TCR	Tribal cultural resource
UC	University of California
US EPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VCP	Vitrified clay pipe
VDB	Vibration decibels
VHFHSZ	Very high fire hazard severity zone
VMT	Vehicle miles travelled
VOC	Volatile organic compound

1. INTRODUCTION

1.1 Purpose of this Document

Orange County Sanitation District (OC San) has prepared this Initial Study (IS) to evaluate the potential environmental impacts related to implementation of the Taft Avenue Sewer Rehabilitation Project (the "proposed project", "project"), which consists of construction and operation of sewer transmission facilities.

OC San is the lead agency under the California Environmental Quality Act (CEQA) for the proposed Project. CEQA requires that the lead agency prepare an IS to determine whether an Environmental Impact Report (EIR), Negative Declaration (ND), or Mitigated Negative Declaration (MND) is needed. OC San has prepared this IS to evaluate the potential environmental consequences associated with the project, and to disclose to the public and decision makers the potential environmental effects of the proposed project. Based on the analysis presented herein, an MND is the appropriate level of environmental documentation for the proposed project.

1.2 Document Background

The proposed project was included in the Orange County Sanitation District 2020 Program Environmental Impact Report Facilities Master Plan (the PEIR). In that document, the proposed project was referred to as "project 2-49," consistent with the numbering of the sewer collection system improvement projects in the Facilities Master Plan (FMP). This CEQA document tiers from the PEIR, incorporating background and setting information, analyses, and mitigation measures from the PEIR.

1.3 Scope of this Document

This IS/MND has been prepared in accordance with CEQA (as amended) (Public Resources Code Section 21000 et. seq.) and the State CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15000 et. seq.), as updated on December 28, 2018. CEQA Guidelines Section 15063 describes the requirements for an IS and Sections 15070–15075 describe the process for the preparation of an MND. Where appropriate, this document refers to either the CEQA Statute or State CEQA Guidelines (as amended in December 2018). This IS/MND contains all of the contents required by CEQA, which includes a project description, a description of the environmental setting, potential environmental impacts, mitigation measures for any significant effects, consistency with plans and policies, and names of preparers.

This IS/MND evaluates the potential for environmental impacts to resource areas identified in Appendix G of the State CEQA Guidelines (as amended in December 2018). The environmental resource areas analyzed in this document include:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation

- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire
- Mandatory Findings of Significance

1.4 CEQA Process

In accordance with CEQA Guidelines Section 15073, this Draft IS/MND will be circulated for a 30-day public review period (July 18, 2023 – August 17, 2023) to local and state agencies, and to interested organizations and individuals who may wish to review and comment on the report. OC San will circulate the Draft IS/MND to the State Clearinghouse for distribution to State agencies. In addition, OC San will circulate a Notice of Intent to Adopt a Mitigated Negative Declaration to the Orange County Clerk, responsible agencies, and interested entities. A copy of the Draft IS/MND is available for review at https://www.ocsan.gov/ceqa. Written comments can be submitted to OC San by 5:00 pm on August 17, 2023 and addressed to:

Kevin Hadden, Principal Staff Analyst
CEQA@ocsan.gov

Following the 30-day public review period, OC San will evaluate all comments received on the Draft IS/MND and incorporate any substantial evidence that the proposed project could have an impact on the environment into the Final IS/MND and prepare a Mitigation Monitoring and Reporting Program (MMRP).

The IS/MND and MMRP will be considered for adoption by the OC San Board of Directors in compliance with CEQA at a future publicly noticed hearing, which are held on the 4th Wednesday of every month at 6:00 pm in the OC San Administrative Offices located at 10844 Ellis Avenue, Fountain Valley.

1.5 Impact Terminology

The level of significance for each resource area uses CEQA terminology as specified below:

No Impact. No adverse environmental consequences have been identified for the resource or the consequences are negligible or undetectable.

Less than Significant Impact. Potential adverse environmental consequences have been identified. However, they are not adverse enough to meet the significance threshold criteria for that resource. No mitigation measures are required.

Less than Significant with Mitigation Incorporated. Adverse environmental consequences that have the potential to be significant but can be reduced to less than significant levels through the application of identified mitigation strategies that have not already been incorporated into the proposed project.

Potentially Significant. Adverse environmental consequences that have the potential to be significant according to the threshold criteria identified for the resource, even after mitigation strategies are applied and/or an adverse effect that could be significant and for which no mitigation has been identified. If any potentially significant impacts are identified, an EIR must be prepared to meet the requirements of CEQA.

2. PROJECT DESCRIPTION

2.1 Project Overview

The Taft Sewer Improvement Project ("project", "proposed project") involves construction and operation of approximately 10,700 linear feet of OC San vitrified clay sewer pipelines (VCP), ranging in size from 18 to 21 inches in diameter, approximately 420 linear feet of smaller 8-inch diameter City of Orange service laterals, and approximately 80 linear feet of 18-inch diameter City of Orange sewer pipeline. The project would connect to existing City of Orange sewer at the intersection of Meats Avenue and Santiago Boulevard and to existing OC San sewer at the intersection of Taft Avenue and Glassell Street. The project would abandon approximately 8,000 feet of existing OC San sewer pipeline including 1,200 linear feet of the existing pipeline along Meats Avenue at the State Route 55 crossing. The project would also abandon approximately 820 linear feet of existing City of Orange service laterals that would be reconnected as part of the project. Please refer to *Section 2.4 Proposed Project Description* for a detailed description of the project components.

The PEIR described project 2-49 as follows, "Project 2-49 would replace in place a portion of the Taft Branch regional sewer located in a developed area of the City of Orange. Approximately 10,000 feet of 12- to 18-inch-diameter pipe would be replaced. The project begins at the intersection of Meats Avenue and N. Breckenridge Street, where an east–west segment is located in a utility easement just south of Taft Avenue. The pipe crosses beneath State Route 55, and then turns south on N. Tustin Street for approximately 2,500 feet before turning west on Taft Avenue. The project is located in Taft Avenue for approximately 5,000 feet, and terminates just east of the intersection with Glassell Street. The project would increase the capacity of a portion of the Taft Branch regional sewer to meet existing and anticipated demand, and 72 manholes are scheduled to be replaced along the pipeline replacement segment."

Based on subsequent engineering analysis, refinements to Project 2-49 were made. As shown in **Figure 2-1**, the proposed project alignment has changed slightly in comparison to the alignment presented in the PEIR. *Section 2.4 Proposed Project Description* describes the current proposed project.

2.2 Project Purpose

The PEIR, Section 3.2, lists a number of objectives from the FMP. The objectives applicable to the proposed project are as follows:

- Maintain the Sanitation District's wastewater conveyance system in optimal condition for full functionality.
- Meet existing and projected demands for wastewater conveyance in the Sanitation District's service area.
- Comply with existing regulations governing wastewater treatment and disposal.

Consistent with the PEIR objectives, the proposed project would address anticipated capacity issues during wet-weather events as identified in OC San's 2019 Master Plan Update (MPU) Report, which showed potential risk of sanitary sewer overflows between maintenance holes (MH) #SAR250-0280 and #SAR250-0085. The existing Taft Branch sewer is a vitrified clay gravity sewer (VCP), which varies in size from 12-inches to 18-inches and was built in 1960. Since that time, the surrounding area has grown significantly. The proposed project would provide an overall design solution to increase the capacity of the Taft Branch sewer

to convey wet-weather flows and replace or construct 39 maintenance holes to meet OC San and City of Orange current standards.

2.3 Project Location

The proposed project is located in the City of Orange, in Orange County, California (see **Figure 2-1**). The project would be constructed within the existing City of Orange right-of-way, along Meats Avenue from west of Santiago Boulevard to Breckenridge Street, south along Sacramento Street, west along Taft Avenue, crossing California Department of Transportation (Caltrans) State Route 55, south along Tustin Street, and west along Taft Avenue to Glassell Street (see **Figure 2-2**).

2.3.1 Environmental Setting

The proposed project is located in both dense residential and commercial areas and crosses State Route 55. The project area setting is fully built-out. Surrounding land uses include commercial, residential, and public facilities.

2.3.2 Sensitive Receptors

Sensitive receptors within the project vicinity include the single-family and multi-family residences on either side of the proposed alignment along Taft Avenue, Sacramento Street, Breckenridge Street and Meats Avenue. In addition, there are over a dozen schools and/or faith-based facilities located within one quarter mile of the project site.

2.3.3 Utilities

Electrical service in the proposed project area is provided by Southern California Edison (SCE). Natural gas service for the proposed project area is provided by the Southern California Gas Company. City of Orange provides water and wastewater services in the project area. OC San is the regional wastewater collection agency. Existing facilities for these utilities are located throughout the vicinity of the proposed project. There is also a 79-3/4" diameter Metropolitan Water District of Southern California (MWD) feeder pipe along Taft Avenue and Tustin Street, which the proposed project would cross.

2.3.4 Transportation

The proposed project alignment would cross under State Route 55. The major roadways in the proposed project vicinity are Taft Avenue, Tustin Street and Meats Avenue. West of the proposed project alignment, immediately west of the intersection of Taft Avenue and Glassell Street, are railroad tracks maintained by Union Pacific Railroad (UPRR). Metrolink operates the Inland Empire – Orange County rail line along these tracks immediately west of the alignment. Bikeways also exist in the project vicinity. There is a Class 2 bike lane on both the north and south sides of Taft Avenue between Glassell Street and Tustin Street; along Taft Avenue between Tustin Street and Sacramento Street; along Meats Avenue between Breckenridge Street and Santiago Boulevard. Active bus routes in the area are operated by Orange County Transportation Authority (OCTA) and include routes 46, 50, 71, and 167 along Taft Avenue, Tustin Street and Meats Avenue.

2.3.5 Air Quality and Water Quality

The project is located within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), within the South Coast Air Basin (SCAB) which is in nonattainment status for ozone and particulate matter

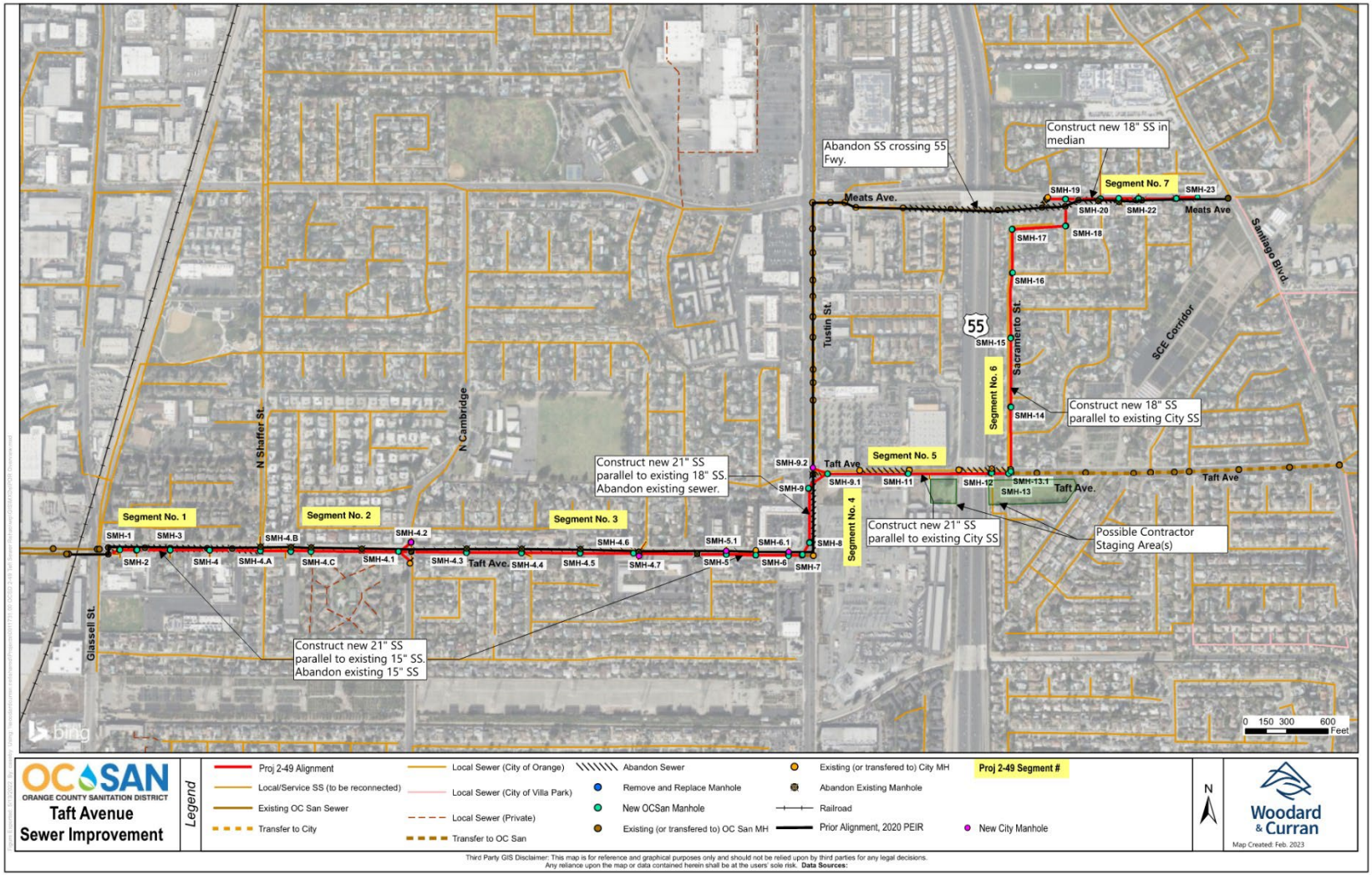
(SCAQMD 2017). The project site lies within the San Ana River watershed, (Santa Ana RWQCB 2015). Water quality is regulated by the Regional Water Quality Control Board (RWQCB), Santa Ana Region. Drainage facilities in the vicinity of the project include the Buckeye Drainage Channel crossing under Meats Avenue along State Route 55.

2.3.6 Geology

Regional geologic mapping indicates that the eastern portion of the alignment is underlain by Holocene and latest Pleistocene age young alluvial fan deposits consisting of gravel, sand, and silt. The western portion of the alignment is underlain by late to middle Pleistocene age old alluvial fan deposits generally consisting of reddish-brown gravel and sand.

Figure 2-1: Regional Location

Figure 2-2: Project Overview



2.3.7 Existing Site Conditions

At the western end of the proposed alignment, Taft Avenue consists of four lanes of traffic and a center turn-lane (median). There are sidewalks and bicycle lanes defined by pavement striping on both sides of the roadway. The speed limit is 40 mph. There are existing overhead electrical utility lines and streetlights along the entire segment. Land uses are a combination of commercial businesses, churches, private schools, single family residential and multi-family residential. See **Figure 2-3**.

In the central segment of the proposed alignment, along Tustin Street between Taft Avenue (south-west) and Taft Avenue (north-east), Tustin Street consists of five lanes of traffic and a center turn-lane (median). There are sidewalks on both sides of the roadway. There are no bicycle lanes defined. The speed limit is 40 mph. There are existing overhead electrical utility lines and streetlights along the entire segment. Land uses include commercial businesses and an SCE substation.

Along Taft Avenue to the northeast, the alignment crosses under State Route 55; there are no on-off ramps. The roadway consists of four lanes of traffic and a center turn-lane (median). There are sidewalks and bicycle lanes defined by pavement striping on both sides of the roadway. The speed limit is 35 mph. There are existing overhead electrical utility lines and streetlights along the entire segment. Land uses are commercial. See **Figure 2-4**.

At the northern end of the proposed alignment, Breckenridge Street and Sacramento Street consist of 2 lanes of traffic with no division. The speed limit is 25 mph. There are existing overhead electrical utility lines and streetlights along the entire segment. Land uses are single-family residential.

Meats Avenue consists of four lanes of traffic and a center turn-lane (median). There are sidewalks and bicycle lanes defined by pavement striping on both sides of the roadway. The speed limit is 35 mph. There are existing overhead electrical utility lines and streetlights along the entire segment. Land uses are single-family residential. See **Figure 2-5.**

Figure 2-3: Western portion of proposed alignment – representative photos

Western limits of Taft Avenue (west) looking northwest at Glassell Street

Taft Avenue (west) looking northeast towards Tustin Street

Figure 2-4: Central portion of proposed alignment – representative photos

Tustin Street (south crossing) and Taft Avenue (west) intersection looking southeast

Tustin Street (north crossing) and Taft Avenue (east) intersection looking southeast

Figure 2-5: Northern portion of proposed alignment – representative photos

2.4 Proposed Project Description

The project would construct 10,780 linear feet of 18-inch and 21-inch sewer transmission pipelines to meet existing and anticipated growth and improve operational efficiency. Approximately 8,000 linear feet of existing 12-inch and 15-inch sewer transmission pipelines would be abandoned as part of this project. While the project would increase the capacity of a portion of the Taft Branch regional sewer pipeline, the capacity of OC San's wastewater collection and treatment plants will remain the same. In addition, the project would construct 420 linear feet of sewer laterals to connect City of Orange to the system ranging in size from 8 to 18 inches in diameter. Details are provided in the following sections.

Most of the alignment would be located in an industrial/ commercial neighborhood west of State Route 55 along Taft Avenue and Tustin Street. The alignment would be partially located in a residential neighborhood east of State Route 55 and bounded by Taft Avenue to the south. The alignment continues east where Sacramento Street becomes E. Brentford Avenue then north and continues along N. Breckenridge Street to Meats Avenue.

2.4.1 Project Details by Segment

Segments No.1, 2, 3: Taft Avenue west of Tustin Street to Glassell Street. The project would replace existing OC San sewer pipeline with approximately 5,100 linear feet of 21-inch sewer pipeline. Trenchless and open-cut construction methods are still being evaluated as part of the Preliminary Design Report. This portion of the project on Taft Avenue would be constructed in three segments for traffic control purposes: from Glassell Street to Shaffer Street; to Cambridge Street; and to Tustin Street. A total of 15 new sewer maintenance holes would be constructed. Additional City of Orange 8-inch laterals would be constructed within City of Orange right-of-way to connect to existing City laterals that would lose connection to the regional sewer line as a result of the project. This would involve construction of approximately 220 linear feet of 6-inch and 8-inch sewer laterals and 4 City maintenance holes associated with the laterals.

To control sewage flows during construction, OC San would maintain operation of the existing 15-inch sewer pipeline until the new pipeline is constructed. Temporary bypass pumps or flow-through plugs would be used to allow City of Orange sewer lateral pipes to continue to operate within the work zone. Bypass pump set-up #1 would be required on Taft Avenue near Glassell Street to allow the final connection from the new sewer pipeline to the existing sewer pipeline. Bypass pump set-up #2 would be required along Shaffer Street at Glendale Drive to divert sewage flow away from Taft Avenue during construction. Bypass pump set-up #3 would be required behind the sidewalk on Tustin Street and Taft Avenue to control flows west on Taft Avenue. Three smaller bypass set-ups will be required to pick-up single services along Taft Avenue. Ultimately, the bypass location would be chosen by the contractor.

A total of 5,200 linear feet of existing OC San 15-inch sewer pipeline would be abandoned in these segments along with 20 existing maintenance holes and approximately 300 linear feet of 6-inch and 8-inch sewer laterals.

Segment No. 4: Tustin Street between Taft Avenue west and Taft Avenue east. The project would construct a new sewer to replace existing OC San 18-inch sewer pipeline with approximately 500 linear feet of 21-inch sewer pipeline. Open-cut construction methods for this segment of the alignment are anticipated and potential impacts are analyzed in this IS/MND. Three new sewer maintenance holes would be constructed and one maintenance hole would be demolished. In addition, the project would construct approximately

80 linear feet of 18-inch sewer laterals to reconnect City laterals that would lose connection to the regional line as a result of the project and construct 1 new City of Orange maintenance hole associated with the laterals. To control sewage flow during construction, OC San would maintain the operation of the existing 15-inch sewer pipeline during construction.

A total of 580 linear feet of existing OC San 18-inch sewer pipeline would be abandoned in this segment along with 1 existing maintenance hole. Segment No. 5: Taft Avenue east of Tustin Street to Sacramento Street. The project would construct approximately 1,400 linear feet of new 21-inch sewer pipeline parallel to the existing City of Orange 12-inch sewer. Trenchless and open-cut construction methods are still being evaluated as part of the Preliminary Design Report. Five maintenance holes would be constructed and connected to the 21-inch sewer pipeline via City laterals constructed in the right-of-way. To control sewage flow during construction, OC San would maintain the operation of the existing 12-inch sewer pipeline during construction.

A total of 790 linear feet of existing City of Orange 12-inch sewer pipeline would be abandoned in this segment along with 1 existing maintenance hole. Segment No. 6: Sacramento Street, E. Brentford Avenue and N. Breckenridge Street. The project would construct approximately 2,300 linear feet of 18-inch sewer parallel to the existing City of Orange 8-inch sewer pipeline along Sacramento Street, E. Brentford Avenue and N. Breckenridge Street. Five new maintenance holes would be constructed with 60-inch barrels to conform to OC San standards. To control sewage flow during construction, OC San would maintain the operation of the existing 8-inch sewer pipeline during construction.

Segment No. 7: Meats Avenue. From Breckenridge Street to Santiago Boulevard, the project would replace existing OC San 12-inch sewer pipeline with approximately 1,400 linear feet of a new parallel 18-inch sewer pipeline. Open-cut construction methods for this segment of the alignment are anticipated and potential impacts are analyzed in this IS/MND. Three new sewer maintenance holes would be constructed and two maintenance holes would be upsized from 48-inch to 60-inch barrels to meet OC San requirements. Six maintenance holes are proposed to be removed as part of this project. Flows from N. Pami Circle would be rerouted south towards N. Breckenridge Street, and approximately 120 linear feet of new 8-inch sewer would be constructed between the existing City of Orange maintenance hole to a new maintenance hole. To control sewage flow during construction, OC San would maintain the operation of the existing 12-inch sewer pipeline during construction.

A total of 960 linear feet of existing OC San 12-inch sewer pipeline would be abandoned in this segment along with 7 existing maintenance holes. 1,230 linear feet of existing OC San 12-inch sewer pipeline adjacent to Meats Avenue crossing State Route 55 would also be abandoned along with 3 existing maintenance holes.

Construction of each OC San pipeline segment would proceed in the following sequence with average trench invert depth as shown in **Table 2-1**.

Table 2-1: Construction Sequencing and Average Depth of Cover

Segment	Location	Activity	Length (LF)	Invert Depth (ft)	Construction Hours *
1	Taft Ave. / Glassel St.	Replace (E) 15-inch SS with 21-inch SS	1,150	17	Day-time, Monday – Friday, 8:30 am-4:30 pm
2	Taft Ave. / Cambridge St.	Replace (E) 15-inch SS with 21-inch SS	1,450	16	Day-time, Monday – Friday, 8:30 am-4:30 pm
3	Taft Ave. / Tustin St.	Construct (N) 21-inch SS	2,500	13	Day-time, Monday – Friday, 8:30 am-4:30 pm
4	Tustin St.	Replace (E) 18-inch SS with 21-inch SS	500	12	Night-time, Monday – Friday, 9:00 pm-5:00 am
5	Taft Ave. (east)	Replace (E) 12-inch SS with 21-inch SS	1,400	23	Day-time, Monday – Friday, 8:30 am-4:30 pm
6	Sacramento St.	Construct (N) 18-inch SS	2,300	17	Day-time, Monday – Friday, 8:30 am-4:30 pm
7	Meats Ave.	Replace (E) 12-inch SS with 18-inch SS	1,400	13	Day-time, Monday – Friday, 8:30 am-4:30 pm

* City of Orange preliminary permitting for this project has indicated work hours shall be 8:30 am to 4:30 pm which varies from OC San General Requirements.

2.4.2 Maintenance Hole Construction

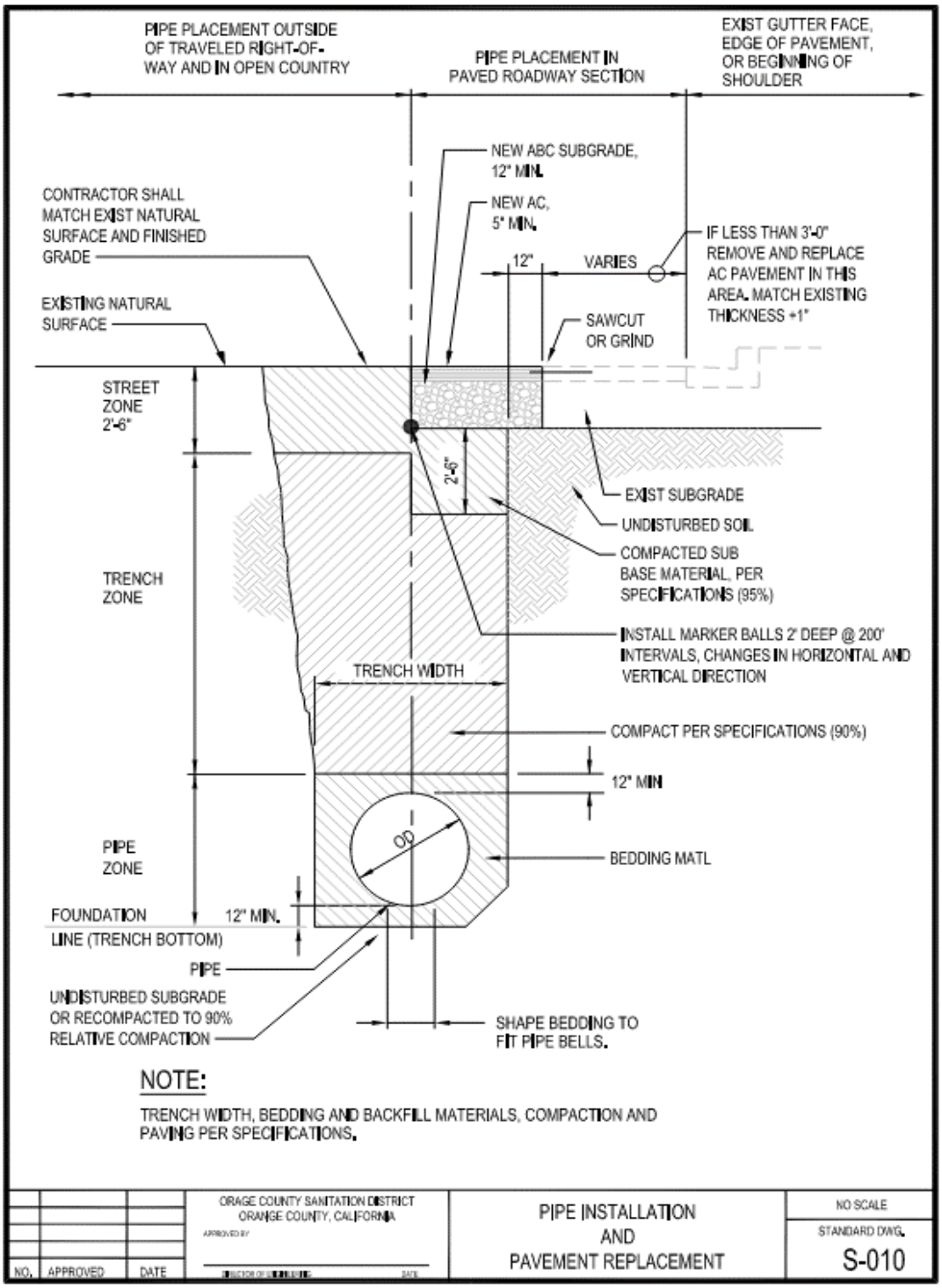
Along the project alignment, a total of 39 maintenance holes would be constructed as follows:

- 31 existing 48-inch barrel OC San maintenance holes would be removed.
- 34 new 60-inch OC San maintenance holes would be constructed.
- 1 existing City of Orange Maintenance hole would be removed.
- 5 new 48-inch barrel City of Orange maintenance holes would be constructed

2.4.3 Pipeline Construction

The proposed 10,780 linear foot sewer pipeline and 420 feet of laterals would be placed within the City of Orange right-of-way using a combination of open-trench and trenchless construction methods. The trench width would be 4-6 feet, while the depth would range from 8- to 25 -feet. The pipeline alignment would be designed to avoid conflict with existing utilities. The trenching cross section would resemble a "T" (see **Figure 2-6**) with the pipeline trench at the center being up to 72-inches wide and 8-25 feet deep, and the City's required paving restoration area being 12 inches wide and 8 inches deep on either side of the trench. The construction contractor would grind and overlay a lane width, or more, depending on the exact location where the alignment sits within the street. The width of resurfacing would be up to the nearest lane line or gutter in accordance with the City of Orange Trench Backfill and Roadway Repair Standard Plans.

Figure 2-6: Proposed Alignment Representative Cross-Section



Source: Orange County Sanitation District Standard Drawing S-010, Design and Construction Requirements Sanitary Sewers (Chapter 12), revised February 2014.

Construction of the pipelines would require the estimated construction equipment shown in **Table 2-2**.

Table 2-2: Construction Vehicle Fleet for Pipelines

Equipment	Number Required for Pipelines
Backhoe/Loader	1
Hydraulic Excavator	1
Crane	1
Drill Rig (if trenchless techniques used)	1
Utility Truck	1
Water Truck	1
Welder	1
Compressor	1
Pump	1
Pick-up Trucks	2
Dump Truck	2
Concrete Saw	1
Pavement Breaker	1
Sweeper	1
Paver	1
Generator	1

The total estimated volume of material to be excavated and removed from construction of the pipeline is approximately 34,600 cubic yards (4 to 6 ft pipeline trench width, 8 to 25 feet trench depth, 11,200 feet trench length, including laterals). This assumes 21-inch pipeline with 8-inches of clearance to either side of the pipe. Excavated material may be reused onsite as trench backfill; however, for the purposes of this analysis, it is conservatively assumed that all excavated trench material would be hauled off site and new fill material would be imported. After construction is complete, all pipeline construction areas would be restored to pre-construction conditions (i.e., no permanent disturbance footprint). The width of resurfacing would be up to the nearest lane line or gutter in accordance with the City of Orange Trench Backfill and Roadway Repair Standard Plans.

A total of 8,000 linear feet of existing OC San sewer transmission pipelines would be abandoned along with 820 linear feet of City of Orange service lines. Thirty-one OC San and one City of Orange sewer maintenance holes would also be abandoned. Abandoning existing sewer pipelines in place involves filling the pipeline with controlled low strength material cement and a concrete plug; filling of sewer lines is completed by injecting from maintenance hole to maintenance hole with no excavation. Abandoning existing maintenance holes involves removing the maintenance hole frame and cover to 5-feet below grade and filling the remaining maintenance hole with crushed aggregate base.

2.4.4 Temporary Bypass and Plug Systems

To control sewage flows during construction, OC San would establish temporary bypass pumping or flow-through plug systems. Temporary aboveground sewage bypass lines would be installed between key upstream to downstream maintenance holes; placing diesel powered self-priming pumps near the upstream

maintenance hole location. Where possible, based on the segment location, the aboveground bypass line follows the sewer line and is laid in street gutters on the road shoulder within the street right-of-way or it will be placed within the contractor's work-zone. However, certain segments of bypass line may need to diverge from the sewer line and work-zone. Where necessary, the temporary bypass line is protected from vehicular traffic and other potential damage by placing it between two concrete traffic barriers (K-rails) or between one K-rail and an adjacent street gutter. Although aboveground alignments are preferred for the temporary bypass pipelines, certain segments must be buried in shallow trenches within the existing roadways to avoid traffic conflicts. These trenches are typically 18 inches deep, not to exceed the depth of the existing road base, and they would be backfilled or covered with metal plates to allow continued vehicle access of the affected area. Trench soil material would be stored and covered onsite; no soil hauling trips for export of trench soil or import of new material would be required. Once the bypass is functional, the main sewer line would be rehabilitated or replaced. Once construction of the sewer pipeline is complete, the temporary bypass infrastructure would be removed, the trench soil – if any - would be backfilled, and the roadway or sidewalk would be restored to original conditions. Details for the project's bypass system would be developed during the final design and encroachment permits obtained with City of Orange and City of Villa Park as required.

2.4.5 Construction Schedule

Project construction is anticipated to begin in approximately January 2024 and continue until December 2025. Construction would include the following four phases:

- Mobilization/utility potholing – January 2024 to April 2024
- Trenching/Pipeline/Maintenance hole installation – May 2024 to June 2025. The pipelines would be constructed at an average rate of 50 linear feet per day, depending on the conditions, extent of existing utilities and traffic control, and permitted work hours. Maintenance holes would be constructed by a second crew following behind the pipeline installation. Therefore, the total duration of construction for the pipeline is estimated to last approximately 12 months.
- Final paving/restoration – July 2025 to October 2025
- Demobilization – November/December 2025

2.4.6 Equipment Staging Areas

Two construction staging area options are included in this environmental analysis; however, the size, location, and number of staging areas would be finalized as part of pre-construction. For the purposes of this analysis, it was assumed each construction staging area would be up to 200 by 200 feet in size and located in vacant land owned by SCE with access to the proposed alignment. The two optional locations for the staging areas are shown in **Figure 2-2**. Access would be from Taft Avenue. The staging area sites are approximately 0.5-acre and 2.0-acres in size.

If the identified staging area options cannot accommodate all equipment storage/staging for the proposed project, the construction contractor may use the Taft Avenue right-of-way for the purposes of equipment storage, staging, and/or pipe stringing. Other existing OC San or City property would be utilized as necessary for staging and intermediate storage for the installation of the sewer pipelines, or the contractor would be responsible for securing suitable temporary equipment storage/staging site(s) prior to

construction and implementing applicable environmental commitments (see *Section 2.6*) at the staging area(s).

2.5 Operations

The pipeline and maintenance holes would not be associated with long-term energy usage or additional OC San operations and maintenance (O&M) activities. Project O&M activities would include inspection and repair, as necessary, of pipeline and maintenance holes.

2.6 Environmental Commitments

The OC San General Requirements contain references to various standards, standard specifications, codes, practices, and requirements that are incorporated into the design and construction of all OC San projects. The following measures are construction best management practices (BMPs), consistent with the OC San General Requirements, that would be implemented as part of the proposed project:

- The design and construction of the facilities will be based on the geotechnical investigation report to minimize geological risk.
- If groundwater is encountered during construction, dewatering discharges will be disposed of in accordance with applicable state and local requirements.
- All construction work will require the contractor to implement fire hazard reduction measures, such as having fire extinguishers located onsite.
- Open trenches will be covered with recessed trench plates during non-construction periods in accordance with encroachment permits.
- Construction will comply with SCAQMD Rule 403 Fugitive Dust Control requirements.
- Sewage control will include a combination of bypass pumping (redundant pumps), spill containment for bypass pumps, temporary plugs, and nighttime construction. Sewer systems experience smaller flows at night compared to during the day, which allows the contractor a better opportunity to control flows.
- Specifications will require the contractor to prepare a Stormwater Pollution Prevention Plan (SWPPP). In accordance with the SWPPP, the contractor would implement BMPs during construction to control water quality of stormwater discharges offsite, such as site management "housekeeping," erosion control, sediment control, tracking control and wind erosion control.
- The contractor will be required to minimize traffic interruptions, and to provide unobstructed access to fire hydrants, fire stations, police stations, hospitals, and any other emergency services.
- The contractor will prepare a traffic control plan, which will be provided to local police and fire departments and public transit facilities.

2.7 Required Permits and Approvals

Anticipated permits are identified in **Table 2-3**. OC San is negotiating an agreement with City of Orange for transfer of existing pipeline maintenance for sewers along Tustin Street and Taft Avenue (east). A California State Water Resources Control Board Division of Drinking Water Waiver is not anticipated because the proposed project's pipelines would be compliant with California's Waterworks Standards (Section 64572, Title 22, CCR) parallel and perpendicular separation criteria; however, the need to apply for a waiver would be determined later in the design stage.

Table 2-3: Permits and Approvals

Agency	Permit/Approval
City of Orange	Encroachment Permit
City of Orange	Review and approval of engineering plans and specifications, traffic control plans and/or contractor shop drawings
City of Villa Park	Encroachment Permit
State Water Resources Control Board	NPDES Construction General Permit for Storm Water Discharges (SWPPP)
State Water Resources Control Board	Division of Drinking Water Title 22 for pipeline separation
California Occupational Safety and Health Administration	Trenching/Shoring Permit
Union Pacific Railroad/ Metrolink	Acceptance of Traffic Control Plan
Metropolitan Water District of Southern California	Orange County Feeder Pipeline crossing approval
Caltrans	Encroachment Permit

3. ENVIRONMENTAL CHECKLIST FORM

1.	**Project title:**	Taft Sewer Improvement Project
2.	**Lead agency name and address:**	Orange County Sanitation District 10844 Ellis Avenue Fountain Valley, CA 92708
3.	**Contact person and phone number:**	Kevin Hadden Principal Staff Analyst CEQA@OCSAN.GOV (714) 593-7462
4.	**Project location:**	City of Orange, Orange, California
5.	**Project sponsor's name and address:**	Same as Lead Agency
6.	**General plan designations:**	City of Orange right-of-way, Residential, Commercial
7.	**Zoning:**	City of Orange roadway right-of-way, Light Manufacturing, Single Family Residential (8000 square feet)

8. **Description of project:** The Taft Sewer Improvement Project ("project", "proposed project") involves construction and operation of approximately 11,000 linear feet of vitrified clay (VC) sewer pipelines, ranging in size from 8 to 21 inches in diameter, and 39 new maintenance holes. The project would connect to existing City of Orange sewer at the intersection of Meats Avenue and Santiago Boulevard and to the existing OC San sewer at the intersection of Taft Avenue and Glassell Street. The project would abandon approximately 8,000 feet of existing sewer pipeline and would remove 32 existing maintenance holes.

9. **Surrounding land uses and setting:** The project would be constructed entirely within the existing City of Orange right-of-way. The project area is fully built-out. Surrounding land uses include commercial, residential, industrial, and public facilities.

10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)**
    - City of Orange: Encroachment Permit
    - City of Orange: Review and approval of engineering plans and specifications, traffic control plans and/or contractor shop drawings
    - State Water Resources Control Board: NPDES Construction General Permit for Storm Water Discharges (SWPPP)
    - State Water Resources Control Board: Division of Drinking Water Title 22 for pipeline separation

- California Occupational Safety and Health Administration: Trenching/Shoring Permit
- Union Pacific Railroad/ Metrolink: Traffic control plan acceptance
- Metropolitan Water District of Southern California: Orange County Feeder Pipeline crossing approval
- City of Villa Park: Encroachment Permit
- Caltrans: Encroachment Permit

11. Have California Native American tribes traditionally and culturally affiliated with the Project area requested consultation pursuant to Public Resources Code section 2180.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

OC San has consulted with Native American tribal representatives through written correspondence, based on a contact list of tribes who indicated to OC San that they are interested in receiving notification. Additionally, OC San staff has undertaken consultation with representatives from the Gabrieleño Band of Mission Indians – Kizh Nation and Juaneño Band of Mission Indians, Acjachemen Nation- Belardes to discuss the project and potential effects to tribal cultural resources.

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

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

DETERMINATION: (To be completed by Lead Agency)

On the basis of this initial evaluation:

[ ] I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[X] I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

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

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

_____	_____
Signature	Date
_____	_____
Printed Name	Title

3.1 Aesthetics

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Except as provided in Public Resources Code Section 21099, would the Project:				
a) Have a substantial adverse effect on a scenic vista?	[ ]	[ ]	[X]	[ ]
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	[ ]	[ ]	[ ]	[X]
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?	[ ]	[ ]	[X]	[ ]
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	[ ]	[X]	[ ]	[ ]

Discussion

The proposed project is located in the OC San service area in the City of Orange. Portions of the City of Orange are characterized by scenic vistas that include undeveloped hillsides, ridgelines, or open space areas that provide a unifying visual backdrop to the urban environment. The eastern boundary of the City of Orange is formed by the Santa Ana Mountains and its scenic resources which include Irvine Lake, grassy valleys, rugged hillsides, rock outcroppings, and winding canyons. In its General Plan, the City of Orange recognizes the contribution of viewsheds to the City's quality of life and identifies the preservation of visual and aesthetic resources as a primary goal (City of Orange 2015a).

As shown in the photographs of the existing conditions of the site (*Section 2.3.7 Existing Site Conditions*), the new sewer transmission pipeline would be constructed within City of Orange streets that support intermittent views of the Santa Ana Mountains for motorists and pedestrians. However, the foothills of the

Santa Ana Mountains are over three miles away from the project area and views from the street are largely obstructed by existing buildings, powerlines, and trees (**Figure 2-3**, **Figure 2-4**, **Figure 2-5**).

The City of Orange and Orange County municipal codes each provide guidelines for proposed permanent lighting with the purpose of reducing unnecessary light pollution while promoting safety and aesthetics. City of Orange Municipal Code section 17.12.030 states that lighting on any premises shall be directed, controlled, screened or shaded in such a manner so as not to shine directly on surrounding premises. Furthermore, lighting on any residential property shall be controlled so as to prevent glare or direct illumination of any public sidewalk or thoroughfares (City of Orange, no date ("nd")). Orange County Municipal Code section 7-9-67 Lighting and Illumination states that all lighting shall be designed and located so as to confine direct rays to the premises (Orange County nd). These codes do not apply to temporary construction-related lighting and glare.

Caltrans manages the State Scenic Highway Program, which was created by the State Legislature in 1963 with the purpose of protecting the natural scenic beauty of California highways. Caltrans assigns responsibility for the regulation of land use and development along State Scenic Highways to the appropriate State and local governmental agencies. Highways receive a designation based on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The nearest State-designated scenic highway is State Route 91 (SR-91), approximately 1.5 miles northeast of the project area (Caltrans 2018). There are no state-designated or eligible scenic highways within the City of Orange.

a) Have a substantial adverse effect on a scenic vista?

The proposed project does not include any aboveground components and would not be visible upon completion with the exception of the maintenance holes within roadways. Therefore, the primary scenic impairments associated with the project would be temporary and would occur during the construction phase. During construction, intermittent scenic views of the Santa Ana mountains (primarily from local roadways of the proposed alignment, sidewalks, bicycle lanes, and adjacent land uses) would be temporarily obstructed by construction workers, equipment (such as the backhoe, excavator, crane, or drill rig listed in **Table 2-2**), and vehicles. Although construction activities would result in visual changes, these potential visual impacts would be short-term and would not occur in the same location over the 24-month construction period. Temporary impacts on scenic vistas would cease upon completion of construction near each vantage point, as construction activities move along the pipeline alignment. Once the project is completed, the area of temporary disturbance would be restored to its original condition and would not obstruct any long-term views. Thus, the project would have no long-term impact on scenic vistas. Impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

The proposed alignment is not located within the viewshed of a State scenic highway. Therefore, there would be no impact on scenic resources associated with a State scenic highway.

Mitigation Measures

None required.

Significance Determination

No impact.

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

The proposed alignment of the project is located within developed and paved public roads and right-of-ways. While implementation of the project would not result in any permanent aboveground components, construction activities such as disturbed roadways, excavation, trenching, placement of materials and staging of equipment may result in short-term impacts regarding the visual character or quality of the project area. Public views in the project area and vicinity include those from roadways, sidewalks and bicycle lanes. Public views of the project construction from roadways would be fleeting – on the order of seconds or minutes – while public views of the construction from sidewalks and bicycle lanes would be longer. This short-term effect on visual continuity is considered less than significant because after construction is complete, all pipeline construction areas would be restored to pre-construction conditions (i.e., no permanent disturbance footprint). The sewer pipeline would not permanently impact the existing visual character or quality of the project site and its surroundings. Project impacts on visual character and public views would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Project construction would occur within daytime (8:30 am-4:30 pm) and nighttime (9:00 pm-5:00 am) hours, depending on project segment, and would include vehicles, equipment, and safety lighting that could temporarily create a minor new source of light and glare (*Section 2.4.5 Construction Schedule)*. As sunlight reflects off metallic and glass construction equipment, momentary instances of glare could affect nearby receptors; however, any reflected glare would not be concentrated and would cease as pedestrians, motorists, and construction equipment move along the project alignment. In addition, the project alignment and staging areas are located within an urbanized area with existing sources of light and glare, including

vehicle and building windows, structures with polished metal exteriors, streetlights within roadways, parking lots and walkways and light emitted from residential and non-residential buildings. The presence of construction vehicles and equipment during project construction would not generate substantial new sources of glare.

While construction activities would have a minimal impact from increased glare, construction lighting impacts could result in temporarily significant impacts due to the potential for light to spill over and disturb sensitive receptors, such as residences along Taft Avenue, Sacramento Street, Breckenridge Street and Meats Avenue. Although existing municipal codes include measures to reduce unnecessary glare and light pollution, these codes do not apply to temporary construction-related lighting and glare. **Mitigation Measure AES-1** would be implemented to reduce the potential impact of construction lighting during nighttime construction.

Construction would be temporary, and equipment would be removed once site restoration is complete. No permanent lights or sources of glare would be installed as part of the project and there would be no long-term impact to daytime and nighttime views in the area. With implementation of **Mitigation Measure AES-1**, impacts would be less than significant.

Mitigation Measures

The following mitigation measure shall be incorporated into the project to reduce potential impacts from light spillage and disturbance to sensitive receptors in the project area during nighttime construction. The following mitigation measure was identified in the FMP PEIR as Mitigation Measure AES-2. The proposed project's aesthetics impacts would be less than significant with mitigation incorporated.

Mitigation Measure AES-1: Construction Lighting.

Should nighttime construction be required, a construction safety lighting plan shall be submitted to the OC San Director of Engineering for review and approval prior to any nighttime construction activities. The Construction Safety Lighting Plan shall require that all construction-related lighting fixtures (including portable fixtures) shall be oriented downward and away from adjacent sensitive areas (including residential and biologically sensitive areas) and that all lighting shall consist of the minimal wattage necessary to provide safety at the construction site.

Significance Determination

Less than significant with mitigation incorporated.

3.2 Agriculture and Forestry Resources

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	[ ]	[ ]	[ ]	[X]
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	[ ]	[ ]	[ ]	[X]
c) Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	[ ]	[ ]	[ ]	[X]
d) Result in the loss of forest land or conversion of forest land to non-forest use?	[ ]	[ ]	[ ]	[X]
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	[ ]	[ ]	[ ]	[X]

Discussion

The proposed project would be located solely within the existing City of Orange right-of-way. The City of Orange does not have any zoning classifications for forestland, timberland, or timberland production and there is no land under a Williamson Act contract (City of Orange 2013). As shown in **Figure 3-1** there are no prime, unique, or farmland of statewide importance within the proposed alignment or staging areas as

classified by the California Department of Conservation (CDOC) Farmland Mapping and Monitoring Program (CDOC 2018).

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

The proposed alignment would be located within urban and built-up land as classified by the California Department of Conservation (**Figure 3-1**). Although construction activities at the intersection of Meats Avenue and Santiago Boulevard would be nearly adjacent to land classified as Unique Farmland, the pipeline would be entirely within the existing roadway right-of-way and would avoid this land. No project construction staging areas are proposed within the farmland area. The proposed project would not convert farmland to non-agricultural use; therefore, there would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

The proposed project would not be located on land zoned for agricultural use (City of Orange 2020) or protected by a Williamson Act Contract (City of Orange 2013). Therefore, no impact would occur as a result of the proposed project.

Mitigation Measures

None required.

Significance Determination

No impact.

c) Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

There is no land zoned or designated for forest land or timberland within the City of Orange (City of Orange 2013). Therefore, the proposed project would have no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

There is no designated forest land or timberland within the City of Orange (City of Orange 2013). There are no forestry or timberland resources in the project area. Therefore, the proposed project would have no impact related to the loss of forest land or timberland.

Mitigation Measures

None required.

Significance Determination

No impact.

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

The project area is entirely within existing City of Orange right-of-way, and adjacent land uses consist of urban development such as residences and commercial buildings (City of Orange 2020). After construction is complete, all pipeline construction areas would be restored to pre-construction conditions (i.e. no permanent disturbance footprint). Additionally, the proposed project would primarily serve existing and planned populations, and would not induce growth (refer to *Section 3.14 Population and Housing*). The proposed project would not result in land use changes and would, therefore, not convert important farmland to a non-agricultural use, conflict with zoning regulations, or result in other changes that would indirectly result in conversion of nearby farmland to non-agricultural use. There are no Williamson Act lands within the project area. Therefore, the proposed project would not have potential to convert or result in the conversion of important farmland or Williamson Act lands to non-agricultural uses. There would be no impacts.

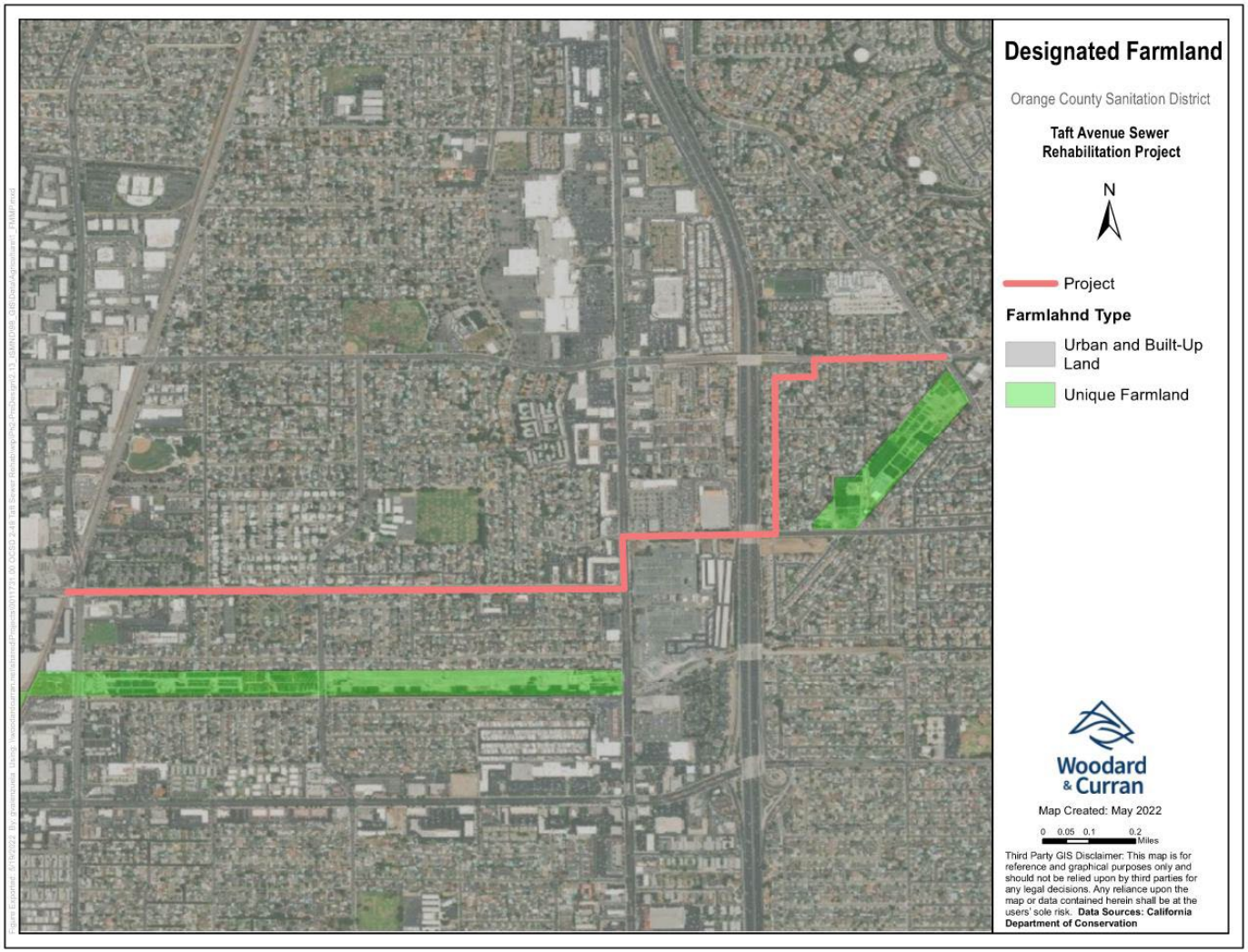
Mitigation Measures

None required.

Significance Determination

No impact.

Figure 3-1: Farmland



3.3 Air Quality

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	[ ]	[ ]	[X]	[ ]
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non- attainment under an applicable federal or state ambient air quality standard?	[ ]	[X]	[ ]	[ ]
c) Expose sensitive receptors to substantial pollutant concentrations?	[ ]	[X]	[ ]	[ ]
d) Result in other emissions (such as those leading to odors or adversely affecting a substantial number of people?	[ ]	[ ]	[X]	[ ]

Discussion

The OC San service area spans 20 cities within Orange County. The OC San service area, including the project area, is located within the SCAB, which is regulated by the SCAQMD. The SCAQMD monitors air pollutant levels to ensure the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) are met and, if they are not met, to develop strategies to meet the standards. Air pollution in the project area is monitored at stations in Anaheim, La Habra, and Mission Viejo, located approximately five, 10, and 15 miles from the project area, respectively.

The NAAQS, which are required to be set by the United States Environmental Protection Agency (US EPA) under the Clean Air Act, provide public health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly (US EPA 2021). Similarly, the CAAQS are established to protect the health of the most sensitive groups and are mandated by State law. US EPA has set NAAQS for six pollutants, which are called "criteria pollutants:" carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), Particulate Matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). In addition to these, California has added three criteria pollutants: hydrogen sulfide (H_2S), visibility reducing particles, and vinyl chloride. In total, California regulates about 200 different chemicals, referred to as toxic air contaminants (TACs) (CARB 2022).

Depending on whether or not the NAAQS or CAAQS are met or exceeded, the SCAB is classified as being in "attainment" or "nonattainment." The 2016 Air Quality Management Plan (AQMP; SCAQMD 2017) assesses the attainment status of the SCAB and is summarized in **Table 3-1**. As shown therein, the SCAB is in nonattainment for the State 1-Hour Ozone, 8-Hour Ozone, PM_{10}-24 hour, PM_{10}-Annual, and $PM_{2.5}$-Annual requirements and the Federal 1-hour Ozone, 8-Hour Ozone, $PM_{2.5}$-24 hour, $PM_{2.5}$-Annual, and lead requirements. Thus, the SCAB is required to implement strategies that would reduce pollutant levels to recognized standards, which is done through the Clean Communities Plan (formerly known as the Air Toxics Control Plan). The Clean Communities Plan is designed to examine the overall direction of the SCAQMD's air toxics control program and includes control strategies aimed to reduce toxic emissions.

Table 3-1: Criteria Pollutant Attainment Status – SCAB

Criteria Pollutant	State CAAQS	Federal (NAAQS)
1-Hour Ozone	Nonattainment	Nonattainment (Extreme)
8-Hour Ozone	Nonattainment	Nonattainment (Extreme)
CO	Attainment	Attainment (Maintenance)
NO_2	Attainment	Attainment (Maintenance)
SO_2	Attainment	Attainment
PM_{10} – 24 hour	Nonattainment	Attainment (Maintenance)
PM_{10} – Annual	Nonattainment	No Criteria Defined
$PM_{2.5}$ – 24 hour	No Criteria Defined	Nonattainment (Serious)
$PM_{2.5}$ - Annual	Nonattainment	Nonattainment (Serious)
Lead	No Criteria Defined	Nonattainment (partial)
Hydrogen Sulfide (H_2S)	Attainment	No Criteria Defined
Sulfates	Attainment	No Criteria Defined
Vinyl Chloride	Attainment	No Criteria Defined

Source: SCAQMD 2018

The SCAQMD provides numerical thresholds to analyze the significance of a project's construction and operational emissions on regional air quality. These thresholds are designed such that a project consistent with the thresholds would not have an individually or cumulatively significant impact on the SCAB's air quality. In addition to Criteria Air Pollutants, thresholds have been set for nitrogen oxides (NO_X) and volatile organic compounds (VOCs), also referred to as reactive organic gases (ROG), which are O_3 precursors. These thresholds are listed in **Table 3-2**.

Table 3-2: SCAQMD Air Quality Significance Thresholds

Pollutant	Mass Thresholds – Construction Thresholds (pounds/day)	Mass Thresholds – Operation Thresholds (pounds/day)
NO_x	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_x	150	150
CO	550	550
Lead	3	3
Toxic Air Contaminants	• Maximum Incremental Cancer Risk $\geq$ 10 in 1 million • Cancer Burden > 0.5 excess cancer cases (in areas $\geq$ 1 in 1 million) • Chronic & Acute Hazard Index $\geq$ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	

Source: SCAQMD 2023

In addition, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to concern regarding exposure of individuals to criteria pollutants in local communities. LSTs have been developed for nitrogen oxides (NO_X), CO, PM_{10} and $PM_{2.5}$. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or State ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area, distance to the sensitive receptor, and project size. As explained in the PEIR, SCAQMD identifies sensitive receptors as residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes. LSTs only apply to emissions within a fixed stationary location; they are not applicable to mobile sources. The use of LSTs is voluntary, to be implemented at the discretion of local agencies (SCAQMD 2008a).

The SCAQMD LSTs are defined for 37 source receptor areas (SRAs). The project is located in source receptor area 17 (SRA-17), Central Orange County (SCAQMD 2008a). LSTs have been developed for emissions within construction areas up to five acres in size. The SCAQMD provides lookup tables for sites that measure up to one, two, or five acres. The proposed project is limited to pipeline and maintenance hole construction; the area under active construction at any given time would not be expected to exceed one acre per day. Pursuant to SCAQMD guidance, LSTs for the one-acre site should be used for sites that are less than one acre in size. LSTs for construction on one-acre sites in SRA-17 are shown in **Table 3-3**. LSTs are provided for a distance of 25 meters (82 feet) from the project, which is the most conservative LST distance (LSTs range from 25 to 500 meters). The proposed alignment along Breckenridge Street and Sacramento Street would be within a two-lane road in a residential neighborhood, therefore the more conservative LSTs for sensitive receptors within a distance of 25 meters are assumed to be applicable to the entire project.

Table 3-3: SCAQMD LSTs for Construction and Operation

Pollutant	Allowable emission from a one-acre site in SRA-17 for a receptor within 25 meters, or 82 feet (pounds/day)
Gradual Conversion of NO_x to NO_2	81
CO	485
PM_{10} – operation	1
PM_{10} – construction	4
$PM_{2.5}$ – operation	1
$PM_{2.5}$ – construction	3

Source: SCAQMD 2009

a) Conflict with or obstruct implementation of the applicable air quality plan?

The SCAQMD's 2022 AQMP assesses the attainment status of the SCAB, which includes Orange County, and provides a strategy for attainment of State and federal air quality standards. The AQMP strategies are developed based on population, housing, and employment growth forecasts anticipated under local city general plans and the SCAG's 2020 Regional Transportation Plan/Sustainable Communities Strategy, referred to as Connect So Cal.

A project would conflict with or obstruct an applicable air quality plan if it would lead to population, housing or employment growth that exceeds the forecasts used in the development of the applicable air quality plan. The proposed project would construct approximately 11,000 linear feet of sewer pipelines and maintenance holes to maintain the condition of the wastewater conveyance system. The proposed project would improve operational benefits and flexibility to accommodate existing and planned demands for wastewater conveyance in OC San's service area that would occur with or without this project. Construction would not require personnel to relocate from outside the area; jobs will be filled by local workers. The proposed project would not lead to unplanned population, housing or employment growth that exceeds the forecasts used in the development of the AQMP. Potential conflicts with the AQMP would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non- attainment under an applicable federal or state ambient air quality standard?

The proposed project would result in emissions of criteria pollutants from short-term construction activities. Construction emissions were estimated using the California Emissions Estimator Model (CalEEMod) 2022.1.1.13, which is used throughout California to quantify criteria pollutants and greenhouse gas emissions (GHGs).

The CalEEMod emissions scenarios were based on project-specific information, found in *Section 2 Project Description*. In instances where project-specific information was not available (e.g., construction equipment horsepower, length of worker trips, soil moisture content), the analysis relied on CalEEMod default values for construction activities. As explained in *Section 2.4 Proposed Project Description*, it is assumed that construction would begin in January 2024 and have a duration of 24 months. The model also assumes compliance with SCAQMD's Rule 403 (Fugitive Dust) which requires construction projects to implement measures to suppress fugitive dust emissions, such as watering of exposed soils, limiting vehicle speeds on unpaved areas, and covering haul trucks.

Construction Emissions

The criteria air pollutant emissions from construction of the proposed project were estimated using CalEEMod version 2022.1.1.13. The tables below present the maximum daily emissions for each of the modeled criteria air pollutants for which the SCAB has not attained national and/or State criteria. **Table 3-4** presents total mass daily emissions without implementation of PEIR **Mitigation Measure AQ-1** and shows that the project's construction emissions would not exceed regional thresholds.

Table 3-4: Proposed Project Maximum Daily Construction Emissions Compared to Regional Thresholds (pounds/day)

Emissions Source	NO_x	ROG	CO	$PM_{2.5}$	PM_{10}
Total onsite and mobile sources	32	4	37	2	3
SCAQMD Regional Thresholds	*100*	*75*	*550*	*55*	*150*
Threshold exceeded?	**No**	**No**	**No**	**No**	**No**

Note: Emissions represent the maximum of winter or summer and are rounded to the nearest whole number.

Table 3-5 shows emissions with implementation of PEIR **Mitigation Measure AQ-1**. PEIR **Mitigation Measure AQ-1** would require that all 50-horsepower or greater diesel-powered equipment be powered with a California Air Resources Board-certified Tier 4 Final engine, except if such engines are not available and the emissions threshold can be met from other equipment. PEIR **Mitigation Measure AQ-1** reduces the cumulative emissions of criteria air pollutants, specifically NO_X emissions, associated with all projects in the FMP, of which the Taft Avenue Sewer Rehabilitation Project is a part. Although the project's individual emissions would not exceed regional thresholds, **Mitigation Measure AQ-1** would be required to reduce the cumulative air pollution impacts of the FMP, as identified in the PEIR. The PEIR required **Mitigation Measure AQ-1** be applied to each project under the FMP. In the case of the current Taft Branch Improvement project, it was assumed all equipment would be equipped with Tier 4 Final engines, except the drill rig engine (for potential microtunneling), which is not readily available. For the drill rig, the construction contractor would comply with **Mitigation Measure AQ-1** by seeking an exemption and demonstrating to OC San that the emissions from the proposed replacement equipment would not exceed SCAQMD mass daily thresholds, the applicable SCAQMD localized significance thresholds, or the

SCAQMD carcinogenic (cancer) risk threshold. With implementation of **Mitigation Measure AQ-1**, the project would not result in an exceedance of national or State ambient air quality standards and impacts would be less than significant.

Table 3-5: Mitigated Proposed Project Maximum Daily Construction Emissions Compared to Regional Thresholds (pounds/day)

Emissions Source	NO_x	ROG	CO	$PM_{2.5}$	PM_{10}
Total onsite and mobile sources	16	2	49	1	2
SCAQMD Regional Thresholds	*100*	*75*	*550*	*55*	*150*
Threshold exceeded?	**No**	**No**	**No**	**No**	**No**

Note: Emissions represent the maximum of winter or summer and are rounded to the nearest whole number. Values are taken from the "mitigated" CalEEMod output tables to represent emissions with Mitigation Measure AQ-1 (Tier 4 Final engines).

Operations

The pipeline and maintenance holes would not be associated with long-term energy usage or additional OC San O&M activities. Inspection and maintenance of the pipeline and maintenance holes would be incorporated into OC San's existing O&M activities and would not be expected to require additional vehicle trips. Thus, no new emissions would be associated with operation of the proposed project.

Mitigation Measures

The following mitigation measure shall be incorporated into the project to reduce mass daily NO_X emissions that would contribute to regional air quality impacts during construction. The following mitigation measure was identified in the FMP PEIR as Mitigation Measure AQ-1. The proposed project's air quality impacts would be less than significant with mitigation incorporated.

Mitigation Measure AQ-1: Tier 4 Final Engines. Prior to the commencement of construction activities for each project, the Orange County Sanitation District (OC San) shall require its construction contractor to demonstrate that all 50-horsepower or greater diesel-powered equipment is powered with California Air Resources Board (CARB)-certified Tier 4 Final engines.

An exemption from this requirement may be granted if (1) the OC San documents equipment with Tier 4 Final engines are not reasonably available, and (2) the required corresponding reductions in criteria air pollutant emissions can be achieved for the project from other combinations of construction equipment. Before an exemption may be granted, the OC San's construction contractor shall: (1) demonstrate that at least two construction fleet owners/operators in Orange County were contacted and that those owners/operators confirmed Tier 4 Final equipment could not be located within Orange County during the desired construction schedule; and (2) the proposed replacement equipment has been evaluated using California Emissions Estimator Model (CalEEMod) or other industry standard emission estimation method and documentation provided to the OC San to confirm that project-generated emissions do not exceed applicable SCAQMD mass daily thresholds, the applicable SCAQMD localized significance thresholds, or the SCAQMD carcinogenic (cancer) risk threshold.

Significance Determination

Less than significant with mitigation incorporated.

c) Expose sensitive receptors to substantial pollutant concentrations?

As explained previously in this section, SCAQMD identifies sensitive receptors as residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive receptors near the proposed project consist of single-family and multi-family residences on either side of the proposed alignment along Taft Avenue, Sacramento Street, Breckenridge Street, and Meats Avenue, as well as a school and day care facility that are located along Taft Avenue (Saint Norbert Catholic School and Children's House Preschool).

LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or State ambient air quality standard at the nearest sensitive receptor. The CAAQS and NAAQS provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. If a project is consistent with the latest adopted clean air plan and does not exceed the SCAQMD significance thresholds, it can be assumed that it will not have a substantial adverse impact on public health. Therefore, projects that conform to the LSTs and SCAQMD regional thresholds are assumed to have a less than significant impact on nearby sensitive receptors.

The proposed project emissions were compared to LSTs for the project area. As noted above, LSTs are only applicable to emissions within a fixed, stationary location, such as construction sites, and vary based on project site size. **Table 3-3** provides LSTs that are applicable to the onsite construction activities, including pipeline trenching, installation of pipeline and maintenance holes, and roadway resurfacing. As explained under the discussion above, SCAQMD provides LST lookup tables for sites that measure up to one, two, or five acres; LSTs for construction sites smaller than one acre should use the one acre threshold. As shown in **Table 3-6,** with adherence to SCAQMD Rule 403 to control fugitive dust, the proposed project would not have a significant air pollution impact on sensitive receptors along the Sacramento Street and North Breckenridge Street alignment. As shown in **Table 3-7**, onsite emissions would not have a significant air pollution impact on sensitive receptors with incorporation of PEIR **Mitigation Measure AQ-1**, requiring Tier 4 final engines.

Table 3-6: Proposed Project Maximum Daily Construction Emissions Compared to Localized Significance Thresholds (pounds/day)

Emissions Source	NO_x	CO	PM_{10}	$PM_{2.5}$
Maximum onsite	30	34	2	1
LST (one-acre, 25 meters LST)	*81*	*485*	*4*	*3*
Threshold exceeded?	**No**	**No**	**No**	**No**

Note: Emissions represent the maximum of winter or summer and are rounded to the nearest whole number.

Table 3-7: Mitigated Proposed Project Maximum Daily Construction Emissions Compared to Localized Significance Thresholds (pounds/day)

Emissions Source	NO_x	CO	PM_{10}	$PM_{2.5}$
Maximum onsite	14	46	<1	<1
LST (one-acre, 25 meters LST)	*81*	*485*	*4*	*3*
Threshold exceeded?	**No**	**No**	**No**	**No**

Note: Emissions represent the maximum of winter or summer and are rounded to the nearest whole number. Values are taken from the "mitigated" CalEEMod output tables.

As discussed in the PEIR, and demonstrated above for the proposed project, no FMP collection system project would exceed the applicable LST during construction, given required compliance with SCAQMD Rule 403 for fugitive dust control. Additionally, as explained in the PEIR, the collection system projects would not be associated with impacts related to CO hotspots or emissions of TACs or hazardous air pollutants. Furthermore, the construction fleet contracted for the proposed project would be required to comply with the CARB In-Use Off-Road Diesel-Fueled Fleets Regulations, which would limit vehicle idling time to five minutes, restrict adding vehicles to construction fleets with older-tier engines, and establish a schedule for retiring older, more polluting engines from the construction fleet (CARB 2011). Although the cumulative levels of NO_X during construction would exceed the thresholds, which would elevate the health risks associated with exposure to NO_2 and NO_X, with implementation of **Mitigation Measure AQ-1**, construction emissions would be less than the SCAQMD mass daily thresholds and impacts would be less than significant. Additionally, the proposed project would not result in a net increase in operational emissions. The proposed project's construction and operational emissions would not exceed SCAQMD regional thresholds or LSTs. Therefore, sensitive receptors would not be subjected to substantial pollutant concentrations and impacts would be less than significant with implementation of **Mitigation Measure AQ-1**.

Mitigation Measures

To reduce criteria air pollutants during construction, namely mass daily NO_X emissions and associated health risk impacts, OC San shall implement **Mitigation Measure-AQ-1**.

Significance Determination

Less than significant with mitigation incorporated.

d) Result in other emissions (such as those leading to odors or adversely affecting a substantial number of people)?

Examples of facilities commonly known to generate objectionable odors include wastewater treatment plants, sanitary landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging facilities (CARB 2005). The proposed project would involve emissions of sulfur compounds from use of oil and diesel fuel during construction, which would potentially result in unpleasant odors. Construction would be temporary and odorous emissions from construction equipment tend to dissipate quickly within short distances from construction sites.

Once the proposed project is operational, the underground sewer pipelines would not be associated with odors. Impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

3.4 Biological Resources

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	[ ]	[X]	[ ]	[ ]
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	[ ]	[ ]	[ ]	[X]
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	[ ]	[ ]	[ ]	[X]

d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	[ ]	[ ]	[ ]	[X]
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	[ ]	[X]	[ ]	[ ]
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	[ ]	[ ]	[ ]	[X]

Discussion

The biological resources study area in the PEIR covered the majority of the proposed project area; however, two segments are located outside this study area: the segment of Taft Avenue east of Tustin Street, and Sacramento Street segment. Likewise, the proposed staging areas were not covered in the PEIR. As such, a Biological Review was prepared in June 2022 which focused on the current project area and two proposed staging areas. Literature and online database searches were completed to identify if any previously identified special-status flora, fauna, or habitats have the potential for occurrence in the project vicinity. Google Earth aerial photos were studied to understand the local and regional context of the immediate project vicinity that could potentially be impacted by proposed construction. The complete Biological Review is provided in **Appendix B** and is relied upon for the analysis in this IS/MND.

Regulated or sensitive resources evaluated included special status plant and wildlife species, migratory/nesting birds, wildlife movement corridors and habitat linkages, rare plant communities, and jurisdictional waters and wetlands. Potential impacts on biological resources were analyzed based on the following statutes:

- Federal Endangered Species Act
- Migratory Bird Treaty Act (MBTA)
- Clean Water Act
- Wetlands and Other Waters of the United States
- California Endangered Species Act
- California Fully Protected Species
- California Native Plant Protection Act
- California Environmental Quality Act (CEQA)
- California Fish and Game Code Section 1602

- California Wetland Definition
- Section 401 Clean Water Act
- Porter-Cologne Water Quality Control Act
- Orange County Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP)
- County of Orange General Plan
- City of Orange General Plan
- City of Orange Municipal Code

The Biological Review literature search was completed to ensure that current and accurate data were integrated into the determination of the proposed project's environmental and regulatory setting. Pertinent sources reviewed included, but were not limited to, the following:

- California Department of Fish and Wildlife Special Vascular Plants, Bryophytes, and Lichens List
- California Department of Fish and Wildlife Special Animals List
- California Natural Diversity Database
- California Native Plant Society Inventory of Rare and Endangered Plants
- U.S. Fish and Wildlife Service (USFWS) Critical Habitat Mapper and File Data
- eBird online database of bird distribution and abundance
- Google Earth aerial imagery

A formal jurisdictional delineation of waters and wetlands was not performed for the project because the project area would not be located within potentially jurisdictional features.

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

The proposed project would be constructed within existing City of Orange roadways. Potential staging areas would be located on vacant land and, if necessary, within roadway right-of-ways. All project components are located in fully developed and/or landscaped and maintained areas and both of the staging areas are manicured lawn and/or mowed-disturbed-ruderal land. As a result, sensitive species are not expected to occur within the project area due to the lack of suitable habitat as well as historical and existing disturbances. The literature search did not discover any current, special-status resources and none are expected to occur given the developed/disturbed conditions and lack of native plant communities.

The potential for nesting bird habitat is low, due to developed/disturbed conditions. Street trees are present but offer low quality nesting opportunities due to their sparse growth from frequent maintenance pruning and moderate to high traffic with associated noise and dust along adjacent streets. However, the Migratory Bird Treaty Act protects nearly all bird species native to the United States, including eggs and nests, making it illegal to directly kill, or destroy a nest of, nearly any native bird species. To reduce the potential for significant impacts to nesting birds, **Mitigation Measure BIO-1** will be implemented, which requires avoidance of nests during the nesting bird season (typically February 1 through August 31) or conducting

a preconstruction nesting bird survey if avoidance is not possible. Implementation of **Mitigation Measure BIO-1** would reduce potential impacts to nesting birds to a less than significant.

Construction of the proposed project would occur entirely within the roadway right-of-ways, and the high levels of existing disturbance within the potential staging areas would likely deter wildlife and nesting birds' long-term use. However, while indirect impacts to plants and wildlife would be minimal, construction activities planned during the bird nesting/breeding season could have a potentially significant impact on hatchlings or fledglings. **Mitigation Measure BIO-1** would be implemented to avoid impacts to nesting birds by avoiding the migratory bird nesting season or requiring a survey for nesting birds prior to construction and requiring active nests be avoided and monitored until construction activities cease. With implementation of **Mitigation Measure BIO-1**, impacts would be less than significant.

Mitigation Measures:

The following mitigation measure shall be incorporated into the project to reduce potential impacts to protected nesting birds. The following mitigation measure was identified in the FMP PEIR as Mitigation Measure BIO-1. The proposed project's biological resource impacts would be less than significant with mitigation incorporated.

BIO-1: Nesting Bird Avoidance.

Construction activities for project-level and program-level projects shall avoid the migratory bird nesting season (typically February 1 through August 31), to reduce any potential significant impact to birds that may be nesting within 500 feet of project sites. If construction activities must occur during the migratory bird nesting season, an avian nesting survey of the project site and suitable habitat within 500 feet of the site shall be conducted for protected migratory birds and active nests. The avian nesting survey shall be performed by a qualified biologist meeting the standards in the field within 72 hours prior to the start of construction in accordance with the Migratory Bird Treaty Act (16 USC 703–712) and California Fish and Game Code, Sections 3503, 3503.5, and 3513. If an active bird nest is found, the nest shall be flagged and an appropriate buffer established around the nest, which shall be determined by the biologist based on the species' sensitivity to disturbance (up to 300 feet for passerines and up to 500 feet for raptors and special-status species). The nest area shall be avoided until the nest is vacated and the juveniles have fledged. No project activities may encroach into the buffer until a qualified biologist has determined that the nestlings have fledged, and the nest is no longer active.

Significance Determination

Less than significant with mitigation incorporated.

b) Have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plan, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

The project area is located within fully developed roadways and both staging areas contain manicured/disturbed grassland which lack native and natural vegetation. The literature search did not discover any current, special-status resources and none are expected to occur given the developed/disturbed conditions and lack of native plant communities. Sensitive plant species typically have very specific habitat requirements which the project area does not support. There are no riparian, riverine,

or natural communities present in the right-of-ways or staging area sites. Therefore, the proposed project would have no impact on any riparian habitat or other sensitive natural community.

Mitigation Measures

None required.

Significance Determination

No impact.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

The proposed project would not directly impact drainages or wetlands potentially under state or federal jurisdiction. The project alignment is within existing right-of-ways and staging areas would be located on parcels that do not encroach into a federally protected wetland or jurisdictional feature. Therefore, no impacts to jurisdictional drainages, wetland or riparian habitat would result from the project.

Surficial soils underlying the project area consist of predominantly moderately to well drained, permeable loams that have been heavily disturbed due to past uses and would not be able to support vernal pools or vernal pool species. No vernal pools or fairy shrimp habitat was observed during review of the Google Earth aerial photos. No impact would occur.

Mitigation Measures

None required.

Significance Determination

Less than significant.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The proposed project area would be contained entirely within roadway right-of-ways and manicured/disturbed grassland and would not result in the construction of any new buildings or structures that could impede wildlife movement. The increased human presence in these areas during construction would be temporary and would not discourage local wildlife use. Therefore, the project would have no impacts on wildlife movement.

Mitigation Measures

None required.

Significance Determination

No impact.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Chapter 12.28 of the City of Orange Municipal Code protects street trees by requiring a permit for removal. "Street trees" are defined by the City as all varieties of trees and shrubs located within all or any portion of a right-of-way including the parkway (City of Orange nd). In the event that street trees or other vegetation would need to be removed for project construction, implementation of **Mitigation Measure BIO-2** would require the project to obtain a permit prior to cutting, trimming, pruning, or removing any tree, shrub, or plant. Impacts would be less than significant with mitigation.

Mitigation Measures

The following mitigation measure shall be incorporated into the project to reduce potential impacts associated with removal or trimming of street trees, The following mitigation measure was identified in the FMP PEIR as Mitigation Measure BIO-5. The proposed project's biological resource impacts would be less than significant with mitigation incorporated.

BIO-2: Public and Parkway Trees.

If the final project design for project-level and program-level projects determines that public and parkway trees may be impacted during project construction for any project-level and program-level projects that occur within the City of Huntington Beach, the City of Fountain Valley, and any other city with a tree protection ordinance (e.g., City of Orange Municipal Code Chapter 12.28 Street Trees), a permit or permission from the applicable city must be obtained prior to cutting, trimming, pruning, or removing any tree, shrub or plant.

Significance Determination

Less than significant with mitigation incorporated.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The proposed project is located within the Matrix Area of the Orange County NCCP/HCP. No habitat and species conservation goals have been established for this area; therefore, the project would have no direct or indirect impacts to the Orange County NCCP/HCP. There would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

3.5 Cultural Resources

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	[ ]	[X]	[ ]	[ ]
b) Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	[ ]	[X]	[ ]	[ ]
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	[ ]	[ ]	[X]	[ ]

Discussion

On November 20 and December 12, 2019, a cultural resources records search of the California Historical Resources Information System (CHRIS) at the South Central Coastal Information Center at the California State University, Fullerton was conducted for the FMP project area identified in the PEIR and a 0.25-mile buffer (OC San 2020). This FMP area includes the proposed project area, and is included as project 2-49 within the PEIR. The purpose of the records search was to identify any previously recorded cultural resources and cultural resources studies within a 0.25-mile buffer of most of the OC San service area. The CHRIS record search included a search of the National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the California State Historic Resources Inventory. Within the entire FMP area, no resources qualify as a historical resource under CEQA guidelines. None of the identified resources are located within the proposed project area.

The PEIR evaluated pre-European contact and early European contact land use of the FMP area across Orange County and examined FMP facilities based on aerial photographs and satellite images. A pedestrian field survey of the FMP area was completed on January 13, 2020 to examine areas identified during the records search and aerial image examination that were thought to have a higher potential for encountering archaeological resources during FMP project activities. A sensitivity analysis included a list of projects in the FMP with nearby culturally sensitive areas which would require monitoring during FMP project activities. Project 2-49 corresponds to the proposed project within the PEIR, and was not identified as a project area with nearby cultural resources. The proposed project area is in a setting that is entirely built-out and construction of the proposed sewer improvement project would be conducted within the existing alignment in the roadway right of way. No historically or culturally sensitive areas were identified in the proposed project area in the FMP PEIR.

a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?

Historical resources are not anticipated to be encountered based on the results of the records searches, aerial studies, and pedestrian survey conducted for the FMP area. Although no known historical resources would be affected by the proposed project, construction has the potential to encounter previously unknown historical resources. While encountering unknown historical resources is unlikely based on the proposed project area's previous ground disturbance and lack of previously recorded historical resources, a Worker Cultural Resources Sensitivity Training (**Mitigation Measure CUL-1**) will be conducted for the proposed project. Prior to construction, a qualified archaeologist will conduct cultural resources sensitivity training for all construction personnel to inform them of the types of archaeological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, and safety precautions to be taken when working with archaeological monitors. In the event of the unanticipated discovery of cultural remains, **Mitigation Measure CUL-2** will be implemented, which involves immediately ceasing all ground disturbing activities while a qualified archaeologist assesses the resource.

The implementation of **Mitigation Measures CUL-1,** and **CUL-2,** by the proposed project would ensure the procedures are in place in the event of unanticipated discovery of previously unknown historical resources. Operation of the proposed project would not involve ground disturbing activities and would therefore have no impact on cultural resources. Implementation of **Mitigation Measures CUL-1** and **CUL-2** would reduce potential impacts to previously unknown historical resources, if encountered during construction, to less than significant.

Mitigation Measures:

The following mitigation measures shall be incorporated into the project to reduce potential impacts to unknown cultural resources that could be uncovered during trenching and excavation. The following mitigation measures were identified in the FMP PEIR as Mitigation Measure CUL-1 and CUL-3.[1] The

[1] FMP PEIR Mitigation Measure CUL-2 does not apply to the Taft Avenue Sewer Rehabilitation Project. Mitigation Measure CUL-2 in the PEIR required archaeological monitoring be conducted for ground-disturbing activities at Reclamation Plant No. 1, Treatment Plant No. 2, the Seal Beach Pump Station Replacement (3-67), and Los Alamitos Sub-Trunk Extension project (3-68) in Seal Beach; Newport Beach Pump Station Odor Control Improvements (5-68) only as they intersect with ground-disturbing activities at the 15th Street Pump Station Rehabilitation (X-022), Lido Pump Station Rehabilitation (X-023), Rocky Point Pump Station Rehabilitation(X-024), and A Street Pump Station Rehabilitation (X-041). FMP PEIR Mitigation Measure CUL-2 required archaeological monitoring be conducted for ground-disturbing activities associated with high cultural sensitivity portions of the Tustin-Orange Interceptor Sewer at Reach 17 Rehabilitation (X-065), Tustin-Orange Interceptor Sewer at Reach 18 Rehabilitation (X-066), Crystal Cove Pumping Station Upgrade and Rehabilitation (5-66), DAFT Demolition (X-043), Hoover-Western Sub-Trunks Sewer Rehabilitation (X-067/X-085), Edinger/Springdale Trunk Sewer Rehabilitation (X-071), Substation and Warehouse Replacement at Plant 2 (P2-126), Operations and Maintenance Complex at Plant 2 (P2-138).

proposed project's potential cultural resources impacts would be less than significant with mitigation incorporated.

CUL-1: Worker Cultural Resources Sensitivity Training. Prior to start of ground-disturbing activities, the qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (or an archaeologist working under the direct supervision of the qualified archaeologist) shall be retained by the Orange County Sanitation District (OC San) and shall conduct cultural resources sensitivity training for all construction personnel. Construction personnel shall be informed of the types of archaeological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, and safety precautions to be taken when working with archaeological monitors. The OC San contractor shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance. See also **TCR-1** in Section 3.18.

CUL-2: Treatment of Archaeological Materials. In the event of the unanticipated discovery of archaeological materials during ground-disturbing activities associated with the proposed project, the Orange County Sanitation District (OC San) shall immediately cease all work activities in the area (within 100 feet) of the discovery until it can be evaluated by the qualified archaeologist. Construction shall not resume until the qualified archaeologist has conferred with OC San on the significance of the resource. In the event that preservation in place is determined to be infeasible and data recovery through excavation is the only feasible mitigation available, an Archaeological Resources Treatment Plan, in accordance with the Advisory Council on Historic Preservation's 2009 Section 106 Archaeology Guidance, shall be prepared and implemented by the qualified archaeologist in consultation with OC San. The Archaeological Resources Treatment Plan will provide for the adequate recovery of the scientifically consequential information contained in the archaeological resource. OC San shall consult with appropriate Native American representatives in determining treatment for pre-contact or Native American resources. The treatment options after data recovery efforts occur may include returning the resource to the appropriate tribe or donation of the resource to a repository identified by the tribe. If preservation in place is not an option or re-deposition on site is not an option, the resource will be curated at an archaeological curation facility (compliant with standards established in 36 CFR 79, Sections 9, 10, and 11). See also **TCR-2** and **TCR-3** in Section 3.18.

Significance Determination

Less than significant with mitigation incorporated.

b) Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?

Although there are no surface indicators of archaeological resources within the proposed project area, it is possible that unknown buried or obscured archaeological resources may exist. Although the project area is considered to have low archaeological sensitivity, in the event construction exposes previously unrecorded archaeological resources, implementation of **Mitigation Measures CUL-1** and **CUL-2** would minimize impacts by conducting Worker Cultural Resources Sensitivity Training (**Mitigation Measure CUL-1)** and halting all ground disturbing activities in the event of an unanticipated discovery of archaeological materials (**Mitigation Measure CUL-2**). Operation of the proposed project would not involve ground disturbing activities and would therefore have no impact on unique archaeological resources. With implementation of

Mitigation Measures CUL-1 and **CUL-2,** potential impacts from construction resulting in an adverse change to unique archeological resources would be less than significant.

Mitigation Measure

See CUL-1 and CUL-2

Significance Determination

Less than significant with mitigation incorporated.

c) Disturb any human remains, including those interred outside of dedicated cemeteries?

Although the proposed project area is considered to have low archaeological sensitivity given the level of previous ground disturbance, there is always a possibility of discovering human remains during ground disturbing activities. Worker Cultural Sensitivity Training conducted in **Mitigation Measure CUL-1** includes the proper procedures to be implemented in the event of an inadvertent discovery of human remains. In the event of a discovery, all ground disturbing activities would halt (**Mitigation Measure CUL-2**). In addition, OC San's General Requirement GR-6-Z: Discovery of Human Remains requires that the County Coroner be notified immediately upon the accidental discovery or recognition of any human remains and construction activities be halted. If the remains are found to be Native American, the Native American Heritage Commission would be notified within 24 hours and guidelines from the Native American Heritage Commission would be followed in the treatment and disposition of the remains. OC San's General Requirement GR-6-Z: Discovery of Human Remains states, "In the event of accidental discovery or recognition of any human remains, the County Coroner would be notified immediately and construction activities shall be halted. If the remains are found to be Native American, the Native American Heritage Commission would be notified within 24 hours. Guidelines of the Native American Heritage Commission shall be adhered to in the treatment and disposition of the remains."

There would be no ground disturbing activities during operation of the proposed project and therefore no mitigation related to discovery of human remains would be required during operation. With implementation of **Mitigation Measures CUL-1, CUL-2** and General Requirement GR-6-Z during construction, impacts as a result of the inadvertent discovery of human remains would be less than significant.

Mitigation Measure

See CUL-1 and CUL-2.

Significance Determination

Less than significant with mitigation incorporated.

3.6 Energy

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	[ ]	[ ]	[X]	[ ]
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	[ ]	[ ]	[X]	[ ]

Discussion

Electrical service for the proposed project area is provided by SCE. According to SCE's power content label for 2021, its electricity comes from approximately 31.4 percent renewables, 2.3 percent large hydroelectric, 22.3 percent natural gas, 9.2 percent nuclear, and 34.8 percent from other and unspecified power sources through transactions (SCE 2022). Natural gas service for the proposed project area is provided by the Southern California Gas Company.

Various state policies encourage GHG emissions reductions, which are interrelated with renewable energy and energy efficiency. GHGs are discussed in greater detail in *Section 3.8 Greenhouse Gas Emissions*. Assembly Bill (AB) 32 and Senate Bill (SB) 32 set statewide targets for GHG reductions, and the 2008 CARB *Scoping Plan* and 2017 *Scoping Plan Update* contain strategies for achieving emission reductions, such as reducing energy demand from mobile sources and land use development. Energy use associated with construction of individual projects is not a focus of these statewide plans.

Neither the County of Orange nor City of Orange maintain a climate action plan or other document governing energy efficiency. The City of Orange General Plan contains goals and policies to encourage energy efficiency (City of Orange 2010); however, these goals and policies are primarily related to building energy efficiency and public transportation and would not apply to the proposed project.

OC San prepared a Climate Resiliency Study in 2019 (OC San 2019) to evaluate climate risks to its facilities, focusing on treatment facilities and pump stations. The study does not specifically address pipelines but contains GHG emission reduction measures which would apply to energy use associated with the project, such as improvements to fleet vehicles (e.g., addition of electric vehicles).

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Construction of the proposed project would involve construction-related fossil fuel consumption from operation of diesel-powered construction equipment, and fossil fuel consumption from material hauling, delivery, and worker vehicle trips. The anticipated construction fleet for the proposed project includes typical construction equipment such as a backhoe/loader, excavator, crane, utility truck, water truck, dump trucks, concrete saw, sweeper, paver, and generator. The construction vehicle fleet is summarized in **Table 2-2** in *Section 2.4 Proposed Project Description*. The PEIR estimated the petroleum demand generated during construction of the collection systems. For project 2-49 Taft Branch Sewer Improvements, the fuel demand estimated in the PEIR is presented in **Table 3-8**. The proposed project as described in this IS/MND has only changed slightly in comparison to the alignment presented in the PEIR but would require a similar construction fleet as anticipated in the PEIR (see *Table 2-2 Construction Vehicle Fleet for Pipelines*). The proposed project would involve 1,000 linear feet more pipeline compared to project 2-49 in the PEIR and the proposed project pipeline would be constructed at an average rate of 50 linear feet per day. Thus, the proposed project would require 20 more days of construction equipment usage compared to the PEIR project 2-49. Given the total construction duration of 24 months, the proposed project would not consume substantially more construction-related energy than that analyzed in the PEIR (i.e., the proposed project would involve up to 20 more days of construction vehicle use than PEIR project 2-49, which is about 4.2% of the total number of construction days).

Table 3-8: Construction Petroleum Demand

Construction equipment	Petroleum Demand (gallons)
Off-road equipment (diesel)	22,775
Haul trucks (diesel)	942
Vendor trucks (diesel)	969
Worker vehicles (gasoline)	1,609

Operation of the proposed project would not involve a change in the consumption of energy. Routine inspection of the pipeline and maintenance holes would be incorporated into OC San's existing O&M activities and would not cause a net change in vehicle trips or associated fossil fuel consumption.

The proposed project would implement typical construction practices such as trenching and repaving. The project would not require unusual or excessive construction equipment or practices that would result in wasteful, inefficient, or unnecessary consumption of energy compared to projects of similar type and size. In addition, the construction fleet contracted for the proposed project would be required to comply with the CARB In-Use Off-Road Diesel-Fueled Fleets Regulations, which would limit vehicle idling time to five minutes, restrict adding vehicles to construction fleets with older-tier engines, and establish a schedule for retiring older, less fuel-efficient engines from the construction fleet (CARB 2011). Once construction is complete, the proposed project would not involve operational energy consumption. Therefore, construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy and impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

As described in the PEIR, the project would not interfere with state or local plans related to renewable energy or energy efficiency. The proposed project would not result in a net increase beyond existing levels in energy use or vehicle trips during operation. The project would not involve land use changes that would indirectly result in an increase in vehicle trips or vehicle miles travelled. As explained under "a" above, the project would not involve wasteful or inefficient energy consumption during construction. Operation of the project would not involve consumption of water or an unplanned increase in the generation of solid waste.

Because the project would not result in a net increase in operational vehicle trips and would not change land use patterns, it would not conflict with statewide plans related to energy use. The City of Orange General Plan contains goals and policies to encourage energy efficiency; however, these apply to project operation, and the proposed project would not increase operational energy use. OC San's 2019 Climate Resiliency Study contains GHG emissions reduction measures which are interrelated with energy use. These focus primarily on wastewater treatment processes and building efficiency. One GHG reduction measure is concerned with improvements to fleet vehicles (e.g., gas efficiency, fuel type, electric cars, bicycles, etc.); the OC San fleet would be used for O&M activities for the proposed project and thus these GHG reduction improvements would be incorporated into O&M, consistent with the Climate Resiliency Study. Therefore, the project would not conflict with local plans (City of Orange or OC San) for energy efficiency or renewable energy. The proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Impacts would be less than significant, and no mitigation would be required.

Mitigation Measures

None required.

Significance Determination

Less than significant

3.7 Geology and Soils

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				

i)	Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	[ ]	[ ]	[X]	[ ]
ii)	Strong seismic ground shaking?	[ ]	[ ]	[X]	[ ]
iii)	Seismic-related ground failure, including liquefaction?	[ ]	[ ]	[X]	[ ]
iv)	Landslides?	[ ]	[ ]	[ ]	[X]
b)	Result in substantial soil erosion or the loss of top soil?	[ ]	[ ]	[X]	[ ]
c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	[ ]	[ ]	[X]	[ ]
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	[ ]	[ ]	[X]	[ ]
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	[ ]	[ ]	[ ]	[X]
f)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	[ ]	[X]	[ ]	[ ]

Discussion

The project is located within the southerly portion of the Los Angeles Basin, which is situated near the northern end of the Peninsular Ranges Geomorphic Province. The Los Angeles Basin has been divided into four structural blocks, which are generally bounded by prominent fault systems: The Northwestern Block, the Southwestern Block, the Central Bock, and the Northeastern Block. The project is located within the Central Block, which is bordered on the west by the Newport-Inglewood fault, on the east by the Whittier-Elsinore fault, on the north by the Malibu Coast-Santa Monica-Raymond fault, and on the south by the San Joaquin Hills. The Central Block is characterized by thick sequences of alluvium overlying predominantly sedimentary rock of Cretaceous through Pleistocene age (Ninyo & Moore 2022).

The project area is underlain by Quaternary-aged (Holocene and Pleistocene) old and young alluvial-fan deposits (USGS 2006). The western end of the proposed alignment is located approximately 5,000 feet east of the Santa Ana River Channel. Regional geologic mapping indicates that the western portion of the alignment is underlain by late to middle Pleistocene age old alluvial fan deposits generally consisting of reddish-brown gravel and sand. The eastern portion of the alignment is underlain by Holocene and latest Pleistocene age young alluvial fan deposits consisting of gravel, sand, and silt (Ninyo & Moore 2022).

Surficial soils underlying the project area consist predominantly of Sorrento clay loam and Myford sandy loam, which are composed of moderately to well drained, permeable loams that occur on gently sloping alluvial fans (UC Davis nd). In addition, because the project alignment is within existing developed City of Orange right-of-ways, artificial fill is expected to be present throughout the area.

Active faults are faults that have ruptured within the Holocene time, or within approximately the last 11,000 years. Potentially active faults are those that show evidence of movement during Quaternary time (approximately the last 1.6 million years) but for which evidence of Holocene movement has not been established (Ninyo & Moore 2022). The Peralta Hills Structure is the only major fault within one mile of the project area and is classified as possibly active by the Southern California Earthquake Data Center (City of Orange 2010). Displacements along these two faults are smaller than those along the more prominent regional faults such as the Elsinore Fault Zone, San Jacinto Fault Zone, and San Andres Fault Zone which lie approximately 6, 35, and 40 miles east of the project area, respectively, and the Newport-Inglewood Fault which lies approximately 10 miles southwest of the project area (USGS nd). Portions of land near the project area along the Santa Ana River and Santiago Creek are susceptible to subsidence. No land near the project area is susceptible to landslides (CGS 2022a).

a.i) Directly or indirectly caused potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 41.

The potential for ground rupture is most likely to occur along the traces of active faults. Although the proposed project area is within a seismically active region of southern California, the project area is not within a State of California Earthquake Fault Zone (also known as Alquist-Priolo Special Studies Zone Fault Zone). Based on literature review and site reconnaissance, no active faults are known to cross the alignment. Therefore, the probability of damage from surface fault rupture is considered to be low. In addition, the design and construction of the project pipeline would be based on the geotechnical data report prepared for the project by Ninyo & Moore (2022) to minimize geological risk. Design recommendations provided in

the geotechnical report include performing earthwork in accordance with the standard specifications for public works construction; stabilizing temporary trenching and shoring; performing excavations in accordance with OSHA regulations; retaining a qualified and experienced engineer to design the shoring system; over-excavation of unstable soils and replacement with gravel wrapped in geo-fabric for trench bottom stability; use of at least six inches of granular pipe bedding material; use of trench backfill material that is free of oversize debris and has an optimum moisture content; and careful trench backfill placement and compaction that is in accordance with appropriate governing agency standards and good construction practice. Therefore, due to the distance of Alquist Priolo faults and potential earthquake magnitudes of local faults, impacts related to ground rupture would be less than significant.

a.ii) Directly or indirectly caused potential substantial adverse effects, including the risk of loss, injury, or death involving: Strong seismic ground shaking?

The project area is located within a seismically active region of southern California near local and regional faults capable of generating earthquakes with strong ground shaking. The intensity of ground shaking would depend upon the magnitude of the earthquake, distance to the epicenter, and the geology of the area between the epicenter and the project area.

Considering the proximity of the project area to active faults capable of producing a maximum moment magnitude of 6.0 or more, the project has a high potential for experiencing strong ground motion during the design life of the proposed improvements (Ninyo & Moore 2022). Although impacts related to strong seismic ground shaking would potentially be significant in the project area, the proposed project would not include any land use components that would induce growth or otherwise bring additional people to the area or structures people would occupy that would be at risk of loss, injury of death from strong seismic ground shaking.

The project would be designed and constructed pursuant to applicable American Water Works Association (AWWA) standards and would incorporate measures to accommodate seismic loading pursuant to guidelines such as the "Greenbook" Standard Specifications for Public Works Construction (Greenbook Committee of Public Works Standards, Inc. 2018) and the International Building Code (IBC; International Code Council 2018). These guidelines are produced through joint efforts by industry groups to provide standard specifications for engineering and construction activities, including measures to accommodate seismic loading parameters. These standards and guidelines are widely accepted by regulatory authorities and are regularly included in related standards such as municipal building and grading codes. In addition, the project design would follow guidelines within the California Building Code (CBC; California Code of Regulations, Title 24, Part 2), which is based on the IBC with amendments to reflect conditions specific to California. The project would also be designed per OC San General Requirement (GR-16) which requires the installation of all equipment and appurtenances to comply with the requirements of the applicable edition of the California Building Code (California Code of Regulations, Title 24, Part 2). OC San General Requirement GR-16 Seismic Design and Construction states, "The installation of all equipment and appurtenances shall comply with the requirements of the applicable edition of the California Building Code (California Code of Regulations, Title 24, Part 2). Supports and connections shall be designed to prevent sliding or overturning, in accordance with the Code and these Specifications. Brackets and anchors shall be of ductile materials so that they can absorb energy and continue to carry load. Any changes to the design affecting structural components shall be documented on drawings stamped and signed by a Structural Engineer registered in the State of California and shall be submitted for Engineer's acceptance."

The pipeline would be designed in conformance with OC San and state seismic engineering standards as well as recommendations of the geotechnical report prepared for the project which would minimize geological risk. Therefore, the proposed project would not directly or indirectly result in substantial adverse effects, including the risk of loss, injury, or death due to seismic ground shaking. Impacts would be less than significant.

a.iii) Directly or indirectly caused potential substantial adverse effects, including the risk of loss, injury, or death involving: Seismic-related ground failure, including liquefaction?

Liquefaction is the process by which clay-free soil, such as sands and silts, temporarily lose cohesion and strength and turn into a fluid state during a severe ground shaking event. This primarily occurs in areas saturated with high groundwater levels and recent deposits of sands and silts. Based on review of the Seismic Hazard Map for the Orange Quadrangle, the project area is not located in a liquefaction hazard zone (Ninyo & Moore 2022). In addition, the project would be designed and constructed in accordance with state and OC San seismic engineering standards described under "a.ii" above, and the geotechnical report prepared for the project (Ninyo & Moore 2022) which would reduce any potential impacts associated with liquefaction. The proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure including liquefaction. Impacts would be less than significant.

a.iv) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Landslides?

Seismically induced landslides and slope failures are common occurrences during or soon after large earthquakes. Landslides can occur when strong ground movement such as an earthquake shakes loose soil and causes land and debris to lose stability and slide. The project area is not located in a landslide susceptibility zone (CGS 2022a). Due to the proximity of the proposed project to the nearby foothills, the potential for seismically induced landslides affecting the proposed transmission pipeline is very low. In addition, the project would be designed and constructed in accordance with state and OC San seismic engineering standards described under "a.ii" above. The proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. There would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

b) Result in substantial soil erosion or the loss of top soil?

The proposed project could result in minor erosion of soils or loss of topsoil onsite during project construction, in particular due to the presence of soil stockpiles during excavation activities. Exposed soil piles are susceptible to erosion during strong winds, heavy rains, or other storm events. Project construction would disturb more than one acre of land and would require a National Pollutant Discharge Elimination System (NPDES) Construction General Permit. A Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented in compliance with the Construction General Permit. Best management

practices (BMPs) would be identified in the SWPPP to control and reduce pollutant discharges associated with construction activities and erosion of soil. Potential BMPs include, but are not limited to, erosion control blankets, silt fences, and fiber rolls (Caltrans 2003). These BMPs would reduce erosion, and potential impacts associated with erosion of exposed soil would be less than significant. With implementation of the standard construction BMPs, the potential for soil erosion during proposed project construction would be considered less than significant. All pipeline disturbance areas would be restored to pre-project conditions after construction is complete and would not result in further soil erosion. Therefore, impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

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

The proposed project area is underlain by Holocene and Pleistocene old and young alluvial-fan deposits, generally consisting of gravel, sand, and silt. Based on the California Department of Water Resources (DWR) Interferometric Synthetic Aperture Radar (InSAR) data, the project area is not at risk for subsidence (DWR 2022). Similar to the seismically induced landslide impacts addressed in response "a.iv" above and the liquefaction impacts addressed in response "a.iii" above, the project area's potential to have unstable soils that could result in landslides, liquefaction (or lateral spreading which is induced by liquefaction), or subsidence, was determined to be a less than significant impact due to the relatively flat topography of the project area and the project's location within existing right-of-ways. Adherence to the state and OC San seismic engineering standards would ensure structural resiliency to earthquake events and any other causes of lateral spreading or liquefaction. In addition, the design and construction of the project pipeline would be based on the geotechnical data report prepared for the project to minimize geological risk (Ninyo & Moore 2022). Fill materials used to backfill would be stable with little risk of subsidence or collapse. Therefore, implementation of the project is not expected to result in significant risk of landslide, lateral spreading, liquefaction, subsidence, or collapse. Impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Expansive soils have the ability to significantly change their volume, shrink and swell, due to their soil moisture content. Expansive soils can crack rigid structures and potentially create pipeline rupture. Typically, expansive soils are very fine grained with a high to very high percentage (60 percent or more) of clay.

Surficial soils underlying the project area consist predominantly of Sorrento clay loam and Myford sandy loam which are composed of 30 percent and 40 percent clay composition, respectively (UC Davis nd). Based on the clay particle content of the soil, the project area would not be located on expansive soils. The proposed project would be designed and constructed to the standards described in response "a.ii" as well as the geotechnical data report prepared for the project to minimize geological risk (Ninyo & Moore 2022). Fill materials used to backfill would be stable with little risk of damage to the infrastructure from expansion. Therefore, impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

The project does not propose the construction or use of septic tanks or alternative wastewater disposal systems. Therefore, there would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

f) Directly or indirectly destroy a unique paleontological resource of site or unique geologic feature?

The California Public Resources Code (Section 5097.5) prevents an individual from removing, destroying, or altering any paleontological resources found on public lands without the permission of the public agency that has jurisdiction over the lands. The Orange County General Plan (2010) contains Objective 2.2 that requires the taking of all reasonable and proper steps to achieve the preservation of archaeological and paleontological remains, or their recovery and analysis to preserve cultural, scientific, and educational values.

No paleontological resources are documented within the project area (OC San 2020). However, paleontological resources sensitivity areas are mapped according to previous fossil discoveries within the OC San service area. The paleontological resources sensitivity map (**Figure 3-2**) is based on published geological mapping and paleontological sensitivity categories set forth in the County of Orange Archaeological/Paleontological Curation: Final Guidelines, Procedures, and Policies (OC San 2020). Sedimentary deposits mapped as moderate to high paleontological resources sensitivity may be impacted at an unknown depth below native topsoil, artificial fill, or younger Quaternary alluvium; therefore, ground-disturbing pipeline replacement activities within these areas may encounter important and unique paleontological resources. The proposed project area is located in an area of moderate paleontological sensitivity. Thus, ground-disturbing activities could result in a potentially significant paleontological resource impact. Implementation of **Mitigation Measure GEO-1** would require development of a

paleontological monitoring plan and preconstruction training prior to ground disturbing activities. With the implementation of **Mitigation Measure GEO-1**, impacts to unique paleontological resources or geologic features would be less than significant.

Mitigation Measures

The following mitigation measure shall be incorporated into the project to reduce potential impacts associated with encountering paleontological resources during excavation. The following mitigation measure was identified in the FMP PEIR as Mitigation Measure GEO-1. The proposed project's impacts on paleontological resources would be less than significant with mitigation incorporated.

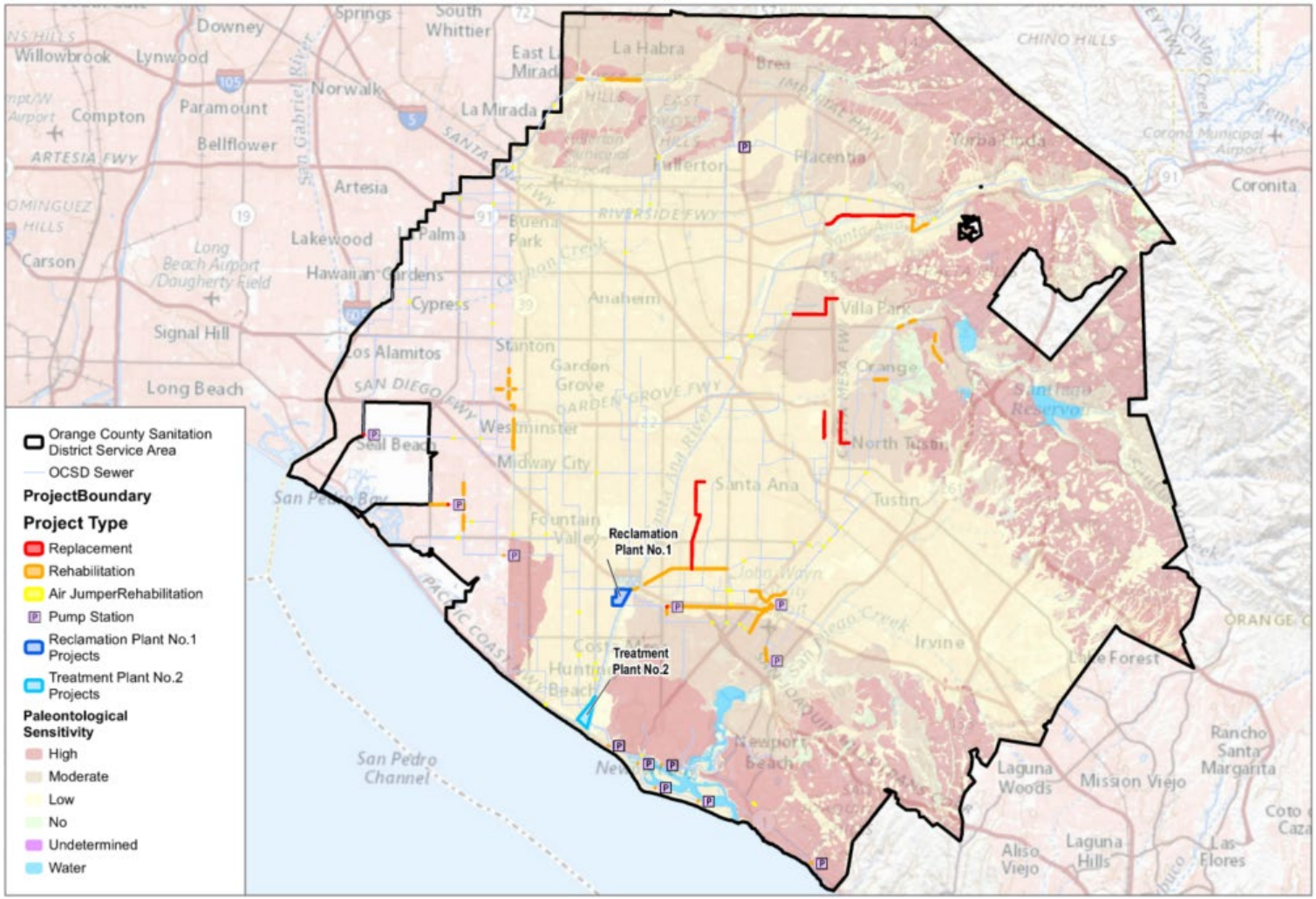
Mitigation Measure GEO-1: Paleontological Resources

Prior to commencement of any construction phase ground-disturbing activity in areas of moderate to high paleontological sensitivity (the Taft Branch Improvement Project is identified as an area of "moderate" paleontological sensitivity, see PEIR Figure 4.6-1), the Orange County Sanitation District shall retain a qualified paleontologist per the 2010 Society of Vertebrate Paleontology guidelines. The paleontologist shall prepare a paleontological resources impact mitigation program for the project that reduces all impacts to less than significant. The paleontological resources impact mitigation program shall be consistent with the Society of Vertebrate Paleontology guidelines and shall include: requirements for preconstruction meeting attendance and worker environmental awareness training, where monitoring is required within the project area based on construction plans and/or geotechnical reports; procedures for adequate paleontological monitoring and discoveries treatment; and paleontological methods (including sediment sampling for microvertebrate fossils), reporting, and collections management. The qualified paleontologist shall attend the preconstruction meeting, and a paleontological monitor under the direction of the qualified paleontologist shall be on site during initial ground-disturbing activities in areas of previously undisturbed moderate and/or high paleontological resources sensitivity. In the event that paleontological resources (e.g., fossils) are unearthed, the paleontological monitor shall temporarily halt and/or divert ground-disturbing activity to allow recovery of paleontological resources. The area of discovery shall be roped off with a 50-foot-radius buffer. Once documentation and collection of the find is completed, the paleontological monitor shall allow ground-disturbing activities to recommence in the area of the find.

Significance Determination:

Less than significant with mitigation incorporated.

Figure 3-2: OC San Facilities Master Plan PEIR - Paleontological Sensitivity



3.8 Greenhouse Gas Emissions

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	[ ]	[ ]	[X]	[ ]
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	[ ]	[ ]	[X]	[ ]

Discussion

GHGs are pollutants that are known to increase the greenhouse effect in the earth's atmosphere thereby adding to global climate change impacts. Several pollutants have been identified as GHGs, and the California definition of a GHG in the Health and Safety Code, Section 38505(g) includes carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Water vapor is also a GHG; however, it is short lived, and concentrations are largely determined by natural processes such as evaporation. Other GHGs such as fluorinated gases are created and emitted through anthropogenic sources. The most common anthropogenic GHGs are CO_2, CH_4, and N_2O.

A measurement called Global Warming Potential (GWP) is used to measure how much energy the emissions of one ton of a gas will absorb over a given period of time, relative to the emissions of one ton of CO_2. CO_2e is the amount of GHG emitted multiplied by its GWP. CO_2 has a 100-year GWP of one; CH_4 has a GWP of 25; and N_2O has a GWP of 298.

In 2005, Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger, set GHG emission reduction targets:

- 2010 should have 2000 levels;
- 2020 should have 1990 levels; and
- GHG emissions should be 80 percent below 1990 levels by 2050.

SB 32, passed in 2016, required that in the next update to the AB 32 Scoping Plan, CARB should "ensure that statewide GHG emissions are reduced to at least 40 percent below the statewide GHG emissions limit no later than December 31, 2030." In 2018, EO B-55, signed by Governor Jerry Brown, set a GHG emission reduction target for California to be carbon neutral by 2045.

CARB adopted the *Scoping Plan* in December 2008 and a *Scoping Plan Update* in December 2017. The *Scoping Plan* contains the strategies California will implement to achieve a GHG emissions reduction of 40

percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. In the *Scoping Plan*, "CARB recommends that lead agencies prioritize onsite design features that reduce emissions, especially from vehicle miles travelled (VMT), and direct investments in GHG reductions within the project region that contribute potential air quality, health, and economic co-benefits locally."

OC San's service area, and the proposed project, lie within the jurisdiction of the SCAQMD. On December 5, 2008, the SCAQMD Board approved interim CEQA GHG significance thresholds for stationary sources, rules, and plans using a tiered approach for determining significance. Tier 3, the primary tier the SCAQMD board uses for determining significance, set a screening significance threshold of 10,000 $MTCO_2e$/year for determining whether an industrial project would have a less than significant cumulative GHG impact, and a screening significance threshold of 3,000 $MTCO_2e$/year for a non-industrial project (SCAQMD 2008b). This threshold is meant to apply to industrial projects where SCAQMD is the lead agency (Radlein, personal correspondence 2020). The proposed project also lies within the boundaries of Orange County and the City of Orange; however, neither of these jurisdictions have prepared a climate action plan with local CEQA significance thresholds. The City of Orange uses SCAQMD thresholds to determine significance of GHG impacts (City of Orange 2020b).

OC San prepared a Climate Resiliency Study in 2019 to evaluate climate risks to its facilities, focusing on treatment facilities and pump stations. The study also contains GHG emission reduction measures, which include water recycling to avoid emissions from imported water, energy recovery from treatment facilities, efficient lighting designs, improvements to building plumbing and ventilation, installation of electric vehicle charging stations, and improvements to fleet vehicles such as addition of electric vehicles (OC San 2019).

SCAG's 2020 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) (SCAG 2020), referred to as Connect SoCal, is a regional growth-management strategy that targets per capita GHG reduction from passenger vehicles and light-duty trucks in the Southern California region pursuant to SB 375. In addition to demonstrating the region's ability to attain and exceed the GHG emission-reduction targets set forth by CARB, the 2020 RTP/SCS outlines a series of actions and strategies for integrating the transportation network with four core goal categories: economy, mobility, environment, and healthy/complete communities. The guiding principles of the plan include: placing high priority for transportation funding in the region on projects and programs that improve mobility, accessibility, reliability and safety, and that preserve the existing transportation system; encouraging RTP/SCS investments and strategies that collectively result in reduced non-recurrent congestion and demand for single occupancy vehicle use, by leveraging new transportation technologies and expanding travel choices; and encouraging transportation investments that will result in improved air quality and public health, and reduced greenhouse gas emissions. The Successful implementation of the 2020 RTP/SCS would result in increased mobility options and a more sustainable growth pattern. .

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

The project would create GHG emissions during construction only. Construction is expected to last approximately 24 months, and the project's life expectancy is conservatively assumed to be 30 years for the purposes of this GHG analysis.[2] Construction impacts would include vehicle and equipment emissions associated with pipeline trenching and installation, maintenance hole construction, and road resurfacing. The project would not generate a net increase in operation emissions because the pipeline would not require energy use to operate, and inspection of the pipeline and maintenance holes would be incorporated into OC San's existing O&M trips. Further details can be found in *Section 2 Project Description*.

Modeling of air emissions from construction was completed in CalEEMod version 2022.1.1.13 for construction of the project. Details on construction, including timing and equipment, can be found in *Section 2.4 Proposed Project Description*. The project would not emit GHGs associated with electricity consumption; all GHG emissions would result from vehicle use, including construction equipment, haul trips, and worker trips. No energy would be required for the operation of the pipeline. Other project details necessary for GHG emissions modeling were obtained from CalEEMod and the design engineer estimates (e.g., equipment horsepower, load factors, fleet mix, and vehicle emissions factors).

The results of the inventory for GHG emissions, as shown in the CalEEMod output tables in **Appendix A**, are presented in **Table 3-9** along with the SCAQMD Tier 3 significance threshold. Consistent with the methodologies in the SCAQMD GHG significance thresholds, total GHG emissions from construction have been amortized over a 30-year lifetime of the project.

Table 3-9: Proposed Project GHG Emissions per Year ($MTCO_2e$/year)

Source	$MTCO_2e$
Operation	negligible
Construction (amortized over 30 years)	58
Total	**58**
Threshold	3,000
Exceed Threshold?	*No*

Based on the results of CalEEMod, construction of the proposed project would emit a total of 1,719 $MTCO_2e$. Amortized over a 30-year period, the project would generate approximately 58 $MTCO_2e$ per year. In addition to the low per year generation of $MTCO_2e$, the project would adhere to existing energy efficiency requirements during construction, including CARB's In-Use Off-Road Diesel-Fueled Fleets Regulations that

[2] As explained in the PEIR, the SCAQMD Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold (SCAQMD 2008b) recommends construction emissions be amortized over a 30-year project lifetime. The operational life of the project is generally anticipated to be greater than 30 years; however, OC San continues to upgrade, rehabilitate, and replace facilities prior to reaching full anticipated operational life to ensure provision of reliable service to the OC San service area. Therefore, the 30-year operational life assumption is appropriate and conservative.

limit vehicle idling time to five minutes and establish a schedule for retiring older and less fuel-efficient engines (CARB 2011). Construction related GHG impacts would be less than significant.

The State of California has set targets for renewable energy from the energy sector through the Renewable Portfolio Standard. The Renewable Portfolio Standard directs energy utilities to source half of their electricity sales from renewable sources by 2030 (CEC 2017). The proposed project would not consume electricity. Therefore, the proposed project would not conflict with or obstruct this target, and impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

California's 2017 *Scoping Plan Update* focuses on reducing energy demand and GHG emissions that result from mobile sources and land use development. The proposed project would not involve a considerable increase in new vehicle trips or land use changes that would result in an increase in vehicle trips, such as urban sprawl. The project is designed to meet existing and anticipated demand that would occur with or without the project. As described in the PEIR, the project would not conflict with any *Scoping Plan* emission reduction strategies or climate change policies or measures, such as the low carbon fuel standard, vehicle efficiency measures, and heavy-duty vehicle GHG emissions reductions.

Because the project would not result in a net increase in operational vehicle trips, the project would not conflict with the 2020 RTP/SCS strategies related to reducing vehicle trips and VMT or use of alternative fuel vehicles. Construction vehicle trips would be temporary, and operation of the project would not result in a net increase in energy use or VMT. Therefore, the project would not conflict with the 2020 RTP/SCS strategies and policies.

O&M visits would be conducted using OC San's fleet vehicles. O&M activities would be conducted using OC San's vehicle fleet, which is continually being improved with regard to efficiency and fuel type, consistent with the Climate Resiliency Study. Therefore, the project would not conflict with OC San plans for reduction of GHG emissions.

The project would not result in GHG emissions higher than the SCAQMD significance screening thresholds. The proposed project would not, therefore, conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Impacts would be less than significant, and no mitigation would be required.

Mitigation Measures

None required.

Significance Determination

Less than significant.

3.9 Hazards and Hazardous Materials

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	[ ]	[X]	[ ]	[ ]
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	[ ]	[X]	[ ]	[ ]
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	[ ]	[X]	[ ]	[ ]
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	[ ]	[X]	[ ]	[ ]
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area?	[ ]	[ ]	[ ]	[X]
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	[ ]	[X]	[ ]	[ ]

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	[ ]	[ ]	[ ]	[X]

Discussion

Hazardous materials are currently used throughout the project area for agricultural, residential, transportation, construction, and other similar land uses. Through natural events, system failures, and accidents (spills), hazardous materials can become a risk to the environment and human health. Numerous local, state and federal laws exist to regulate the storage, use, handling and transportation of hazardous materials. To increase public safety and awareness of hazardous materials exposure risk, businesses and entities that handle, store, transport, or use hazardous materials are required to file reports with appropriate authorities and maintain emergency response plans in the event of a hazardous materials release (OC San 2020).

A regulatory records search was performed for the project area using the SWRCB GeoTracker database (SWRCB 2022) and the California Department of Toxic Substances Control (DTSC) EnviroStor database (DTSC 2022), both accessed 5/22/2022. These lists are a compilation of information from various sources listing potential and confirmed hazardous waste and hazardous substances sites in California.

There are no active hazardous materials cleanup sites listed on the SWRCB's GeoTracker database and the DTSC's EnviroStor database within or adjacent to the proposed project area. However, there are four open cleanup program sites and one open leaking underground storage tank (LUST) within one mile of the project area. The four open cleanup program sites are located at 1315 North Tustin Avenue (Express Cleaners); 1465 North Batavia Street (Orange Education Center); 1808 North Batavia Street (Dolomite/Resolution Trust Corp), and 2060 North Batavia Street (Great Western Carpet). The Express Cleaners, Dolomite/Resolution Trust Corp, Orange Education Center, Great Western Carpet are located 0.41, 0.45, 0.54, and 0.58 miles from the proposed project area, respectively. The single open LUST site is located at 2098 North Tustin Street (Mobil #08-KBK), 0.37 miles from the proposed project area. There are 17 closed cleanup program sites and 29 closed LUST sites within one mile of the project area.

There are two active and seven inactive or closed hazardous sites listed on the EnviroStor database within one mile of the proposed project area. The two active sites identified in the EnviroStor database are Shaffer Plaza (301-349 East Grove Avenue & 1997 North Orange Olive Road) and Thermal-Vac Technology, Inc. (1221 West Struck Avenue), which are located 0.39 and 0.94 miles, respectively, from the project area.

Subsurface exploration and laboratory testing was conducted as part of the Geotechnical Report development (Ninyo & Moore 2022). Between April 7th and 19th, 2022 eighteen small diameter exploratory borings along the project alignment were drilled, logged, and sampled. Soil samples were screened for VOCs. Elevated readings were measured near the surface in soils from two borings collected near the intersection of Taft Avenue and Tustin Street. Additionally, petroleum hydrocarbons were reported in the samples collected from three of the borings. However, concentrations of VOCs and petroleum hydrocarbons did not exceed regulatory screening levels. Detected metals were within background concentrations found in southern California soils and did not exceed regulatory screening levels (Ninyo & Moore 2022).

The California Department of Forestry and Fire Protection's (Cal Fire) Fire Resources Assessment Program (FRAP) assesses the amount and extent of California's forests and rangelands, analyzes their conditions, and

identifies alternative management and policy guidelines. Through the FRAP, CalFire produces maps designating very high fire hazard severity zones (VHFHSZ) within State and Local Responsibility Areas (SRAs). The project area is located within the City of Orange Local Responsibility Area (LRA) and adjacent to the City of Villa Park LRA. The City of Orange and City of Villa Park LRA maps designate the project area as a non-VHFHSZ (Cal Fire 2011a and 2011b).

There are no private, public, or military airports within 2 miles of the proposed project area. The project area is not within an airport land use plan.

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Typical hazardous materials that may be used during construction and routine O&M activities include gasoline, diesel fuel, oil, solvents, and lubricants. The use of these materials for their intended purpose would not pose a significant risk to the public or environment. Wastes, both hazardous and non-hazardous, accumulated during construction activities would be handled, documented, and disposed of in accordance with federal, state, and local laws and regulations.

Hazardous materials would be stored in designated construction staging areas (see *Section 2.4.6 Equipment Staging Areas*) and would be used, transported, handled, and stored in accordance with all applicable federal, state, and local laws and regulations (Federal Code Title 40 and 49; Occupational Safety and Health Administration (OSHA) 29 CFR 1910; California code section 5001, 5401, 5701, and 25507; California Health and Safety Code Division 20, Chapter 6.5, Article 6.5, Article 6.6) which are intended to minimize health risk to the public associated with hazardous materials. In addition, the project would require implementation of a Stormwater Pollution Prevention Plan (SWPPP) to address the discharge of construction related pollutants in storm water runoff (including construction-related hazardous materials) through implementation of appropriate BMPs. Specific BMPs would be determined during preparation of the SWPPP based on site- and project-specific characteristics (equipment types, etc.), and would be in conformance with the NPDES Construction General Permit. Conformance with federal hazardous materials transportation law (49 U.S.C. 5101 et seq.) and California Health and Safety Code Division 20, Chapter 6.5, Article 6.5 would require precautionary measures be taken during the routine transport of hazardous materials, such as testing and preparation of a transportation safety plan. According to California Health and Safety Code Division 20, Chapter 6.5, Article 13, used oil that may be produced from construction or operation of the project would be recycled.

Because the project requires excavation and restoration of road surfaces, any yellow traffic striping present would be tested for lead and chrome content and asphalt would be tested for asbestos prior to excavation or removal activities. **Mitigation Measure HAZ-1** will be implemented to identify and abate yellow traffic striping that may contain lead chromate and asphalt that may contain asbestos. Therefore, hazards to the public or the environment through routine transport, use, or disposal of hazardous materials would be less than significant with mitigation incorporated.

Mitigation Measures

The following mitigation measure shall be incorporated into the project to reduce potential impacts associated with hazardous materials exposure and release during construction. The following mitigation measure was identified in the FMP PEIR as Mitigation Measure HAZ-1. The proposed project's impacts related to the use of hazardous materials would be less than significant with mitigation incorporated.

Mitigation Measure HAZ-1: Pre-Demolition Hazardous Material Survey and Abatement

A survey will be conducted on collection system projects to identify yellow traffic striping that may contain lead chromate and asphalt that may contain asbestos. Following results of the hazardous materials survey, and incorporating information from current lead and asbestos inventories, demolition or renovation plans and contract specifications, including those for road-disturbing activities, shall incorporate abatement procedures for the removal of materials containing asbestos, lead, and universal waste items, as required by law. All abatement work shall be done in accordance with federal, state, and local regulations, including those of the U.S. Environmental Protection Agency, Occupational Safety and Health Administration, California Occupational Safety and Health Administration, and the South Coast Air Quality Management District.

Significance Determination

Less than significant with mitigation incorporated.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

The proposed project has the potential to expose the public and the environment to hazards associated with on-site releases of hazardous materials including gasoline, diesel fuel, oil, solvents, and lubricants during construction. As stated in *Section 2.3.2 Sensitive Receptors,* there are sensitive receptors within the project area which increase the risk of impact from an accidental release of hazardous materials. Hazardous materials would be used, transported, handled, and stored in accordance with all applicable federal, state, and local laws and regulations as discussed in a) above.

Because the project requires excavation and restoration of road surface, any yellow traffic striping present would be tested for lead and chrome content prior to excavation or removal activities. As discussed in a) above, any identified lead and asbestos materials would be abated prior to demolition in accordance with **Mitigation Measure HAZ-1**.

Multiple hazardous material pipelines (e.g., oil and gas) are located within the OC San service area boundary. Multiple Southern California Gas Company gas pipelines transect the proposed pipeline. An OC San 8-inch high pressure gas line runs parallel to the proposed pipeline along Taft Avenue (Woodard & Curran 2022). This proximity of utility assets is a routine occurrence, and OC San's standard project planning process as part of engineering design will include identifying existing underground or overhead utilities occurring in the vicinity of the proposed project.

The project area was not identified in the GeoTracker and EnviroStor databases as a site associated with soil contamination, LUSTs or any past or ongoing site cleanup activities. However, there is a potential for encountering unidentified contamination during ground disturbing activities. Therefore, OC San will implement **Mitigation Measure HAZ-2** that requires development of a Hazards Contingency Plan prior to ground disturbing activities. The Hazards Contingency Plan would outline procedures for training, safety, and identification of contaminated media (soil, soil vapor, groundwater) during construction activities; therefore, risks associated with previously unidentified contamination would be mitigated.

The cleanup activities that have occurred at contamination sites within one mile of the proposed project may include monitoring wells. These monitoring wells may be actively monitored as part of cleanup activities associated with the nearby cleanup site and not identified in the GeoTracker or Envirostor

databases. Disturbance of these monitoring wells during construction activities could cause a release of hazardous materials to the environment. Monitoring wells are protected under California Water Code (Division 7, Chapter 10, Article 4) and cannot be damaged or removed without proper permission from the overseeing regulatory agency. Any monitoring wells encountered during construction will be managed as described in **Mitigation Measure HAZ-3**, which requires consultation with the agency overseeing a cleanup site to determine if the proposed project may affect a monitoring well and determine a plan of action to protect the well.

Upon completion of construction, no chemicals would be stored onsite or routinely transported and used for project maintenance, other than oil and gasoline associated with use of operations and maintenance vehicles. OC San vehicles would be regularly maintained in good working order, in accordance with standard district practices. Because no other hazardous materials would be handled or emitted on a regular basis, operation of the project would result in very low to no risk of accidental release of hazardous materials. With the implementation of **Mitigation Measures HAZ-1** through **HAZ-3**, the impacts from hazardous materials to the public or the environment from potential accidents during construction would be reduced to less than significant. Also, it is noted that because the project would collectively improve older infrastructure, the risk of incidental rupture or release of sewage to the environmental would be reduced compared to existing conditions.

Mitigation Measures

The following mitigation measures shall be incorporated into the project to reduce impacts associated with potential accidental hazardous materials release during construction. The following mitigation measures were identified in the FMP PEIR as Mitigation Measures HAZ-1, HAZ-4, and HAZ-5. The proposed project's impacts related to the accidental upset of hazardous materials would be less than significant with mitigation incorporated.

See **Mitigation Measure HAZ-1: Pre-Demolition Hazardous Materials Survey and Abatement**

Mitigation Measure HAZ-2: Hazards Contingency Plan.
Prior to commencement of any ground-disturbing activities where it has been determined that hazardous materials are present and will be disturbed (see **Mitigation Measure HAZ-4**), a Hazards Contingency Plan shall be developed that addresses potential impacts to soil, soil vapor, and groundwater from releases on or near the project sites. The Hazards Contingency Plan shall include training procedures for identification of contamination. The Hazards Contingency Plan shall describe procedures for assessment, characterization, management, and disposal of hazardous constituents, materials, and wastes, in accordance with all applicable state and local regulations. Contaminated soils and/or groundwater shall be managed and disposed of in accordance with local and state regulations. The Hazards Contingency Plan shall include health and safety measures, which may include but are not limited to periodic work breathing zone monitoring and monitoring for volatile organic compounds using a handheld organic vapor analyzer in the event impacted soils are encountered during excavation activities. As opposed to a single document, all necessary elements of a Hazards Contingency Plan may be developed into contract specifications.

Mitigation Measure HAZ-3: Monitoring Well Protection.
Monitoring wells associated with nearby cleanup sites may be located within the proposed project boundaries. Some of these wells may still be actively monitored as part of required cleanup activities. The agency overseeing the associated cleanup site (Regional Water Quality Control Board, Department

of Toxic Substances Control, or Orange County Health Care Agency) will be consulted prior to project activities that could affect the monitoring wells to determine the best plan of action to either decommission and destroy, protect, and/or replace affected monitoring wells.

Significance Determination

Less than significant with mitigation incorporated.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Taft Elementary School (1080 North California Street), Saint Norbert Catholic School (300 E Taft Avenue), and Children's House Preschool (1400 E Taft Avenue) area located within one-quarter mile of the proposed project area. There is a low risk of accidental release of hazardous materials and toxic air pollutants during project construction. As explained under responses "a" and "b" above, construction of the proposed project would be compliant with local regulations and implementation of **Mitigation Measures HAZ-1** and **HAZ-2**, would reduce the risk of hazardous emissions to the environment associated with demolition and excavation of any unidentified soil contamination. In addition, the proposed project's estimated maximum daily construction emissions of particulate matter and other air pollutants would be below the SCAQMD regional threshold and one-acre LST threshold with mitigation as explained in *Section 3.3 Air Quality*. Therefore, impacts on schools within one-quarter mile of the proposed project would be less than significant with implementation of **Mitigation Measures HAZ-1** and **HAZ-2**.

Mitigation Measures

See **Mitigation Measure HAZ-1 Pre-Demolition Hazardous Materials Survey and Abatement** and **HAZ-2 Hazards Contingency Plan**.

Significance Determination

Less than significant with mitigation incorporated.

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

Regulatory records were searched through the SWRCB GeoTracker database (SWRCB 2022) and the DTSC EnviroStor database (DTSC 2021). None of the proposed project area falls within a site that is included on a list of recent or currently active clean-up or hazardous materials sites per Government Code Section 65962.5 (SWRCB 2022; DTSC 2022).

Implementation of the Hazards Contingency Plan, as described in **Mitigation Measure HAZ-2**, would be used to mitigate hazards associated with newly identified contaminated sites. With implementation of Mitigation Measure **HAZ-2**, these hazards would be reduced to less than significant.

Mitigation Measures

See **Mitigation Measures HAZ-2 Hazards Contingency Plan.**

Significance Determination

Less than significant with mitigation incorporated.

e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project Area?

There are no private, public, or military airports within 2 miles of the proposed project area. In addition, the project area is not within an airport land use plan and would not include tall structures that could interfere with airport safety measures. There would be no impacts.

Mitigation Measures

None required.

Significance Determination

No impact.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The City of Orange has an emergency plan that establishes emergency preparedness and emergency response procedures for both peacetime and wartime disasters. The plan is termed an "Emergency Operations Plan" (EOP) and provides guidance for the City's response in case of emergencies within Orange or originating from areas outside the municipal boundary, including foreign and domestic terrorist acts. The plan was prepared in accordance with the State Office of Emergency Services guidelines for multi-hazard functional planning and contains annexes which address specific functions and duties of response agencies and a directory of emergency response resources. The City's plan addresses specific agency response for any type of disaster (City of Orange 2010).

The 2020 County of Orange and Orange County Fire Authority Local Hazard Mitigation Plan (LHMP) was developed collaboratively to increase public awareness, document resources for risk reduction and loss prevention, and identify activities to guide the County toward building a safer, more sustainable and more resilient community. The mission of the LHMP is to promote sound public policy designed to protect residents, critical facilities, infrastructure, key resources, private property, and the environment from natural hazards in unincorporated areas, fire hazards in the Fire Authority service area, and County and Fire Authority owned facilities (Orange County 2021).

The proposed project would construct approximately 11,000 linear feet of pipeline within existing City of Orange right-of-ways that would temporarily require partial road closures such that construction activities may conflict with the adopted emergency response plan and emergency evacuation plan (the City EOP and County LHMP). **Mitigation Measure TRA-1** would ensure that any temporary impacts to emergency vehicle flow and/or ingress/egress to properties along the project alignment are coordinated in advance with emergency service providers and law enforcement to ensure that provision of sufficient emergency service, access, and evacuation can occur during construction if necessary. O&M required during long-term operation of the project would be incorporated into OC San's existing operation and maintenance routine and would not be expected to affect emergency response. Implementation of **Mitigation Measure TRA-1** would reduce impacts to local emergency service providers and potential interference with an adopted

emergency response plan or emergency evacuation plan during project construction. Impacts would be less than significant.

Mitigation Measures

See **Mitigation Measure TRA-1.**

Significance Determination

Less than significant with mitigation incorporated.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Cal Fire has identified wildfire risk areas through the Fire Hazard Severity Zone maps. The City of Orange and City of Villa Park LRA maps designate the project area and vicinity as a non-VHFHSZ (Cal Fire 2011). The project alignment is entirely within existing roadway right-of-ways; the project area does not contain and is not adjacent to wildlands. The project area has a low risk of wildfire and the project would involve the installation and maintenance of an underground pipeline, which is not infrastructure typically associated with fire risk (see *Section 3.20 Wildfire*). Therefore, there would be no impacts associated with the exposure of people or structures either directly or indirectly to a significant risk of loss, injury or death involving wildlife fire.

Mitigation Measures

None required.

Significance Determination

No impact.

3.10 Hydrology and Water Quality

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	[ ]	[ ]	[X]	[ ]
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge	[ ]	[ ]	[ ]	[X]

such that the Project may impede sustainable groundwater management of the basin?				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in substantial erosion or siltation on- or off-site;	[ ]	[ ]	[X]	[ ]
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	[ ]	[ ]	[ ]	[X]
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	[ ]	[ ]	[X]	[ ]
iv) impede or redirect flood flows?	[ ]	[ ]	[ ]	[X]
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?	[ ]	[ ]	[ ]	[X]
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	[ ]	[ ]	[X]	[ ]

Discussion

Surface Water

The proposed project is located in the Walnut Canyon-Santa Ana River subwatershed (HUC 180702031002) within the larger Santa Ana River Watershed. The Santa Ana River Watershed drains from the slopes of the San Bernardino Mountains to the valley floor of the Inland Empire, through the Prado Basin, on to Orange County and then the Pacific Ocean. The primary waterway in the Santa Ana River Watershed is the Santa Ana River. The project area is located within the Lower Santa Ana River Hydraulic Area, which extends from Prado Dam to the Pacific Coast (OC San 2020).

The Santa Ana Regional Water Quality Control Board (RWQCB), Region 8, regulates water quality within the Santa Ana Region, including the upper and lower Santa Ana River watersheds. The RWQCB prepares and maintains the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan). The Basin Plan sets water quality standards in the Santa Ana River Basin by establishing beneficial uses for specific water bodies and designating numerical and narrative water quality objectives. The project area is located between the Santa Ana River Reach 2 and the Santiago Creek Reach 1, and upstream of the Santa Ana River Reach 1. The Santa Ana River Reach 2 carries all the upstream flows down through Santa Ana Canyon to Orange County where as much of the water as possible is recharged into the Orange County groundwater basin. The downstream end of the recharge area, which is the ordinary limit of surface flows, is at 17th Street in Santa Ana. The Santa Ana River Reach 1 extends from 17th Street to the Pacific Ocean. Beneficial uses of the Santiago Creek Reach 1 and Santa Ana River Reaches 1 and 2 are shown in **Table 3-10**.

Table 3-10: Beneficial Uses

Beneficial Use	Santiago Creek Reach 1	Santa Ana River Reach 1	Santa Ana River Reach 2
Agricultural Supply		Existing	
Groundwater Recharge	Existing	Existing	
Municipal and Domestic Supply	Existing	Except	Except
Rare/Threatened/Endangered Species		Existing	
Contact Recreation	Existing	Existing	Existing
Non-Contact Recreation	Existing	Existing	Existing
Warm Freshwater Habitat	Existing	Existing	Intermittent
Wildlife Habitat	Existing	Existing	Intermittent

Source: SAWPA 2022

The SWRCB also maintains the 303(d) List of Impaired Water Bodies, which identifies water bodies where water quality indicators exceed acceptable thresholds. The Santa Ana RWQCB develops and implements total maximum daily loads (TMDLs) to address water quality impairments and help achieve water quality standards. Water quality is also governed through NPDES stormwater discharge permits issued to municipalities, construction sites, and industrial facilities to control non-point-source pollutants in stormwater discharges to surface waters. The proposed project area does not directly drain to a 303(d)-listed impaired water body.

The U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA) identifies flood hazard areas on Flood Insurance Rate Maps prepared for the National Flood Insurance Program. These areas, known as Special Flood Hazard Areas, are defined as areas where there is a one percent chance of flooding in any given year (also referred to as a 100-year flood). FEMA maps also identify moderate flood hazard areas, which are areas outside the one-percent flood area where there is a 0.2 percent chance of flooding in a given year (also referred to as a 500-year flood). Areas outside the 100-year and 500-year flood zones are considered areas of minimal flood hazard. Although the Santa Ana River and Santiago Creek are considered 100-year flood zones, these water bodies are outside of the project area. There are no 100-year or 500-year flood zones in the project area (FEMA 2009).

Groundwater

The proposed project overlies the Coastal Plain of Orange County Groundwater Basin (Orange County Basin, DWR Basin Number 8-001). This basin underlies central and northern Orange County and is bordered by

the Santa Ana Mountains to the east, the Pacific Ocean to the west, the Newport–Inglewood Fault to the southwest, and Coyote Hills to the north. The Orange County Groundwater Basin reaches depths of more than 2,000 feet and is composed of a complex series of interconnected sand and gravel deposits (OC San 2020). The proposed project specifically overlies the Orange County Groundwater Management Zone within the Lower Santa Ana River Basin (Santa Ana RWQCB 2017).

The Orange County Basin is designated as a medium priority groundwater basin by DWR (DWR nd) under the Sustainable Groundwater Management Act (SGMA). Under SGMA, groundwater basins ranked as medium- or high-priority are required to develop groundwater sustainability plans (GSPs) or submit an alternative to a GSP that demonstrates how water managers have already achieved or will achieve sustainable groundwater management. In July, 2019, the DWR approved the Basin 8-1 Alternative prepared by Orange County Water District, City of La Habra and Irvine Ranch Water District satisfy SGMA requirements for groundwater sustainability of the Coastal Plain of the Orange County Basin, and included required elements of GSPs as described in the California Water Code (§10727.2, 10727.4, and 10727.6). The Basin 8-1 Alternative is updated every five years per SGMA requirements (OCWD nd).

The Santa Ana RWQCB designates beneficial uses for the Lower Santa Ana River Basin, including the Orange County Groundwater Management Zone. Beneficial uses for the Orange County Groundwater Management Zone include municipal, agricultural, industrial service, and industrial process supply (Santa Ana RWQCB 2017).

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Construction activities that primarily result in sediment releases are related to exposing previously stabilized soils to potential mobilization by rainfall/runoff and wind. Such activities have the potential to degrade surface or groundwater quality and include grading, excavations, and temporary stockpiling of soil. Erosion and sedimentation affect water quality and interfere with photosynthesis, oxygen exchange, and the respiration, growth, and reproduction of aquatic species. Additionally, other pollutants, such as nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported to downstream drainages, which could contribute to the degradation of water quality. Furthermore, during grading and soil storage, there is the potential for soil migration off site via wind (OC San 2020).

The proposed project would disturb more than one acre of land and would require a NPDES Construction General Permit. As required by the permit, the construction contractor would prepare a SWPPP and implement BMPs during construction to control water quality from stormwater discharges offsite, such as site management "housekeeping," erosion control, sediment control, tracking control and wind erosion control. Potential BMPs include, but are not limited to, erosion control blankets, silt fences, and fiber rolls to prevent potential impacts to surface or groundwater quality (Caltrans 2003). The contractor would be required to comply with the Construction General Permit throughout construction. If groundwater is encountered during excavation, dewatering discharges would be disposed of in accordance with applicable state and local requirements. Compliance with permits including implementation of BMPs, would ensure the project would not violate water quality standards or waste discharge requirements, nor significantly degrade surface water and groundwater quality. Construction impacts on surface water and groundwater quality would be less than significant.

During construction, sewage releases would be controlled via a combination of bypass pumping (redundant pumps), spill containment for bypass pumps, and working at night for portions of work (see *Section 2.6*

Environmental Commitments). With incorporation of these standard construction measures, construction impacts relating to potential sewage releases and water quality would be less than significant.

Operation of the proposed project would consist of distributing wastewater through the proposed pipeline to OC San's sanitary sewer system. The existing sewer transmission pipelines are under capacity and implementation of the proposed project would lessen the potential for sewerage releases to occur. No adverse impacts on surface water and groundwater quality would occur from operation of the project.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?

The proposed project is a sewer improvement project in an urbanized area and the project area is located within fully paved roadway rights of way. After installation of the new sewer pipeline, the project alignment would be restored to existing conditions, and would not result in a change in impervious surface area affecting the ability of rainfall to recharge the groundwater basin.

As discussed in *Section 3.14 Population and Housing,* the proposed project would serve existing wastewater demand and planned future growth that would occur with or without the project. The project would not induce population growth or increase water demands that would require additional groundwater pumping. Operation of the project does not require potable or non-potable water, meaning the use of water would be limited to temporary construction activities such as dust control. Therefore, the proposed project would not be expected to substantially decrease groundwater supplies or interfere with groundwater recharge efforts. There would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

c.i) Substantially alter the existing drainage pattern of the site area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: result in substantial erosion or siltation on- or off-site?

The proposed project does not require the crossing of a river or stream. The proposed project would be constructed entirely within existing paved roadway rights of way which would be restored to pre-construction conditions, and thus would not permanently increase total impervious surface area.

Project construction may result in disturbance or exposure of soil that could be subject to erosion and sedimentation during a rain event. However, implementation of SWPPP and BMPs as required by the NPDES Construction General Permit would limit erosion and sedimentation.

As a result, the proposed project would not alter the existing drainage pattern of the project area in a manner which would result in substantial erosion or siltation on- or off-site. Therefore, the proposed project would have a less than significant impact.

c.ii) Substantially alter the existing drainage pattern of the site area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

There are no 100-year or 500-year flood zones in the project area (FEMA 2009). Construction of the project includes installation of underground sewer pipelines in paved roadways, and surface conditions would be restored to pre-project conditions. Thus, the rate or amount of surface runoff would not increase. As a result, the proposed project would not alter the existing drainage pattern of the site area in a manner which would result in flooding on- or off-site. Therefore, the proposed project would have no impact.

c.iii) Substantially alter the existing drainage pattern of the site area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

As discussed in *c,i, and cii*, above, the proposed project would not increase surface runoff or alter the existing drainage pattern of the site area in a manner which would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. In addition, all construction activities would be conducted in accordance with BMPs specified in the construction SWPPP to reduce impacts to pollutants in storm water discharges. Also, because the project would collectively improve older infrastructure, the risk of incidental release of sewage would be reduced compared to existing conditions. Therefore, the proposed project would have a less than significant impact.

c.iv) Substantially alter the existing drainage pattern of the site area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: impede or redirect flood flows?

As discussed in *c,i, cii and ciii*, above proposed project would not increase impervious surfaces or pass above, below, or through an existing stream or river. In addition, there are no 100-year or 500-year flood zones in the project area (FEMA 2009). As a result, the proposed project would not alter the existing drainage pattern of the site area in a manner which impede or redirect flood flows and would have no impact.

Mitigation Measures

None required.

Significance Determination

Less than significant.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?

A tsunami is a large ocean wave, caused by earthquakes or major ground movement. The proposed project site is located approximately 15 miles from the Pacific Ocean; at this distance, a tsunami would not impact the project area. A seiche is a large wave generated in an enclosed body of water such as a lake, which is also typically caused by an earthquake. There are no identified seiche zones in the Orange County Local Hazard Mitigation Plan or the Orange County General Plan Safety Element. There are no 100-year or 500-year floodplains within the project area (FEMA 2009). In addition, the project pipeline would be installed below existing roadways which would be resurfaced after construction, so there would be no risk of floods inundating the project and potential for release of pollutants is low. Therefore, there would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

As noted previously, the Basin Plan sets water quality objectives for the project area. Water quality thresholds identified in the Basin Plan are intended to reduce pollutant discharge and ensure that water bodies are of sufficient quality to meet their designated beneficial uses. The proposed project would not conflict with the water quality standards outlined in the Basin Plan or worsen water quality conditions in any 303(d)-listed water body. As discussed above, pollutant discharge during construction would be avoided via compliance with the Construction General Permit and SWPPP and NPDES permits for construction dewatering, if needed. Once operational, the project would convey wastewater through OC San's existing sanitary sewer system. The project would not discharge extracted or treated water or be a source of pollutants for downstream water bodies (e.g., Santa Ana River, Santiago Creek). Therefore, the proposed project would not conflict with the Basin Plan.

As previously discussed, the Orange County Basin is being managed for groundwater sustainability under the Basin-8 Alternative to a GSP, approved by DWR in 2017. The purpose of the project is to install sewer transmission lines to improve OC San's operational efficiency and capacity. The project does not involve the extraction of groundwater nor would it result in any increases in impervious surfaces that could affect groundwater recharge, and thus the project would not impact groundwater sustainability. Therefore, the project would not conflict with applicable water quality control plans or groundwater management plans. Impacts would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

3.11 Land Use and Planning

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Physically divide an established community?	[ ]	[ ]	[ ]	[X]
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect	[ ]	[ ]	[X]	[ ]

Discussion

The proposed project is located in the City of Orange. Land use in the City of Orange is established in the City of Orange General Plan Land Use Element, which describes the desired future physical and economic composition of the City's planning area and the planned relationship of uses. The primary objectives of the Element are to determine the future location, type, and intensity of new development and redevelopment projects, and to establish the desired mix and relationship between such projects to maximize the long-term livability of the community (City of Orange 2015). According to the City of Orange Zoning Map, parcels adjacent to the proposed project are classified as single family residential, multi-family residential, commercial, and industrial (City of Orange 2022). As stated in *Section 2.3.7 Existing Site Conditions*, land uses in the project area are a combination of commercial businesses, churches, private schools, single family residential and multi-family residential.

The project pipeline would be constructed within existing City of Orange roadways. The proposed temporary staging areas along Taft Avenue (**Figure 2-2**) would be located on vacant land that is designated light industrial and single family residential. If the identified staging area options cannot accommodate all equipment storage/staging for the proposed project, the construction contractor may use roadway right-of-ways for the purposes of equipment storage, staging, and/or pipe stringing. Other existing OC San or City property would be utilized as necessary for staging and intermediate storage for the installation of the sewer pipelines, or the contractor would be responsible for securing suitable temporary equipment storage/staging site(s) prior to construction and implementing applicable environmental commitments (see *Section 2.6*) at the staging area(s).

As noted in the PEIR, OC San understands the importance of consistency with the goals and policies identified within local jurisdictions' General Plans and other local ordinances and plans; however, per California Government Code Section 53091, OC San, as a wastewater treatment facility, is exempt from local

zoning and building ordinances. As part of standard practice, OC San would coordinate with local jurisdictions to the extent feasible during implementation of the proposed project (see OC San General Requirements 9 (GR-9)) Public Convenience and Access, for example) to avoid and/or minimize potential impacts.

a) Physically divide an established community?

The proposed project would be constructed entirely within existing roadways and would temporarily require lane closures that would impact access to adjacent land uses and short-term vehicle trip lengths. However, no streets would be fully closed and continued access to established communities and businesses would be maintained during construction (see *Section 3.17 Transportation*). In addition. impacts would not permanently affect the existing surrounding established communities. The project would be constructed completely belowground, and all pipeline and maintenance hole construction areas would be restored to pre-construction conditions after construction is complete (i.e., no permanent disturbance footprint). The temporary construction staging areas would be located on land that is vacant and, if necessary, within roadway right-of-ways. The proposed project would not permanently interfere with the pedestrian, bicycle or vehicle circulation and would not result in a physical barrier within the existing community. Therefore, the proposed project would have no impact related to physically dividing an established community.

Mitigation Measures

None required.

Significance Determination

No impact.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The proposed project would replace a portion of the Taft Branch regional sewer pipeline to maintain OC San's wastewater conveyance system, meet existing and projected demands for wastewater conveyance in the OC San service area, and comply with existing wastewater treatment and disposal regulations. The project would be located within existing roadways and staging areas located on vacant land (and within the Taft Avenue right-of-way if necessary), and the project area would be returned to pre-construction conditions after construction is completed. Construction and operation of the project would not require or result in changes to land use or zoning designations. Furthermore, as part of standard practice, OC San would coordinate with all applicable local jurisdictions to the extent feasible during construction of the project to avoid and/or minimize potential impacts.

As noted in the PEIR, the City of Orange General Plan (City of Orange 2015b) land use policies that are applicable to the proposed project include:

- Goal 1.0. Ensure water, sewer, and storm drain systems that meet the needs of residents and businesses.
- Policy 1.1. Provide sufficient levels of water, sewer, and storm drain service throughout the community.

The proposed project would replace and rehabilitate a portion of the existing sewer system to meet the needs of existing and planned future demands for wastewater service and would be consistent with the relevant General Plan goals. Therefore, impacts from the project would be less than significant with respect to a conflict with an applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Mitigation Measures

None required.

Significance Determination

Less than significant.

3.12 Mineral Resources

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	[ ]	[ ]	[ ]	[X]
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	[ ]	[ ]	[ ]	[X]

Discussion

Historically, the City of Orange contributed to the gravel industry, but over the years the City's mineral resources have been mostly exhausted and all state-designated Mineral Resource Zones (MRZs) have been declassified either as a result of completed mining activity or urban development. Remaining mineral resource deposits are primarily limited to the sand and gravel resources contained in and along the Santa Ana River and Santiago Creek. Sand and gravel resources are referred to collectively as "aggregate." Aggregate is the primary component of Portland cement concrete, a material widely used in the construction industry. As these resource deposits are important to the region's economy, the City of Orange General Plan Land Use Element (City of Orange 2015a) provides a means to protect the resource areas from premature urbanization through protected land use designations. The Resource Area land use designation allows for only aggregate extraction or recreation uses. The Open Space designation does not permit mining but does prevent urbanization, making it possible to mine the areas at some future date if necessary. One

area within the northeastern portion of the city (surrounding two groundwater recharge pits [Bond Pits] on Santiago Canyon Road) and one area northwest of the City (approximately 18-acre site of the R.J. Noble Company) are designated as Resource Areas. Open Space designation areas are located at the west end of Lincoln Avenue, areas adjacent to Santiago Creek, and the north, east, and west sides of Irvine Lake in East Orange (City of Orange 2015).

a-b) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

The proposed project would rehabilitate wastewater conveyance pipelines within roadway right-of-ways and previously disturbed land. The proposed project area is not located within designated Resource Area or Open Space land as classified on the City of Orange General Plan Land Use Policy Map (City of Orange 2015b). All disturbed areas would be restored to pre-construction conditions after construction is complete (i.e., no permanent footprint). In addition, construction and operation of the project would not require or result in changes to land use or zoning designations. No impact on the availability of a known mineral resource or the availability of an important mineral resource recovery site that is of value locally, or to the region or residents of the state would occur as a result of construction or operation of the proposed project.

Mitigation Measures

None required.

Significance Determination

No impact.

3.13 Noise

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	[ ]	[X]	[ ]	[ ]
b) Generation of excessive groundborne vibration or groundborne noise levels?	[ ]	[ ]	[X]	[ ]

c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?	[ ]	[ ]	[ ]	[X]

Discussion

A Noise Impact Analysis (**Appendix E**) was conducted for the proposed project and is relied upon for the analysis in this IS/MND. Noise is generally defined as unwanted sound. Noise can cause hearing impairment for humans, and may also disrupt everyday activities such as sleep, speech, and activities requiring concentration. Noise can also interfere with the activities of wildlife, especially nesting birds. Noise-sensitive land uses are generally those where excess noise would disrupt how humans and/or wildlife use the land. Land uses such as schools, churches, and hospitals would typically be considered noise-sensitive. Noise may be generated by mobile (i.e., line) sources (for example, cars, trains, and aircraft) or stationary (i.e., point) sources (for example, machinery, airports, and construction sites).

Noise is described using specific terminology, as summarized below. The following explanations are adapted from the U.S. Department of Transportation Federal Highway Administration (FHWA) *Construction Noise Handbook* (FHWA 2006) and the U.S. Department of Transportation Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018):

- **A-Weighting.** A method used to account for changes in level sensitivity as a function of frequency. A-weighting de-emphasizes the high and low frequencies and emphasizes the mid-frequencies, in an effort to simulate the relative response of the human ear.
- **Community Noise Equivalent Level (CNEL).** A 24-hour time-averaged sound exposure level adjusted for average-day sound source operations. The adjustment includes a 5-dB penalty for noise occurring between 7:00 pm and 10:00 pm, and a 10-decibel (dB) penalty for those occurring between 10:00 pm and 7:00 am, to adjust for the increased impact of nighttime noise on human activities.
- **Decibel (dB).** A unit of measure of sound level. dB is calculated by comparing sound pressure to a sound pressure reference (the threshold of human hearing) and are measured using a logarithmic scale. A-weighted decibels are expressed as dBA or dB(A).
- **Equivalent Sound Level (L_{eq}).** The equivalent sound level describes a receiver's cumulative noise exposure from all events over a specified period of time.
- **Ground Effect.** The change in sound level, either positive or negative, due to intervening ground between source and receiver. Ground effect is influenced by multiple factors, including ground characteristics, source-to-receiver geometry, and the spectral characteristics of the source. A commonly used rule-of-thumb for propagation over soft ground (e.g., grass) is that ground effects will account for about 1.5 dB per doubling of distance. However, this relationship tends to break down for distances greater than about 100 to 200 ft.

- **Line Source.** A source of noise that is created by multiple point sources moving in one direction; for example, a continuous stream of roadway traffic, which radiates sound cylindrically. Sound levels measured from a line source decrease at a rate of 3 dB per doubling of distance.
- **Noise Barrier.** The structure, or structure together with other material, that potentially alters the noise at a site.
- **Point Source.** A source that radiates sound spherically. Sound levels measured from a point source decrease at a rate of 6 dB per doubling of distance.

Groundborne vibration may occur when heavy equipment or vehicles create vibrations in the ground, which can then propagate through the ground to buildings, creating a low-frequency sound. Groundborne vibration can be described by both its amplitude and frequency. Amplitude may be characterized by particle velocity, which is measured in inches or millimeters per second. Vibration can be felt outdoors, but the perceived intensity of vibration impacts is much greater indoors, due to the shaking of the structure. Groundborne vibrations can be a source of annoyance to humans due to a "rumbling" effect, and such vibrations may also cause damage to buildings. Groundborne vibration is discussed in terms of these impacts on humans and structures. The annoyance potential of groundborne noise is typically characterized with the A-weighted sound level. Some of the most common sources of vibration come from trains, transit vehicles, construction equipment, airplanes, and large vehicles. Several land uses are especially sensitive to vibration, and therefore have a lower vibration threshold. The following vibration terminology have been adapted from the FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018):

- **Vibration Decibels (VdB)**. The vibration velocity level in decibel scale.
- **Peak Particle Velocity (PPV)**. The peak signal value (maximum positive or negative peak) of the vibration signal. PPV is often used in monitoring of construction vibration (such as blasting) because it is related to the stresses that are experienced by buildings and is not used to evaluate human response. PPV is usually expressed in inches/second in the United States.
- **Root Mean Square (rms)**. The rms is used to describe the smoothed vibration amplitude. The rms amplitude is used to convey the magnitude of the vibration signal felt by the human body, in inches/second. The average is typically calculated over a one-second period. The rms amplitude is always less than the PPV and is always positive.

Noise Standards

The PEIR identified the County of Orange Noise Ordinance (Division 6, Noise Control), which sets a standard of 55 dBA during the daytime and 50 dBA during the nighttime in residential zones and prohibits noise that:

- exceeds the standard for more than 30 minutes; or
- exceeds the standard by 5 dBA for more than 15 minutes; or
- exceeds the standard by 10 dBA for more than 5 minutes; or
- exceeds the standard by 15 dBA for more than 1 minute; or
- exceeds the standard by 20 dBA for any period of time.

The County of Orange Noise Ordinance exempts noise associated with construciton activities that take place between 7:00 am and 8:00 pm Monday through Saturday.

The proposed project is located in the City of Orange. The City of Orange (Code of Ordinances Chapter 8.24 – Noise Control) has set exterior noise standards at residential properties of the following, unless ambient noise levels exceed the following standards, in which case the exterior noise cannot exceed the ambient levels (up to 70 dBA):

- 55 dBA hourly average L_{eq} during the daytime (7:00 am – 10:00 pm)
- 50 dBA hourly average L_{eq} at night (10:00 pm – 7:00 am)
- 70 dBA maximum level L_{max}, during the daytime (7:00 am – 10:00 pm)
- 65 dBA hourly average L_{max} at night (10:00 pm – 7:00 am)

The City's Noise Control ordinance does not set noise standards for commercial areas. The residential noise standard applies to non-transportation, fixed sources of noise (e.g., construction equipment moving around a fixed construction site, industrial equipment, pumps, fans, generators). Noise associated with construction is exempt from this standard, as long as it occurs between 7:00 am and 8:00 pm Monday through Saturday, or 9:00 am and 8:00 pm Sundays and federal holidays. Noise associated with any maintenance or construction activity undertaken by a public utility within street right of way is also exempt from the City Noise Ordinance, regardless of the time of day it is undertaken.

The City Noise Ordinance does not provide a quantitative limit to the noise levels that may be created from construction activities that are exempt. Therefore, in order to determine if the proposed project's construction activities would create a significant substantial temporary noise increase, the Noise Impact Analysis (**Appendix E**) identified construction noise guidance provided by the FTA, which is based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise. The FTA general construction noise criteria indicate that a significant construction noise impact would occur if construction noise exceeds 90 dBA L_{eq} during the daytime or 80 dBA L_{eq} during the nighttime at any nearby noise-sensitive receptors.

Existing Conditions

The project area is fully built out. Surrounding land uses include commercial, residential, and public facilities. The pipeline alignment also crosses State Route 55. As described in the PEIR and Noise Impact Analysis, transportation is the major source of noise in the project area, with vehicle traffic being the primary noise source. The PEIR conducted ambient noise measurements and found that ambient noise at the representative FMP collection systems ranged from 66 to 69 dBA L_{eq}.

Noise-sensitive receptors adjacent to or in the vicinity of pipeline alignment include the single-family and multi-family residences on either side of the proposed alignment along Taft Avenue, Sacramento Street, Breckenridge Street, and Meats Avenue. Schools and faith-based facilities are also located along the alignment. The pipeline alignment would be located in the existing roadway right-of-way, typically around 25 feet from the nearest receptor.

The pipeline alignment at the west end is surrounded by commercial and residential land uses. Moving east along Taft Avenue, land uses are primarily residential. Along Tustin Street, there are commercial land uses and a SCE power station. The pipeline alignment crosses under State Route 55, then turns north onto Sacramento Street, a residential street. On North Breckenridge Street and Meats Avenue, the alignment is surrounded by residential land uses.

Noise measurements were taken in the vicinity of the project site and are summarized in the Noise Impact Analysis (**Appendix E**). To understand the potential impact of proposed nighttime construciton noise, 24-hour noise measurements were taken at the nearest sensitive receptors to the Tustin Street portion of the project site. For the rest of the project area where construction would occur during the daytime, short-term noise measurements were taken between 10 am and 11 am. At the Tustin Street portion of the project site, existing nighttime noise levels ranged from 59.1 to 62 dBA L_{eq}, and existing daytime noise levels ranged from 61.4 to 64.3 dBA L_{eq}. At the short-term noise measurement locations on the project site, daytime noise levels ranged from 55.8 to 63.8 dBA L_{eq}.

a) Generation of 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?

Construction

Construction of the proposed project is expected to last 24 months. However, the trenching, pipeline installation, and maintenance hole installation phase is estimated to last approximately 12 months and would involve the most noise-generating activities from use of heavy construction equipment and hauling. The construction equipment that would be used can be found in *Section 2.4 Proposed Project Description*. The typical noise level of each piece of construction equipment that would be used for the Project is shown in **Table 3-11**.

Table 3-11: Typical Construction Equipment Noise Levels

Equipment	Typical Noise Levels (dBA, at 50 feet)
Backhoe/Loader	78
Compressor	78
Concrete Saw	90
Crane	81
Drill Rig	79
Dump Truck	76
Generator	81
Hydraulic Excavator	81
Pavement Breaker	90[1]
Paver	77
Pick-up Trucks	75
Pump	81
Sweeper	82
Utility Truck	74[1]
Water Truck	74[1]
Welder	74

Source: FHWA 2006, and CalEEMod default equipment mix
1. Pavement breaker noise level was assumed to be comparable to a jackhammer. Water truck noise was assumed to be comparable to a tractor. Utility truck noise was assumed to be comparable to a flat-bed truck.

As summarized in *Section 2.4 Proposed Project Description*, construction of the proposed pipeline would occur during daytime hours for Segments 1, 2, 3, 5, 6, and 7. Segment 4, which is in or adjacent to Tustin Street, would be constructed at night in order to minimize traffic impacts on the five-lane street within a commercial and industrial area. Potential pipeline alignment and staging areas are shown in **Figure 2-2.** Pipelines would be constructed using a combination of open cut or trenchless methods (with techniques for certain segments still under evaluation as described in *Section 2.4.1 Project Details by Segment*). Pipeline construction would include noise-generating activities such as saw cutting of the pavement, trench excavation, trench backfill and compaction, and site restoration/pavement replacement. Pipeline construction is expected to occur at a rate of 50 linear feet per day. Therefore, construction noise impacts at any one receptor would be of short duration as construction would move along the pipeline alignment as it is completed.

During project construction, truck trips would generate noise along haul routes. Noise-sensitive land uses along haul routes, including residences, would be exposed to truck noise during construction. The nearest noise-sensitive receptors to the project site are homes located on both sides of Meats Avenue, Breckenridge Street, Sacramento Street, and on Taft Avenue west of Tustin Street. The amount of noise generated by temporary construction activities is affected by the vehicle speed, load, road condition, and other factors. As noted in the PEIR and Noise Impact Analysis, road noise is a major noise source in the area. Construction truck noise that occurs in noisy locations is generally less disruptive than the same noise would be in a quieter location.

Table 3-12 presents noise levels from temporary construction activities associated with pipeline construction, including mobilization/ utility potholing; trenching/ pipeline/ MH installation; final paving /restoration; and demobilization. The equipment list was derived from CalEEMod, consistent with the methodologies in the PEIR. The noise levels were modeled using the Federal Highway Administration Roadway Construction Noise Model (RCNM). Model results are included in **Appendix E**.

Table 3-12: Noise Level from Construction within the Roadway Right-of-Way at nearest Residential Land Uses

Pipeline Segment	Time of Construction	Distance to Nearest Residence (ft)	Construction Noise Level (dBA L_{eq})	FTA Construciton Noise Standard (dBA)/ Exceed?	Ambient Noise Level (dBA L_{eq})/ Exceed?
1 - Taft Ave (west)/ Glassel	Daytime	65	73	90/ No	62.4/ Yes
2 - Taft Ave (west)/ Cambridge	Daytime	60	83	90/ No	62.4/ Yes
3 - Taft Ave/ Tustin Street	Daytime	55	84	90/ No	64.3/ Yes
4 - Tustin St	Nighttime	220	67	80/ No	59.1/ Yes
5 - Taft Ave (east)	Daytime	50	85	90/ No	69.8/ Yes
6 - Sacramento St	Daytime	50	85	90/ No	55.8/ Yes
7 - Meats Ave	Daytime	50	85	90/ No	63.8/ Yes

Source: **Appendix E**.

The level of noise from pipeline construction would be associated with construction undertaken by a public utility within street right of way, and would therefore be exempt from – and not conflict with – local noise standards. The project's temporary construction activities would not exceed FTA general standards for human effects and reaction to noise. Furthermore, it would be temporary; construction noise would not be centered at a single receptor for the entire duration of construction. The proposed project would involve some nighttime work, but the nighttime work would occur in a commercial neighborhood, along Tustin Avenue, at least 200 feet from the nearest residential property line. Noise attenuates greatly with distance. For localized sources of noise grouped closely together, such as a construction site, noise attenuates at a rate of approximately 6 dB per doubling of distance (FTA 2018). Thus, the nighttime construction noise at the nearest residential property line would be around 67 dBA.

Construction noise impacts from the proposed staging area are presented in **Table 3-13**. The City provides different noise standards for the pipeline construction activities undertaken within a street right of way, versus the activities at the proposed staging areas; therefore, the pipeline construction activities and staging area activities were analyzed separately.

Table 3-13: Nighttime Noise Level from Construction Staging Area at nearest Residential Land Uses

Location of Receptors	Distance to Nearest Residence (ft)	Construction Noise Level (dBA L_{eq})	Nighttime Noise Standard (dBA L_{eq})/ Exceed?	Ambient Noise Level (dBA L_{eq})/ Exceed?
Homes to the West	380	61	50 dBA/ Yes	64/ No
Homes to the East	100	68	50 dBA/ Yes	64/ Yes

Source: **Appendix E**

The construction staging area located on vacant land on Taft Avenue may be used during the proposed nighttime construction work on Tustin Street. There may be other construction staging areas used during construction of the proposed project; however, all other potential construction staging areas would only be used during the daytime when construction noise is exempt from City noise restrictions. For construction activities that occur during nighttime hours, the City Noise Ordinance limits construction noise to the exterior noise standards of 50 dBA L_{eq} and 65 dBA L_{max}, or ambient noise level (up to 70 dBA), whichever is higher.

Compared to the representative ambient noise levels measured for the PEIR and Noise Impact Analysis, construction noise levels of the proposed project pipeline construction would at times be higher than ambient. Noise associated with construction that occurs during the day (i.e., between 7:00 am and 8:00 pm Monday-Friday or between 9:00 am and 8:00 pm Sundays and holidays) is exempt from the City's exterior noise standards. Therefore, construction noise associated with pipeline segments 1, 2, 3, 5, 6, and 7 would not conflict with the City's noise standards. The proposed project would implement **Mitigation Measure NOI-1**, Noise Reduction Measures and **Project Design Feature, NOI-1**, Public Outreach, as specified in the PEIR. **Mitigation Measure NOI-1** requires measures such as keeping equipment in proper working order, locating stockpiles and staging areas away from sensitive receptors, and noise reduction measures such as exhaust mufflers. **Project Design Feature NOI-1** requires outreach to surrounding residents and businesses to notify them of construction work and timing, and require the contractor to address noise complaints. Although temporary construction noise associated with pipeline segments 1, 2, 3, 5, 6, and 7 would be less than significant, these measures would reduce noise even further.

Noise associated with nighttime construction for pipeline segment 4 has the potential to exceed the ambient noise level at the nearest residential receptor and, therefore, conflict with the City's noise control ordinance. The proposed project would be required to implement **Mitigation Measure NOI-2**, Nighttime Noise Reduction Measures. **Mitigation Measure NOI-2** requires noise barriers that will ensure ambient nighttime noise levels at nearby residential receptors are not exceeded during nighttime work.

Compared to the City nighttime noise standards for residential areas, construction noise levels of the proposed project staging area construction activities would at times exceed the 50 dBA L_{eq} standard. **Mitigation Measure NOI-3** , Time of Day Restrictions, requires that if the staging area on the east side of State Route 55 is used, all activities within this staging area shall be limited to when construction activities are exempt from the City noise standards as detailed in Section 8.24.050(E) of the City of Orange Municipal Code: 7:00 am and 8:00 pm Monday through Saturday, or 9:00 am and 8:00 pm Sundays and federal holidays.

Additionally, OC San General Requirements (GR-6-B) require noise control measures, such as proper equipment maintenance and use of mufflers on internal combustion engine equipment; these measures would further reduce noise from the proposed project. OC San General Requirement GR-6-B, Noise Control, states:

- Work hours are as stated in the General Requirements under the section entitled "Length of Workday and Workweek / Prevailing Wage" which states, "Eight (8) hours of labor shall constitute a calendar day's labor for employees" and "A working day shall be Monday through Friday and shall be between 7:00 am and 3:30 pm" Changes to work hours may require the use of noise control measures." Note, City of Orange preliminary permitting for this project has indicated work hours shall be 8:30 am to 4:30 pm.

- All equipment used during construction shall be muffled and maintained in good operating condition. All internal combustion engine driven equipment shall be fitted with intake and exhaust mufflers that are in good condition.

- Back up bells on equipment may only be operated between 7:00 am and 5:00 pm. Air compressors and diesel engine operation will not be permitted between 5:30 pm and 7:00 am. Unless otherwise directed by the OC San Project Engineer, temporary generators will be permitted to operate between 7:00 am and 5:00 pm providing that the generator noise level shall not exceed 85 dB at 3 feet. For projects not located on OC San property, noise control shall comply with ordinances for the city where the Work is being performed.

With the implementation of these measures, impacts would be reduced to less than significant.

Operations

Once operational, the below-ground conveyance pipelines would not generate noise. Noise may be associated with occasional vehicle maintenance trips, but these trips would be infrequent and the resulting noise would be negligible. The project would have less-than-significant long-term operational noise impacts.

Mitigation Measures

The following design feature and mitigation measures shall be incorporated into the project to reduce potential construction noise impacts. The following design feature and mitigation measure NOI-1 were identified in the FMP PEIR as Project Design Feature NOI-1 and Mitigation Measure NOI-1. The proposed project's noise impacts would be less than significant with mitigation incorporated.

Project Design Feature NOI-1: Public Outreach.

To address construction noise impacts, the Orange County Sanitation District (OC San) has a process in place as follows:

A. Public outreach is conducted in communities that could be impacted by construction activities so that the public is aware of the work that must be conducted, where the work will occur, and the timing of the proposed work.

B. At least five (5) days prior to the start of construction activities, the OC San will notify the surrounding residents and businesses by mail or other means of distribution. For projects located outside of Plant 1 or Plant 2, the construction contractor will post signs in the project vicinity that identify the Orange County Sanitation District as the project owner and a general contract phone number. Sign location(s) will be identified with local jurisdiction approval.

C. Once work begins, the contractor has the responsibility to address noise and vibration-related complaints.

Mitigation Measure NOI-1: Noise Reduction Measures.

For Facilities Master Plan (FMP) projects located within 500 feet of noise-sensitive receivers (residences, hotels and motels, educational institutions, libraries, hospitals, and clinics), the following measures shall be implemented:

A. All mobile or fixed noise-producing equipment used on an FMP project that is regulated for noise output by a local, state, or federal agency shall comply with such regulation while in the course of program activity.

B. Construction equipment shall be properly outfitted and maintained with manufacturer-recommended noise-reduction devices to minimize construction-generated noise.

C. Electrically powered equipment shall be used instead of pneumatic or internal-combustion-powered equipment, where feasible.

D. Stationary noise sources such as generators or pumps shall be located at least 100 feet from noise-sensitive land uses as feasible.

E. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.

F. Construction site and haul-road speed limits shall be established and enforced during the construction period.

G. As feasible, the hours of construction, including noise-generating activities and all spoils and material transport, shall be restricted to the time periods and days permitted by the local noise or other applicable ordinances. As necessary, the OC San shall coordinate with the applicable local jurisdiction regarding activities that are not consistent with local ordinances to avoid/minimize impacts.

H. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. Additionally, pursuant to Occupational Safety and Health Act Sections 1926.601(b)(4) and 1926.602(a)(9), a device that uses broadband "white noise" instead of a single-tone alarm may be used if it is shown to be effective.

I. The Orange County Sanitation District or its designees shall coordinate with local jurisdictions and sensitive receptors regarding the proposed FMP to address any potential project-specific noise-related issues prior to commencement of construction activities.

J. Noise-reduction measures such as exhaust mufflers, sound blankets or temporary sound walls shall be used to reduce noise from noise-generating equipment and activities during construction.

Mitigation Measure NOI-2: Nighttime Noise Reduction Measures.

In order to ensure construction noise at nearby residences does not exceed the standards detailed in Section 8.24.050(E) of the City of Orange Municipal Code, prior to the start of nighttime construction for Pipeline Segment 4, 500 feet on Tustin Street, OC San shall ensure the following nighttime noise reduction measures are in place:

- The construction contractor shall establish a current nighttime ambient noise level at the nearest residential property, 1612 E Briardale Avenue, or accept on the 24-hour average nighttime ambient noise level measured in the Noise Impact Analysis (**Appendix E**) of 59.1 dBA L_{eq}.

- The contractor shall install temporary construction noise barriers. These barriers shall block the line of sight between the equipment and the nearest residential property and shall provide a minimum of 10 dBA of noise attenuation. The construction noise barrier shall be constructed with no gaps or perforations. It shall remain in place until the conclusion of the nighttime construction activities.
- The project plans and specifications shall include documentation verifying the inclusion of an appropriate noise barrier.
- The construction contractor shall monitor noise levels during nighttime construction activities, as needed, to ensure they do not exceed ambient noise levels of 70 dBA, whichever is less.

Mitigation Measure NOI-3: Time of Day Restrictions.

In order to ensure construction noise at nearby residences does not exceed the City of Orange noise standards as detailed in Section 8.24.050(E) of the City of Orange Municipal Code, if the Staging Area located on the east side of State Route 55 is used as part of the proposed project, all activities within this Staging Area shall be limited to when construction activities are exempt from the City noise standards as detailed in Section 8.24.050(E) of the City of Orange Municipal Code. No time-of-day restrictions are placed on the SCE Staging Area located on the west side of State Route 55.

Significance Determination

Less than significant with mitigation incorporated.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Construction activities associated with the proposed project would have the potential to generate low levels of groundborne vibration. Groundborne vibrations propagate through the ground and decrease in intensity quickly as they move away from the source. Vibrations with a PPV of 0.2 inches/second or greater have the potential to cause damage to non-engineered timber and masonry buildings (FTA 2018). The *Transit Noise and Vibration Impact Assessment Manual* provides average source levels for typical construction equipment that may generate groundborne vibrations. Most construction equipment that would be used in construction of the project is not expected to generate substantial groundborne vibration. For example, a loaded truck produces 0.076 PPV at a distance of 25 feet, and a pavement breaker produces 0.035 PPV at a distance of 25 feet.

According to the FTA's *Transit Noise and Vibration Impact Assessment Manual*, 75 VdB is the threshold for human annoyance from groundborne vibration noise when events are occasional. Typical vibration dB levels for a loaded truck are 86 VdB at a distance of 25 feet, and a pavement breaker typically produces 79 VdB at a distance of 25 feet (see **Appendix E**). Groundborne vibration and noise tends to be more perceptible and disruptive during nighttime hours when people are generally indoors and asleep. Pipeline construction along residential areas (Segments 1, 2, 3, 5, 6, and 7) would occur only between the hours of 7:00 am and 8:00 pm on weekdays, and would therefore avoid impacts during the night when they would be more likely to be noticed. Nighttime construction work on Segment 4 would occur on portions of the alignment near commercial areas, which would not be sensitive to nighttime noise. Construction equipment could be used as close as 50 feet from the nearest sensitive receptors.

None of the construction equipment to be used would exceed the threshold of 0.2 inch per second PPV at the nearest residences (see **Appendix E**). However, loaded trucks, which would generate the greatest vibration out of the construction fleet, would produce levels of vibration noise that has the potential to cause human annoyance. Groundborne vibration noise from loaded trucks would attenuate to below 75 VdB at a distance of 70 feet (FTA 2018), and vibration from loaded trucks would be temporary and brief. Vibrations associated with pipeline construction would occur infrequently and would be short in duration. Additionally, pipeline construction would move along the alignment at a rate of 50 linear feet per day and would not remain in the same location for an extended period of time; therefore, sensitive receptors near the pipeline alignment would not experience vibrations for the entire duration of project construction. Exposure to groundborne noise would be temporary, sporadic, and limited in duration. Once operational, the pipeline would not produce groundborne vibration or groundborne noise. The impact would be less than significant.

Mitigation Measure

None required.

Significance Determination

Less than significant.

c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The project is not located within the vicinity of an airport. The closest airports are the John Wayne International Airport and Fullerton Municipal Airport, which are both over five miles from the project. The project would not expose residences or workers to excessive aircraft noise and there would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

3.14 Population and Housing

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	[ ]	[ ]	[ ]	[X]
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	[ ]	[ ]	[ ]	[X]

Discussion

OC San provides wastewater collection, treatment, and disposal services for approximately 2.6 million people in central and northwest Orange County. Over the next 20 years, the population of the service area is expected to increase by 8.3 percent (OC San 2017).

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

The proposed project would not directly induce unplanned population growth because no new housing or permanent employment are proposed or would result from construction and operation of the project. The proposed project involves expansion of, and improvement to, OC San's sanitary sewer infrastructure within its existing service area. Operation of the project would service existing and projected wastewater demand and is consistent with planned growth that would occur with or without the project. Inspection and repair, if necessary, of the proposed project would be incorporated into OC San's existing O&M activities; no new staff would be required to serve the project. Therefore, the proposed project would not directly or indirectly induce unplanned population growth. No impact would occur.

Mitigation Measures

None required.

Significance Determination

No impact.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Construction and operation of the project would occur entirely within existing roadways and staging would occur within vacant lots (and within the roadway right-of-ways, if necessary). The project would not displace existing people or houses or require the construction of replacement housing. No impact would occur.

Mitigation Measures

None required.

Significance Determination

No impact.

3.15 Public Services

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

Discussion

Fire Protection

The City of Orange Fire Department provides fire, paramedic, and ambulance services within the proposed project area. Station #3, located at 1910 N Shaffer Street, is approximately one-quarter mile away from the project area and is the closest of the City's eight stations. Paramedic teams are located at all eight stations, of which three also provide ambulance service. The average response time is around three to five minutes (City of Orange 2023).

Police Protection

The City of Orange Police Department provides police protection and crime prevention services within the proposed project area. The Department's headquarters is located at 1107 N Batavia Street, approximately 1 mile from the project area. In addition, the Department operates several substations, including substations located in Santiago Canyon, at the Block of Orange.

Schools

The proposed project is located within the Orange Unified School District, which encompasses all or part of the cities of Anaheim, Garden Grove, Orange, Santa Ana, and Villa Park, as well as some unincorporated county areas. The District operates 46 schools including preschools, elementary schools, middle schools, high schools, and alternative education schools (OUSD nd). The Taft Elementary school, located at 1080 North California Street, is within one-quarter mile of the project area. Private schools within one-quarter mile of the project area include Saint Norbert Catholic School (300 E Taft Avenue), and Children's House Preschool (1400 E Taft Avenue).

Parks

The City of Orange Community Services Department maintains and manages 23 parks and recreational facilities within the proposed project area. Construction and operation of the proposed project would occur entirely within existing roadways and vacant parcels. There are no City parks within or adjacent to the project area. Shaffer Park located at 1930 N Shaffer Street is the closest and approximately one-quarter mile from the project area.

Other Public Facilities

The City of Orange Public Library is located at 407 E. Chapman Avenue, approximately 2 miles from the project area. There are three hospitals within the City of Orange: University of California, Irvine Medical Center (101 The City Drive South) approximately three miles from the project area, St. Joseph Hospital (1100 West Stewart Drive) approximately 2.5 miles from the project area, and Chapman Global Medical Center (2601 E Chapman Avenue) approximately 2 miles from the project area.

a.i) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: Fire protection?

The proposed project would not include construction of new or expanded OC San facilities that would increase the number of fire protection facilities, or indirectly cause population growth or development, resulting in the need for additional fire protection services. The proposed project would upgrade, replace, and rehabilitate aging sewer pipelines within OC San's wastewater collection and treatment system, and operation would not result in a population increase. The need for new or expanded public facilities, such as fire protection facilities, is typically associated with a population increase. The project would therefore not substantially increase the need for new fire department staff or new facilities and no impact would occur.

a.ii) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: Police protection?

The proposed project would not include construction of new or expanded OC San facilities that would increase the number of police protection facilities, or indirectly cause population growth or development, resulting in the need for additional police protection services. The proposed project would upgrade, replace, and rehabilitate aging sewer pipelines within OC San's wastewater collection and treatment system, and operation would not result in a population increase. The need for new or expanded public facilities, such as police protection facilities, is typically associated with a population increase. The project would therefore not substantially increase the need for new police fire department staff or new facilities and no impact would occur.

a.iii) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: Schools?

The proposed project would not change existing demand on schools because the project would serve existing and planned communities. Construction of the proposed project does not include housing, and operation would not result in new employment or population growth that would result in an influx of students. No new school facilities would need to be built to maintain class size ratios or other performance objectives. As a result, no impact on school facilities would occur.

a.iv) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: Parks?

The City of Orange Municipal Code 16.60.040 Park Acreage Standard requires 3 acres of useable parkland for every 1,000 residents, which is the minimum parkland dedication allowed by the Quimby Act for residential subdivisions (City of Orange 2020a). The proposed project would not change existing demand on City parks or recreational facilities because the project does not propose new housing units, nor would it directly or indirectly induce population or permanent employment within the area. Construction and operation of the project would not necessitate expansion of existing or construction of new parks or recreational facilities to maintain the City's existing park acreage standard. Therefore, no impact on park facilities would occur.

a.v)Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: Other public facilities?

The proposed project would not change existing demand on other public facilities because the project does not propose new housing units, nor would it directly or indirectly induce population or permanent employment within the area. Construction and operation of the project would not necessitate expansion of existing or construction of new public facilities such as libraries or hospitals. Therefore, no impact on other public facilities would occur.

Mitigation Measures

None required.

Significance Determination

Less than significant with mitigation incorporated.

3.16 Recreation

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	[ ]	[ ]	[ ]	[X]
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	[ ]	[ ]	[ ]	[X]

Discussion

According to the City of Orange Zoning Map, adjacent parcels are classified as single family residential, multi-family residential, commercial, and industrial (City of Orange 2022). As discussed under *Section 3.15 Public Services*, there are no parks or recreational facilities within the project area. There are also no regional,

state, multi-use, or proposed trails within the project area. The Santa Ana River Trail is the closest public trail to the project area and is located approximately 1 mile to the east. Segments of the project alignment along Meats Avenue and Taft Avenue are within existing Class II and III Bike Lanes. Class II On-road bike lanes are located along arterial roadways that are delineated by painted stripes and other features. Class III On-road bike routes share use with motor vehicle traffic; they provide a route that is signed but not striped (City of Orange 2015c). Potential impacts of the project on bicycle facilities are discussed in *Section 3.17 Transportation*.

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

The proposed project would serve existing and planned development that would occur with or without the project. The proposed project does not include residential housing and would not induce permanent employment or population growth that would permanently increase the use of the parks and recreational facilities. The project would not increase the use of existing parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated. Therefore, the proposed project would have no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

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

Implementation of the proposed project would not require construction or expansion of recreational facilities which could have an adverse physical impact on the environment. As a result, no impact would occur.

Mitigation Measures

None required.

Significance Determination

No impact.

3.17 Transportation

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

Discussion

Local access in the project area is provided by Taft Avenue, Tustin Street, Meats Avenue, Glassell Street, Cambridge Street, and Santiago Boulevard. The project alignment is transected by, and would cross under, State Route 55. The City of Orange does not have designated truck routes. Public transportation in the project area consists of bus service provided by the Orange County Transit Authority (OCTA). Bus routes 46, 60, 71, and 167 operate along the proposed project alignment along Taft Avenue, Tustin Street, and Meats Avenue. Bicycle facilities along the project alignment consist of a Class 2 bike lane on both the north and south sides of Taft Avenue between Glassell Street and Tustin Street; along Taft Avenue between Tustin Street and Sacramento Street; and along Meats Avenue between Breckenridge Street and Santiago Boulevard.

The City of Orange Traffic Division requires that the traffic and circulation impacts of proposed development projects be analyzed through the preparation of a traffic impact analysis prepared in conformance with Transportation Division requirements. The *Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment* (City of Orange 2020c) identifies the required contents and methodology, including thresholds for when the traffic impact analysis must include a level of service analysis and/or a VMT impact analysis, as required by CEQA. Certain projects, because of their size, nature, or location, are exempt from producing a level of service analysis. Generally, these projects are local-serving, generate less than 100 peak hour trips, and add 50 or fewer peak hour trips to any one intersection. Likewise, some

projects and activities are exempt from producing a VMT analysis. Similar to the level of service exemptions, these projects are generally local-serving or generate less than 110 daily vehicle trips (City of Orange 2020c).

On September 3, 2020, the SCAG adopted Connect SoCal, SCAG's 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy. The plan is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The plan details how the region will address its transportation and land use challenges and opportunities in order to achieve its regional emissions standards and GHG reduction targets. The Connect SoCal plan represents the vision for Southern California's future, including policies, strategies, and projects for advancing the region's mobility, economy, and sustainability through 2040 (SCAG 2020).

The City of Orange General Plan Public Safety element identifies generalized evacuation corridors. Although emergency egress may vary depending on the type and scale of emergencies, emergency evacuations in the City of Orange will most often take place on Chapman Avenue, Katella Avenue, Glassell Street, Lincoln Avenue, Orangewood Avenue, and Hewes Street (City of Orange 2010).**a) *Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?***

Project construction is estimated to last 24 months. Additional details on the construction schedule can be found in *Section 2.4 Proposed Project Description*. Potential construction-related conflict with the circulation system would be temporary. Potential circulation-related impacts associated with pipeline construction would occur in segments as construction progresses along each segment of the pipeline alignment over the construction period, and disturbed areas would be restored to pre-construction condition. As discussed below under impact "b," project construction would not result in a considerable increase in vehicle trips or VMT. The City of Orange considers projects that generate less than 100 peak hour trips (and less than 51 peak hour trips at any one intersection) to have a less than significant level of service and/or a VMT impact (City of Orange 2020c). Project construction would require approximately 48 round-trip worker trips per day, and an average of 23 round-trip hauling trips per day, for a total of 70 trips per day, which would be distributed over a typical 8-hour workday (see **Appendix A**). Thus, the project would result in fewer than 100 peak hour trips and would not produce a significant VMT impact to roadways in the project area. Therefore, project construction would not conflict with transportation-related policies outlined in the City of Orange *Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment*. Although the proposed project will not construct pipelines or maintenance holes within City of Villa Park jurisdiction, temporary sewer bypass pumping equipment around Meats Avenue and Santiago Boulevard would cross over into roadways within City of Villa Park jurisdiction. Similarly, although the proposed project will not construct pipelines or maintenance holes west of Glassell Street, traffic control signs would be placed in Glassell Street and cross over UPRR right-of-way.

Although construction of the proposed project within existing right-of-way may require temporary closures of vehicle lanes, bicycle lanes, alternative transportation, and sidewalks, potential impacts related to these closures would be minimized through the implementation of construction traffic measures. OC San's General Requirement (GR) 9 Public Convenience and Access requires the construction contractor to provide safe, adequate access for vehicles and pedestrians to businesses and residences adjacent to the worksite. GR-9 requires the construction contractor to submit for OC San's acceptance a Traffic Control plan stamped and signed by a Traffic Engineer registered in the State of California. GR-9 also requires the construction contractor to coordinate with applicable cities on traffic detour routes, street sweeping and collection and removal of garbage adjacent to the worksite.

Mitigation Measure TRA-1 requires the construction contractor to submit project plans and specifications to the City of Orange Public Works Department, City of Villa Park Public Works Department, Caltrans, Union Pacific Railroad, and Metrolink, and to implement construction traffic management measures for Closures of Transportation Facilities including bus stops. Implementation of **Mitigation Measure TRA-1** would ensure potential temporary impacts related to closures of pedestrian and bicycle access routes, and alternative transit facilities in City of Orange, City of Villa Park, Caltrans, Union Pacific Railroad, and Metrolink right-of-ways are less than significant.

In addition, bicycle lanes, sidewalks, and transit stops that would be temporarily impacted would be restored upon the completion of construction, as required by OC San General Requirement GR-42 Restoration of Surfaces.

Operation of the proposed project would not conflict with regional transportation plans or the City of Orange General Plan because below-ground pipelines would not have a permanent impact on circulation. Maintenance holes would be designed according to OC San standard specifications such that they would not impact circulation. Inspection of the pipelines and maintenance holes would be incorporated into OC San's existing O&M activities. The proposed project's impacts on the circulation system would therefore be less than significant.

Mitigation Measures

See Mitigation Measure TRA-1.

Significance Determination

Less than significant with mitigation incorporated.

b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

CEQA Guidelines Section 15064.3, subdivision (b) outlines criteria for analyzing transportation impacts in terms of VMT for land use projects and transportation projects. VMT refers to the amount and distance of automobile travel attributable to a project. According to the Office of Planning and Research *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR 2018), the term "automobile" refers to on-road passenger vehicles, specifically cars and light-duty trucks. In the case of the proposed project, worker trips would be conducted in cars and light-duty trucks. Vendor and hauling trips would be conducted in medium- or heavy-duty trucks and are therefore excluded from the estimation of VMT. Environmental impacts associated with the use of medium- and heavy-duty truck trips are addressed in the Air Quality, Energy, and Greenhouse Gas sections of this document.

Construction of the proposed project would involve temporary worker trips which would occur during the 24-month construction period. Project construction would require approximately 19 round-trip worker trips per day. According to OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA*, projects that generate fewer than 110 trips per day may be assumed to cause a less-than-significant transportation impact (OPR 2018). The City of Orange *Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment* also presumes that projects generating less than 110 trips per day have a less than significant impact. Therefore, construction of the project would not result in a considerable increase in VMT.

Operation of the proposed project is expected to require occasional worker trips for inspection and testing of the pipeline and maintenance holes. These trips would be incorporated into OC San's existing O&M

program and would not increase VMT in the project area. Based on OPR guidance, the proposed project would not create a significant impact related to VMT. The project would be consistent with CEQA Guidelines Section 15064.3, subdivision (b) and the impact would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The project would not construct new roadways; existing roadways would be restored to their prior condition once construction is complete. Therefore, after construction, the project would not create roadway hazards.

Project construction would temporarily increase transportation hazards in the project area because it would require incompatible uses (i.e., use of heavy construction equipment) and ingress/egress to temporary staging areas from existing roadways. **Mitigation Measure TRA-1** requires preparation of a traffic control plan. The traffic control plan would include measures to ensure that vehicle ingress and egress from construction sites and the staging area(s) and use of heavy construction equipment in the project area occur safely. After construction is complete, all pipeline construction areas would be restored to pre-construction conditions; there would be no permanent change to roadway characteristics and uses. OC San's General Requirements require best management practices that would also be implemented during construction, such as covering trenches with plates during non-construction periods, which would further reduce project impacts. With adherence to Mitigation Measure TRA-1, the impacts from the proposed project would be less than significant.

Mitigation Measures

The following mitigation measure shall be incorporated into the project to reduce potential impacts to access and safety during construction. The following mitigation measure was identified in the FMP PEIR as Mitigation Measure TRA-1. The proposed project's traffic impacts would be less than significant with mitigation incorporated.

Mitigation Measure TRA-1: Coordination with Cities, Caltrans

Prior to initiation of construction activities, engineering drawings and specifications and/or contractor shop drawings shall be submitted for review and approval by the Orange County Sanitation District (OC San), to the Public Works Departments of Orange and Village Park, the California Department of Transportation (Caltrans), and Union Pacific Railroad and/or Metrolink (where applicable). The proposed project may impact local transportation facilities due to temporary street and/or lane closures, temporary transit stop relocations, haul truck circulation, and construction staging. These impacts, if any, will be identified in the engineering drawings and specifications and/or contractor shop drawings identified for individual projects. The following steps will be required to mitigate construction traffic impacts identified in the engineering drawings and specifications and/or contractor shop drawings:

Closures to Transportation Facilities

A. Traffic control, and associated Traffic Control Plans, for any lane closure, detour, or other disruption to traffic circulation, including bicycle and pedestrian trails. Bicycle and pedestrian trails shall remain open, to the greatest extent possible, during construction or re-routed to ensure continued connectivity.

B. Engineering drawings and specifications shall meet the standards established in the current California Manual on Uniform Traffic Control Device.

C. Bus stop access impacts shall be coordinated with, and approved by, the Orange County Transportation Authority.

D. Consistent with applicable City and/or Caltrans requirements, and at least three (3) business days before any construction activities that would affect travel on nearby roadways, the construction contractor shall notify the affected City Public Works Department and/or Caltrans of construction activities that could impede movement (such as lane closures) along roadways to allow for uninterrupted emergency access. Surrounding property owners shall also be notified of construction activities through the OC San Public Outreach Process.

Truck Haul Routes and Circulation

E. As required by the applicable agency, construction vehicle haul routes for the delivery of construction materials (e.g., lumber, tiles, piping, windows) to the site, necessary traffic controls and detours, and a construction phasing plan for the construction activities shall be identified.

F. The hours during which transport activities can occur and methods to mitigate construction-related impacts to adjacent streets shall be specified. Examples of these methods include: 1) transport of materials and heavy equipment to the site(s) shall be avoided during the AM and PM peak commute hours; 2) haul trucks shall utilize designated truck routes to the extent feasible; 3) advance warning signage and/or detour routes shall be provided along streets where construction activities would occur; and, 4) scheduling of construction activities and workers at each individual site so that less than 110 daily trips would occur.

G. The contractor shall be required to keep all haul routes clean and free of debris, including gravel and dirt resulting from its operations. The contractor shall clean adjacent streets, as directed by the OC San, of any material that may have been spilled, tracked, or blown onto adjacent streets and areas.

H. As required by the applicable agency, hauling and transport of oversize loads outside of their standard working hours will require approvals.

I. Use of local streets shall be prohibited, except what is required to provide direct access to a construction site.

J. Haul trucks entering or exiting public streets shall yield to public traffic at all times.

K. If hauling operations cause any damage to existing pavement, streets, curbs, and/or gutters along the haul route, the contractor shall be fully responsible for repairs. The repairs shall restore the damaged property to its original condition.

Construction Staging

L. Any off-site construction staging or material storage sites shall be identified to the extent feasible.

M. All project-related staging of vehicles shall be kept out of the adjacent public roadways and shall occur on site or within other off-street areas.

Significance Determination

Less than significant with mitigation.

d) Result in inadequate emergency access?

Construction of the proposed project may require lane closures along the pipeline alignment and would generate trips associated with construction (worker travel and delivery of materials and equipment). Lane closures have the potential to hinder access for emergency vehicles. Traffic control measures are included in **Mitigation Measure TRA-1**. Traffic control measures implemented during project construction would require that emergency crews be able to access sites and surrounding areas. The contractor would coordinate to ensure that emergency responders are informed of construction locations and construction does not interrupt emergency access. Traffic control measures would also require that the contractor make a reasonable effort to preserve access to business and properties during construction. OC San's General Requirements require best management practices to maintain emergency access, such as maintaining access to fire hydrants, maintaining safe pedestrian crossings, preserving unobstructed access to emergency service buildings (such as police stations, fire stations, and hospitals), and notifying emergency services prior to construction. OC San General Requirement GR-9 requires the construction contractor to maintain public safety, and unobstructed access to all fire hydrants, fire stations, police stations, hospitals, or other emergency services. GR-9 requires the contractor to coordinate with the local police and fire departments and public transit facilities, provide them with a copy of the accepted Traffic Control Plan, and to ensure that 24-hour emergency access is available. In addition, GR-9 requires the contractor to provide and maintain fences, barriers, directional signs, lights, and flagmen as are necessary to give adequate warning to the public at all times of any dangerous condition to be encountered as a result of the construction work and to give directions to the public as appropriate. These General Requirements would further reduce project impacts. Project impacts would be reduced to less than significant with the implementation of **Mitigation Measure TRA-1**.

Mitigation Measures

See Mitigation Measure TRA-1.

Significance Determination

Less than significant with mitigation.

3.18 Tribal Cultural Resources

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	[ ]	[X]	[ ]	[ ]
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	[ ]	[X]	[ ]	[ ]

Discussion

In November and December 2019, a cultural resources records search of the CHRIS was conducted at the South Central Coastal Information Center at the California State University, Fullerton to identify any previously recorded cultural resources and cultural resources studies in and within a 0.25-mile radius of the FMP area for a majority of the OC San service area. On January 13, 2020 a pedestrian field survey was conducted to identify cultural resources within the FMP area. *Section 3.5, Cultural Resources,* provides a summary of the search results. Only one significant archaeological site was identified as a historic resource within the FMP area, and it was not located within the proposed project area. The site, a large pre- contact

habitation located primarily on lands administered by a military installation, was not identified as a Tribal Cultural Resource (TCR) by any tribal entity consulted for the FMP PEIR. According to the PEIR (OC San 2020), no burials or other deposits are known to exist within the FMP area, which has been fully developed.

California Health and Safety Code Section 7050.5

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains shall occur until the county coroner has examined the remains (Section 7050.5[b]). PRC Section 5097.98 also outlines the process to be followed in the event that remains are discovered. If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) within 24 hours (Section 7050.5[c]). NAHC will notify the "most likely descendant." With the permission of the landowner, the most likely descendant may inspect the site of discovery. The inspection must be completed within 48 hours of notification of the most likely descendant by NAHC. The most likely descendant may recommend means of treating or disposing of, with appropriate dignity, the human remains, and items associated with Native Americans.

California Public Resources Code, Section 5097.98

PRC Section 5097.98 addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the NAHC to resolve disputes regarding the disposition of such remains. It has been incorporated into Section 15064.5(e) of the CEQA Guidelines. The proposed project would be required to comply with PRC Section 5097.98 should any unknown human remains be discovered during site disturbance.

Assembly Bill (AB) 52 Consultation

AB 52 established a formal consultation process. AB 52 mandates that the lead agency must provide formal written notification to the designated contact of traditionally and culturally affiliated California Native American tribes that have previously requested notice. Native American tribes are notified early in the project review phase by written notification that includes a brief description of the proposed project, location, and the lead agency's contact information. The Tribal contact then has 30 days to request project-specific consultation pursuant to this section (Public Resources Code §21080.1).

As a part of the consultation pursuant to Public Resources Code §21080.3.1(b), both parties may suggest mitigation measures (Public Resources Code §21082.3) that can avoid or substantially lessen potential significant impacts to TCRs or provide alternatives that would avoid significant impacts to a TCR. The California Native American tribe may request consultation on mitigation measures, alternatives to the project, or significant effects. The consultation may also include discussion on the environmental review, the significance of TCRs, the significance of the project's impact on the TCRs, project alternatives, or the measures planned to preserve or mitigate impacts on resources. Consultation shall end when either: 1) both parties agree on the mitigation measures to avoid or mitigate significant effects on a TCR, or 2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached.

Per AB 52, OC San initiated consultation with Native Tribes that are traditionally and culturally affiliated with the geographic area of the proposed project to identify resources of cultural or spiritual value to the tribe. On April 13, 2022, OC San sent consultation notification letters to Native American Tribes on the OC San Master List pursuant to the requirements of AB 52 pertaining to government-to government consultation. **Table 3-14** summarizes OC San's consultation efforts. To date, OC San has conducted consultation with one federally recognized Native American Tribe: The Gabrieleño Band of Mission Indians – Kizh Nation. OC San has also conducted consultation with the Juaneño Band of Mission Indians - Acjachement Nation-Belardes. An additional Native American Tribe was contacted but did not respond, as noted in **Table 3-14**.

Table 3-14: Native Tribal Consultation Summary

Tribe	Individual Contacted	Date Letter Mailed	Response Received	Consultation Held
Gabrieleño Band of Mission Indians – Kizh Nation	Andrew Salas	April 13, 2022	April 19, 2022	Letter sent June 12, 2023 and response received June 20, 2023
Juaneño Band of Mission Indians - Acjachement Nation-Belardes	Joyce Perry	April 13, 2022	May 17, 2022	July 7 and 19 2022
San Gabriel Band of Mission Indians	Anthony Morales	April 13, 2022	None	None

The Gabrieleño Band of Mission Indians – Kizh Nation sent a letter to OC San on April 19, 2022 which stated the proposed project is within its Ancestral Tribal Territory and requested consultation under AB 52. OC San responded, and after some correspondence, the Gabrieleño Band of Mission Indians – Kizh Nation provided OC San with information and language on May 27, 2022 for OC San to consider in its analysis of the proposed project's potential impacts on TCRs. The information and language have been kept confidential, but generally described the high degree of cultural sensitivity of the project area and the tribe's concerns with specific subsurface ground disturbance activities. The Gabrieleño Band of Mission Indians – Kizh Nation provided OC San with proposed mitigation measures to reduce the potential impacts of the project on TCRs. The tribe expressed specific concern about ground disturbance in areas that may contain "original" soils from the project area because original soils may contain TCRs. The tribe requested information regarding whether the soil that would be disturbed by the proposed project is original and never previously disturbed, original soil that has been excavated and then used as backfill, or soil of unknown origin which could potentially be original. In response, TCR mitigation measures were added to this Initial Study, including worker awareness training, development of a cultural resources monitoring plan, and consultation with the most likely descendant in the event of discovery of human remains, to reduce potential impacts on TCRs from ground-disturbing activities (see **Mitigation Measures TCR-1, TCR-2,** and **TCR-3**).

The Juaneño Band of Mission Indians - Acjachement Nation-Belardes responded to OC San's AB 52 notification letter via email to OC San on Tuesday May 17, 2022. The email stated that the proposed project is within the tribe's territory. The Juaneño Band of Mission Indians - Acjachement Nation-Belardes requested a copy of the CHRIS records search for the project area, which OC San provided on June 8. The tribe then requested the site records for any pre-contact resources associated with burials within the 0.25-mile buffer

and OC San provided an explanation that none of the previously-recorded sites with burials were within the 0.25-mile buffer of the proposed project. OC San also included an explanation that no previously recorded cultural resources were identified within 2 miles of the proposed project. Conference calls were held between OC San and the Juaneño Band of Mission Indians – Acjachement Nation-Belardes on July 7 and July 19 to discuss these issues. During the July 19 call, the Juaneño Band of Mission Indians – Acjachement Nation-Belardes indicated that no TCRs are present within one mile of the proposed project and the AB 52 consultation process could be concluded for the proposed Taft Sewer Improvement Project. The Juaneño Band of Mission Indians - Acjachement Nation-Belardes also asked to be consulted on future projects identified in the FMP PEIR.

Based on the cultural sensitivity of the area, TCRs may potentially be present within the project's proposed footprint. Therefore, the project may have the potential to affect TCRs during ground-disturbing activities, such as trenching.

a.i) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).

The cultural resources records search, aerial photo studies, and pedestrian field survey determined there are no known TCRs within the proposed project area. While the possibility of encountering intact subsurface TCRs is low, there is always the potential for ground disturbing activities to encounter previously unknown TCRs. **Mitigation Measures CUL-1**, **CUL-2**, and OC San General Requirement GR-6-Z (regarding procedures to be followed if human remains are uncovered), will be implemented, and Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5 will be followed. As discussed in *Section 3.5 Cultural Resources,* **Mitigation Measure CUL-1** informs construction personnel of the types of resources that may be encountered and the proper procedures to implement in the event of an unanticipated discovery. **Mitigation Measure TCR-1** informs construction personnel on recognizing tribal cultural resources, and appropriate proceedures to follow if tribal cultural resources, human remains or grave goods are encountered. **Mitigation Measure TCR-2** requires a plan with protocols for the discovery of resources that may qualify as tribal cultural resources, and a treatment plan for resource recovery. **Mitigation Measure CUL-2** will cease all ground disturbing activities until the resource can be assessed by a qualified archaeologist. OC San General Requirement 6-Z and Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5 require construction be immediately halted, the County coroner be notified immediately if human remains are encountered, the Native American Heritage Commission (NAHC) be notified if the remains are found to be Native American, and NAHC guidelines be adhered to for treatment and disposition of the remains. **Mitigation Measure TCR-3** requires notification and coordination with the most likely descendant in the even human remains are discovered that may be of Native American origin.

With the implementation of **Mitigation Measures CUL-1**, **CUL-2,** OC SAN General Requirement 6-Z, adherence to California Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5, and implementation of **Mitigation Measures TCR-1**, **TCR-2**, and **TCR-3**, there would be no substantial adverse changes to the significance of a TCR that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources.

Mitigation Measures:

The following mitigation measure shall be incorporated into the project to reduce potential impacts to unknown tribal cultural resources that could be uncovered during trenching and excavation. The following mitigation measures were not included in the FMP PEIR; they are new to the proposed project. The proposed project's potential tribal cultural resources impacts would be less than significant with mitigation incorporated.

TCR-1: Worker Environmental Awareness Program (WEAP): Prior to the start of ground-disturbing activities, OC San shall retain an archaeologist (Project Archaeologist) meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (48 Federal Register 44716) to provide WEAP training that focuses on the inadvertent discovery of archaeological and tribal cultural resources. The WEAP training shall be provided to all construction personnel prior to the commencement of any ground-disturbing activities and shall include, at minimum, the following topics so construction personnel will understand their responsibilities:

1. What archaeological and tribal cultural resources are and why they are important
2. Review environmental laws that protect archaeological and tribal cultural resources, and the consequences of unauthorized collection of artifacts and other cultural material
3. Explain the protocol to be followed if an artifact or tribal/cultural resource feature is discovered during construction as identified in TCR-2; and
4. Explain the protocol to be followed if potential human remains or associated grave goods are encountered during construction as identified in TCR-2 and TCR-3.

Upon completion of the WEAP training, construction personnel will sign an acknowledgment that they attended the training, understand the training, and will comply with the protocols presented.

TCR-2: Develop and Implement a Cultural Resource Management Plan (CRMP). Prior to the start of ground-disturbing activities, OC San's Project Archaeologist shall develop a CRMP that includes protocols to be implemented for the potential scenarios that may arise with the discovery of unanticipated archaeological resources that may also qualify as tribal cultural resources. The CRMP shall follow the provisions of Section 15064.5(f) of the CEQA Guidelines. The CRMP shall also be consistent with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 Federal Register 44716–44740), the California Office of Historic Preservation's *Archaeological Resource Management Reports: Recommended Contents and Format* (1990), *Guidelines for Archaeological Research Designs* (1991), and *Guidelines for the Curation of Archaeological Collections* (1993), and the Advisory council on Historic Preservation's *Treatment of Archaeological Properties: A Handbook* (1980).

The CRMP shall meet the performance standards outlined above (and further identified below) to avoid, minimize, or mitigate impacts to unanticipated archaeological resources that may also qualify as tribal cultural resources:

1. *Discovery Response Protocols:* The CRMP shall identify a stop work radius in the event of a discovery, define resource protection measures to be followed such as delineation of an Environmentally Sensitive Area (ESA), and define a notification protocol to guide OC San's consultation with Tribes when resources are discovered.

2. *Monitoring Protocols:* The CRMP shall contain protocols for archaeological and tribal monitoring to be activated if sensitive resource areas are inadvertently discovered such as: Monitors will observe ground-disturbing work, coordinate with the OC San project lead/foreman if a work stoppage is required, and assist in the immediate implementation of the Discovery Response Protocols. The Monitoring Protocols shall include a description of roles and responsibilities and protocols for communication/notification in the event of a discovery.
3. *Evaluation and Treatment Protocols:* The CRMP shall contain procedures for archaeological evaluation of discoveries in accordance with the CRHR criteria (14 CCR 4852[b]) and for treatment of resources found to be significant in the event that avoidance or preservation in place are not possible. The CRMP shall include:
    a. A research design that contains an explicit statement of theoretical and methodological approaches to be followed, pursuant to the Secretary of the Interior's Standards for Archaeological Documentation (48 Federal Register 44734–44737).
    b. Specific field and laboratory methodologies appropriate for the environmental and cultural context of the area under study, as well as expected results and reasons for those expectations, pursuant to the Secretary of the Interior's Standards and Guidelines for Identification and Evaluation (48 FR 44720–44726).
    c. A treatment plan for recovering and preserving scientifically consequential data from intact archaeological deposits identified during the testing and evaluation phase that are determined to be significant according to the criteria set forth in the research design, following the guidelines provided in the Advisory Council on Historic Preservation's *Treatment of Archaeological Properties: A Handbook* (1980). The treatment plan shall include provisions for determining the disposition or long-term curation of any archaeological materials that may be recovered during construction.
4. *Discovery Protocols for Human Remains and/or Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony:* The CRMP shall identify procedures to be implemented in the event of a discovery of human remains and/or funerary objects, sacred objects, and objects of cultural patrimony, consistent with the requirements of mitigation measure TCR-3, including requirements for Tribal consultation regarding arrangements for reburial in a culturally appropriate location. The CRMP shall also contain procedures for Tribal consultation in case isolated objects of Tribal significance are encountered in disturbed stratigraphic contexts, to ensure appropriate treatment or disposition of the objects.

TCR-3: Discovery of Human Remains. In the event of an unanticipated discovery of human remains, in accordance with California Health and Safety Code Section 7050.5, the County Coroner shall be notified within 24 hours of the discovery. The project lead/foreman shall designate an Environmentally Sensitive Area (ESA) physical demarcation/barrier 100 feet around the resource and no further excavation or disturbance shall occur within the ESA until OC San, informed by the County Coroner of its decision, makes a determination regarding the disposition of the remains. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours. In accordance with Public Resources Code Section 5097.98, the NAHC must immediately notify those persons it believes to be the most likely descendant (MLD) from the deceased Native American. The MLD shall complete their inspection within 48 hours of being granted access to the site. In consultation with the MLD, OC San will determine the disposition of the human remains. OC San shall notify the project lead/foreman when the ESA may be released again for construction.

Significance Determination:

Less than significant with mitigation incorporated.

a.ii) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

The project is located within Ancestral Tribal Territory of the Gabrieleno Band of Mission Indians – Kizh Nation. It is also located within the territory of the Juaneño Band of Mission Indians - Acjachement Nation-Belardes. During AB 52 consultation for the proposed project, the Gabrieleno Band of Mission Indians – Kizh Nation expressed concern that the proposed project has the potential to impact TCRs during ground disturbing activities in areas with original soil. The tribe suggested mitigation measures to lessen those potential impacts. **Mitigation Measure TCR-1** informs construction personnel on recognizing tribal cultural resources, and appropriate proceedures to follow if tribal cultural resources, human remains or grave goods are encountered. **Mitigation Measure TCR-2** requires a plan with protocols for the discovery of resources that may qualify as tribal cultural resources, and a treatment plan for resource recovery. **Mitigation Measure TCR-3** requires notification and coordination with the most likely descendant in the even human remains are discovered that may be of Native American origin. .

In addition, the implementation of **Mitigation Measures CUL-1**, **CUL-2,** OC San General Requirements 6-Y and 6-Z, and adherence to California Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5, will be required. With adherence to these measures, the impact to any previously unknown TCRs will be less than significant.

Mitigation Measures

Refer to **Mitigation Measures CUL-1** and **CUL-2** in *Section 3.5 Cultural Resources* and **Mitigation Measures TCR-1**, **TCR-2**, and **TCR-3** above.

Significance Determination:

Less than significant with mitigation incorporated.

3.19 Utilities and Service Systems

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Would the Project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	[ ]	[ ]	[X]	[ ]
b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?	[ ]	[ ]	[ ]	[X]
c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	[ ]	[ ]	[ ]	[X]
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	[ ]	[ ]	[X]	[ ]
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	[ ]	[ ]	[X]	[ ]

Discussion

Water Service

Municipal water service in the OC San service area, covering northern and central Orange County, is provided by municipalities and water districts who serve customers within their respective geographic boundaries. These entities supply a combination of groundwater from the Orange County Water Basin, and imported water delivered by the MWD to its member agencies. Within the OCWD boundaries approximately 60% to 70% of the water needs are met by groundwater, with the rest supplied by imported water from MWD (OC San 2020).

Water service in the project area is provided by the City of Orange Public Works Department, Water Division. The City of Orange obtains approximately 75 percent of its water from groundwater sources via 12 active wells with the Orange County Groundwater Basin, managed by the Orange County Water District. The City of Orange also relies on imported water from the Colorado River and Northern California from the MWD through the Municipal Water District of Orange County (City of Orange 2023a).

Wastewater Treatment

OC San is the sole wastewater treatment entity in its service area. Sewer collection upstream of OC San facilities is the responsibility of OC San's various member agencies, the cities, and special districts. These entities maintain a series of underground pipelines, typically located in roads, that convey wastewater from their customer collection points to OC San sewer mains (OC San 2020).

Stormwater Drainage

Stormwater collection and conveyance within the OC San service area is provided by the District's constituent cities and by Orange County Public Works within the unincorporated areas, with smaller local facilities draining into a larger regional system maintained by the Orange County Flood Control District. The local storm drain system in the project area consists of roadway gutters, inlets, basins, and small-diameter lateral pipes located in and adjacent to existing roads and connects to the larger downstream system which drains to the Santa Ana River and eventually to the Pacific Ocean.

Electrical, Natural Gas, and Telecommunications Utilities

Southern California Edison, a subsidiary of the publicly traded company Edison International, is the electrical power service provider in most of Orange County, including the entire OC San service area. Southern California Edison transmits electricity from generation plants to substations, and then distributes the electricity to its customers through an extensive series of underground conduits and overhead lines hung on a combination of wooden and steel poles. Underground conduit is typically located beneath public roadways, and overhead lines often follow road alignments (OC San 2020).

Southern California Gas Company, a subsidiary of the publicly traded company Sempra Energy, is the natural gas service provider in all of Orange County. Southern California Gas Company maintains a series of transmission and distribution pipelines throughout the OC San service area, mostly located beneath public streets (OC San 2020).

Telecommunications service in the OC San service area is variously provided by AT&T, Spectrum, and Cox Communications. These companies maintain cable networks throughout their service areas to carry signals

to their customers, including underground conduit located within public roadways, and overhead lines often collocated with electric wire (OC San 2020).

Landfills

Solid waste disposal in the OC San service area is currently handled at three landfills operated by Orange County Waste & Recycling (OCWR), a department of the County of Orange. These are the Frank R. Bowerman Landfill, in Irvine; the Olinda Alpha Landfill, in Brea; and the Prima Deshecha Landfill, in San Juan Capistrano CalRecycle nd). The Olinda Alpha Landfill and the Prima Deshecha Landfill accept public and commercial waste, whereas the Frank R. Bowerman Landfill is available for commercial use only. All three landfills are permitted as Class III landfills, which accept only non-hazardous municipal solid waste for disposal; no hazardous or liquid waste are accepted. Landfill closure dates are presented in **Table 3-15**.

Table 3-15: OCWR Landfill Closure Dates

Landfill Name	Location	Date Opened	Ceased Operation Date	Remaining Capacity
Frank R. Bowerman	Irvine	1990	2053	205,000,000 cubic yards
Olinda Alpha	Brea	1960	2036	17,500,000 cubic yards
Prima Deshecha	San Juan Capistrano	1976	2102	134,300,000 cubic yards

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The project proposes to upgrade, replace, and rehabilitate aging sewer pipelines within the City of Orange, an urban, developed area of Orange County that is currently served by extensive service infrastructure. As a result of the extensive existing utility and public service infrastructure within the project area, the project alignment would run parallel to or intersect existing water transmission and delivery pipelines, stormwater drainage pipelines and channels, underground electrical conduit, underground natural gas pipelines, and underground telecommunications lines (Woodard & Curran 2022). This proximity of various entities' utility assets is a routine occurrence, and OC San's standard project planning process as part of engineering design will include identifying existing underground or overhead utilities occurring in the vicinity of the proposed project.

OC San will coordinate with Southern California Edison, Southern California Gas Company and the telecommunication companies to ensure facilities are adequately protected during construction. This coordination would also determine if temporary or permanent relocation of underground facilities is warranted, and establish agreements for mutually acceptable terms of the relocation. Temporary and permanent relocation of utilities such as small-diameter water pipelines and electrical conduit in an urban area such as City of Orange is a common component of infrastructure improvement projects, and the scale of any such relocation would be minor and would not have the potential to cause environmental impacts that would be considered significant under CEQA. In addition, OC San is required to comply with California Government Code Sections 4215–-4216.24 and coordinate with the regional notification center to prevent unintended impacts on underlying pipelines and conduit. Mandatory coordination with the regional notification center would further avoid the potential for accidental breaches of utilities during construction.

Compliance with the referenced regulation during construction would ensure that the impact would be less than significant.

The project would not require or result in the construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities beyond the expansion of OC San's sanitary sewer system included in the proposed project. Construction of the project would occur within existing roadways which would be restored to pre-construction conditions, so no permanent change in stormwater drainage would occur. As discussed in *Section 3.14 Population and Housing*, the proposed project would serve existing and planned development that would occur with or without the project and would not induce unplanned population or employment growth that would require or result in the construction of new or expanded water, wastewater treatment, stormwater drainage, electrical power, natural gas, or telecommunications facilities. As explained in *Section 3.6 Energy*, operation of the proposed project would not involve the consumption of electricity. Therefore, the project would not result in the need to construct new electrical facilities. The environmental impacts of the proposed project's sewer transmission pipeline are evaluated throughout this IS/MND and are anticipated to all be mitigated to a less than significant level.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?

The project proposes to upgrade, replace, and rehabilitate aging sewer pipelines within OC San's existing service area. Construction of the proposed project would require a minimal water supply for purposes such as dust control and concrete mixing. Existing sources would be sufficient and no new or expanded supply would be required for construction. Operation of the proposed project would not induce unplanned population growth that would require or result in the construction of new water treatment facilities or the expansion of existing facilities. No impact related to sufficient water supplies would occur.

Mitigation Measures

None required.

Significance Determination

No impact.

c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?

The proposed project would upgrade, replace, and rehabilitate aging sewer pipelines within the OC San service area. As discussed in *Section 3.14 Population and Housing*, the proposed project would serve existing and planned development that would occur with or without the proposed project and would not induce

unplanned population or employment growth that would require or result in the construction of new or expanded wastewater collection infrastructure or treatment services. Therefore, there would be no impact.

Mitigation Measures

None required.

Significance Determination

No impact.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Construction of the proposed project would generate solid waste in the form of construction and demolition debris that would need to be hauled off site and disposed of in a landfill by OC San's construction contractors. Construction and demolition material would include asphalt and concrete removed from paved areas and concrete, metal, and plastic pipe sections. While excavated soil would be reused onsite as backfill to the extent feasible, it is estimated that approximately 21,000 cy of material would need to be exported and disposed at a permitted landfill in accordance with local and state solid waste disposal requirements. The existing OCWR landfills noted in **Table 3-15** have remaining permitted capacity and would be available to accept non-hazardous demolition waste from the proposed project. However, OC San's contractor would be required to comply with OCWR's Construction and Demolition (C&D) Program and establish a plan for the diversion of at least 65 percent of this debris to approved C&D facilities that would reuse, recycle, or repurpose the material. If OCWR updates the C&D Program to adjust the required percentage or make other substantive changes in their requirements throughout the life of the project, the contractor would be responsible for complying with the C&D Program requirements at the time construction occurs. Compliance with this OCWR program would ensure that the project's impact with respect to generation of solid waste during the construction phase is less than significant.

Operation of the project is not anticipated to generate solid waste in the long-term. Therefore, solid waste generation would be limited to temporary construction activities and would not significantly affect available solid waste disposal capacity in the region. Therefore, impacts related to local infrastructure capacity would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Construction and operation of the proposed project would comply with local, state, and federal regulations related to solid waste. While operation of the project is not anticipated to generate a long-term solid waste stream, construction activities would create debris such as excavated soil and demolished concrete, asphalt, metal, and plastic. Excavated soil would be backfilled to the extent possible, but OC San's construction

contractor would be required to dispose of excess construction debris in accordance with existing reduction statutes and regulations, such as OCWR's C&D Program, discussed in d) above, as well as Assembly Bill (AB) 939 and AB 341. These regulations would determine the landfill to be used for disposal of construction debris, mandatory 50 percent diversion of solid waste (AB 939), and mandatory recycling programs to reduce GHG emissions (AB 341). Therefore, impacts related to compliance with local, state, and federal reduction statues and regulations related to solid waste would be less than significant.

Mitigation Measures

None required.

Significance Determination

Less than significant.

3.20 Wildfire

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	[ ]	[ ]	[ ]	[X]
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	[ ]	[ ]	[ ]	[X]
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	[ ]	[ ]	[ ]	[X]

d) Expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	[ ]	[ ]	[ ]	[X]

Discussion

The California Department of Forestry and Fire Protection's Fire Resources Assessment Program assesses the amount and extent of California's forests and rangelands, analyzes their conditions, and identifies alternative management and policy guidelines. Through the Fire Resources Assessment Program, CalFire produces maps designating very high fire hazard severity zones within SRAs and LRAs. The project vicinity is designated as a non-very high fire hazard severity zone in the City of Orange and City of Villa Park LRA maps (Cal Fire 2011a and 2011b).

As discussed in Section 3.9(f), the City of Orange has an emergency plan (EOP) which establishes emergency preparedness and emergency response procedures for both peacetime and wartime disasters. Additionally, the County of Orange and Orange County Fire Authority (OCFA) have a Local Hazard Mitigation Plan (LHMP) that includes key measures and activities to help protect residents, critical facilities, infrastructure, key resources, private property, and the environment from natural hazards in unincorporated areas, fire hazards in the Fire Authority service area, and County and Fire Authority owned facilities (Orange County 2021).

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

The project is not located in a VHFHZ. Construction activities would be located within existing City of Orange roadways. Potential staging areas would be located in vacant land and, if necessary, within roadway right-of-ways. Sidewalk and lane closures during construction would temporarily restrict access for use by emergency response vehicles or emergency evacuations and could impair implementation of or physically interfere with the City of Orange EOP or County/OCFA LHMP. Prior to initiation of construction activities, OC San would develop and implement a Traffic Control Plan to reduce impacts to emergency vehicle access potentially caused by lane closures that would take place during construction of the proposed project. Further consideration of the proposed construction activities and potential for roadway access and hazardous conditions can be found under *Section 3.17 Transportation*.

Operation of the proposed project would not physically impair or otherwise interfere with adopted emergency response or evacuation plans in the project area, as all disturbed ground surface would be returned to pre-construction conditions after excavation and below-grade pipeline installation. The project would not interfere with emergency evacuation plans. Operation would involve minimal truck trips for maintenance as needed. The proposed project would not have an impact on an adopted emergency response plan or emergency evacuation plan. There would be no impact.

Mitigation Measures

None required.

Significance Determination

Less than significant.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The project area and surrounding area is not located within very high, high, or moderate fire hazard severity zones (CalFire 2011a and 2011b). Staging areas would be located on vacant land and, if necessary, within the roadway right-of-ways. Pipelines would be installed below grade on parcels that do not have steep slopes. Therefore, the proposed project would not exacerbate wildfire risks or expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire. There would be no impact.

Mitigation Measures

None required.

Significance Determination

Less than significant.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

The project area and surrounding area is not located within very high, high, or moderate fire hazard severity zones (CalFire 2011a and 2011b). The proposed project would not involve the installation or maintenance of infrastructure that is typically associated with fire risk, such as roads, fuel breaks, emergency water sources, or power lines. The project would rely on existing roads for access during construction and O&M. Installation of the sewer infrastructure would occur within the existing roadway rights of way. Once construction is complete, the project would not introduce people or structures to wildfire risk. There would be no impact.

Mitigation Measures

None required.

Significance Determination

Less than significant.

d) Expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

The proposed project would be located within existing City of Orange roadways. The potential construction staging areas would be located in vacant land and, if necessary, within roadway right-of-ways. Pipelines would be installed below-grade and overlying ground surface would be restored to pre-construction conditions, resulting in no permanent impact on site drainage. The project would have a less than significant impact related to stormwater runoff (see *Section 3.10 Hydrology and Water Quality*). No impact would occur.

Mitigation Measures

None required.

Significance Determination

No impact.

3.21 Mandatory Findings of Significance

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less than Significant Impact*	*No Impact*
Does the Project:				
a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	[ ]	[X]	[ ]	[ ]
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	[ ]	[X]	[ ]	[ ]
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	[ ]	[X]	[ ]	[ ]

Discussion

a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the

number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

The proposed project would upgrade, replace, and rehabilitate aging sewer pipelines within OC San's wastewater collection and treatment system. The entirety of the proposed project alignment would be within existing roadway right-of-ways. With implementation of mitigation measures, the proposed project would not have the potential to substantially degrade the quality of the environment, reduce wildlife habitat, result in adverse impacts to wildlife populations or communities, or eliminate important examples of major periods of California history or prehistory.

The proposed project would result in emissions of criteria air pollutants from short-term construction activities. **Mitigation Measure AQ-1** would require the construction contractor to demonstrate that all 50-horsepower or greater diesel-powered equipment is powered with CARB-certified Tier 4 Final engines. Implementation of **Mitigation Measure AQ-1** reduces the cumulative emissions of criteria air pollutants, specifically NO_X emissions, that would contribute to regional air quality impacts during construction to less than significant.

As discussed in *Section 3.4 Biological Resources*, the proposed project site does not contain suitable habitat to support special status wildlife or plant species or sensitive plant or animal communities because of the disturbance history of the site, lack of suitable soils, inappropriate hydrologic conditions, or absence of appropriate vegetation communities. However, project construction has the potential to impact nesting birds, which are protected under the MBTA and CFGC. **Mitigation Measure BIO-1** would require a qualified biologist to conduct surveys for nesting birds and appropriate mitigation to be implemented to reduce potential direct and indirect impacts if construction activities must occur within the nesting season. **Mitigation Measure BIO-2** would require a permit or permission from the City of Orange be obtained prior to cutting or removing any tree, shrub, or plant, which serve as habitat to various species. With implementation of **Mitigation Measures BIO-1** and **BIO-2**, the project would not have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of a rare or endangered plant or animal.

No paleontological resources are documented within the project area. However, the project area is located in an area of moderate paleontological sensitivity and there is potential for ground-disturbing pipeline replacement activities to uncover previously unrecorded paleontological resources. **Mitigation Measure CUL-1** would require cultural resources sensitivity training for all construction personnel to be held by a qualified archaeologist prior to the start of ground-disturbing activities. **Mitigation Measure CUL-2** would require that all ground disturbing work be temporarily suspended if cultural resources are discovered during construction and would ensure appropriate procedures for preservation are conducted. **Mitigation Measure GEO-1** would require development of a paleontological monitoring plan and preconstruction training prior to ground disturbing activities. With implementation of **Mitigation Measures CUL-1**, **CUL-2**, and **GEO-1**, the project would not have the potential to eliminate important examples of the major periods of California prehistory.

The project is located within Ancestral Tribal Territory of the Gabrieleno Band of Mission Indians – Kizh Nation. It is also located within the territory of the Juaneño Band of Mission Indians - Acjachement Nation-Belardes. The project has the potential to impact tribal cultural resources during ground disturbing activities in areas with original soil. **Mitigation Measure TCR-1** informs construction personnel on recognizing tribal

cultural resources, and appropriate procedures to follow if tribal cultural resources, human remains or grave goods are encountered. **Mitigation Measure TCR-2** requires a plan with protocols for the discovery of resources that may qualify as tribal cultural resources, and a treatment plan for resource recovery. **Mitigation Measure TCR-3** requires notification and coordination with the most likely descendant in the even human remains are discovered that may be of Native American origin. In addition, the implementation of **Mitigation Measures CUL-1**, **CUL-2,** OC San General Requirements 6-Y and 6-Z, and adherence to California Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5, will be required. With implementation of **Mitigation Measures TCR-1**, **TCR-2**, and **TCR-3**, the project would not have the potential to eliminate important examples of the major periods of California history.

Mitigation Measures

See **Mitigation Measures AQ-1, BIO-1, BIO-2, CUL-1, CUL-2, GEO-1, TCR-1, TCR-2, TCR-3**.

Significance Determination

Less than significant with mitigation incorporated.

b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

As described in Section 3.1 through Section 3.20, all resource topics associated with the proposed project have been analyzed in accordance with the CEQA and the State CEQA Guidelines and were found to pose no impact, less than significant impact, or less than significant impact with mitigation incorporated. No potentially significant impact would occur from project implementation. According to the CEQA Guidelines, 15065(a)(3), "cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

According to CEQA Guidelines Section 15130(b) there are two approaches to discussing cumulative project impacts: the *List-of-Projects* method (a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency); or the *Summary-of-Projections* method (a summary of projections contained in an adopted general plan or related planning document or in a prior environmental document that has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency. OC San is relying on the *Summary-of-Projections* method for purposes of this analysis.

The Taft Branch Improvements Project (project number 2-49) was identified in OC San's 2017 Waste Collection and Treatment FMP. An FMP is a long-term planning document that addresses the wastewater collection, treatment, recycling, and ocean outfall facility needs for OC San over a defined planning period. The major goals of the FMP were to identify a phased 20-year program of capital improvement projects that maintain reliability and accommodate future growth, as well as meet future regulatory requirements, level of service goals, and strategic initiatives. A total of 84 projects were identified in the 2017 FMP (OC San 2017). Cumulative impacts for each of the Appendix G Environmental Topics were analyzed and

included in the Draft PEIR Table 1-1 Summary of FMP Impacts. Impacts were found to be no impact, less than significant, or less than significant with mitigation incorporated.

The proposed project would not have impacts that are individually limited, but cumulatively considerable. The impacts of the project have been analyzed individually in this MND and cumulatively in the PEIR in accordance with the CEQA Guidelines; each topic has been found to have either no impact, a less than significant impact, or a less than significant impact with mitigation incorporated. The project is of a limited scale, and, taken in sum with other projects in the area, would not produce cumulatively considerable impacts to the environment or human beings. Therefore, cumulative impacts of the proposed project would be less than significant.

Mitigation Measures

See **Mitigation Measures AES-1, AQ-1, BIO-1, CUL-1, CUL-2, GEO-1, HAZ-1, HAZ-2, HAZ-3, NOI-1, NOI-2, TRA-1, TCR-1, TCR-2, TCR-3.**

Significance Determination

Less than significant.

c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

With implementation of mitigation measures, the proposed project would not have the potential to cause substantial adverse effects on human beings.

Lighting produced during nighttime construction activities has the potential to affect nighttime views at the surrounding properties. Implementation of **Mitigation Measure AES-1** would require a Construction Safety Lighting Plan and would reduce impacts to less than significant.

The project may expose the community, including sensitive receptors, to noise from construction. Implementation of **Mitigation Measures NOI-1, NOI-2** and **NOI-3** would require noise reduction measures and would reduce impacts to less than significant.

Although all existing applicable regulations would be followed, there is potential for hazardous materials associated with typical construction activities to be released during construction. Implementation of **Mitigation Measures HAZ-1** (Pre-Demolition Hazardous Buildings Material Survey and Abatement), **HAZ-2** (Hazardous Material Contingency Plan), and **HAZ-3** (Monitoring Well Protection) would minimize the risk of hazardous material exposure through material use and accidents and reduce impacts to less than significant.

Construction impacts would be temporary and have a limited footprint but would require temporary closures of roadways, bicycle lanes, and sidewalks. Potential impacts related to these closures would be minimized through the implementation of a Traffic Control Plan and Detour Plan, as described in **Mitigation Measure TRA-1**, which would ensure that appropriate traffic controls are implemented. Implementation of **Mitigation Measure TRA-1** would reduce impacts to less than significant.

The impacts of the proposed project have been analyzed in accordance with the CEQA Guidelines; each topic has been found to have either no impact, a less than significant impact, or a less than significant

impact with mitigation incorporated. Therefore, with the implementation of the mitigation measures noted above, the project would not result in any environmental effects that would cause substantial adverse effects on human beings either directly or indirectly.

Mitigation Measures

See **Mitigation Measures AES-2, NOI-1, NOI-2, NOI-3, HAZ-1, HAZ-2, HAZ-3,** and **TRA-1**.

Significance Determination

Less than significant with mitigation incorporated.

4. REPORT PREPARATION

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APPENDIX A: CALEEMOD OUTPUT

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Taft Sewer Rehab
Construction Start Date	1/3/2024
Operational Year	2025
Lead Agency	Orange County Sanitation District
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	1.8
Precipitation (days)	2.2
Location	33.81776879539578, -117.83134946317298
County	Orange
City	Orange
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5738
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.13

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building A	Landscape	Special Lar	Populatior	Description
Other Asphalt Surfaces	59	1000sqft	1.35	0	0	0		

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Un/Mit.	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Unmit.	4.28	3.5	27.4	30.2	0.08	1.03	0.99	2.02	0.95	0.25	1.2		9160	9160	0.42	0.33	5.8	9275
Mit.	1.43	1.22	11.6	41.9	0.08	0.25	0.99	1.24	0.24	0.25	0.49		9160	9160	0.42	0.33	5.8	9275
% Reduced	66.6	65.1	57.5	−38.8		76.1		38.7	74.9		59.2							
Daily, Winter (Max)																		
Unmit.	4.71	3.86	31.7	37	0.09	1.19	0.99	2.18	1.09	0.25	1.35		10276	10276	0.46	0.34	0.15	10389
Mit.	1.86	1.58	16	48.7	0.09	0.41	0.99	1.4	0.38	0.25	0.64		10276	10276	0.46	0.34	0.15	10389
% Reduced	60.5	59	49.6	−31.6		65.9		35.9	64.9		52.8							
Average Daily (Max)																		
Unmit.	2.45	2	15.5	18.1	0.05	0.55	0.59	1.14	0.51	0.15	0.66		5515	5515	0.25	0.2	1.42	5581
Mit.	0.87	0.75	7.24	25.3	0.05	0.16	0.59	0.75	0.15	0.15	0.3		5515	5515	0.25	0.2	1.42	5581
% Reduced	64.5	62.8	53.2	−39.5		71		34.6	69.9		54.4							
Annual (Max)																		
Unmit.	0.45	0.37	2.83	3.31	0.01	0.1	0.11	0.21	0.09	0.03	0.12		913	913	0.04	0.03	0.24	924
Mit.	0.16	0.14	1.32	4.61	0.01	0.03	0.11	0.14	0.03	0.03	0.05		913	913	0.04	0.03	0.24	924
% Reduced	64.5	62.8	53.2	−39.5		71		34.6	69.9		54.4							
Exceeds (Daily Max)																		
Threshold		75	100	550	150			150			55							
Unmit.		No	No	No	No			No			No							

	TOG	ROG	NOx	CO	SO₂	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO₂	NBCO₂	CO₂T	CH₄	N₂O	R	CO₂e
Mit.		No	No	No	No			No			No							
Exceeds (Average Daily)																		
Threshold		75	100	550	150			150			55							
Unmit.		No	No	No	No			No			No							
Mit.		No	No	No	No			No			No							

2.2. Construction Emissions by Year, Unmitigated

Year	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily - Summer (Max)																		
2024	4.28	3.5	27.4	30.2	0.08	1.03	0.99	2.02	0.95	0.25	1.2		9160	9160	0.42	0.33	5.8	9275
2025	4.06	3.33	25.4	29.7	0.08	0.91	0.99	1.9	0.84	0.25	1.09		9127	9127	0.42	0.33	5.53	9241
Daily - Winter (Max)																		
2024	4.71	3.86	31.7	37	0.09	1.19	0.99	2.18	1.09	0.25	1.35		10276	10276	0.46	0.34	0.15	10389
2025	4.43	3.63	29.3	36.5	0.09	1.02	0.99	2.01	0.94	0.25	1.19		10246	10246	0.46	0.34	0.14	10358
Average Daily																		
2024	2.19	1.8	14.5	16.6	0.04	0.55	0.48	1.03	0.5	0.12	0.62		4746	4746	0.21	0.16	1.21	4800
2025	2.45	2	15.5	18.1	0.05	0.55	0.59	1.14	0.51	0.15	0.66		5515	5515	0.25	0.2	1.42	5581
Annual																		
2024	0.4	0.33	2.65	3.04	0.01	0.1	0.09	0.19	0.09	0.02	0.11		786	786	0.04	0.03	0.2	795
2025	0.45	0.37	2.83	3.31	0.01	0.1	0.11	0.21	0.09	0.03	0.12		913	913	0.04	0.03	0.24	924

2.3. Construction Emissions by Year, Mitigated

Year	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily - Summer (Max)																		
2024	1.43	1.22	11.6	41.9	0.08	0.25	0.99	1.24	0.24	0.25	0.49		9160	9160	0.42	0.33	5.8	9275
2025	1.41	1.21	11.5	41.7	0.08	0.24	0.99	1.24	0.24	0.25	0.49		9127	9127	0.42	0.33	5.53	9241
Daily - Winter (Max)																		
2024	1.86	1.58	16	48.7	0.09	0.41	0.99	1.4	0.38	0.25	0.64		10276	10276	0.46	0.34	0.15	10389
2025	1.78	1.52	15.4	48.5	0.09	0.36	0.99	1.35	0.34	0.25	0.59		10246	10246	0.46	0.34	0.14	10358
Average Daily																		
2024	0.8	0.68	6.74	22.3	0.04	0.16	0.48	0.64	0.15	0.12	0.27		4746	4746	0.21	0.16	1.21	4800
2025	0.87	0.75	7.24	25.3	0.05	0.16	0.59	0.75	0.15	0.15	0.3		5515	5515	0.25	0.2	1.42	5581
Annual																		
2024	0.15	0.12	1.23	4.07	0.01	0.03	0.09	0.12	0.03	0.02	0.05		786	786	0.04	0.03	0.2	795
2025	0.16	0.14	1.32	4.61	0.01	0.03	0.11	0.14	0.03	0.03	0.05		913	913	0.04	0.03	0.24	924

2.4. Operations Emissions Compared Against Thresholds

Un/Mit.	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Unmit.	0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																		
Unmit.	0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily (Max)																		
Unmit.	0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual (Max)																		
Unmit.	0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exceeds (Daily Max)																		
Threshold		55	55	550	150			150			55							3000
Unmit.		No	No	No	No			No			No							No
Exceeds (Average Daily)																		
Threshold		55	55	550	150			150			55							3000
Unmit.		No	No	No	No			No			No							No

2.5. Operations Emissions by Sector, Unmitigated

Sector	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e	
Daily, Summer (Max)																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water													0	0	0	0	0		0
Waste													0	0	0	0	0		0
Total		0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water													0	0	0	0	0		0
Waste													0	0	0	0	0		0
Total		0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water													0	0	0	0	0		0
Waste													0	0	0	0	0		0
Total		0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water													0	0	0	0	0		0
Waste													0	0	0	0	0		0
Total		0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.6. Operations Emissions by Sector, Mitigated

Sector	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e	
Daily, Summer (Max)																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water													0	0	0	0	0		0
Waste													0	0	0	0	0		0
Total		0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water													0	0	0	0	0		0
Waste													0	0	0	0	0		0
Total		0	< 0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																			
Mobile		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																	
Energy		0	0	0	0	0	0		0	0		0		0	0	0	0		0

Water												0	0	0	0	0		0
Waste												0	0	0	0	0		0
Total	0	< 0.005		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Mobile	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Area		< 0.005																
Energy	0	0	0	0	0	0		0	0		0		0	0	0	0		0
Water												0	0	0	0	0		0
Waste												0	0	0	0	0		0
Total	0	< 0.005		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	0.14	0.12	1.2	1.92	< 0.005	0.05		0.05	0.05		0.05		290	290	0.01	< 0.005		291
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	0.14	0.12	1.2	1.92	< 0.005	0.05		0.05	0.05		0.05		290	290	0.01	< 0.005		291
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.03	0.03	0.28	0.45	< 0.005	0.01		0.01	0.01		0.01		67.6	67.6	< 0.005	< 0.005		67.9
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.01	0.01	0.05	0.08	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005		11.2	11.2	< 0.005	< 0.005		11.2
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Worker	0.01	0.01	0.01	0.15	0	0	0.03	0.03	0	0.01	0.01		33.9	33.9	< 0.005	< 0.005	0.14	34.4
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Worker	0.01	0.01	0.01	0.13	0	0	0.03	0.03	0	0.01	0.01		32.2	32.2	< 0.005	< 0.005	< 0.005	32.6
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Worker	< 0.005	< 0.005	< 0.005	0.03	0	0	0.01	0.01	0	< 0.005	< 0.005		7.61	7.61	< 0.005	< 0.005	0.01	7.71
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Worker	< 0.005	< 0.005	< 0.005	0.01	0	0	< 0.005	< 0.005	0	< 0.005	< 0.005		1.26	1.26	< 0.005	< 0.005	< 0.005	1.28
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

3.2. Site Preparation (2024) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		

Daily, Summer (Max)																		
Off-Road Equipment	0.03	0.03	0.14	2.03	< 0.005	0.01		0.01	0.01		0.01	290	290	0.01	< 0.005			291
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	0.03	0.03	0.14	2.03	< 0.005	0.01		0.01	0.01		0.01	290	290	0.01	< 0.005			291
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.01	0.01	0.03	0.47	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005	67.6	67.6	< 0.005	< 0.005			67.9
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Off-Road Equipment	< 0.005	< 0.005	0.01	0.09	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005	11.2	11.2	< 0.005	< 0.005			11.2
Dust From Material Movement							0	0		0	0							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Worker	0.01	0.01	0.01	0.15	0	0	0.03	0.03	0	0.01	0.01	33.9	33.9	< 0.005	< 0.005		0.14	34.4
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																		
Worker	0.01	0.01	0.01	0.13	0	0	0.03	0.03	0	0.01	0.01	32.2	32.2	< 0.005	< 0.005	< 0.005		32.6
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																		
Worker	< 0.005	< 0.005	< 0.005	0.03	0	0	0.01	0.01	0	< 0.005	< 0.005	7.61	7.61	< 0.005	< 0.005		0.01	7.71
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Worker	< 0.005	< 0.005	< 0.005	0.01	0	0	< 0.005	< 0.005	0	< 0.005	< 0.005	1.26	1.26	< 0.005	< 0.005	< 0.005		1.28
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.3. Grading (2024) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	2.84	2.38	18.3	18.5	0.06	0.68		0.68	0.63		0.63	5816	5816	0.24	0.05			5836
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	2.84	2.38	18.3	18.5	0.06	0.68		0.68	0.63		0.63	5816	5816	0.24	0.05			5836
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	1.36	1.14	8.79	8.87	0.03	0.33		0.33	0.3		0.3	2788	2788	0.11	0.02			2798
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.25	0.21	1.6	1.62	< 0.005	0.06		0.06	0.06		0.06	462	462	0.02	< 0.005			463
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							

Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite																	
Daily, Summer (Max)																	
Worker	0.11	0.1	0.11	1.65	0	0	0.36	0.36	0	0.08	0.08	373	373	< 0.005	0.01	1.53	378
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.16	0.03	1.96	0.85	0.01	0.02	0.4	0.42	0.02	0.11	0.13	1580	1580	0.13	0.25	3.3	1661
Daily, Winter (Max)																	
Worker	0.11	0.1	0.12	1.43	0	0	0.36	0.36	0	0.08	0.08	355	355	0.01	0.01	0.04	359
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.16	0.03	2.03	0.86	0.01	0.02	0.4	0.42	0.02	0.11	0.13	1580	1580	0.13	0.25	0.09	1659
Average Daily																	
Worker	0.05	0.05	0.06	0.72	0	0	0.17	0.17	0	0.04	0.04	172	172	< 0.005	0.01	0.32	175
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.08	0.02	0.98	0.41	< 0.005	0.01	0.19	0.2	0.01	0.05	0.06	758	758	0.06	0.12	0.68	796
Annual																	
Worker	0.01	0.01	0.01	0.13	0	0	0.03	0.03	0	0.01	0.01	28.5	28.5	< 0.005	< 0.005	0.05	28.9
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.01	< 0.005	0.18	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	125	125	0.01	0.02	0.11	132

3.4. Grading (2024) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment		0.79	0.75	5.86	30.5	0.06	0.16		0.16	0.16		0.16	5816	5816	0.24	0.05		5836
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment		0.79	0.75	5.86	30.5	0.06	0.16		0.16	0.16		0.16	5816	5816	0.24	0.05		5836
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																		
Off-Road Equipment		0.38	0.36	2.81	14.6	0.03	0.08		0.08	0.08		0.08	2788	2788	0.11	0.02		2798
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Off-Road Equipment		0.07	0.07	0.51	2.67	< 0.005	0.01		0.01	0.01		0.01	462	462	0.02	< 0.005		463
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Worker		0.11	0.1	0.11	1.65	0	0	0.36	0.36	0	0.08	0.08	373	373	< 0.005	0.01	1.53	378
Vendor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling		0.16	0.03	1.96	0.85	0.01	0.02	0.4	0.42	0.02	0.11	0.13	1580	1580	0.13	0.25	3.3	1661
Daily, Winter (Max)																		
Worker		0.11	0.1	0.12	1.43	0	0	0.36	0.36	0	0.08	0.08	355	355	0.01	0.01	0.04	359
Vendor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling		0.16	0.03	2.03	0.86	0.01	0.02	0.4	0.42	0.02	0.11	0.13	1580	1580	0.13	0.25	0.09	1659
Average Daily																		
Worker		0.05	0.05	0.06	0.72	0	0	0.17	0.17	0	0.04	0.04	172	172	< 0.005	0.01	0.32	175
Vendor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling		0.08	0.02	0.98	0.41	< 0.005	0.01	0.19	0.2	0.01	0.05	0.06	758	758	0.06	0.12	0.68	796
Annual																		

Worker	0.01	0.01	0.01	0.13	0	0	0.03	0.03	0	0.01	0.01	28.5	28.5	< 0.005	< 0.005	0.05	28.9
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.01	< 0.005	0.18	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	125	125	0.01	0.02	0.11	132

3.5. Grading (2025) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	2.73	2.29	16.7	18.3	0.06	0.6		0.6	0.55		0.55		5822	5822	0.24	0.05		5842
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	2.73	2.29	16.7	18.3	0.06	0.6		0.6	0.55		0.55		5822	5822	0.24	0.05		5842
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	1.62	1.36	9.93	10.9	0.03	0.36		0.36	0.33		0.33		3464	3464	0.14	0.03		3476
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.3	0.25	1.81	1.99	0.01	0.07		0.07	0.06		0.06		573	573	0.02	< 0.005		575
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Worker	0.11	0.1	0.1	1.54	0	0	0.36	0.36	0	0.08	0.08		365	365	< 0.005	0.01	1.38	370
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0.15	0.03	1.89	0.83	0.01	0.02	0.4	0.42	0.02	0.11	0.13		1553	1553	0.13	0.25	3.27	1634
Daily, Winter (Max)																		
Worker	0.11	0.1	0.11	1.33	0	0	0.36	0.36	0	0.08	0.08		347	347	< 0.005	0.01	0.04	351
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0.15	0.03	1.96	0.84	0.01	0.02	0.4	0.42	0.02	0.11	0.13		1553	1553	0.13	0.25	0.08	1631
Average Daily																		
Worker	0.06	0.06	0.06	0.83	0	0	0.21	0.21	0	0.05	0.05		209	209	< 0.005	0.01	0.35	212
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0.09	0.02	1.18	0.5	0.01	0.01	0.24	0.25	0.01	0.07	0.08		924	924	0.07	0.15	0.84	971
Annual																		
Worker	0.01	0.01	0.01	0.15	0	0	0.04	0.04	0	0.01	0.01		34.7	34.7	< 0.005	< 0.005	0.06	35.1
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0.02	< 0.005	0.21	0.09	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01		153	153	0.01	0.02	0.14	161

3.6. Grading (2025) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	0.79	0.75	5.85	30.5	0.06	0.16		0.16	0.16		0.16		5822	5822	0.24	0.05		5842
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	0.79	0.75	5.85	30.5	0.06	0.16		0.16	0.16		0.16		5822	5822	0.24	0.05		5842
Dust From Material Movement							< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

Average Daily																	
Off-Road Equipment	0.47	0.44	3.48	18.1	0.03	0.1		0.1	0.09		0.09	3464	3464	0.14	0.03		3476
Dust From Material Movement						< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																	
Off-Road Equipment	0.09	0.08	0.64	3.31	0.01	0.02		0.02	0.02		0.02	573	573	0.02	< 0.005		575
Dust From Material Movement						< 0.005	< 0.005		< 0.005	< 0.005							
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite																	
Daily, Summer (Max)																	
Worker	0.11	0.1	0.1	1.54	0	0	0.36	0.36	0	0.08	0.08	365	365	< 0.005	0.01	1.38	370
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.15	0.03	1.89	0.83	0.01	0.02	0.4	0.42	0.02	0.11	0.13	1553	1553	0.13	0.25	3.27	1634
Daily, Winter (Max)																	
Worker	0.11	0.1	0.11	1.33	0	0	0.36	0.36	0	0.08	0.08	347	347	< 0.005	0.01	0.04	351
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.15	0.03	1.96	0.84	0.01	0.02	0.4	0.42	0.02	0.11	0.13	1553	1553	0.13	0.25	0.08	1631
Average Daily																	
Worker	0.06	0.06	0.06	0.83	0	0	0.21	0.21	0	0.05	0.05	209	209	< 0.005	0.01	0.35	212
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.09	0.02	1.18	0.5	0.01	0.01	0.24	0.25	0.01	0.07	0.08	924	924	0.07	0.15	0.84	971
Annual																	
Worker	0.01	0.01	0.01	0.15	0	0	0.04	0.04	0	0.01	0.01	34.7	34.7	< 0.005	< 0.005	0.06	35.1
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0.02	< 0.005	0.21	0.09	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	153	153	0.01	0.02	0.14	161

3.7. Building Construction (2024) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Off-Road Equipment	0.43	0.36	4.29	7.2	0.01	0.16		0.16	0.15		0.15		1145	1145	0.05	0.01		1149
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.11	0.09	1.08	1.81	< 0.005	0.04		0.04	0.04		0.04		289	289	0.01	< 0.005		290
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.02	0.02	0.2	0.33	< 0.005	0.01		0.01	0.01		0.01		47.8	47.8	< 0.005	< 0.005		47.9
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Worker	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Worker	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

Annual																	
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.8. Building Construction (2024) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Off-Road Equipment	0.43	0.36	4.29	7.2	0.01	0.16		0.16	0.15		0.15		1145	1145	0.05	0.01		1149
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.11	0.09	1.08	1.81	< 0.005	0.04		0.04	0.04		0.04		289	289	0.01	< 0.005		290
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.02	0.02	0.2	0.33	< 0.005	0.01		0.01	0.01		0.01		47.8	47.8	< 0.005	< 0.005		47.9
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Worker	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Worker	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Worker	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

3.9. Building Construction (2025) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Off-Road Equipment	0.37	0.31	3.83	7.13	0.01	0.11		0.11	0.1		0.1		1147	1147	0.05	0.01		1151
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.03	0.03	0.33	0.61	< 0.005	0.01		0.01	0.01		0.01		97.5	97.5	< 0.005	< 0.005		97.8
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.01	< 0.005	0.06	0.11	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005		16.1	16.1	< 0.005	< 0.005		16.2
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

Offsite																	
Daily, Summer (Max)																	
Daily, Winter (Max)																	
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																	
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																	
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.10. Building Construction (2025) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Off-Road Equipment	0.37	0.31	3.83	7.13	0.01	0.11		0.11	0.1		0.1		1147	1147	0.05	0.01		1151
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.03	0.03	0.33	0.61	< 0.005	0.01		0.01	0.01		0.01		97.5	97.5	< 0.005	< 0.005		97.8
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.01	< 0.005	0.06	0.11	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005		16.1	16.1	< 0.005	< 0.005		16.2
Architectural Coatings		0																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Daily, Winter (Max)																		
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																		
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.11. Paving (2024) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	1.09	0.91	6.9	8.13	0.01	0.32		0.32	0.3		0.3		1155	1155	0.05	0.01		1159
Paving		0.01																

Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																	
Off-Road Equipment	1.09	0.91	6.9	8.13	0.01	0.32		0.32	0.3		0.3	1155	1155	0.05	0.01		1159
Paving		0.01															
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																	
Off-Road Equipment	0.52	0.44	3.31	3.9	0.01	0.16		0.16	0.14		0.14	554	554	0.02	< 0.005		556
Paving		< 0.005															
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																	
Off-Road Equipment	0.1	0.08	0.6	0.71	< 0.005	0.03		0.03	0.03		0.03	91.7	91.7	< 0.005	< 0.005		92
Paving		< 0.005															
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite																	
Daily, Summer (Max)																	
Worker	0.07	0.06	0.07	1.05	0	0	0.23	0.23	0	0.05	0.05	237	237	< 0.005	0.01	0.97	241
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																	
Worker	0.07	0.06	0.08	0.91	0	0	0.23	0.23	0	0.05	0.05	226	226	< 0.005	0.01	0.03	228
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																	
Worker	0.03	0.03	0.04	0.46	0	0	0.11	0.11	0	0.03	0.03	110	110	< 0.005	< 0.005	0.2	111
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																	
Worker	0.01	0.01	0.01	0.08	0	0	0.02	0.02	0	< 0.005	< 0.005	18.2	18.2	< 0.005	< 0.005	0.03	18.4
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.12. Paving (2024) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	0.29	0.26	3.62	7.87	0.01	0.06		0.06	0.06		0.06	1155	1155	0.05	0.01		1159	
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	0.29	0.26	3.62	7.87	0.01	0.06		0.06	0.06		0.06	1155	1155	0.05	0.01		1159	
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.14	0.13	1.74	3.77	0.01	0.03		0.03	0.03		0.03	554	554	0.02	< 0.005		556	
Paving		< 0.005																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.03	0.02	0.32	0.69	< 0.005	0.01		0.01	0.01		0.01	91.7	91.7	< 0.005	< 0.005		92	
Paving		< 0.005																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		

Worker	0.07	0.06	0.07	1.05	0	0	0.23	0.23	0	0.05	0.05	237	237	< 0.005	0.01	0.97	241
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																	
Worker	0.07	0.06	0.08	0.91	0	0	0.23	0.23	0	0.05	0.05	226	226	< 0.005	0.01	0.03	228
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Daily																	
Worker	0.03	0.03	0.04	0.46	0	0	0.11	0.11	0	0.03	0.03	110	110	< 0.005	< 0.005	0.2	111
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																	
Worker	0.01	0.01	0.01	0.08	0	0	0.02	0.02	0	< 0.005	< 0.005	18.2	18.2	< 0.005	< 0.005	0.03	18.4
Vendor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.13. Paving (2025) - Unmitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	1	0.84	6.63	8.03	0.01	0.29		0.29	0.26		0.26		1155	1155	0.05	0.01		1159
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	1	0.84	6.63	8.03	0.01	0.29		0.29	0.26		0.26		1155	1155	0.05	0.01		1159
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.6	0.5	3.94	4.77	0.01	0.17		0.17	0.16		0.16		687	687	0.03	0.01		689
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.11	0.09	0.72	0.87	< 0.005	0.03		0.03	0.03		0.03		114	114	< 0.005	< 0.005		114
Paving		< 0.005																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Worker	0.07	0.06	0.06	0.98	0	0	0.23	0.23	0	0.05	0.05		232	232	< 0.005	0.01	0.88	236
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Worker	0.07	0.06	0.07	0.85	0	0	0.23	0.23	0	0.05	0.05		221	221	< 0.005	0.01	0.02	224
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Worker	0.04	0.04	0.04	0.53	0	0	0.14	0.14	0	0.03	0.03		133	133	< 0.005	< 0.005	0.23	135
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Worker	0.01	0.01	0.01	0.1	0	0	0.02	0.02	0	0.01	0.01		22.1	22.1	< 0.005	< 0.005	0.04	22.4
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

3.14. Paving (2025) - Mitigated

Location	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Onsite																		
Daily, Summer (Max)																		
Off-Road Equipment	0.29	0.26	3.61	7.87	0.01	0.06		0.06	0.06		0.06		1155	1155	0.05	0.01		1159
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Off-Road Equipment	0.29	0.26	3.61	7.87	0.01	0.06		0.06	0.06		0.06		1155	1155	0.05	0.01		1159
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Off-Road Equipment	0.17	0.16	2.15	4.68	0.01	0.04		0.04	0.04		0.04		687	687	0.03	0.01		689
Paving		0.01																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Off-Road Equipment	0.03	0.03	0.39	0.85	< 0.005	0.01		0.01	0.01		0.01		114	114	< 0.005	< 0.005		114
Paving		< 0.005																
Onsite truck	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Offsite																		
Daily, Summer (Max)																		
Worker	0.07	0.06	0.06	0.98	0	0	0.23	0.23	0	0.05	0.05		232	232	< 0.005	0.01	0.88	236
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Worker	0.07	0.06	0.07	0.85	0	0	0.23	0.23	0	0.05	0.05		221	221	< 0.005	0.01	0.02	224
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Average Daily																		
Worker	0.04	0.04	0.04	0.53	0	0	0.14	0.14	0	0.03	0.03		133	133	< 0.005	< 0.005	0.23	135
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Worker	0.01	0.01	0.01	0.1	0	0	0.02	0.02	0	0.01	0.01		22.1	22.1	< 0.005	< 0.005	0.04	22.4
Vendor	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Hauling	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Other Asphalt Surfaces	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Other Asphalt Surfaces	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

4.1.2. Mitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Other Asphalt Surfaces		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Other Asphalt Surfaces		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces														0	0	0	0	0
Total														0	0	0	0	0
Daily, Winter (Max)																		
Other Asphalt Surfaces														0	0	0	0	0
Total														0	0	0	0	0
Annual																		
Other Asphalt Surfaces														0	0	0	0	0
Total														0	0	0	0	0

4.2.2. Electricity Emissions By Land Use - Mitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces														0	0	0	0	0
Total														0	0	0	0	0
Daily, Winter (Max)																		
Other Asphalt Surfaces														0	0	0	0	0
Total														0	0	0	0	0
Annual																		
Other Asphalt Surfaces														0	0	0	0	0
Total														0	0	0	0	0

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Daily, Winter (Max)																		
Other Asphalt Surfaces		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Annual																		
Other Asphalt Surfaces		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		

Other Asphalt Surfaces	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily, Winter (Max)																
Other Asphalt Surfaces	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual																
Other Asphalt Surfaces	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.3. Area Emissions by Source

4.3.2. Unmitigated

Source	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Consumer Products		< 0.005																
Architectural Coatings			0															
Total		< 0.005																
Daily, Winter (Max)																		
Consumer Products		< 0.005																
Architectural Coatings			0															
Total		< 0.005																
Annual																		
Consumer Products		< 0.005																
Architectural Coatings			0															
Total		< 0.005																

4.3.1. Mitigated

Source	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Consumer Products		< 0.005																
Architectural Coatings			0															
Total		< 0.005																
Daily, Winter (Max)																		
Consumer Products		< 0.005																
Architectural Coatings			0															
Total		< 0.005																
Annual																		
Consumer Products		< 0.005																
Architectural Coatings			0															
Total		< 0.005																

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces													0	0	0	0	0	0
Total													0	0	0	0	0	0
Daily, Winter (Max)																		
Other Asphalt Surfaces													0	0	0	0	0	0
Total													0	0	0	0	0	0
Annual																		
Other Asphalt Surfaces													0	0	0	0	0	0
Total													0	0	0	0	0	0

4.4.1. Mitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0
Daily, Winter (Max)																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0
Annual																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0
Daily, Winter (Max)																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0
Annual																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0

4.5.1. Mitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0
Daily, Winter (Max)																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0
Annual																		
Other Asphalt Surfaces												0	0	0	0	0		0
Total												0	0	0	0	0		0

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.6.2. Mitigated

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		

Daily, Winter (Max)
Total
Annual
Total

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Equipment Type	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.7.2. Mitigated

Equipment Type	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Equipment Type	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.8.2. Mitigated

Equipment Type	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Equipment Type	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.9.2. Mitigated

Equipment Type	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Vegetation	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

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

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Species	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Avoided																		
Subtotal																		
Sequestered																		
Subtotal																		
Removed																		
Subtotal																		
Daily, Winter (Max)																		
Avoided																		
Subtotal																		
Sequestered																		
Subtotal																		
Removed																		
Subtotal																		
Annual																		
Avoided																		
Subtotal																		
Sequestered																		
Subtotal																		

Removed
Subtotal

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Vegetation	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

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

Land Use	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Total																		
Daily, Winter (Max)																		
Total																		
Annual																		
Total																		

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Species	TOG	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Daily, Summer (Max)																		
Avoided																		
Subtotal																		
Sequestered																		
Subtotal																		
Removed																		
Subtotal																		
Daily, Winter (Max)																		
Avoided																		
Subtotal																		
Sequestered																		
Subtotal																		
Removed																		
Subtotal																		
Annual																		
Avoided																		
Subtotal																		
Sequestered																		
Subtotal																		
Removed																		
Subtotal																		

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Typ	Start Date	End Date	Days Per V	Work Day:	Phase Description

Site prep/potholing	Site Prepa	1/3/2024	4/30/2024	5	85
Grading	Grading	5/1/2024	10/31/2025	5	393
Trenchless	Building C	10/1/2024	1/31/2025	7	123
Paving	Paving	5/1/2024	10/31/2025	5	393

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipmen	Fuel Type	Engine Tier	Number p	Hours Per	Horsepow	Load Factor
Site prep/potholing	Tractors/L	Diesel	Average	1	8	84	0.37
Grading	Tractors/L	Diesel	Average	2	7	84	0.37
Grading	Dumpers/	Diesel	Average	2	7	16	0.38
Grading	Excavators	Diesel	Average	1	8	36	0.38
Grading	Concrete/	Diesel	Average	1	8	33	0.73
Grading	Cranes	Diesel	Average	1	6	367	0.29
Grading	Off-Highw	Diesel	Average	3	8	376	0.38
Grading	Pumps	Diesel	Average	1	8	11	0.74
Trenchless	Bore/Drill	Diesel	Average	1	24	83	0.5
Paving	Cement ar	Diesel	Average	1	6	10	0.56
Paving	Pavers	Diesel	Average	1	6	81	0.42
Paving	Paving Eq	Diesel	Average	1	8	89	0.36
Paving	Rollers	Diesel	Average	1	7	36	0.38
Paving	Air Compr	Diesel	Average	1	8	37	0.48
Paving	Generator	Diesel	Average	1	8	14	0.74
Paving	Sweepers/	Diesel	Average	1	8	36	0.46

5.2.2. Mitigated

Phase Name	Equipmen	Fuel Type	Engine Tier	Number p	Hours Per	Horsepow	Load Factor
Site prep/potholing	Tractors/L	Diesel	Tier 4 Final	1	8	84	0.37
Grading	Tractors/L	Diesel	Tier 4 Final	2	7	84	0.37
Grading	Dumpers/	Diesel	Average	2	7	16	0.38
Grading	Excavators	Diesel	Tier 4 Final	1	8	36	0.38
Grading	Concrete/	Diesel	Tier 4 Final	1	8	33	0.73
Grading	Cranes	Diesel	Tier 4 Final	1	6	367	0.29
Grading	Off-Highw	Diesel	Tier 4 Final	3	8	376	0.38
Grading	Pumps	Diesel	Average	1	8	11	0.74
Trenchless	Bore/Drill	Diesel	Average	1	24	83	0.5
Paving	Cement ar	Diesel	Average	1	6	10	0.56
Paving	Pavers	Diesel	Tier 4 Final	1	6	81	0.42
Paving	Paving Eq	Diesel	Tier 4 Final	1	8	89	0.36
Paving	Rollers	Diesel	Tier 4 Final	1	7	36	0.38
Paving	Air Compr	Diesel	Tier 4 Final	1	8	37	0.48
Paving	Generator	Diesel	Average	1	8	14	0.74
Paving	Sweepers/	Diesel	Tier 4 Final	1	8	36	0.46

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way T	Miles per Trip	Vehicle Mix
Site prep/potholing				
Site prep/potholing	Worker	2.5	18.5	LDA,LDT1,LDT2
Site prep/potholing	Vendor		10.2	HHDT,MHDT
Site prep/potholing	Hauling	0	20	HHDT
Site prep/potholing	Onsite truck			HHDT

Grading				
Grading	Worker	27.5	18.5	LDA,LDT1,LDT2
Grading	Vendor		10.2	HHDT,MHDT
Grading	Hauling	22.3	20	HHDT
Grading	Onsite truck			HHDT
Paving				
Paving	Worker	17.5	18.5	LDA,LDT1,LDT2
Paving	Vendor		10.2	HHDT,MHDT
Paving	Hauling	0	20	HHDT
Paving	Onsite truck			HHDT
Trenchless				
Trenchless	Worker	0	18.5	LDA,LDT1,LDT2
Trenchless	Vendor	0	10.2	HHDT,MHDT
Trenchless	Hauling	0	20	HHDT
Trenchless	Onsite truck			HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way T	Miles per Trip	Vehicle Mix
Site prep/potholing				
Site prep/potholing	Worker	2.5	18.5	LDA,LDT1,LDT2
Site prep/potholing	Vendor		10.2	HHDT,MHDT
Site prep/potholing	Hauling	0	20	HHDT
Site prep/potholing	Onsite truck			HHDT
Grading				
Grading	Worker	27.5	18.5	LDA,LDT1,LDT2
Grading	Vendor		10.2	HHDT,MHDT
Grading	Hauling	22.3	20	HHDT
Grading	Onsite truck			HHDT
Paving				
Paving	Worker	17.5	18.5	LDA,LDT1,LDT2
Paving	Vendor		10.2	HHDT,MHDT
Paving	Hauling	0	20	HHDT
Paving	Onsite truck			HHDT
Trenchless				
Trenchless	Worker	0	18.5	LDA,LDT1,LDT2
Trenchless	Vendor	0	10.2	HHDT,MHDT
Trenchless	Hauling	0	20	HHDT
Trenchless	Onsite truck			HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Red	PM2.5 Reduction
Water unpaved roads twice	55	55
Limit vehicle speeds on unpa	44	44
Sweep paved roads once per	9	9

5.5. Architectural Coatings

Phase Name	Residentia	Residential	Non-Residenti	Non-Resid	Parking Area Coated (sq ft)
Trenchless	0	0	0	0	0

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Ir	Material Ex	Acres Graded	Material D	Acres Paved (acres)
Site prep/potholing			0	0	
Grading	35000	35000	0	0	
Paving	0	0	0	0	1.35

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency	PM10 Redu	PM2.5 Reduction
Water Exposed Area	2	61	61
Water Demolished Area	2	36	36

5.7. Construction Paving

Land Use	Area Pave	% Asphalt
Other Asphalt Surfaces	1.35	100

5.8. Construction Electricity Consumption and Emissions Factors

Year	kWh per Y	CO2	CH4	N2O
2024	0	532	0.03	< 0.005
2025	0	532	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Wee	Trips/Satur	Trips/Sunday	Trips/Year	VMT/Wee	VMT/Satu	VMT/Sunc	VMT/Year
Other Asphalt Surfaces	0	0	0	0	0	0	0	0

5.9.2. Mitigated

Land Use Type	Trips/Wee	Trips/Satur	Trips/Sunday	Trips/Year	VMT/Wee	VMT/Satu	VMT/Sunc	VMT/Year
Other Asphalt Surfaces	0	0	0	0	0	0	0	0

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)

5.10.1.2. Mitigated

Hearth Type	Unmitigated (number)

5.10.2. Architectural Coatings

Residential Interior Area Coa	Residentia	Non-Reside	Non-Residenti	Parking Area Coated (sq ft)
0	0	0	0	3540

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0
Summer Days	day/yr	0

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0
Summer Days	day/yr	0

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Land Use	Electricity	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Other Asphalt Surfaces	0	532	0.033	0.004	0

5.11.2. Mitigated

Land Use	Electricity	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Other Asphalt Surfaces	0	532	0.033	0.004	0

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Wa	Outdoor Water (gal/year)
Other Asphalt Surfaces	0	0

5.12.2. Mitigated

Land Use	Indoor Wa	Outdoor Water (gal/year)
Other Asphalt Surfaces	0	0

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (to	Cogeneration (kWh/year)
Other Asphalt Surfaces	0	

5.13.2. Mitigated

Land Use	Waste (to	Cogeneration (kWh/year)
Other Asphalt Surfaces	0	

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipmen	Refrigerant	GWP	Quantity (	Operation Service Le	Times Serviced

5.14.2. Mitigated

Land Use Type	Equipmen	Refrigerant	GWP	Quantity (	Operation Service Le	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per D	Hours Per	Horsepow	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per D	Hours Per	Horsepow	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number pe	Hours per Day	Hours per	Horsepow	Load Factor

5.16.2. Process Boilers

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

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetatio	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetatio	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acre	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acre	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

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

5.18.2.2. Mitigated

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

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will

Climate Hazard	Result for	Unit
Temperature and Extreme H	13.1	annual days of extreme heat
Extreme Precipitation	4.3	annual days with precipitation above 20 mm
Sea Level Rise	0	meters of inundation depth
Wildfire	0	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure S	Sensitivity S	Adaptive Capa	Vulnerability Score
Temperature and Extreme H	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure S	Sensitivity S	Adaptive Capa	Vulnerability Score
Temperature and Extreme H	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

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

Indicator	Result for Project Census Tract
Exposure Indicators	
AQ-Ozone	55.4
AQ-PM	78.1
AQ-DPM	71.7
Drinking Water	54.5
Lead Risk Housing	48.1
Pesticides	72
Toxic Releases	93.2
Traffic	96.8
Effect Indicators	
CleanUp Sites	0
Groundwater	14.3
Haz Waste Facilities/Generat	58.8
Impaired Water Bodies	0
Solid Waste	52.9
Sensitive Population	
Asthma	25.5
Cardio-vascular	19.9
Low Birth Weights	32.5
Socioeconomic Factor Indicators	
Education	75.6
Housing	80.1
Linguistic	64.1

Poverty	65.3
Unemployment	41.8

7.2. Healthy Places Index Scores

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

Indicator	Result for Project Census Tract
Economic	
Above Poverty	28.01232
Employed	41.16515
Median HI	61.41409
Education	
Bachelor's or higher	53.54806
High school enrollment	100
Preschool enrollment	27.35789
Transportation	
Auto Access	48.06878
Active commuting	71.64122
Social	
2-parent households	67.57346
Voting	48.05595
Neighborhood	
Alcohol availability	34.7748
Park access	2.194277
Retail density	54.22815
Supermarket access	80.54664
Tree canopy	15.16746
Housing	
Homeownership	54.04851
Housing habitability	31.1305
Low-inc homeowner severe l	25.38175
Low-inc renter severe housir	19.28654
Uncrowded housing	18.76043
Health Outcomes	
Insured adults	10.09881
Arthritis	70
Asthma ER Admissions	78
High Blood Pressure	65
Cancer (excluding skin)	58
Asthma	43
Coronary Heart Disease	58
Chronic Obstructive Pulmona	40
Diagnosed Diabetes	61
Life Expectancy at Birth	96
Cognitively Disabled	87
Physically Disabled	74
Heart Attack ER Admissions	77
Mental Health Not Good	37
Chronic Kidney Disease	65
Obesity	48
Pedestrian Injuries	20
Physical Health Not Good	41
Stroke	52

Health Risk Behaviors	
Binge Drinking	17
Current Smoker	41
No Leisure Time for Physical	41
Climate Change Exposures	
Wildfire Risk	0
SLR Inundation Area	0
Children	38
Elderly	71
English Speaking	30
Foreign-born	79
Outdoor Workers	20
Climate Change Adaptive Capacity	
Impervious Surface Cover	26
Traffic Density	94
Traffic Access	66
Other Indices	
Hardship	68
Other Decision Support	
2016 Voting	73

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score fo	63
Healthy Places Index Score fo	40
Project Located in a Designat	No
Project Located in a Low-Inco	Yes
Project Located in a Commur	No

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

7.4. Health & Equity Measures

Measure Title	Co-Benefits Achieved

7.5. Evaluation Scorecard

Category	Number o	Total Points	Max Possible I	Weighted Score

7.6. Health & Equity Custom Measures

Measure Title	Sponsor

8. User Changes to Default Data

Screen	Justification
Operations: Landscape Equip	No landscaping
Construction: Construction P	see project description.
Construction: Off-Road Equip	from similar examples, project description
Construction: Architectural C	coatings during paving stage
Operations: Architectural Co	no change from existing

APPENDIX B: BIOLOGICAL TECHNICAL MEMORANDUM

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June 1, 2022

Haley Johnson
Woodard & Curran
9665 Chesapeake Drive, Suite 320
San Diego, CA 92123

Re: Biological Review: OCSAN Taft Avenue Sewer Rehabilitation Project

Dear Haley:

This biological review provides the results of a desktop literature of the Taft Avenue Sewer Rehabilitation Project (Project) proposed by the Orange County Sanitary District (OCSAN). The Project is located in the City of Orange (City) in Orange County, California.

PROJECT DESCRIPTION

The proposed Project, known as project 2-49 Taft, involves replacement and relocation of the existing sewer line within the City's rights-of-way, specifically along Meats Avenue west from Santiago Boulevard to Breckinridge Street, south along Sacramento Street, west along Taft Avenue, crossing Caltrans State Route 55, south along Tustin Street, and west along Taft Avenue to Glassell Street. Two staging areas are proposed to support construction, both located on the south side of Taft Avenue on opposite sides of the Costa Mesa Freeway (Hwy 55) and referred to as West (0.5-acre) and East (2.0 acre).

PURPOSE & SCOPE

The majority of the Project was analyzed in the *2020 Facilities Master Plan Programmatic Environmental Impact Report for the 2017 Facilities Master Plan* (PEIR).[1] Two segments east of Tustin Street along Taft Avenue and Sacramento Street deviate from that studied in the PEIR. Likewise, the proposed staging areas were not covered in the PEIR.

As such, this Biological Review focuses on the current Project alignment and two proposed staging areas, as shown on Figure 1. The text summarizes the results of SWCA's desktop review of on-line data bases and aerial photos.

VICINITY CHARACTERISTICS

The Project is in City's urban core, dominated by commercial, residential and transportation land uses. All project components are located in fully developed and/or landscaped and maintained areas. Both of the staging areas are manicured lawn and/or mowed-disturbed-ruderal land underneath SCE high tension power lines.

[1] Dudek, December 2020. Prepared for Orange County Sanitation District. SCH No. 2019070998

LITERATURE SEARCH

A literature search was completed to discover previously identified extant special-status flora, fauna, or habitats in the Project vicinity. Special-status species include plants and animals listed as endangered, threatened, or candidate for listing as endangered or threatened under the federal Endangered Species Act, the California Endangered Species Act, or both. This term also includes all plant species listed by the state as rare and those species listed by the California Native Plant Society (CNPS)[2] with a Rare Plant Rank (RPR) of 1, 2 or 4, and those included on the current CDFW "Special Vascular Plants, Bryophytes, and Lichens List.[3] Also included are wildlife species designated by the California Department of Fish and Wildlife (CDFW) as Fully Protected, Species of Special Concern, Watch List species, and other wildlife included in the most current CDFW "Special Animals List."[4] The latter two CDFW lists are used to define current protected species.

Occurrence records in the California Natural Diversity Database (CNDDB) and CNPS Rare Plant Inventory (Inventory) were checked for current records. Additional database and mapping resources reviewed included U.S. Fish and Wildlife Service (USFWS) species lists and critical habitat maps, eBird, and vegetation and land-use mapping. Google Earth aerial photos were studied to understand the local and regional context of the immediate Project vicinity potential impacted by proposed construction.

State & Federal Regulations

The federal Migratory Bird Treaty Act (MBTA) prohibits any person, unless permitted by regulations, to

> …pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatsoever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention … for the protection of migratory birds ... or any part, nest, or egg of any such bird. (16 United States Code (USC) 703)

The list of migratory birds includes nearly all bird species native to the United States. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the act and excluded all non-native species. Thus, it is illegal under MBTA to directly kill, or destroy a nest of, nearly any native bird species.

Section 3503 of the State of Calfiornia Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 provides protection for all birds of prey, including their eggs and nests. Take or possession of any migratory non-game bird as designated in the MBTA is prohibited by Section 3513 of the Fish and Game Code.

FINDINGS

As noted above, the Project is fully developed (pipeline alignment) and/or manicured/disturbed grassland (both staging areas). The literature search did not discover any current, extant special-status resources and none are expected to occur given the developed/disturbed conditions and lack of native plant communities

[2] California Native Plant Society. 2022. Inventory of Rare, Threatened, and Endangered Plants of California. Online edition, v8-03 0.39.

[3] California Department of Fish and Wildlife (CDFW). April 2022. California Natural Diversity Database: Special Vascular Plants, Bryophytes and Lichens List.

[4] California Department of Fish and Wildlife. April 2022. California Natural Diversity Database: Special Animals List.

Nesting bird habitat potential is low, due to developed/disturbed conditions. Street trees are present but offer low quality nesting opportunities due to their sparce growth habit from frequent maintenance pruning and moderate to high traffic with associated noise and dust along adjacent streets.

RECOMMENDATIONS

PEIR Mitigation Measures

The PEIR specifies mitigation measures to be implemented to protect nesting birds, summarized below (refer to PEIR for exact wording):

> **MM-BIO-1: Nesting Bird Avoidance.** Construction shall avoid the migratory bird nesting season (typically February 1 through August 31). If construction will occur during this timeframe, avian surveys of the Project and suitable habitat in the surrounding 500-foot area shall be conducted to search for active nests within 72-hours prior to construction start-up. Active nests will be flagged and an appropriate buffer established surrounding the nest, to be determined by Project Biologist. The nest shall be avoided until vacated and juveniles have fledged. No Project activities shall occur within the buffer until the Project Biologist determines that the nest is no longer active.

OCSAN General Requirements

The Sanitary District published General Requirements for contractors.[5] The following (item T, page 17) covers the Protection of Wildlife:

> "If any Work in this Contract might disturb wildlife, even in urban areas, a Biological Monitor shall be hired by the CONTRACTOR to provide assistance in the field to assure that biological resources are protected and that Project-specific mitigation measures are implemented. The Biological Monitor shall be qualified for the tasks to be performed. If endangered or threatened species are present in the Project area and require removal or relocation, the Biological Monitor shall hold the appropriate permits and approvals for access and capture or marking of the species of concern.
>
> Specific activities of the Biological Monitor may include the following:
>
> - Marking areas to be protected from construction activity.
> - Observing construction activities and their impacts on biota.
> - Capturing and relocating biota as necessary to protect them from construction activities.
>
> Prior to the removal of healthy trees at a worksite, a Biological Monitor shall survey the trees to determine if active bird nests are present. If nests of sensitive species are present, tree removal will be scheduled to avoid the nesting season. CONTRACTOR shall provide a written record of whether tree removal is required and, as needed, hire a biologist or provide documentation that nesting birds (listed species of special interest of those as threatened or endangered) are not present in the trees to be removed. Refer to the Specification section(s) regarding detailed landscaping requirements."

[5] District 6 Trunk Sewer Relief Project No. 6-17 *General Requirements*.

CONCLUSIONS

The Project does not provide unique or high-quality biological habitat values. Non-native plants dominate the parcel. Development of the Project as proposed is not anticipated to result in significant adverse impacts to special-status or protected biological resources, given implementation of the mitigation measures regarding breeding/nesting bird surveys.

Sincerely,

Jackie Bowland Worden
Lead Biologist/Natural Resources Project Manager

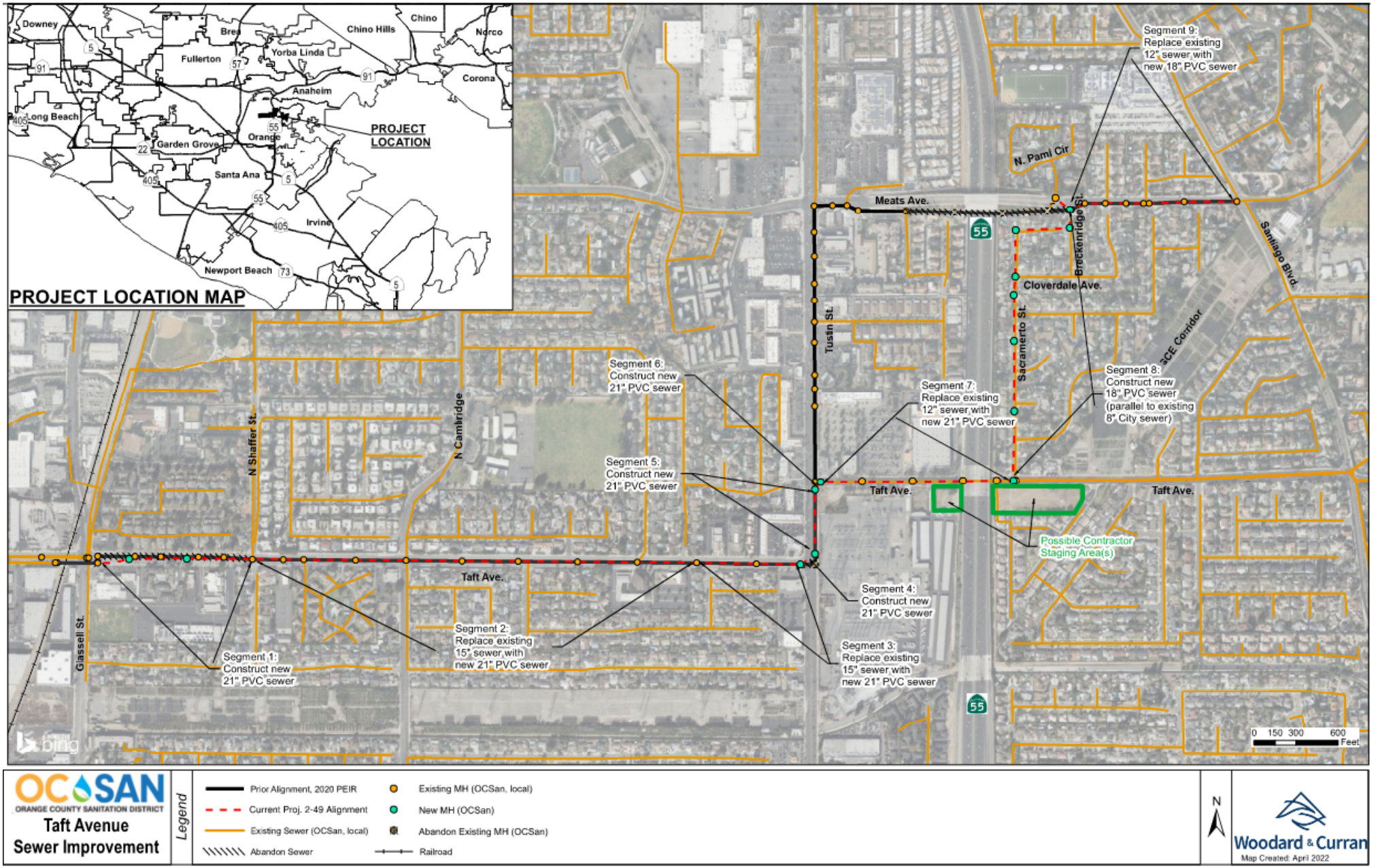

Figure 1. Site Plan

APPENDIX C: TRIBAL CULTURAL RESOURCES CONSULTATION (CONFIDENTIAL)

APPENDIX D: GEOTECHNICAL INVESTIGATION REPORT

Geotechnical Data Report

Taft Branch Improvements

Orange County Sanitation District

Project 2-49

Orange, California

Woodard & Curran

24422 Avenida de la Carlota, Suite 180 | Laguna Hills, California 92653

June 7, 2023 | Project No. 211663001

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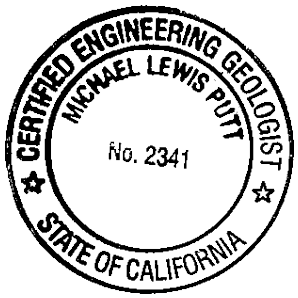

Michael L. Putt, PG, CEG
Principal Geologist

Daniel Chu, PhD, PE, GE
Chief Geotechnical Engineer

ANP/JRS/MLP/DBC/mlc

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FIGURES

APPENDICES

1 INTRODUCTION

In accordance with your request and authorization, Ninyo & Moore has performed a geotechnical evaluation and prepared this Geotechnical Data Report for the Orange County Sanitation District Taft Branch Improvements project located in the city of Orange, California (Figure 1). We previously performed a preliminary geotechnical evaluation for the project (Ninyo & Moore, 2021). The purpose of our geotechnical services was to evaluate the soil and geologic conditions at the project site and develop recommendations for the geotechnical design and construction of the proposed improvements. This report presents our findings, conclusions, and recommendations regarding the project.

2 SCOPE OF SERVICES

Our scope of services for the geotechnical evaluation included the following:

- Project coordination, planning, and scheduling of the subsurface exploration.
- Review of readily available background materials, including published geologic maps and literature, in-house information, and stereoscopic aerial photographs. We also reviewed pertinent geotechnical information, as-built plans, and California Department of Transportation (Caltrans) bridge inspection records that were provided to us by Woodard & Curran, Orange County Sanitation District (OCSD), and the City of Orange.
- A field reconnaissance to observe and document the existing site conditions and to mark boring locations for utility clearance by Underground Service Alert.
- Subsurface exploration consisting of drilling, logging, and sampling eighteen small-diameter borings to depths ranging from approximately 17 to 20½ feet below the ground surface. The borings were logged by a representative from Ninyo & Moore and soil samples were collected for laboratory testing.
- Geotechnical laboratory testing of selected soil samples to evaluate in-situ moisture content and dry density, percentage of particles finer than the no. 200 sieve, direct shear strength, and soil corrosivity.
- Analytical testing of drummed site materials for soil disposal. Drummed materials were disposed by a licensed hazardous materials contractor at an approved disposal/recycling facility.
- Data compilation and engineering analysis of the information obtained from our background review, subsurface evaluation, and laboratory testing.
- Preparation of this geotechnical report presenting our findings, conclusions, and recommendations for design and construction of the project.

3 PROJECT UNDERSTANDING

Based on our review of the Request for Proposals (OCSD, 2020), the selected alignment exhibit (Woodard & Curran, 2022) you provided, and on our discussions with the design team, we understand that that the project will include the design of a new approximately 10,700-foot-long sewer pipeline to replace the existing Taft Branch sewer pipeline that becomes deficient under the wet weather flow model. The project will increase the size of the sewer in order to eliminate deficiencies in capacity. The project will also include the removal and replacement of existing manholes with 60-inch diameter manholes, constructing new manholes, and abandoning some existing sewer pipelines.

The proposed Taft Branch sewer improvements will extend from the upstream connection point at the intersection of North Santiago Avenue and Meats Avenue to the downstream connection point at the intersection of Taft Avenue and Glassell Street in the City of Orange, California (Figure 2). From the downstream connection point to where Taft Avenue continues to the east from North Tustin Street, the existing 15-inch pipeline will be replaced with a new parallel 21-inch pipeline. A new 21-inch pipeline will be constructed parallel to an existing City of Orange sewer pipeline and will extend east along Taft Avenue, beneath the 55 Freeway overpass to Sacramento Street. On Sacramento Street, a new 18-inch pipeline will continue to the north to East Brentford Avenue, North Breckenridge Street and Meats Avenue. On Meats Avenue, the new pipeline will continue east up to the connection point near Santiago Boulevard and will consist of an 18-inch pipe installed in the median and replacing the existing 18-inch pipe. The existing pipelines generally range from approximately 10 to 15 feet deep. We understand that the new pipelines will be constructed via an open-cut trench.

4 SITE DESCRIPTION

As described above, the proposed sewer alignment will be located within the right of way along Meats Avenue, North Breckenridge Street, East Brentford Avenue, North Sacramento Street, East Taft Avenue, North Tustin Avenue, and Taft Avenue. North Tustin, Meats, and Taft Avenues are arterial roads and consist of 4 to 6 lanes with left turn pockets. North Breckenridge Street, East Brentford Avenue, and North Sacramento Street consist of two-lane residential roads. All roads are paved with asphalt concrete. Several utilities are buried within the streets and overhead power and communication lines are present. The elevation along the alignment ranges from approximately 200 feet above mean sea level (MSL) near the western end of the proposed alignment to approximately 300 feet above MSL near the eastern end of the alignment (United States Geological Survey [USGS], 2018).

5 SUBSURFACE EVALUATION AND LABORATORY TESTING

Our subsurface exploration was conducted on April 7 through 19, 2022, and consisted of drilling, logging, and sampling of eighteen small-diameter exploratory borings, borings B-1 through B-11 and B-14 through B-20. Borings B-12 and B-13 that were planned on Taft Avenue near the 55 Freeway were not performed due to the street being recently resurface and a moratorium that would not allow for pavement cores within the street without extensive repaving.

The borings were drilled to depths ranging from approximately 10 to 20½ feet using a truck-mounted drill rig with hollow-stem augers. The purpose of the exploratory borings was to observe the subsurface materials and collect bulk and relatively undisturbed samples for laboratory testing. The approximate locations of the exploratory borings are shown on Figures 2 through 7. Logs of the exploratory borings are presented in Appendix A.

Geotechnical laboratory testing was performed on representative soil samples to evaluate the in-situ moisture content and dry density, gradation, percentage of particles finer than the No. 200 sieve, Atterberg limits, direct shear strength, expansion index, sand equivalent, soil corrosivity, and R-Value. In-situ moisture and dry density test results are presented on the boring logs in Appendix A. The remaining laboratory tests are presented in Appendix B.

Soil samples collected during the field exploration were screened for volatile organic compounds (VOCs) using a Peak ground acceleration (PID). The PID measures organic vapors in parts per million (ppm). Samples were monitored for vapor readings of more than 45 ppm. The PID readings are presented on the boring logs in Appendix A. Elevated PID readings were measured in the near surface soils in boring B-8 through B-10 and some hydrocarbon odors were noted in some of the soils. Selected soil samples were analyzed for the presence of Total Petroleum Hydrocarbons (TPH), Title 22 Metals, and VOCs, in general accordance with United States Environmental Protection Agency (EPA) Methods 8015M, 6010B/7471A, and 8260B, respectively. Low concentrations of TPH in the motor oil range (22 to 170 mg/kg) were reported in the samples collected from B-8 (1.3-1.3 feet), B-9 (7-9 feet) and B-10 (19-20.5 feet) and in the diesel range (17 mg/kg) were reported in B-9 (7-9 feet). These concentrations did not exceed regulatory screening levels. Metals concentrations were within background concentrations found in southern California soils and did not exceed regulatory screening levels.

For the purpose of characterizing the auger cuttings prior to disposal off-site, composite samples of the soils were collected in glass jars, placed into a chilled container, and submitted to a state-certified laboratory for analysis. The soil samples were analyzed for the presence of TPH, Title 22 Metals, and VOCs, in general accordance with EPA Methods 8015M, 6010B/7471A, and 8260B,

respectively. The soil samples were classified as non-hazardous waste and the drums were disposed of at a legal dump facility. The soil analytical test results are presented in Appendix C.

5.1 Previous Subsurface Exploration

Our geotechnical review included review of as-built sewer improvement plans, materials reports, and Caltrans bridge inspection reports that were provided to us by OCSan and the City of Orange. The as-built construction drawings for the Taft Branch Sewer (County Sanitation Districts of Orange County, 1960) did not include geotechnical or other soil boring information.

A materials report was prepared by the County of Orange for the proposed widening of Tustin Avenue from 750 feet south of Chapman Avenue to Lincoln Avenue in the City of Orange (County of Orange, 1965a). The materials report included 18 borings along Tustin Avenue, including 3 borings (B-12, B-13, and B-14) between Meats Avenue and Taft Avenue, near the proposed sewer pipeline. The materials encountered in those borings consisted of clay, silty clay, and sandy clay. The soil survey sheet that includes borings B-12, B-13, and B-14 is presented in Appendix A. The locations of the borings are presented in Figure 2.

Boring logs were also shown on County Sanitation District No. 2 of Orange County construction plans for the Taft Interceptor Sewer (County Sanitation Districts No. 2 of Orange County, 1985). The Borings (B-1 through B-3) were performed along Taft Avenue between Main Street and Glassell Street, west of the proposed new alignment. The materials encountered in the borings generally consisted very fine to fine, silty sand, clayey sand, and sandy silt. The pages from the County Sanitation Districts plans that include the logs of borings are presented in Appendix A. The location of Boring No. 3 is presented on Figure 2. Boring Nos. 1 and 2 are located west of Boring No. 3 and are beyond the limits of the site plan presented in Figure 2.

We also reviewed Caltrans as-built construction drawings associated the Meats Avenue Overcrossing and the Taft Avenue Undercrossing, which included Log of Test Borings sheets with the as-built plans. The Log of Test Boring sheets for the Meats Avenue Overcrossing are presented in Appendix A, which include borings associated with the construction of the original bridge (Caltrans, 1962) and the replacement bridge (Caltrans, 1998a). The log of Test Borings indicate that the subsurface soils generally consisted of stiff silty clay to clayey silt near the surface, and dense to very dense silty sand, gravel, and cobbles below. Refusal was encountered in very dense gravelly soils in some of the hollow-stem auger borings for the Meats Avenue bridge. The Log of Test Boring sheets for the Taft Avenue Undercrossing (formerly known as the Orange Avenue Undercrossing) are presented in Appendix A. Similar soil conditions were encountered in the borings performed for the Taft Avenue bridge as were described for the Meats Avenue bridge,

including near surface stiff to very stiff fine silty clay and clayey silt with dense to very dense sand and gravel below. Refusal was also encountered in some of these borings in very dense sand and gravel (Caltrans, 1967 and 1998b).

6 GEOLOGY AND SUBSURFACE CONDITIONS

6.1 Regional Geology Setting

The project alignment is located within the southerly portion of the Los Angeles Bain, which is situated near the northern end of the Peninsular Ranges Geomorphic Province. The Los Angeles Basin has been divided into four structural blocks, which are generally bounded by prominent fault systems: The Northwestern Block, the Southwestern Block, the Central Bock, and the Northeastern Block (Norris and Webb, 1990). The subject site is located within the Central Block, which is bordered on the west by the Newport-Inglewood fault, on the east by the Whittier-Elsinore fault, on the north by the Malibu Coast-Santa Monica-Raymond fault, and on the south by the San Joaquin Hills. The Central Block is characterized by thick sequences of alluvium overlying predominantly sedimentary rock of Cretaceous through Pleistocene age. The depths to crystalline basement rocks are known from petroleum well logs and geophysical data. The total thickness of sedimentary section is roughly 4,000 meters (i.e., about 13,000 feet) near the southern end of the Los Angeles Basin, and exceeds 9,000 meters (i.e., about 30,000 feet in the deepest portion of the block) (Norris and Webb, 1990).

6.2 Project Area Geology

The western end of the proposed sewer alignment is located approximately 5,000 feet east of the Santa Ana River Channel. Regional geologic mapping indicates that the eastern portion of the alignment is underlain by Holocene and latest Pleistocene age young alluvial fan deposits consisting of gravel, sand, and silt. The western portion of the alignment is underlain by late to middle Pleistocene age old alluvial fan deposits generally consisting of reddish brown, gravel and sand. The regional geologic conditions are shown on Figure 8.

Generalized descriptions of the materials encountered at the site during our subsurface exploration are presented below. The materials encountered during our subsurface exploration generally consisted of asphalt concrete (AC) pavement sections, fill soils, and alluvial deposits. More detailed descriptions are presented on the boring logs in Appendix A.

6.2.1 Pavement Sections

The pavement sections consisted of approximately 4 to 20 inches of AC over approximately 0 to 10 inches of base. The aggregate base generally consisted of medium dense silty gravel and clayey gravel. In boring B-11 approximately 6 inches of concrete was observed below the AC.

6.2.2 Fill

Fill was encountered below the pavement sections in borings B-2 through B-5, B-8 through B-11, and B-14 and ranged in depth up to approximately 4 feet. The fill generally consisted of reddish brown, moist, hard, sandy clay with trace gravel, and loose to medium dense clayey sand, silty and sandy gravel, clayey gravel, and sandy silt.

6.2.3 Alluvium

Alluvium was encountered beneath the fill and beneath the pavement in borings B-1, B-6, B-7, and B-15 through B-20 to the total depths explored of approximately 20½ feet. The alluvium generally consisted of moist, firm to hard, sandy lean clay, fat clay, and silt, and medium dense to very dense silty gravel, clayey gravel, poorly graded gravel, clayey sand, silty sand, and sand. The granular alluvial soils contained varying amounts of gravel and cobbles that resulted in difficult drilling conditions. Drilling refusal was encountered in borings B-1, B-3, B-8, B-9, B-15, and B-16 due to very dense gravel and possible cobbles.

7 GROUNDWATER

Groundwater was not observed at the time of drilling in each of the borings B-1 through B-20. Historically high groundwater in the area of the sewer alignment is mapped as greater than 40 feet below the ground surface (Department of Conservation Division of Mines and Geology [CDMG], 1997). Figure 9 presents the depths to historic high groundwater in the project area. In addition, a groundwater monitoring well located approximately 0.2 miles south of the alignment recorded groundwater at a depth of approximately 78 feet below the ground surface (State of California, 2021). Groundwater was not encountered in the borings performed for the Meats Avenue and Taft Avenue Bridges (Caltrans, 1962, 1967, 1998a, b). Fluctuations in the level of groundwater may occur due to variations in the level of tidal fluctuations, ground surface topography, subsurface stratification, rainfall, irrigation practices, groundwater pumping, and other factors which may not have been evident at the time of our field evaluation.

8 FAULTING AND SEISMICITY

The pipeline alignment is not located within a State of California Earthquake Fault Zone (formerly known as Alquist-Priolo Special Studies Zone). However, the site is located in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered significant during the design life of the proposed improvements. The numerous faults in southern California include active, potentially active, and inactive faults. As defined by the California Geological Survey, active faults are faults that have ruptured within the Holocene time, or within approximately the last 11,000 years. Potentially active faults are those that show evidence of movement during Quaternary time (approximately the last 1.6 million years) but for which evidence of Holocene movement has not been established. Inactive faults have not ruptured in the last approximately 1.6 million years. The approximate locations of major faults in the site vicinity and their geographic relationship to the site are shown on Figure 5.

In addition to the mapped faults shown on Figure 5, the Coyote Hills segment of the Puente Hills blind thrust fault is located approximately 5.8 miles from the site (USGS, 2008). Blind thrust faults are low-angle faults at depths that do not break the surface and are, therefore, not shown on Figure 10. Although blind thrust faults do not have a surface trace, they can be capable of generating damaging earthquakes.

The principal seismic hazards at the subject site are surface fault rupture, ground motion, and liquefaction. A brief description of these hazards and the potential for their occurrences on site are discussed below.

8.1 Surface Fault Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the force main alignment. Therefore, the probability of damage from surface fault rupture is considered to be low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

8.2 Ground Motion

Considering the proximity of the site to active faults capable of producing a maximum moment magnitude of 6.0 or more, the project area has a high potential for experiencing strong ground motion. The 2022 CBC specifies that the risk-targeted maximum considered earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. The MCE_R ground motion response accelerations are based on the spectral response accelerations for 5 percent damping in the direction of maximum horizontal response

and incorporate a target risk for structural collapse equivalent to 1 percent in 50 years with deterministic limits for near-source effects. The horizontal peak ground acceleration (PGA) that corresponds to the MCE_R for the project area at the mid-point of the alignment (at the intersection of E. Taft Avenue and N. Tustin Street) was calculated as 0.585g using the 2021 Applied Technology Council (ATC) seismic design tool (web-based).

The 2022 CBC specifies that the potential for liquefaction and soil strength loss be evaluated, where applicable, for the mapped maximum considered earthquake geometric mean (MCE_G) peak ground acceleration (PGA_M) with adjustment for site class effects in accordance with the American Society of Civil Engineers (ASCE) 7-16 Standard. The MCE_G PGA is based on the geometric mean PGA with a 2 percent probability of exceedance in 50 years. The PGA_M was calculated as 0.736g using the 2021 ATC seismic design tool.

8.3 Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking. Based on our review of the Seismic Hazard Map for the Orange Quadrangle (California Department of Conservation, 19998), the site is not located in a liquefaction hazard zone and liquefaction is not a design consideration for the project.

9 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed improvements are feasible from a geotechnical standpoint, provided the recommendations presented in this report are incorporated into the design and construction of the project. In general, the following conclusions were made:

The primary geotechnical concern for the project includes the presence granular sand and gravel alluvial fan deposits that were observed to be dense to very dense and contain significant amounts of cobbles. Difficult drilling conditions were encountered in the granular deposits and several borings encountered auger and/or sampler refusal. Difficult excavating conditions should be

anticipated during open-cut trenching and excavations are anticipated to generate oversize materials that will not be suitable for re-use in trench backfill.

A summary of our additional geotechnical conclusions are listed below.

- The site is underlain by fill soils and alluvial deposits. The fill soils generally consisted of moist, hard, sandy clay with trace gravel, and loose to medium dense clayey sand, silty and sandy gravel, clayey gravel, and sandy silt. Alluvial deposits encountered generally consisted of moist, firm to hard, sandy lean clay, fat clay, and silt, and medium dense to very dense silty gravel, clayey gravel, poorly graded gravel, clayey sand, silty sand, and sand with carrying amounts of cobbles.
- Excavation of the on-site materials should be feasible with excavators, backhoes, or other earthmoving equipment in good working order. However, difficult excavating conditions should be planned for by the contractor where very dense granular materials are encountered.
- We anticipate that excavated soils should be generally suitable for use as compacted fill following moisture-conditioning provided they are free of trash, debris, roots, vegetation, deleterious materials, and cobbles or hard lumps of material in excess of 4 inches in diameter.
- Groundwater was not observed at the time of drilling in each of the borings B-1 through B-20. Historically high groundwater in the area of the sewer alignment is mapped as greater than 40 feet below the ground surface (CDMG, 1997). Shallow groundwater conditions and dewatering is not anticipated during construction.
- Temporary shoring for trenching should be designed by the contractor to support the excavation sidewalls and to reduce the potential for settlement of the adjacent roadway and existing utilities. Excavations and shoring should conform to the Occupational Safety and Health Administration (OSHA) standards for Type C soil.
- Existing utilities are present along the project alignment, including pipelines trending parallel with the subject alignment. Care should be taken to avoid damaging and/or undermining nearby utilities and other adjacent structures. Shoring design and installation procedures should be developed that reduce the potential for damage to existing improvements.
- The proposed sewer pipeline alignment is not located within a State of California Earthquake Fault Zone (formerly known as the Alquist-Priolo Special Studies Zone). Based on our review of published geologic maps, there are no known active faults underlying the alignment. Therefore, the potential for surface rupture at the site is considered to be low.
- The proposed sewer pipeline alignment is not located within an area mapped by the State of California (CDMG, 1999) as being susceptible to earthquake-induced liquefaction.
- Our limited laboratory corrosion testing indicates that the on-site soils can be classified as corrosive based on California Department of Transportation (Caltrans, 2018) corrosion guidelines.

10 RECOMMENDATIONS

The recommendations presented in the following sections provide general geotechnical criteria regarding the design and construction of the sewer pipeline. The recommendations are based on the results of our subsurface evaluation and laboratory testing, our review of the referenced geologic materials, and our geotechnical analysis. The proposed construction should be

performed in conformance with the recommendations presented in this report, project specification, and appropriate agency standards.

10.1 Earthwork

Based on our understanding of the project, earthwork is anticipated to include excavations up to approximately 15 feet deep and backfilling and compaction around the new pipelines and manholes. The on-site soils will be generally excavatable utilizing conventional excavation equipment, but are anticipated to be difficult in the very dense granular materials. In addition, abandoned, buried utilities and/or structures may be present. In general, earthwork should be performed in accordance with the standard specifications for public works construction. Work within the public right-of-way for trenched excavations should comply with the requirements of the "Greenbook" Standard Specifications for Public Works Construction. Earthwork should be performed in accordance with the requirements of applicable governing agencies and the recommendations presented in the following sections.

10.1.1 Construction Plan Review and Pre-Construction Conference

We recommend that the construction plans be submitted to Ninyo & Moore for review to evaluate conformance to the geotechnical recommendations provided in this report. We further recommend that a pre-construction conference be held. The owner and/or their representative, the governing agency representatives, the civil engineer, the geotechnical engineer, and the contractor should be in attendance to discuss the work plan and project schedule. Discussions should include how earthwork will be performed, site safety, and regulatory agency requirements.

10.1.2 Site Clearing

Prior to performing site excavations, the alignment should be cleared of surface obstructions, debris, abandoned utilities, and other deleterious materials. Existing utilities within the project limits should be re-routed or protected from damage by construction activities. Obstructions that extend below finish grade, if any, should be removed and the resulting holes filled with compacted soils. Materials generated from the clearing operations should be removed from the project site and disposed at a legal dumpsite.

10.1.3 Excavation Characteristics

Based on our subsurface exploration and experience, we anticipate that excavations within fill and alluvial soils at the site may be accomplished with heavy earthmoving equipment, including backhoes, excavators, or other trenching equipment in good condition. We

anticipate that the materials along the alignment will vary from medium dense to very dense silty gravel, clayey gravel, poorly graded gravel, clayey sand, silty sand, and sand, and firm to hard, sandy lean clay, fat clay, and silt. As described above, the granular deposits are very dense and have high percentages of gravel and cobbles. Boulders may also be encountered. Numerous borings encountered difficult drilling conditions and auger and sampler refusal was encountered in some borings. Difficult excavating conditions should be planned for by the contractor, including screening of oversize materials from trench backfill.

10.1.4 Temporary Excavations and Shoring

Some of the soils along the project alignment have little cohesion that are considered to be prone to caving. In addition, excavations that are close to parallel utilities may encounter loose trench zone materials which are also considered unstable. The site soils should be treated as "Type C" soils in accordance with the OSHA criteria.

Temporary excavations should be stable at inclinations near 1:1 (horizontal to vertical) up to a depth of about 4 feet below the existing grade and stable at inclinations of approximately 1½:1 (horizontal to vertical) for excavations deeper than 4 feet but no more than 20 feet below existing grade. Some surficial sloughing may occur, and temporary slopes should be evaluated in the field by the project geotechnical consultant. Excavations should be performed in accordance with OSHA regulations.

Shored trenches are anticipated for the project due to anticipated trench instability and limited working area. Shoring systems should be designed for the anticipated soil conditions using the lateral earth pressure values shown on Figure 11 for braced excavations. Driven sheet piles are generally not recommended due to the very dense nature of the granular soils along the alignment and the high percentage of gravel and cobbles. Shoring alternatives such as steel trench shields and manhole boxes, hydraulic shoring, slide rail shoring system, and for deeper excavations a beam and plate shoring system, may be appropriate. Selection of the shoring system is the responsibility of the contractor.

The recommended design pressures are based on the assumption that the shoring system is constructed without raising the ground surface elevation behind the shored sidewalls of the excavation, that there are no surcharge loads, such as soil stockpiles and construction materials, and that no loads act above a 1:1 (horizontal to vertical) plane ascending from the base of the shoring system. For a shoring system subjected to the above-mentioned surcharge loads, the contractor should include the effect of these loads on the lateral earth pressures acting on the shored walls.

The selection of shoring systems and construction installation should also consider the protection of adjacent improvements. The sandy materials along the alignment have a potential for caving and shoring systems should be installed and removed such that adjacent improvements are not left unsupported.

We anticipate that settlement of the ground surface will occur behind the shored excavation. The amount of settlement depends heavily on the type of shoring system, the contractor's workmanship, and soil conditions. To reduce the potential for distress to adjacent improvements, we recommend that the shoring system be designed to limit the ground settlement behind the shoring system to ½ inch or less. Possible causes of settlement that should be addressed include settlement during installation of the shoring elements, excavation for structure construction, construction vibrations, and removal of the support system. We recommend that shoring installation be evaluated carefully by the contractor prior to construction and that ground vibration and settlement monitoring be performed during construction.

The contractor should retain a qualified and experienced engineer to design the shoring system. The shoring parameters presented in this report are minimum requirements, and the contractor should evaluate the adequacy of these parameters and make the appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect workers. OSHA requirements pertaining to worker safety should be observed.

10.1.5 Excavation Bottom Stability

We anticipate the trench bottoms will expose relatively dense granular soils along the majority of the alignment and stiff to hard clayey soils in some areas. Additional overexcavation or recompaction of the pipeline subgrade is not anticipated unless the bottoms becomes significantly disturbed during excavation. If unstable trench bottoms are encountered, in general, unstable bottom conditions may be mitigated by overexcavating the excavation bottom to approximately 2 feet and replacing with gravel wrapped by geo-fabric (Mirafi 140N or equivalent). The purpose of the geofabric is to reduce the potential for migration of clayey materials into the gravel and thereby reducing the potential for creating voids due to soil migration.

10.1.6 Pipe Bedding

We recommend that new sewer pipelines be supported on 6 inches or more of granular bedding material such as sand with a sand equivalent (SE) value of 30 or more. Based on

our observations and laboratory test results, the majority of the site soils do not have an SE of 30 or more and our not considered suitable for use as bedding material.

Bedding material should be placed around the pipe, and 12 inches or more above the top of the pipe in accordance with the current “Greenbook” Standard Specifications for Public Works. Special care should be taken not to allow voids beneath and around the pipe. Bedding material and compaction requirements should be in accordance with the recommendations of this report, the project specifications, and applicable requirements of the appropriate agencies.

Special care should be taken not to allow voids beneath and around the pipe. Compaction of the bedding material and backfill should proceed along both sides of the pipe concurrently. Trench backfill, including bedding material, should be placed and compacted with mechanical equipment in accordance with the recommendations presented in the Earthwork section of this report.

10.1.7 Fill Material

In general, the on-site soils should be suitable for re-use as trench backfill. Fill material should be free of oversize rocks, debris, roots, vegetation, or other deleterious materials. Wet soils should be processed to a moisture content that is slightly above the laboratory optimum moisture and suitable for compaction. Oversize material larger than about 4 inches in diameter should be broken into smaller pieces or should be removed from the site. Materials for use as backfill should be evaluated by Ninyo & Moore prior to compaction.

On-site soils used for fill may involve moisture conditioning to achieve appropriate moisture content for compaction. Some of the clayey soils have high moisture contents and should be allowed to dry to a near-optimum moisture content prior to their placement as trench backfill.

Imported fill material, if used, should also consist of clean, granular material with a low expansion potential, corresponding to an expansion index of 50 or less. The soil should also be tested for corrosive properties prior to importing. We recommend that the imported materials satisfy the Caltrans (2021) criteria for non-corrosive soils (i.e., soils having a chloride concentration of 500 ppm or less, a soluble sulfate content of approximately 0.15 percent (1,500 ppm) or less, a pH value of 5.5 or higher, or an electrical resistivity of 1,500 ohm-centimeters or more). Materials for use as fill should be evaluated by Ninyo & Moore prior to importing. The contractor should be responsible for the uniformity of import material brought to the site.

10.1.8 Trench Backfill Placement and Compaction

Trench backfill should be compacted in horizontal lifts to a relative compaction of 90 percent or more as evaluated by ASTM International (ASTM) D 1557. Fill soils should be moisture-conditioned to two percent or more above the optimum moisture content. The optimum lift thickness of fill will depend on the type of compaction equipment used but generally should not exceed 8 inches in loose thickness. Special care should be taken to avoid pipe damage when compacting trench backfill above pipes. Placement and compaction of the fill soils should be in general accordance with appropriate governing agency standards and good construction practice.

10.1.9 Modulus of Soil Reaction

The modulus of soil reaction is used to characterize the stiffness of soil backfill placed along the sides of buried flexible pipelines for the purpose of evaluating deflection caused by the weight of the backfill above the pipe. We recommend that a modulus of soil reaction of 1,000 pounds per square inch be used for design, provided that granular bedding material or concrete slurry be placed adjacent to the pipe, as recommended in the previous section.

10.2 Corrosivity

Laboratory testing was performed on a representative soil sample to evaluate pH, electrical resistivity, water-soluble chloride content, and water-soluble sulfate content. The soil pH and electrical resistivity tests were performed in general accordance with California Test Method (CT) 643. Chloride content testing was performed in general accordance with CT 422. Sulfate content testing was performed in general accordance with CT 417. The laboratory test results are presented in Appendix B.

The results of our corrosivity testing indicated a pH level ranging from 7.5 to 8.0, an electrical resistivity ranging from 596 to 1,424 ohm-centimeters, chloride content ranging from approximately 45 to 115 ppm, and sulfate content ranging from approximately 30 to 50 ppm (0.003 to .005 percent). Based on the laboratory test results and Caltrans corrosion criteria (2021), the project site can be classified as a corrosive site. Caltrans currently considers a site to be corrosive to foundation elements if the minimum electrical resistivity is less than or equal to 1,500 ohm-cm, chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 1,500 ppm, or the pH is 5.5 or less.

10.3 Concrete

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. The potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight, moderate for water-soluble sulfate contents ranging from 0.10 to 0.20 percent by weight, severe for water-soluble sulfate contents ranging from 0.20 to 2.00 percent by weight, and very severe for water-soluble sulfate contents over 2.00 percent by weight. The soil samples tested for this evaluation, using Caltrans Test Method 417, indicate a water-soluble sulfate content of approximately 0.003 to 0.005 percent by weight (i.e., 30-50 ppm). Accordingly, the on-site soils are considered to have a negligible potential for sulfate attack. However, due to the potential variability of the on-site soils, consideration should be given to using Type II/V cement for the project.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that the concrete for the proposed improvements, if applicable, be placed with a slump of 4 inches based on ASTM C 143. The slump should be checked periodically at the site prior to concrete placement. We further recommend that concrete cover over reinforcing steel for foundations be provided in accordance with CBC (2019). The structural engineer should be consulted for additional concrete specifications.

10.4 Pavement Reconstruction

Trenching within the street right-of-way will result in the replacement of pavement for the project. In general, pavement repair should conform to the material and compaction requirements of the adjacent pavement sections. AB material should conform to the latest specifications in Section 200-2.2 for crushed AB or Section 200-2.4 for crushed miscellaneous base of the Greenbook and should be compacted to a relative compaction of 95 percent in accordance with ASTM D 1557. AC should conform to Section 2036 of the Greenbook and should be compacted to a relative compaction of 95 percent in accordance with ASTM D 1560 or CT 304. Actual pavement reconstruction should conform to the requirements of the appropriate governing agency.

11 CONSTRUCTION MONITORING PROGRAM

We recommend that pre-construction condition surveys be performed on structures and improvements within approximately 50 feet of the proposed excavations prior to construction. This survey should include locating existing cracks and measuring widths of cracks, in combination with videotape documentation of existing conditions. In addition, interviews should be conducted

with utility owners so that existing knowledge about the age, type, and maintenance history of affected utilities is available prior to construction.

11.1 Construction Vibrations

People can perceive vibrations from construction activities at significantly lower levels than might cause cosmetic damage to structures. Jones & Stokes (2004) indicate that transient vibrations, such as from pile driving or construction activities, may be noticeable, and therefore may result in complaints, at peak particle velocities as low as 0.02 to 0.06 inch per second (ips). The vibrations may be disturbing and result in complaints and/or damage claims at peak particle velocities as low as 0.2 to 0.4 ips. However, these vibration levels are well below the level considered to cause cosmetic damage to residential construction.

There is also the possibility of settlement of the soil during construction activities due to vibrations. This settlement may result in damage to structures. If the construction vibrations can be maintained below a peak particle velocity of 0.2 ips, it is anticipated the settlement can be limited to acceptable levels based on past projects in similar conditions.

For the above stated reasons, we recommend that seismographs be used in the early stages of construction to monitor the vibrations. Seismographs should be located near structures and improvements next to the construction activities. Additional seismographs should be located at various structures and improvements farther from construction activities to monitor vibrations as a function of distance from the sites. Periodic vibration monitoring is recommended during other construction activities. After review of the data obtained, the number of seismographs may be reduced at the discretion of the client and the geotechnical consultant.

11.2 Ground Surface Settlement

We recommend that arrays of ground surface settlement points be installed around the proposed excavations. The contractor should submit a monitoring plan showing the proposed locations of settlement points for review and approval by the project engineer. We recommend that the contractor be responsible for maintaining total settlement at any survey point to less than ½ inch. If the settlements reach this limit, we recommend that a further review of construction methodologies be performed and appropriate changes be made.

11.3 Lateral Movement for Shoring Support System

We recommend that survey points be established behind excavations located in areas where existing structures are located above a 1:1 (horizontal to vertical) plane projected from the bottom

of the proposed excavations to the ground surface. The survey points should be monitored and evaluated daily during excavation activities to provide an advanced warning system of potential problems. As discussed previously, we recommend that the shoring system be designed to limit the ground settlement behind the shoring system to ½ inch or less to reduce the potential for distress to adjacent structures and improvements. If settlement values reach ¼ inch, we recommend that a review of the contractor's methods be performed and appropriate changes be made, if needed

11.4 Hazardous Materials

Based on the findings from the analytical testing performed on the soils that will be encountered during the construction activities in the vicinity of borings B-8, 9, and 10, Ninyo & Moore recommends that the construction contractor follow standard industry practices for the protection of the health and safety of workers, including wearing appropriate personal protective equipment (PPE), and not eating, drinking or smoking onsite during construction activities. If unforeseen conditions or stained, odorous, or discolored soil is encountered during excavation activities, work should be stopped immediately until further assessment is performed to evaluate the extent and level of contamination.

12 CONSTRUCTION OBSERVATION

The recommendations provided in this report are based on our understanding of the proposed project and our evaluation of the data collected based on subsurface conditions disclosed by widely spaced exploratory borings. It is imperative that the geotechnical consultant checks the interpolated subsurface conditions during construction. We recommend that Ninyo & Moore review the project plans and specifications prior to construction. It should be noted that, upon review of these documents, some recommendations presented in this report may be revised or modified.

During construction we recommend that the duties of the geotechnical consultant include, but not be limited to:

- Observing trench excavation bottoms for suitability to support the new pipelines,
- Observation and testing during the placement and compaction of trench backfill.
- Evaluating imported materials, if any, prior to their use as fill.

The recommendations provided in this report assume that Ninyo & Moore will be retained as the geotechnical consultant during the construction phase of this project. If another geotechnical consultant is selected, we request that the selected consultant indicate to the owner and to our

firm in writing that our recommendations are understood and that they are in full agreement with our recommendations.

13 LIMITATIONS

The geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area and are based on existing data collected by other consultants. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of environmental concerns or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

Our conclusions and recommendations are based on an analysis of the observed site conditions and review of existing geotechnical reports prepared by other geotechnical firms. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. In the event of any changes in the nature, design, or locations of the proposed improvements, the conclusions and recommendations presented herein may not be valid unless the changes are evaluated by Ninyo & Moore and the conclusions of this report are modified in writing. It should be understood that the conditions of a site can change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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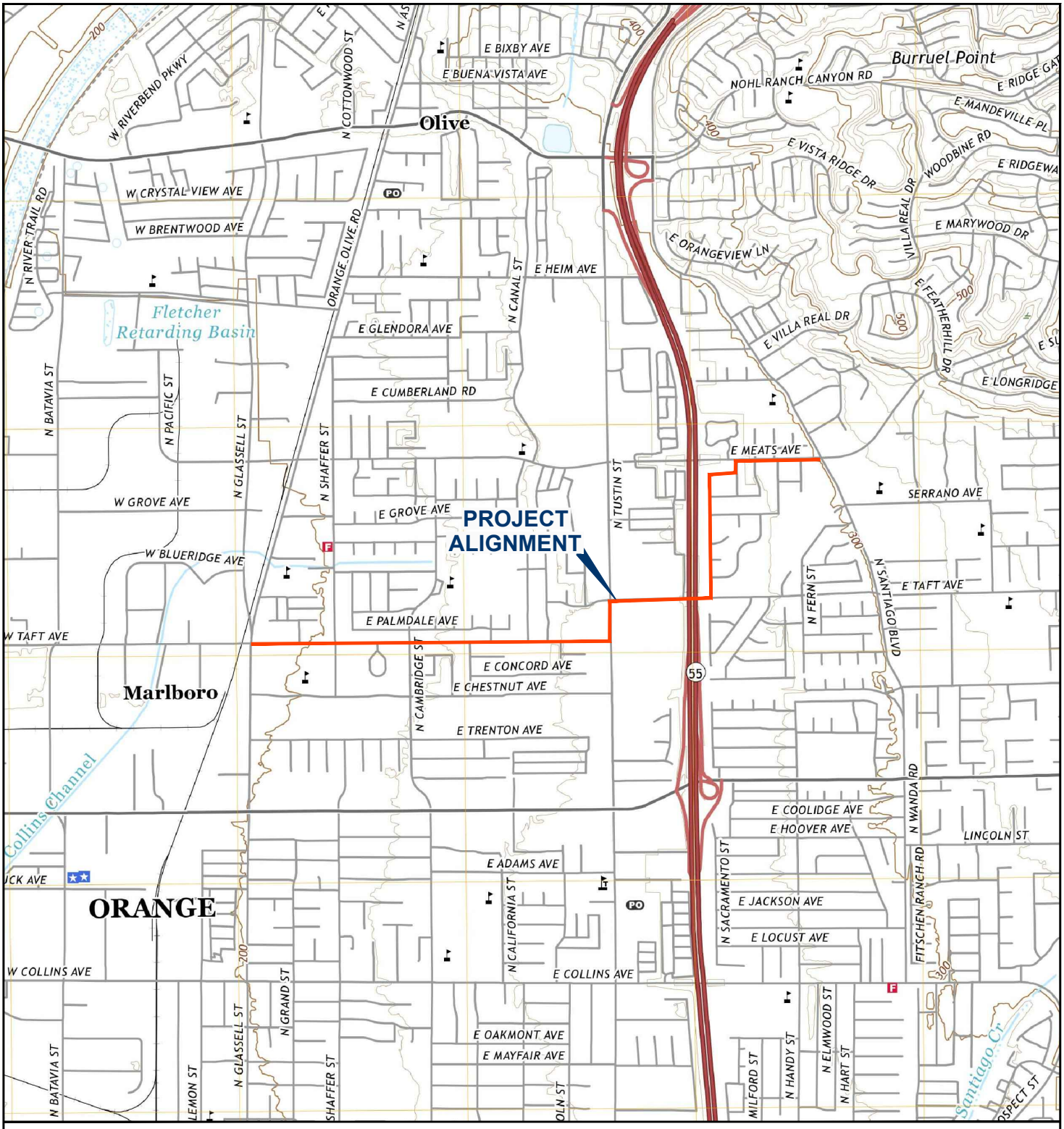
FIGURES



NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: USGS, 2018.

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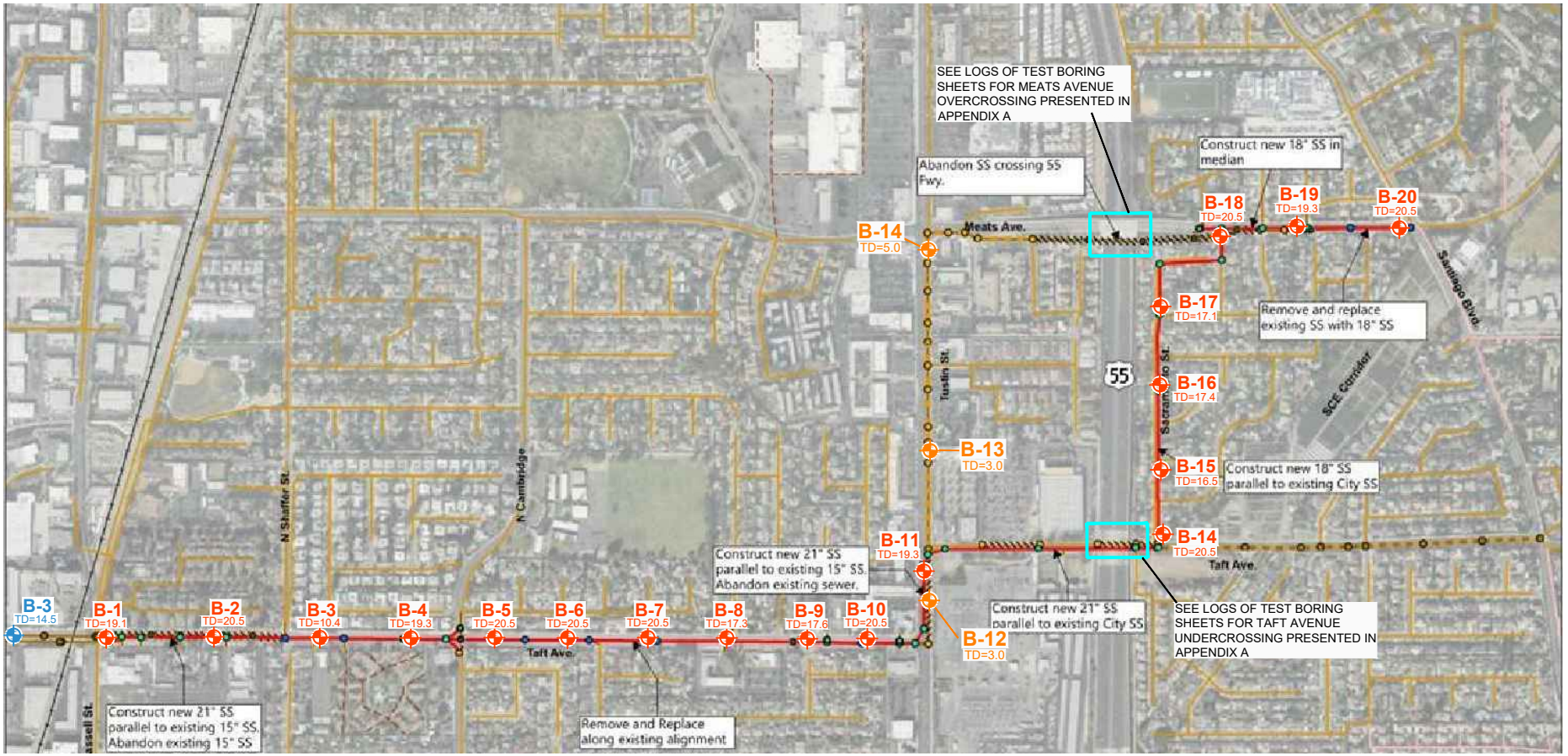
FIGURE 1

SITE LOCATION

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

- Proj 2-49 Alignment | Segment #s
- Local/Service SS (to be reconnected)
- Existing OC San Sewer
- Transfer to City
- Local Sewer (City of Orange)
- Local Sewer (City of Villa Park)
- Local Sewer (Private)
- Transfer to OC San
- Abandon Sewer
- Remove and Replace Manh
- New Manhole
- Existing (or transfered to) O
- Existing (or transfered to) City MH
- Abandon Existing Manhole
- Railroad
- B-20 TD=20.5 Boring; TD=Total Depth in Feet
- Proposed Boring Locations (This Study) TD=Total Depth in Feet
- B-14 TD=5.5 Boring; (County of Orange, 1965a) TD=Total Depth in Feet
- B-3 TD=14.5 Boring; (County Sanitation Districts No. 2 of Orange County, 1985) TD=Total Depth in Feet

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FEET

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NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: WOODARD & CURRAN, 2022.

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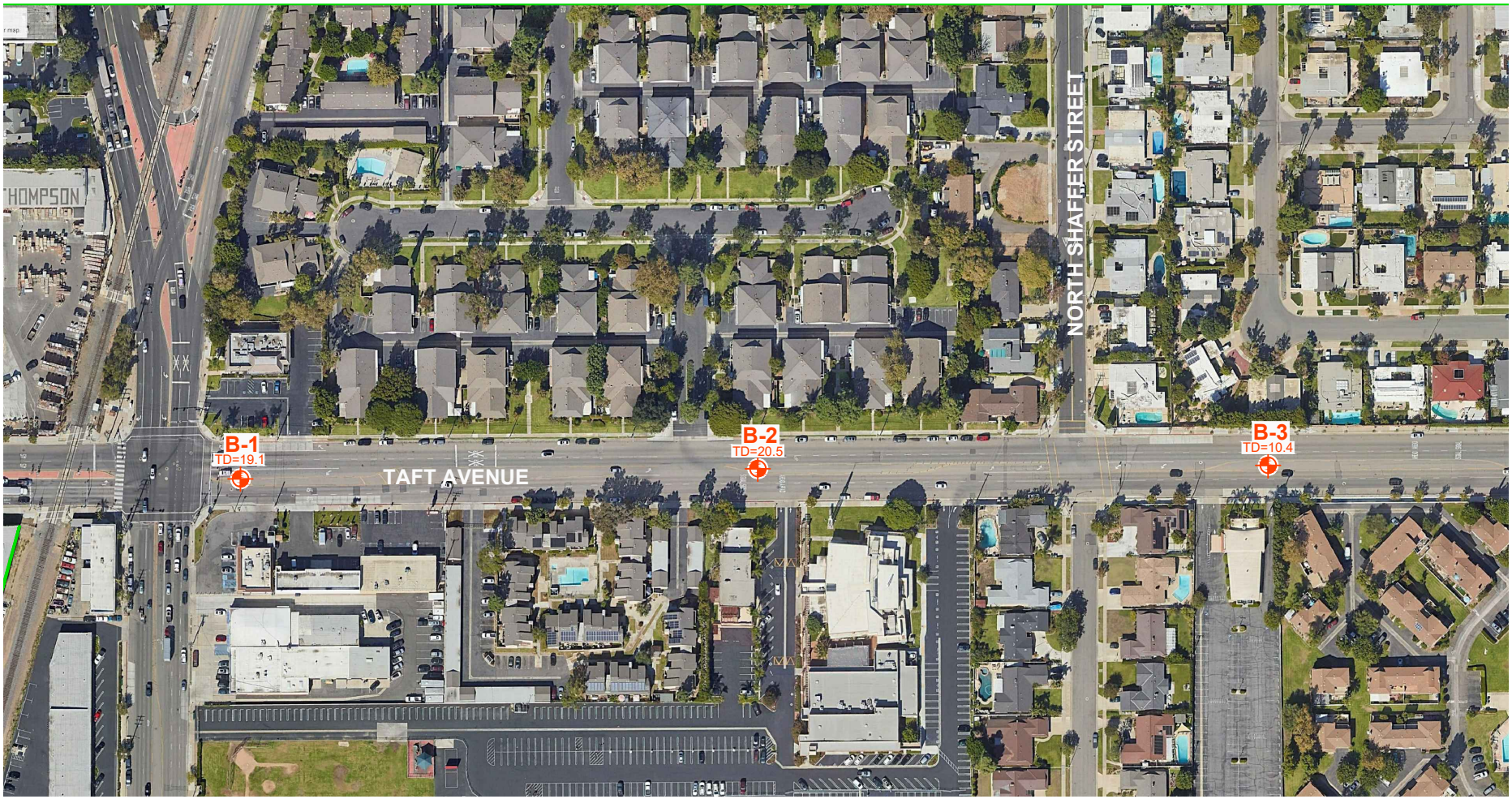
FIGURE 2

SITE PLAN

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

B-3 TD=10.4 — Boring; TD=Total Depth in Feet

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2022.

N

FEET
0 200 400

FIGURE 3

BORING LOCATIONS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

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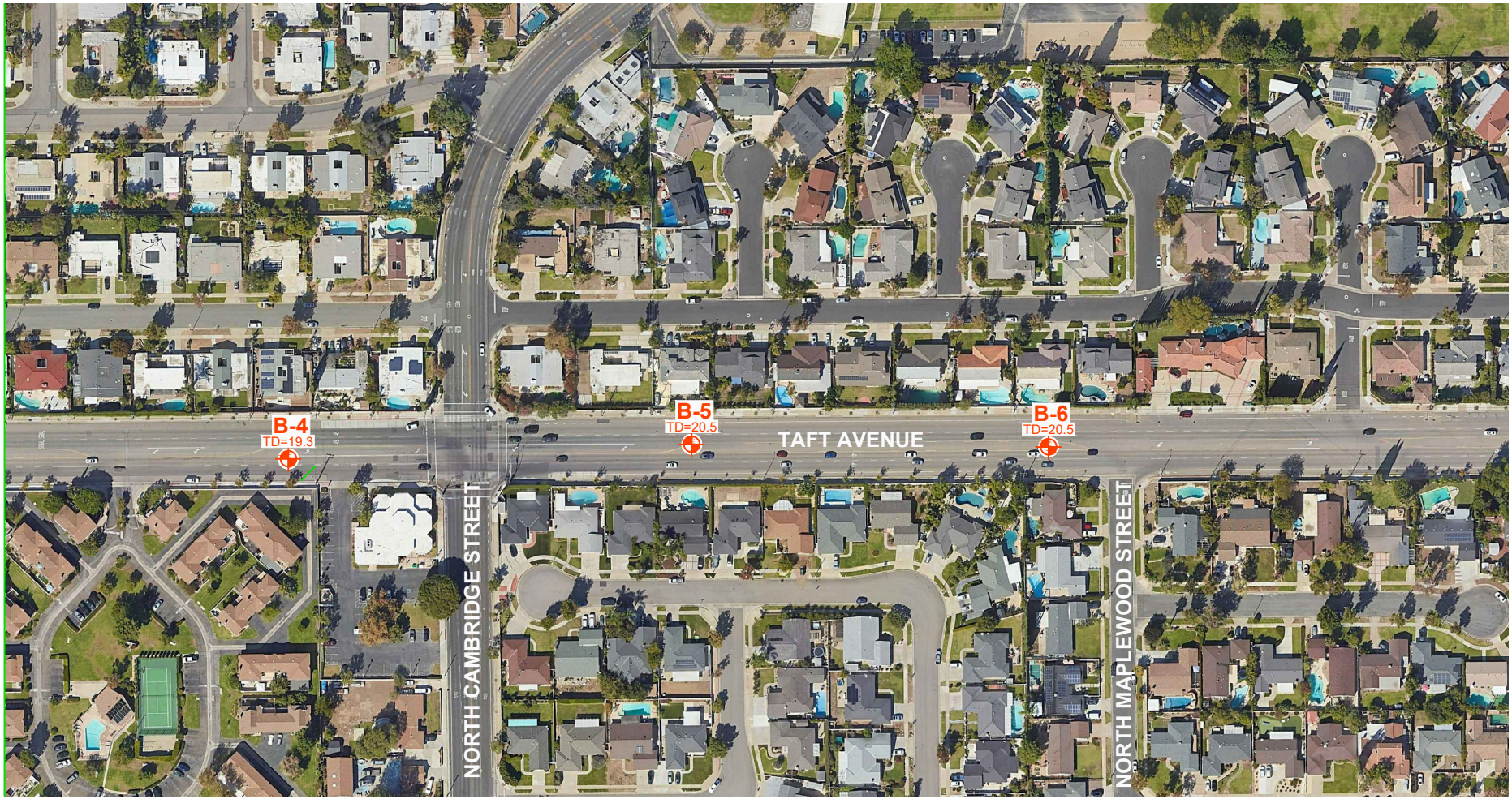
3_211663001_BL1.dwg 05/13/2022 (MAY 2022) GK



LEGEND

B-6 TD=20.5 — Boring; TD=Total Depth in Feet

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2022.

N

FEET
0 200 400

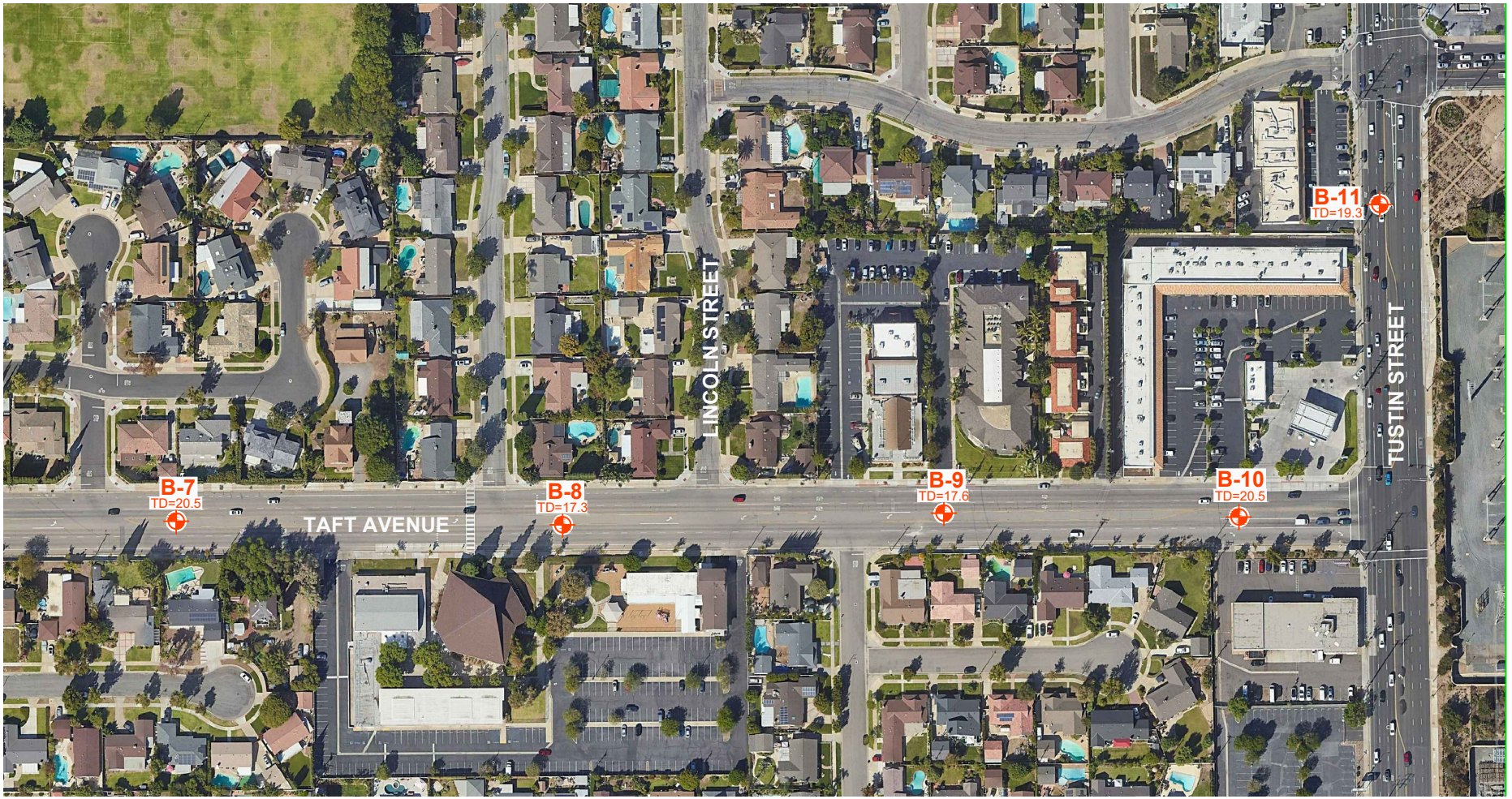
FIGURE 4

BORING LOCATIONS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

4_211663001_BL2.dwg 05/13/2022 (MAY 2022) GK



LEGEND

B-11 TD=19.3 — Boring; TD=Total Depth in Feet

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2022.

N

FEET
0 200 400

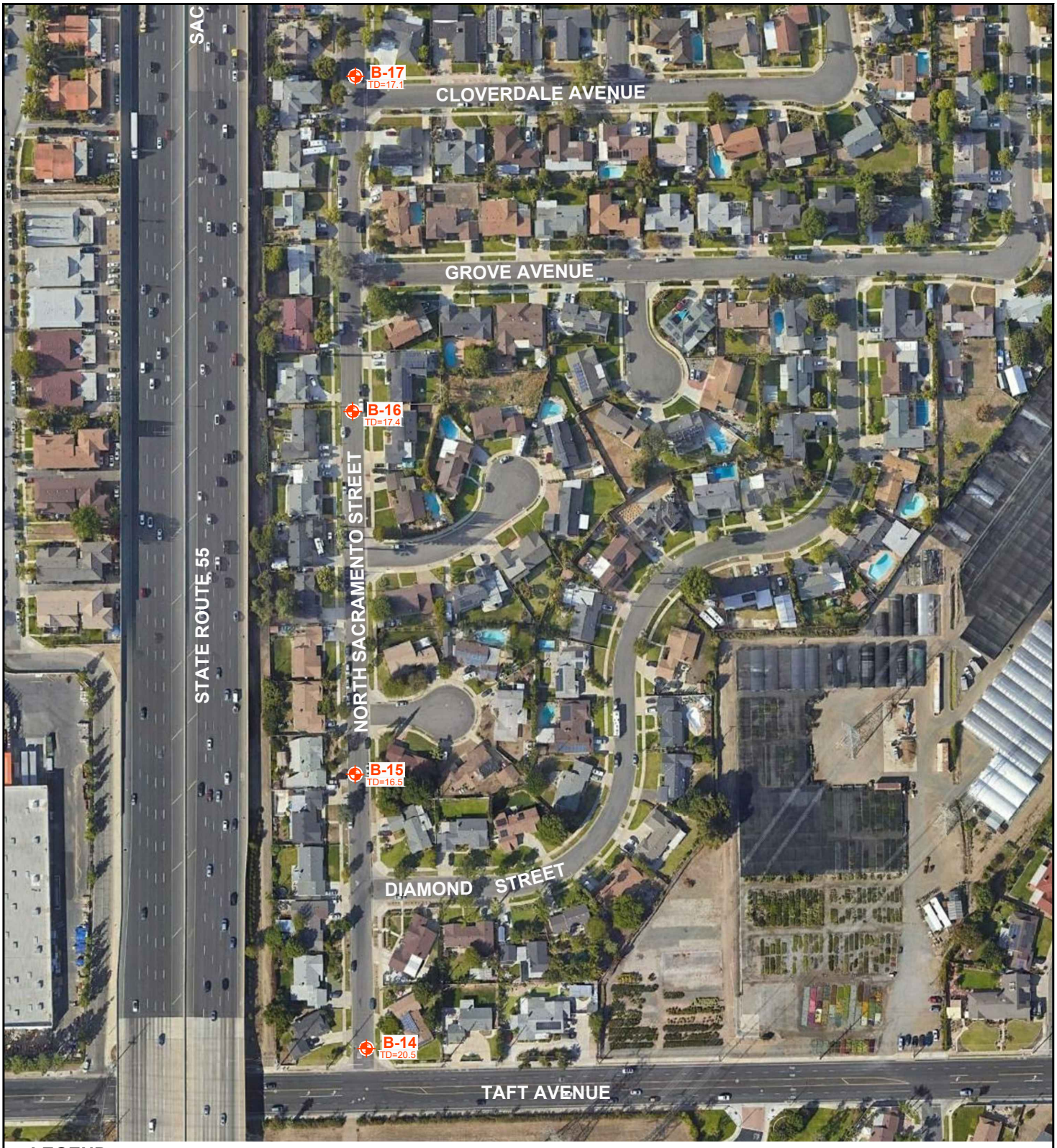
FIGURE 5

BORING LOCATIONS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

5_211663001_BL3.dwg 05/13/2022 (MAY 2022) GK



LEGEND

B-17 TD=17.1 — Boring; TD=Total Depth in Feet

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2022.

N

FEET
0 200 400

6_211663001_BL4.dwg 05/16/2022 (MAY 2022) GK

FIGURE 6

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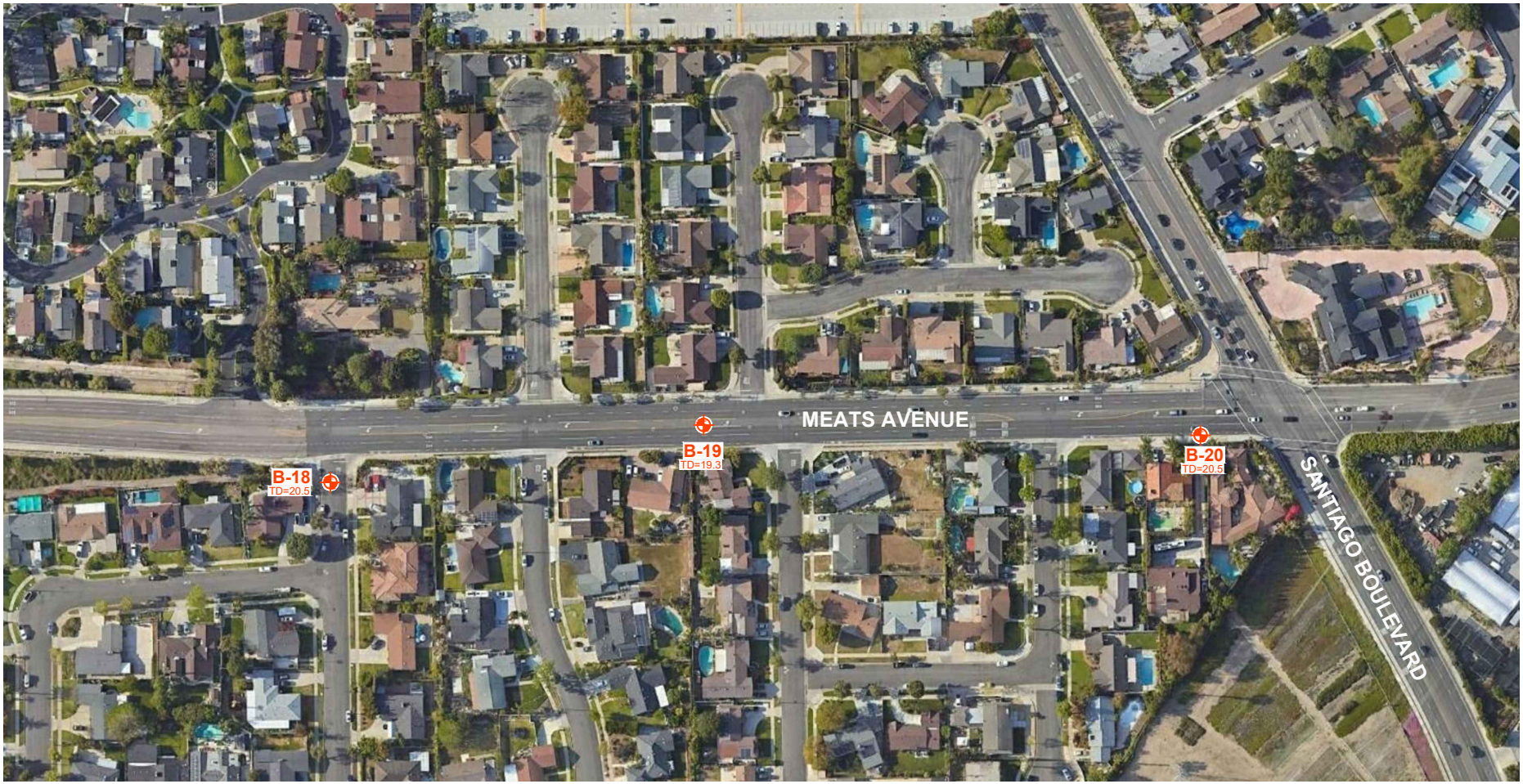
BORING LOCATIONS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23



LEGEND

B-20 TD=20.5 — Boring; TD=Total Depth in Feet

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH, 2022.

N

FEET

0 200 400

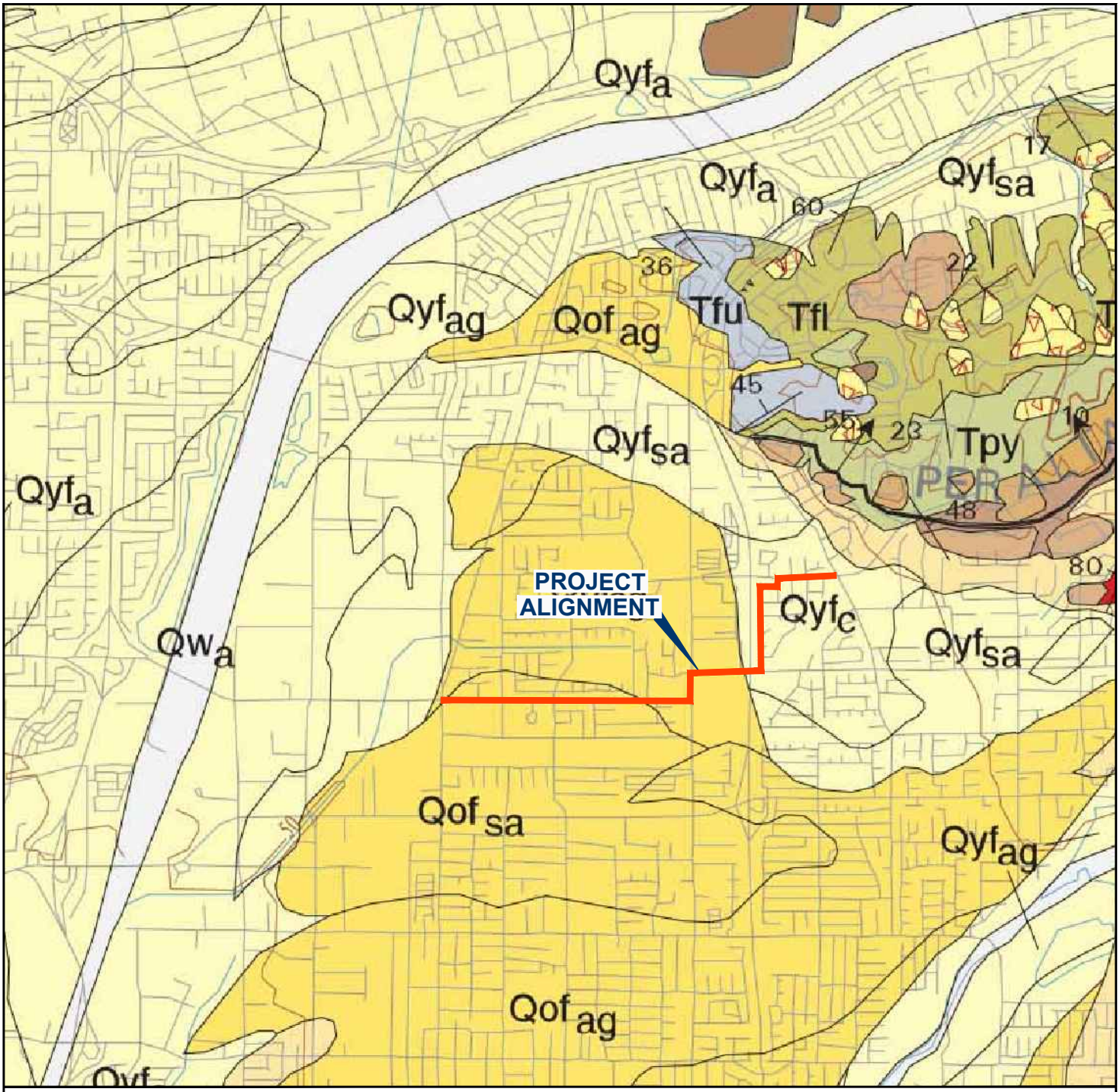
FIGURE 7

BORING LOCATIONS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

7_211663001_BL5.dwg 05/13/2022 (MAY 2022) GK



REFERENCE: MORTON, 2004, PRELIMINARY DIGITAL GEOLOGIC MAP OF THE SANTA ANA 30X60 QUADRANGLE.

LEGEND

Qof	OLDER ALLUVIAL DEPOSITS		GEOLOGIC CONTACT
Qyf	YOUNG ALLUVIAL FAN DEPOSITS		FAULT
Qw	WASH DEPOSITS		

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

N

FEET

0 3,000 6,000

8_211663001_RG.dwg 05/13/2022 (MAY 2022) GK

FIGURE 8

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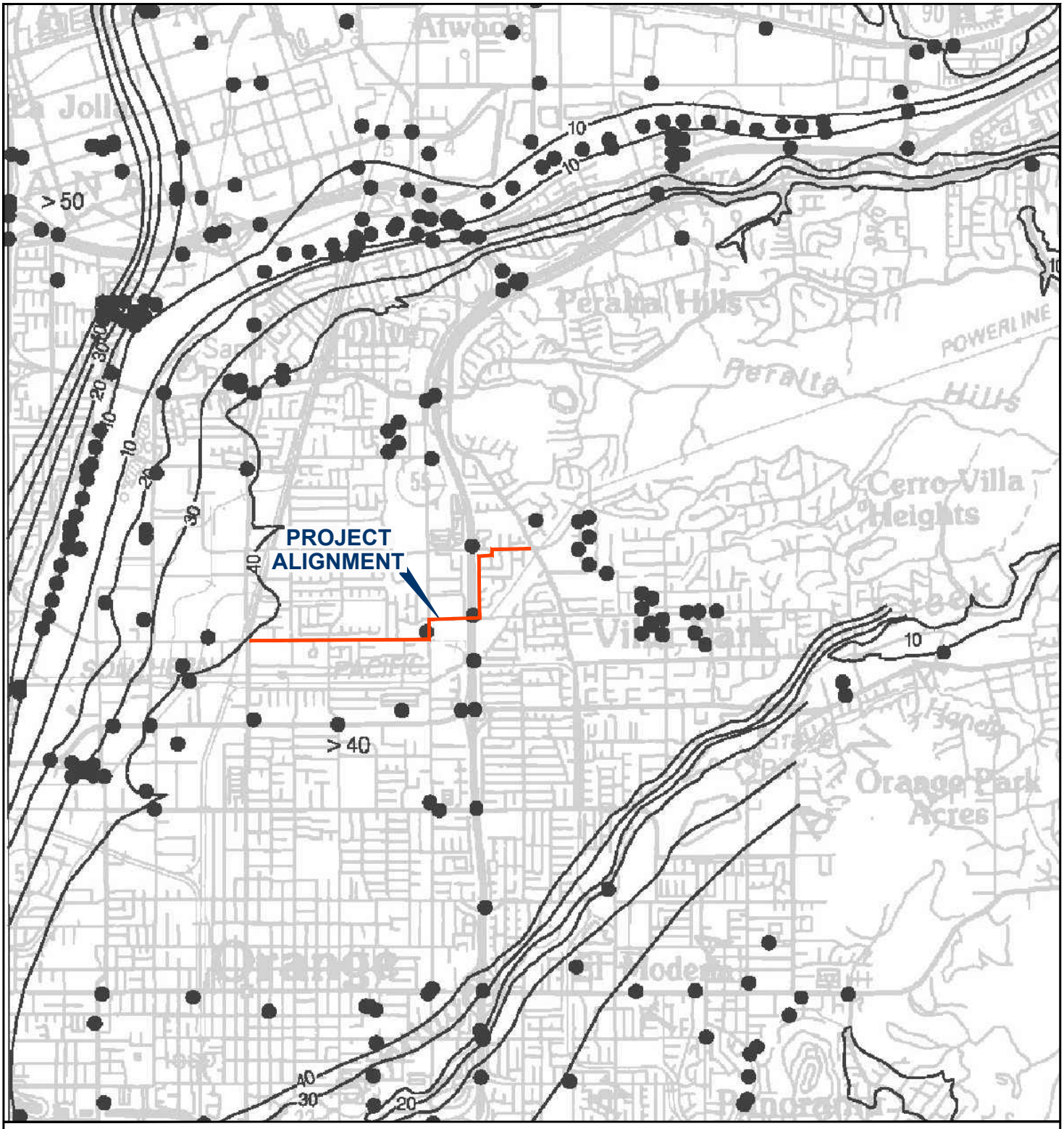
REGIONAL GEOLOGY

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23



NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: CDMG, 1997.

N

FEET

0 4,000 8,000

FIGURE 9

HISTORIC HIGH GROUNDWATER

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA

211663001 I 6/23

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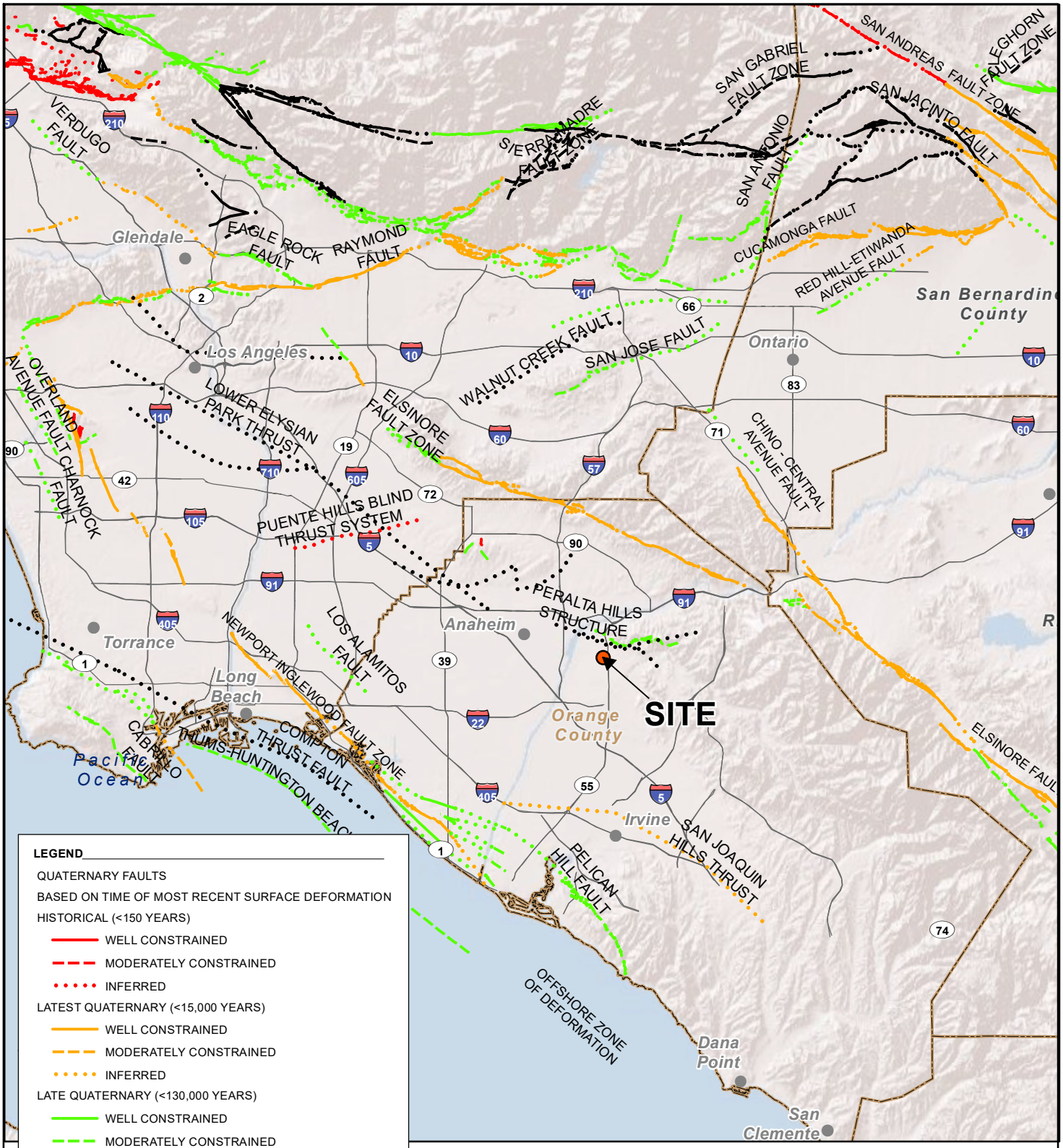
9_211663001_HHG.dwg 05/13/2022 (MAY 2022) GK



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

SOURCES: CALIFORNIA GEOLOGICAL SURVEY, ACCESSED MAY 12, 2022, AT: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults; ESRI, 2021.

211663001_FL.mxd 12/1/2021

FIGURE 10

FAULT LOCATIONS
TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 | 6/23

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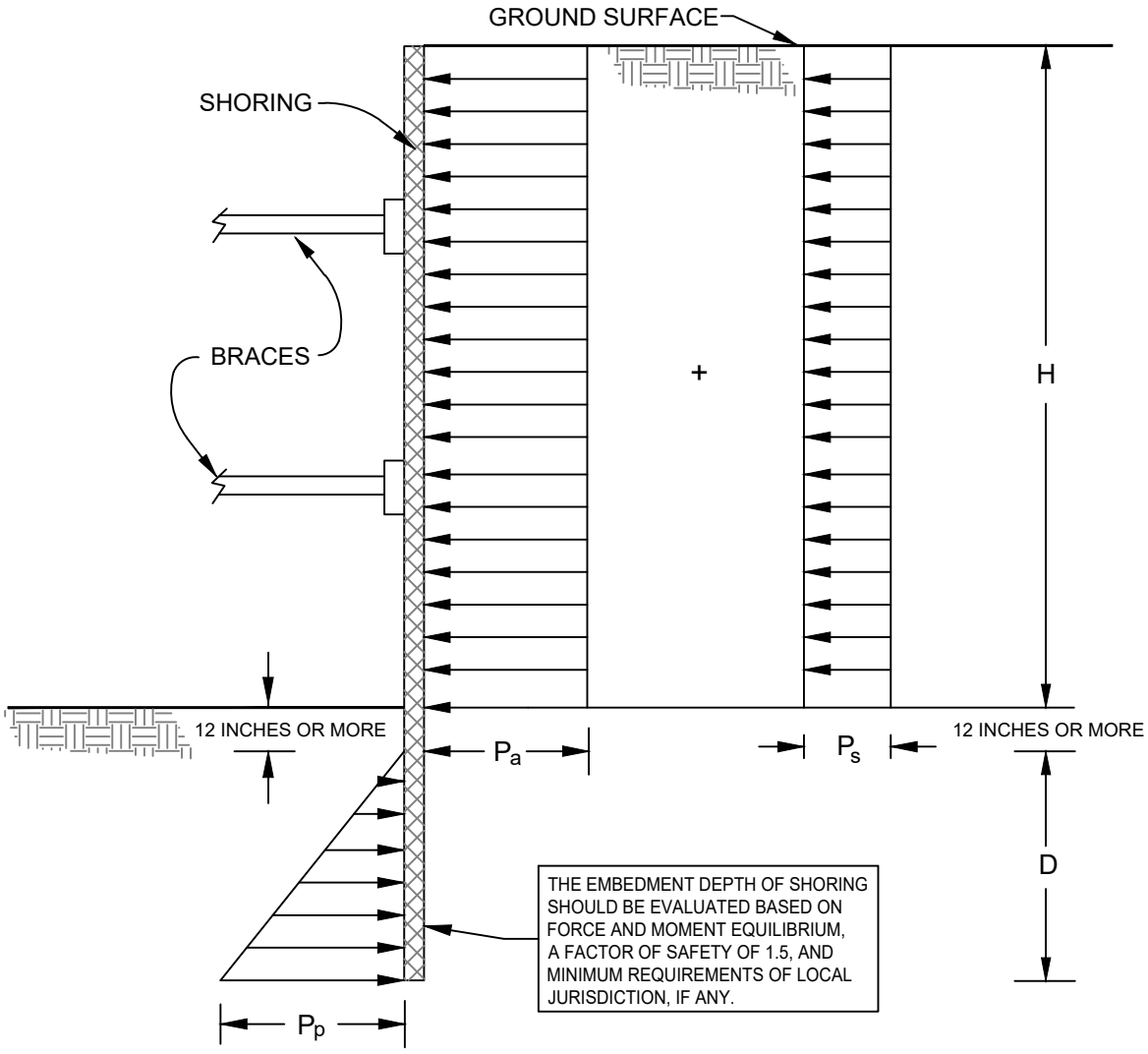

NOTES:

1. APPARENT LATERAL EARTH PRESSURE, P_a
   P_a = 24H psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 300D psf
4. ASSUMES GROUNDWATER IS NOT PRESENT
5. SURCHARGES FROM EXCAVATED SOIL OR CONSTRUCTION MATERIALS ARE NOT INCLUDED
6. H AND D ARE IN FEET

NOT TO SCALE

11_211663001_LEP-BE(GS).dwg 05/23/2022 GK

FIGURE 11

LATERAL EARTH PRESSURES FOR BRACED EXCAVATION (GRANULAR SOIL)

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT
ORANGE, CALIFORNIA
211663001 I 6/23

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APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed soil samples were obtained in the field using the following method.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler
Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of $1^3/_8$ inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples
Relatively undisturbed soil samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler
The sampler, with an external diameter of 3 inches, was lined with 1-inch-long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler barrel was driven into the ground with the weight of a 140-pound hammer mounted on the drill rig in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer or bar, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sampler barrel in the brass rings, sealed, and transported to the laboratory for testing.

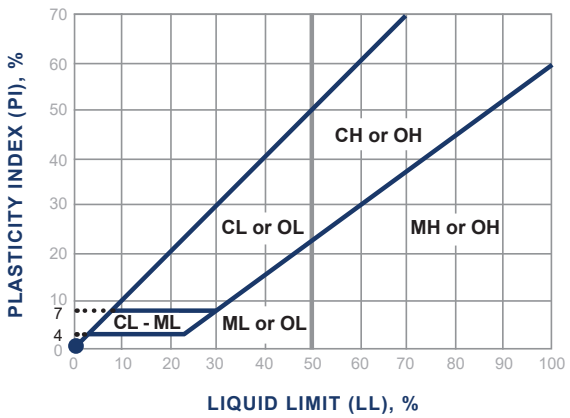
Soil Classification Chart Per ASTM D 2488

Primary Divisions			Secondary Divisions	
			Group Symbol	Group Name
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	**GRAVEL** more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	**SILT and CLAY** liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY
			OH (plots below "A"-line)	organic SILT
	Highly Organic Soils		PT	Peat

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consis-tency	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

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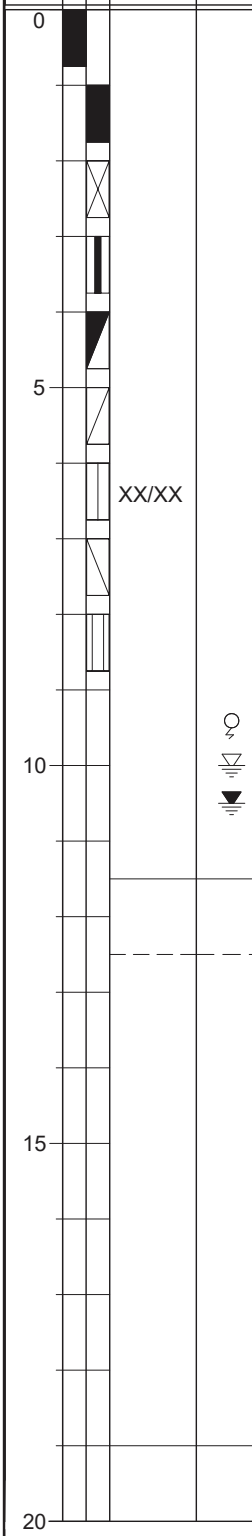
USCS METHOD OF SOIL CLASSIFICATION

BORING LOG EXPLANATION SHEET



Bulk sample.

Modified split-barrel drive sampler.

No recovery with modified split-barrel drive sampler.

Sample retained by others.

Standard Penetration Test (SPT).

No recovery with a SPT.

Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.

No recovery with Shelby tube sampler.

Continuous Push Sample.

Seepage.

Groundwater encountered during drilling.

Groundwater measured after drilling.

SM

MAJOR MATERIAL TYPE (SOIL):

Solid line denotes unit change.

CL

Dashed line denotes material change.

Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Shear Bedding Surface

The total depth line is a solid line that is drawn at the bottom of the boring.

DATE DRILLED 4/14/22 BORING NO. B-1

GROUND ELEVATION 190' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0									ASPHALT CONCRETE:
								GM	Approximately 8 inches thick.
								CL	AGGREGATE BASE: Brown, moist, medium dense, silty GRAVEL; approximately 9 inches thick.
						1.3			ALLUVIUM: Reddish brown, moist, hard, sandy lean CLAY; few to little gravel and possible cobbles.
			38	12.3	118.0	1.0			
			12			2.1			Very stiff.
10			23	14.4	115.6				
			6			0.7			Stiff.
			15	15.5	113.4	0.3			Very stiff.
			47			0.8			Hard.
			50/2"			0.2			Gray, moist, very dense, silty GRAVEL.
			50/1"			1.1		GM	Difficult Drilling; possible cobbles. Refusal due to sampler bouncing on gravel and possible cobbles.
20									Total Depth = 19.1 feet (Refusal). Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/14/22.
30									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A- 1

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/14/22 BORING NO. B-2

GROUND ELEVATION 195' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								ASPHALT CONCRETE:
							GM	Approximately 8 inches thick.
					1.2		CL	AGGREGATE BASE:
							CL	Brown, moist, medium dense, silty GRAVEL; approximately 9 inches thick.
								FILL:
								Reddish brown, moist, hard, sandy lean CLAY; trace gravel.
								ALLUVIUM:
		38	14.9	116.1	0.6			Reddish brown, moist, stiff, lean CLAY; trace gravel.
		9			0.8			Decrease in gravel.
10		19	17.5	107.4	0.5			Very stiff.
		5			0.8			Firm.
		20			0.5			Very stiff.
		4			1.0			Increase in sand; firm.
		8			0.8			Trace gravel; stiff.
		29			1.0			Hard.
20					0.9		SM	Grayish brown, moist, dense, silty SAND; trace gravel.
								Total Depth = 20.5 feet.
								Groundwater was not encountered during drilling.
								Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/14/22.
								Note:
								Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30								
40								

FIGURE A- 2

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/14/22 BORING NO. B-3

GROUND ELEVATION 205' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								GM	ASPHALT CONCRETE: Approximately 6 inches thick.
								CL	AGGREGATE BASE: Brown, moist, medium dense, silty GRAVEL; approximately 5 inches thick.
						0.2		CL	FILL: Reddish brown, moist, hard, sandy lean CLAY; trace gravel.
			85/10"	9.9	123.4	0.8			ALLUVIUM: Reddish brown, moist, hard, sandy lean CLAY.
			84			0.7		GM	Brown, moist, very dense, silty GRAVEL. Difficult drilling.
10			50/5"	4.0	113.6	0.9			Refusal due to very dense gravel and possible cobbles.
									Total Depth = 10.4 feet (Refusal). Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/14/22.
20									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30									
40									

FIGURE A- 3

Ninyo & Moore
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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/13/22 BORING NO. B-4

GROUND ELEVATION 210' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0					1.8			ASPHALT CONCRETE:
							GM	Approximately 8 inches thick.
								AGGREGATE BASE:
							CL	Brown, moist, medium dense, silty GRAVEL; approximately 8 inches thick.
							CL	FILL:
								Reddish brown, moist, hard, sandy lean CLAY; few to little gravel.
								ALLUVIUM:
								Reddish brown, moist, hard, sandy lean CLAY; few to little gravel.
		71	10.3	119.0	0.1		GM	Brown, moist, very dense, silty GRAVEL.
		50/6"			0.2			
10		50/6"			0.3			
		56			0.2			
		60			0.3			
		26			0.4			Dense.
		75/8"			0.4			Very dense.
		50/3"						
20								Total Depth = 19.3 feet.
								Groundwater was not encountered during drilling.
								Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/14/22.
								Note:
								Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30								
40								

FIGURE A- 4

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/13/22 BORING NO. B-5

GROUND ELEVATION 215' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0									ASPHALT CONCRETE:
						0.0		GM	Approximately 8 inches thick.
								CL	AGGREGATE BASE:
								CL	Brown, moist, medium dense, silty GRAVEL; few cobbles; approximately 10 inches thick.
									FILL:
									Reddish brown, moist, dense, sandy lean CLAY; trace gravel.
									ALLUVIUM:
									Reddish brown, moist, dense, sandy lean CLAY; trace gravel.
			30	15.5	10.0	0.2		GM	Brown, moist, medium dense, silty GRAVEL.
			40			0.4			Very dense.
10			58			0.2			Dense.
			50/3"			0.0			Very dense; difficult drilling.
			50/5"			0.0			
			90/10"			0.3			
			50			0.3			
20			85			0.2			
									Total Depth = 20.5 feet.
									Groundwater was not encountered during drilling.
									Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/14/22.
									Note:
									Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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DATE DRILLED 4/12/22 BORING NO. B-6

GROUND ELEVATION 220' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY VAM LOGGED BY VAM REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0									ASPHALT CONCRETE:
								GM	Approximately 8 inches thick.
						0.0		CL	AGGREGATE BASE: Brown, moist, medium dense, silty GRAVEL; approximately 10 inches thick.
								SC	ALLUVIUM: Dark brown, moist, firm, lean CLAY; trace gravel and cobbles.
			31	10.0	121.3	0.0			Reddish brown, moist, medium dense, clayey SAND; few gravel; trace cobbles.
								GM	Brown, moist, dense, silty GRAVEL.
			30			0.0			
10			59	3.5	112.9	0.4			
			37			4.3			Very dense; difficult drilling.
			50/4"						
			50/5"						
			62			0.0			
20			37			0.0			
									Total Depth = 20.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/12/22.
30									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 6

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/13/22 BORING NO. B-7

GROUND ELEVATION 225' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY VAM LOGGED BY VAM REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0									ASPHALT CONCRETE: Approximately 6 inches thick.
						0.1		GM CL	AGGREGATE BASE: Brown, moist, medium dense, silty GRAVEL; approximately 2 inches thick. ALLUVIUM: Brown and reddish brown, moist, firm, sandy lean CLAY; trace gravel.
			20	5.5	116.5	0.9		GM	Brown, moist, medium dense, silty GRAVEL.
			7	4.7	120.4	0.0		CL	Brown, moist, stiff, sandy lean CLAY; trace gravel.
						0.3		GM	Brown, moist, dense, silty GRAVEL.
10			55						
			39			0.3			Very dense.
			38						
			59			1.0			
			50/4"			0.8			Difficult drilling.
						1.6			
20			64						
									Total Depth = 20.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/13/22.
									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30									
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DATE DRILLED 4/8/22 BORING NO. B-8

GROUND ELEVATION 235' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY VAM LOGGED BY VAM REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								ASPHALT CONCRETE: Approximately 16 inches thick.
							GM	FILL:
					62.2		SM	Brown, moist, medium dense, silty sandy GRAVEL; mild hydrocarbon odor.
								ALLUVIUM: Brown, moist, medium dense, silty SAND with gravels; hydrocarbon odor.
		13	7.8	117.4	4.6		SC	Brown, moist, loose, clayey SAND with gravel.
		11			2.7		CL	Reddish brown, moist, very stiff, lean CLAY.
10		52	4.4	124.0	4.0		GM	Brown, moist, dense, silty sandy GRAVEL.
		70						Very dense.
		81			8.8			
		68			2.2			
		50/4"						Refusal on gravel and possible cobbles.
								Total Depth = 17.3 feet (Refusal). Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/8/22.
20								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 8

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/8/22 BORING NO. B-9

GROUND ELEVATION 235' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY VAM LOGGED BY VAM REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							GM	ASPHALT CONCRETE: Approximately 7 inches thick.
					0.5		GM	FILL: Brown, moist, medium dense, silty sandy GRAVEL.
		9	11.9	118.1	8.5			ALLUVIUM: Brown, moist, loose, silty sandy GRAVEL.
		12			177.3		GC	Reddish brown, moist, medium dense, clayey sandy GRAVEL.
10		76						Very dense; difficult drilling.
		44			8.2			
		69	5.0	124.4	26.2			Dense.
		56			4.2			Very dense.
		50/1"						Slow drilling on gravel and possible cobbles. Refusal on very dense gravel and cobbles.
20								Total Depth = 17.6 feet (Refusal). Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and hot patched on 4/8/22.
								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 9

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/7/22 BORING NO. B-10

GROUND ELEVATION 245' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								ML	ASPHALT CONCRETE: Approximately 5.5 inches thick.
								CL	FILL: Brown, moist, medium dense, sandy SILT with gravel; trace cobbles; approximately 9 inches thick.
						310			ALLUVIUM: Brown, moist, very stiff, lean CLAY with gravel; trace cobbles; hydrocarbon odor.
		■	16			217			
		■	67			0.6		SP	Brown, moist, dense, poorly graded SAND with gravel.
		■	50/6"	4.4	127.2	1.5		GM	Brown, moist, very dense, silty GRAVEL.
10		■	42			0.7			
		⊠	42					GP	Brown, moist, medium dense, poorly graded GRAVEL; few to little cobbles.
		■	81	4.3	120.5	0.1			Very dense
		■	64			0.1			
		■	28			150		ML	Brown, moist, hard, SILT.
20									Total Depth = 20.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/7/22.
									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 10

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/12/22 BORING NO. B-11

GROUND ELEVATION 245' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY VAM LOGGED BY VAM REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0									ASPHALT CONCRETE: Approximately 10 inches thick.
						0.0		SC	PORTLAND CEMENT CONCRETE: Approximately 6 inches thick.
								CL	FILL: Gray and red, moist, loose, clayey SAND; few gravel.
								CL	Reddish gray, moist, very stiff to hard, sandy lean CLAY; trace construction debris.
			34	17.4	112.9	0.7			ALLUVIUM: Reddish gray, moist, very stiff to hard, lean sandy CLAY.
			21			2.9		GC	Reddish brown, moist, dense, clayey sandy GRAVEL.
10			32	6.6	101.0	25.9			Medium dense.
			61			0.3			Very dense.
			50/4"			7.1			Probable cobbles; difficult drilling.
			56			2.3			
			17/11"			5.0			
			15/4"						
20									Total Depth = 19.3 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/12/22.
30									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A- 11

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/15/22 BORING NO. B-14

GROUND ELEVATION 265' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								GC	ASPHALT CONCRETE: Approximately 4 inches thick.
								GP-GC	AGGREGATE BASE:
						1.4		GP-GC	Brown, moist, medium dense, clayey GRAVEL; trace cobbles; approximately 8 inches thick.
									FILL: Brown, moist, dense, poorly graded GRAVEL with clay; trace cobbles.
			25	7.3	91.7	2.2		GM	ALLUVIUM: Brown, moist, dense, poorly graded GRAVEL with clay; trace cobbles.
									Brown, moist, medium dense, silty GRAVEL.
			24			2.1			Dense.
						3.8			
10			80	5.7	114.5				Very dense; oxidation staining; probable cobbles.
			50/6"			6.6			Difficult drilling.
						7.8			
			61						
						8.5			
			44						
			50/2"						
						5.2			
20			80						
									Total Depth = 20.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/15/22.
									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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40									

FIGURE A- 12

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/15/22 BORING NO. B-15

GROUND ELEVATION 265' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								GM	ASPHALT CONCRETE: Approximately 4 inches thick.
						0.6		CL	AGGREGATE BASE: Light brown, moist, medium dense, silty GRAVEL; approximately 6 inches thick.
									ALLUVIUM: Reddish brown, moist, hard, sandy lean CLAY; trace gravel.
			65	10.8	114.1	1.6			
						3.7		GM	Light brown, moist, very dense, silty GRAVEL; trace cobbles.
			48						
						0.7			
10			80	5.1	125.4				
						1.6			
			15						Medium dense.
								CL	Brown, moist, very stiff, sandy lean CLAY.
						3.5		GM	Brown, moist, medium dense, silty GRAVEL.
			22						
						2.6			
			66						Very dense; refusal on gravel and possible cobbles.
20									Total Depth = 16.5 feet (Refusal). Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/15/22.
30									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

DATE DRILLED 4/18/22 BORING NO. B-16

GROUND ELEVATION 265' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0					1.6		GM	ASPHALT CONCRETE: Approximately 4 inches thick.
							CL	AGGREGATE BASE: Dark brown, moist, medium dense, silty GRAVEL; approximately 6 inches thick.
								ALLUVIUM: Dark brown, moist, very stiff, sandy lean CLAY; trace gravel.
		22	21.4	102.3	6.7			
		56			1.4			Hard.
							GM	Light grayish brown, moist, very dense, silty GRAVEL.
10		67	16.7	125.4	1.4			Dense.
		41			1.9			Very dense.
		58	4.7	124.6	1.7			Dense.
		35			2.8			Very dense.
		50/5"						Difficult drilling; refusal due to gravel and possible cobbles.
								Total Depth = 17.4 feet.
								Groundwater was not encountered during drilling.
20								Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/18/22.
								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 14

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/18/22 BORING NO. B-17

GROUND ELEVATION 265' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								GM	ASPHALT CONCRETE: Approximately 5 inches thick.
						1.0		CL	AGGREGATE BASE: Dark brown, moist, medium dense, silty GRAVEL; approximately 5 inches thick.
									ALLUVIUM: Dark brown, moist, hard, sandy lean CLAY; trace gravel.
			56	19.6	108.0	4.8			
			33			8.5			
								GM	Light brown, moist, very dense, silty GRAVEL.
10			83	3.4	120.1	3.7			Reddish brown.
			54			7.3			Difficult drilling; possible cobbles.
			50/5"			6.5			
			76/11"			7.6			
			50/1"						Total Depth = 17.1 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/15/22.
20									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 15

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/18/22 BORING NO. B-18

GROUND ELEVATION 275' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								GM	ASPHALT CONCRETE: Approximately 4.5 inches thick.
						2.3		CL	AGGREGATE BASE: Light brown, moist, medium dense, silty GRAVEL; approximately 6 inches thick.
									ALLUVIUM: Dark brown, moist, hard, sandy lean CLAY; trace gravel.
			37	27.1	101.0	0.5			
			17			2.0		CH	Dark brown, moist, very stiff, fat CLAY; trace gravel.
10			34	21.2	105.5	7.0			Hard.
			30			3.0			Decrease in gravel.
			30	20.7	105.7	7.9			
			23			6.3			
			50/6"	19.9	107.3	3.0			
20			49			1.6		GM	Light brown, moist, very dense, silty GRAVEL.
									Total Depth = 20.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with concrete on 4/18/22.
									Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
									The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 16

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/19/22 BORING NO. B-19

GROUND ELEVATION 280' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0					0.1			ASPHALT CONCRETE: Approximately 20 inches thick.
							CL	ALLUVIUM: Dark brown, moist, medium dense, sandy lean CLAY; trace gravel and cobbles.
		52						Hard.
		20			0.2			Very stiff.
10		47	19.1	106.2	0.2			Hard.
		17			0.2			Very stiff.
		30						Hard.
		74			5.6		GM	Light brown, moist, very dense, silty GRAVEL.
		50/3"						Difficult drilling; possible cobbles.
		50/3"			4.3			
20								Total Depth = 19.3 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/19/22.
								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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FIGURE A- 17

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TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

DATE DRILLED 4/19/22 BORING NO. B-20

GROUND ELEVATION 295' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY ANP LOGGED BY ANP REVIEWED BY JRS/MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								ASPHALT CONCRETE:
							GM	Approximately 7 inches thick.
							CL	AGGREGATE BASE: Light brown, moist, medium dense, silty GRAVEL; approximately 6 inches thick.
					2.6			ALLUVIUM: Dark brown, moist, very stiff, sandy lean CLAY.
		22	21.6	99.3	1.2			
		11			2.3			
10		50	20.5	104.2	2.7			Hard.
		16			2.6			Very stiff.
		27	16.6	102.0	1.4			Hard.
		41			1.3			
		54			1.2			
20		30			0.7			
								Total Depth = 20.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-sand slurry and capped with hot asphalt concrete on 4/15/22.
30								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
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Previous Boring Logs by County of Orange, County Sanitation District, and Caltrans

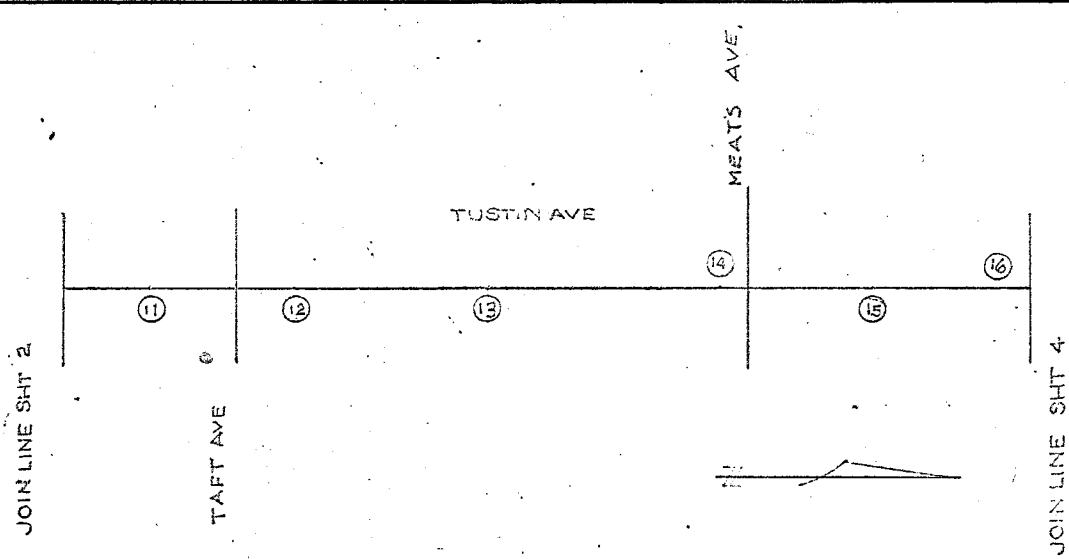
SOIL SURVEY SHEET

PROJECT NO. AUED 568 BY [illegible] CHKD. BY ____

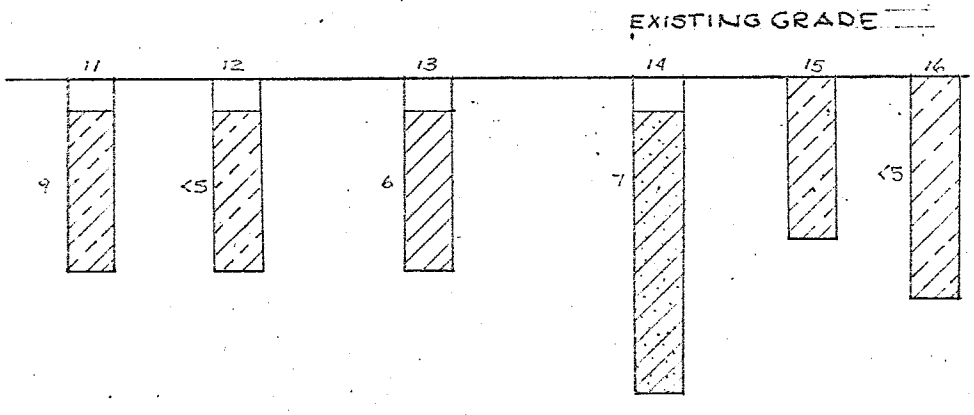
DATE 4-22-65 PROJECT TUSTIN AVE LIMITS 750'S/O CHAPMAN - LINCOLN SH. 2 of 6

DESCRIPTION	BORING OR SAMPLE NO.	11			12			13			14			15			16		
	LAB NUMBER	64-1943			64-1944			64-439			64-374			64-[illegible]			64-[illegible]		
	DATE SAMPLED	9-2-64			9-2-64			4-6-65			5-13-64			12-20-64			12-22-64		
	STATION	490'S/TAFT			302'N/TAFT			1196'S/MEATS			6'S/E MEATS			[illegible]			1600'N/MEATS		
	DISTANCE FROM ℄	20'E			28'E			40'E			200'N			20'W			15'W		
	DEPTH OR ELEVATION	0.5'-2.5'			0.5'-2.0'			0.5'-3.0'			0.5'-5.5'			0.5'-2.5'			0.5'-5.5'		
	TYPE OF MATERIAL	SANDY CLAY			SANDY CLAY			CLAY			SANDY CLAY			SANDY CLAY			SANDY CLAY		
SIEVE ANALYSIS	% PASSING NO. 4	100			100			100			100			100			100		
	" " 8	97			98			98			96			96			97		
	" " 16	92			93			93			92			92			93		
	" " 30	87			88			88			87			87			89		
	" " 50	81			82			82			80			80			82		
	" " 100	76			77			77			73			73			76		
	" " 200	71			74			73			68			68			70		
	% SAND & ROCK (+200)	29			26			27			32.3			32			30		
	% SILT (-200 to 5 microns)	42			44			38.5			39.9			39			40		
	% CLAY (-5 microns)	29			30			34.5			27.8			29			30		
STABILOMETER TEST	SPECIMEN IDENTIFICATION	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
	COMPACTOR AIR PRESSURE	3	4	8	5		0	4	6	12							4	6	21
	MOISTURE AT COMP. %	15.4	14.1	14.8	16.5			18.1	18.5	16.7							14.8	13.2	10.8
	DRY DENS. OF BRIQ. lbs/cu.ft.	105	111.3	115.5	108			105.4	105.4	111.							109.6	115.2	121.1
	EXUDATION PRESSURE P.S.I.	275	273	490	350			270	270	330	250	245	665				410	645	900
	STABILOMETER R-VALUE	7	15	25	<5			6	7	25	6	8	22				7	10	32
	G.E.-STABILOMETER-INCHES	25.11	23.69	19.67				25.11	20.6	16.6	25.4	24.8	20.6				25.1	24.2	17.6
	EXPAN. PRESSURE-INCHES	0	0	1.5	5			0	0	30	0	0	1				0	0	13.5
	R-VALUE at EQUILIBRIUM	7 STAB			<5 STAB			7 STAB			7 STAB						<5 STAB		
	G.E. at EQUILIBRIUM-INCHES	24.51			25.72			25.11			25.11						25.72		
	FIELD MOISTURE %	10.06			20.00														
	TRAFFIC INDEX	8.0			8.0			8.0			8.0			8.0			8.0		

PLAN VIEW OF BORINGS
SCALE-Horiz. 1" = 1000'

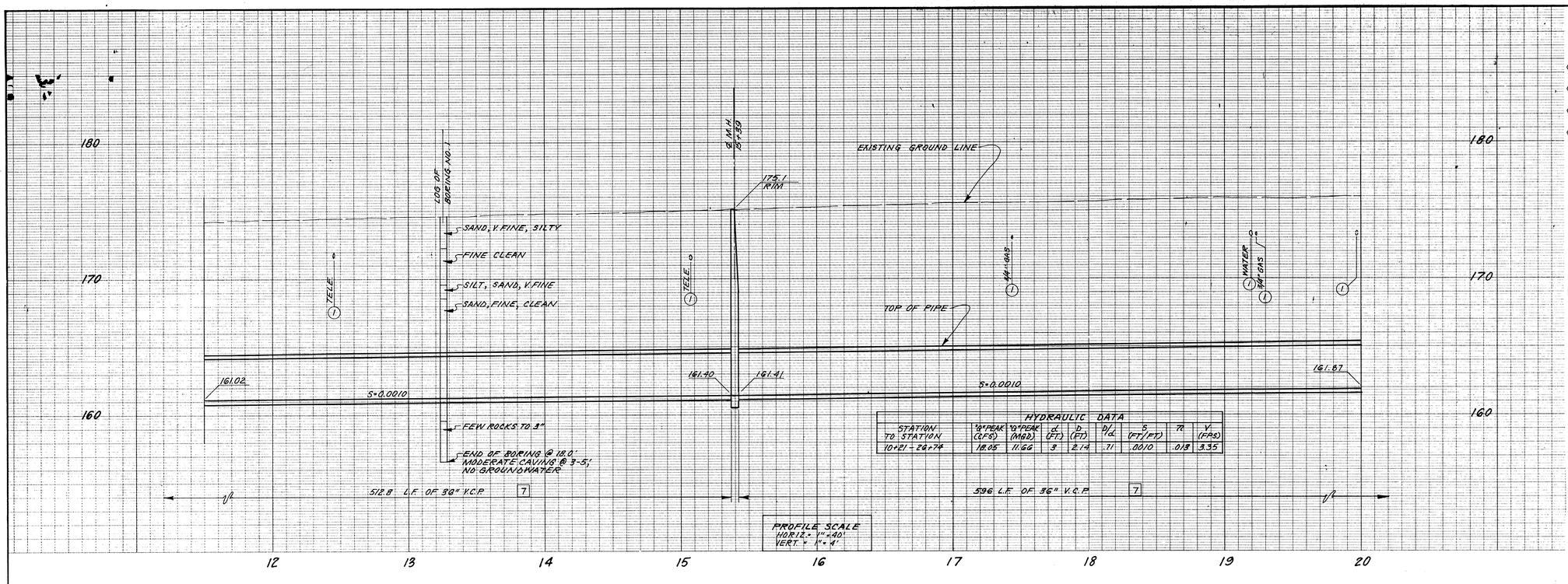


LOG OF TEST BORINGS
SCALE-Vert. 1" = 3'



LEGEND

- P.C.C.
- A.C.
- A.B.
- SAND
- SILT
- CLAY
- R-VAL. LIMITS
- SOIL CHANGE



UTILITIES

	DESCRIPTION	OWNER
1	16" STEEL OIL	FOUR CORNERS PIPELINE
7	3" STEEL GAS	SO. CALIF. GAS, TRANS.
12	3/4" PE GAS	SO. CALIF. GAS, TRANS.
15	TELEPHONE CONDUIT	PACIFIC BELL
16	16" WATER	CITY OF ORANGE
23	WATER SERVICE	CITY OF ORANGE
24	12" V.C.P. SEWER	C.S.D.O.C.

CONSTRUCTION NOTES

2 — CONSTRUCT 60" I.D. STANDARD MANHOLE PER C.S.D.O.C. STANDARD DRAWING NO. S-25-1.

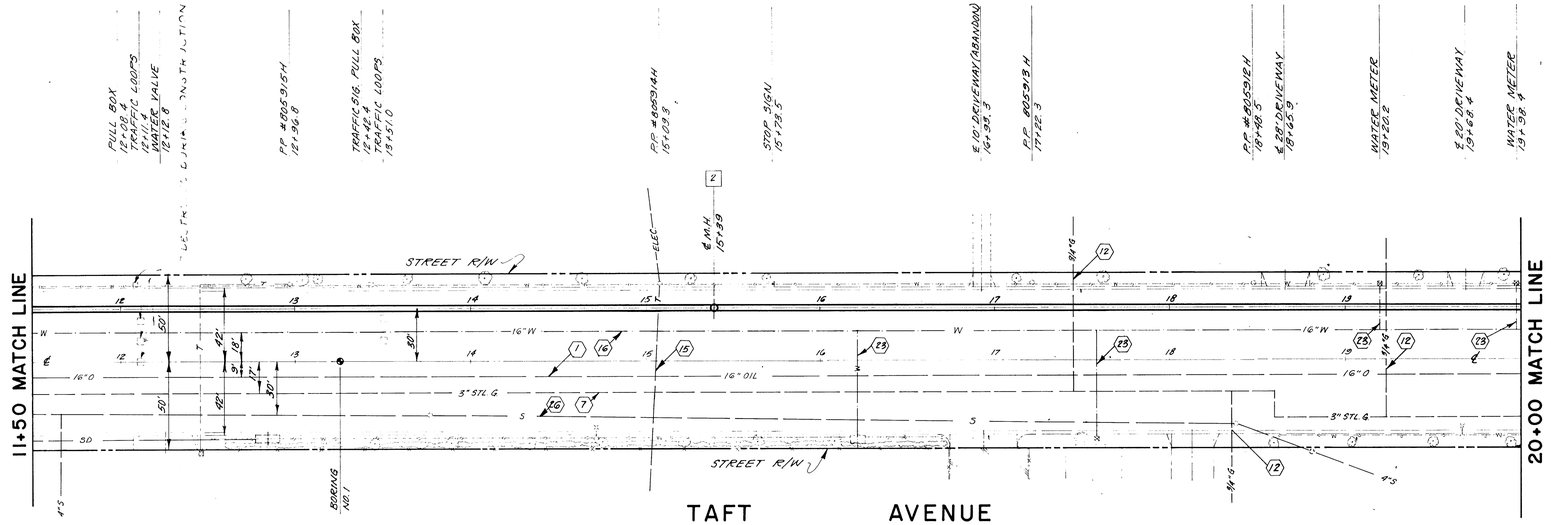
7 — CONSTRUCT 36" EXTRA STRENGTH V.C.P. WITH STANDARD BEDDING PER C.S.D.O.C. STANDARD DWG. NO. S-21-2.

DISPOSITION NOTES

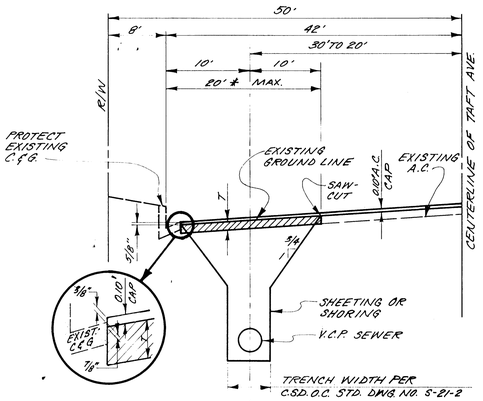
1 — PROTECT IN PLACE

STATION TO STATION	HYDRAULIC DATA							
	10 YEAR PEAK (C.F.S.)	10 YEAR PEAK (MGD.)	L (FT.)	D (FT.)	d/D	S (FT./FT.)	n	V (F.P.S.)
10+21 - 24+74	18.05	11.66	3	2.14	.71	.0010	.013	3.35

SCALE 1" = 40'



"AS CONSTRUCTED"



* TRENCH RESURFACING WIDTH FOR PURPOSE OF QUANTITY ESTIMATE. WIDTH MAY VARY WITH CONSTRUCTION.

TRENCH RESURFACING TABLE (T)	
WEST OF BATAVIA ST.	EAST OF BATAVIA ST.
0.30' AC / 1.50' AB	0.30' AC / 1.45' AB

TYPICAL TRENCH SECTION

N.T.S.

UTILITIES

	DESCRIPTION	OWNER
1	16" STEEL OIL	FOUR CORNERS PIPELINE
4	8" STEEL HP GAS	SO. CALIF GAS, TRANS.
5	4" STEEL GAS	SO. CALIF GAS, TRANS.
7	3" STEEL GAS	SO. CALIF GAS, TRANS.
8	3" PE GAS	SO. CALIF GAS, TRANS.
15	12 KV ELECTRIC CABLE	SO. CALIF EDISON
16	TELEPHONE CONDUIT	PACIFIC BELL
17	12" WATER	CITY OF ORANGE
18	10" WATER	CITY OF ORANGE
19	8" WATER	CITY OF ORANGE
23	WATER SERVICE	CITY OF ORANGE
24	21" V.C.P. SEWER	C.S.D.O.C.
26	12" V.C.P. SEWER	C.S.D.O.C.
27	10" V.C.P. SEWER	CITY OF ORANGE
28	8" V.C.P. SEWER	CITY OF ORANGE

CONSTRUCTION NOTES

2 — CONSTRUCT 60" I.D. STANDARD MANHOLE PER C.S.D.O.C. STANDARD DRAWING NO. S-25-1

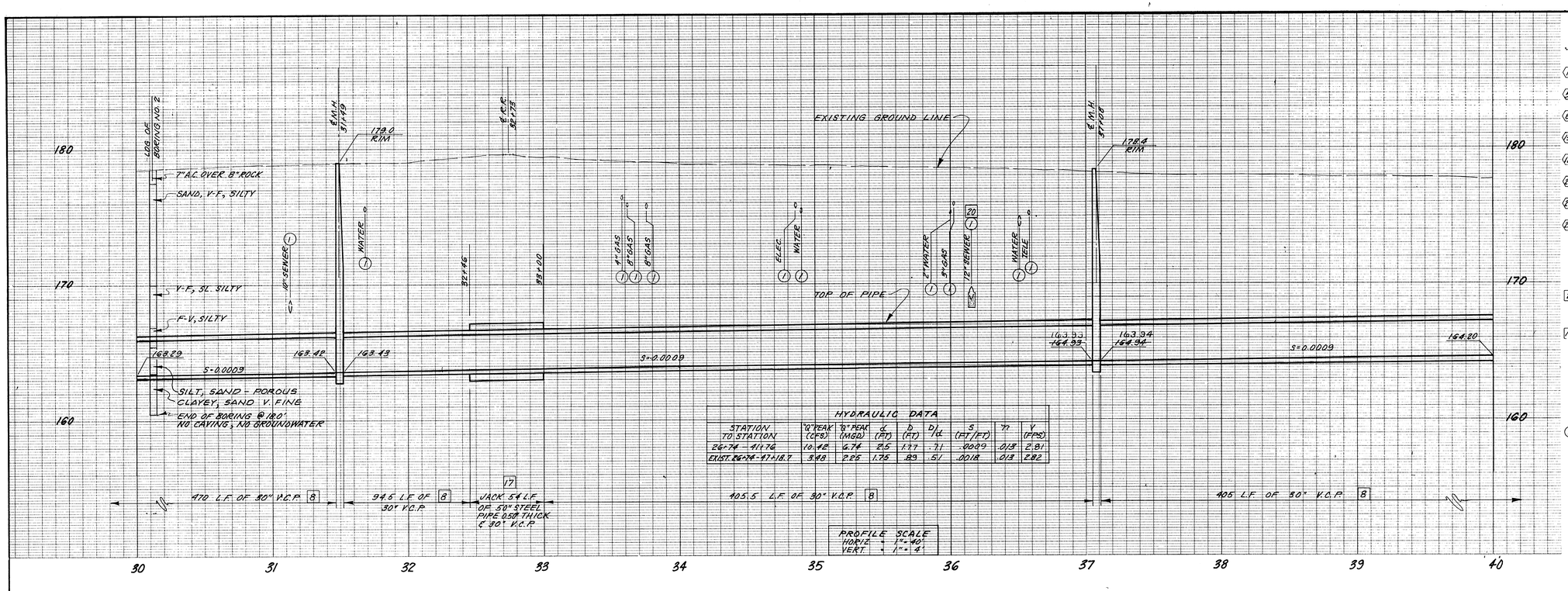
8 — CONSTRUCT 30" EXTRA STRENGTH V.C.P. WITH STANDARD BEDDING PER C.S.D.O.C. STANDARD DWG. NO. S-21-2.

17 — JACK 50"ø MIN. I.D. STEEL CASING, 0.500" MIN. WALL THICKNESS, AND 30" EXTRA STRENGTH V.C.P. PER C.S.D.O.C. STANDARD DRAWING NO. S-36-1.

20 — CONSTRUCT PIPE SUPPORT PER C.S.D.O.C. STANDARD DRAWING NO. S-37-1.

DISPOSITION NOTES

1 — PROTECT IN PLACE

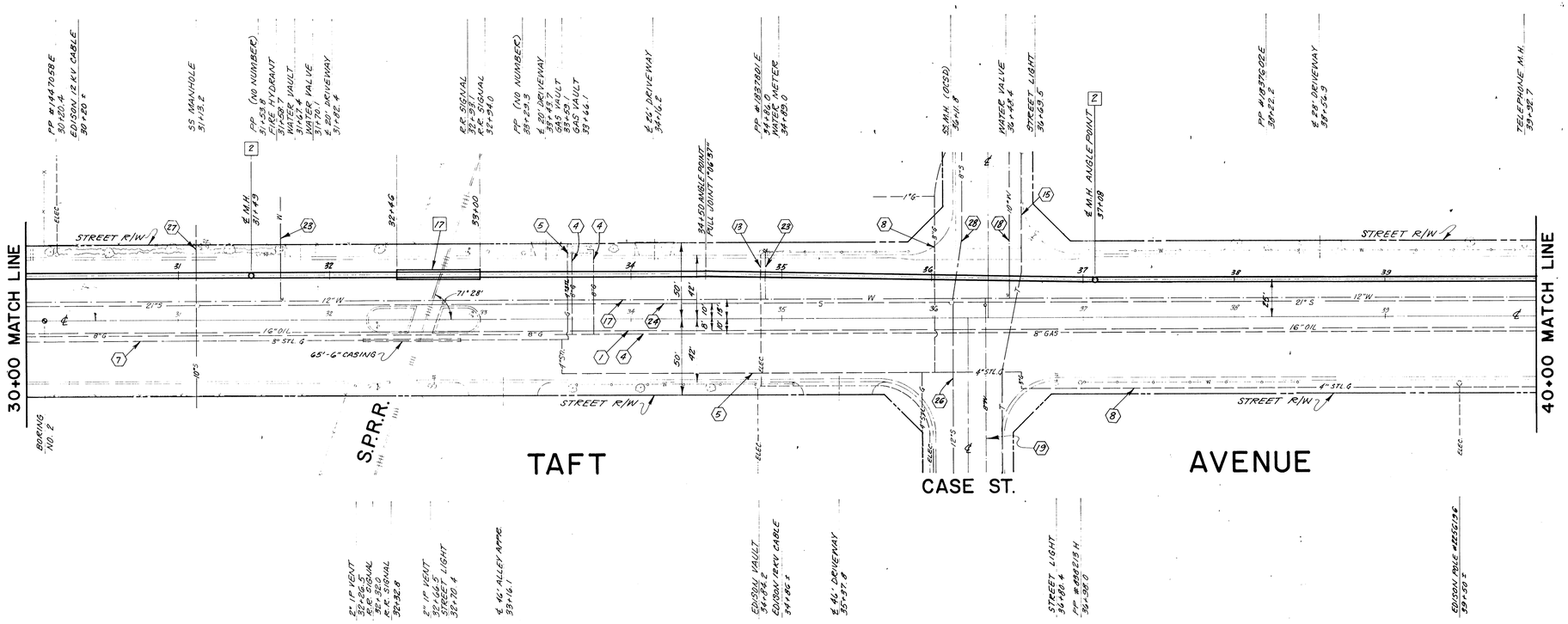


HYDRAULIC DATA

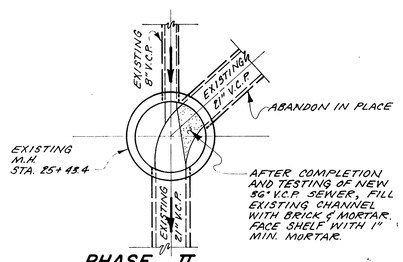
STATION TO STATION	"Q" PEAK (CFS)	"Q" PEAK (MGD)	d (FT)	D (FT)	D/d	S (FT/FT)	"n"	V (FPS)
26+74 - 41+76	10.48	6.74	2.5	1.77	.71	.0009	.013	2.81
EXIST. 26+74 - 47+18.7	3.48	2.25	1.75	.89	.51	.0018	.013	2.82

PROFILE SCALE
HORIZ - 1"=40'
VERT - 1"=4'

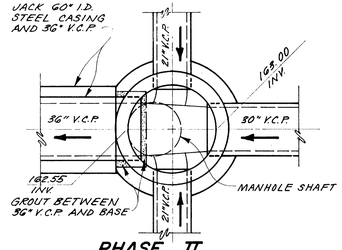
SCALE 1"= 40'



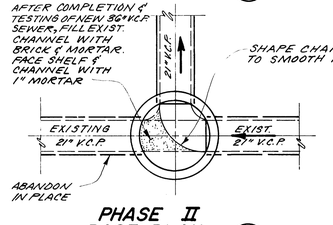
"AS CONSTRUCTED"



PHASE II BASE PLAN (1)
SCALE 1/4"=1'-0"



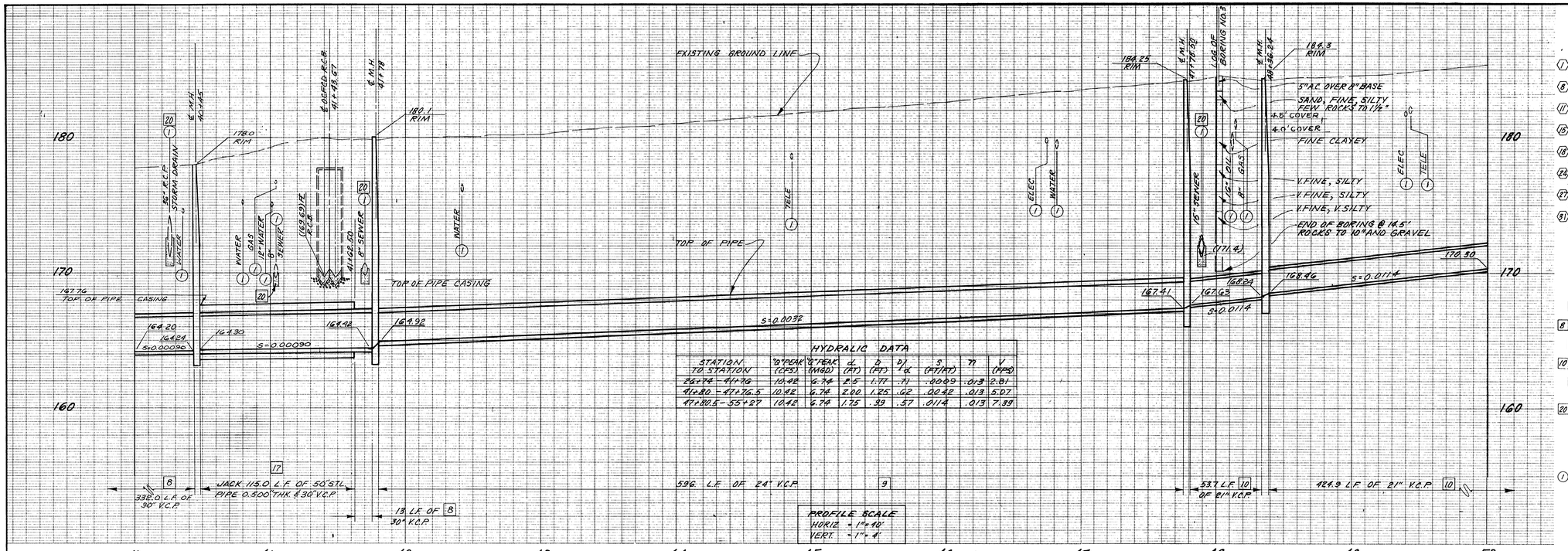
PHASE II BASE PLAN (2)
SCALE 1/4"=1'-0"



PHASE II BASE PLAN (3)
SCALE 1/4"=1'-0"

SHEET 5 OF 18 SHEETS

5-215



STATION TO STATION	Q PEAK (CFS)	Q PEAK (MGD)	d/D (AT)	D (FT)	D/d	S (FT/FT)	n	V (FPS)
36+74 – 41+76	10.42	6.74	2.5	1.77	.71	.0009	.013	2.81
41+80 – 47+76.5	10.42	6.74	2.00	1.25	.62	.0042	.013	5.07
47+80.5 – 55+27	10.42	6.74	1.75	.99	.57	.0114	.013	7.39

HYDRALIC DATA

PROFILE SCALE
HORIZ. = 1"=10'
VERT. = 1"=4'

338.0 L.F. OF 30" V.C.P.
JACK 115.0 L.F. OF 50' STL. PIPE 0.500" THK. & 30" V.C.P.
13 L.F. OF 30" V.C.P.
596 L.F. OF 24" V.C.P.
53.7 L.F. OF 21" V.C.P.
424.9 L.F. OF 21" V.C.P.

UTILITIES

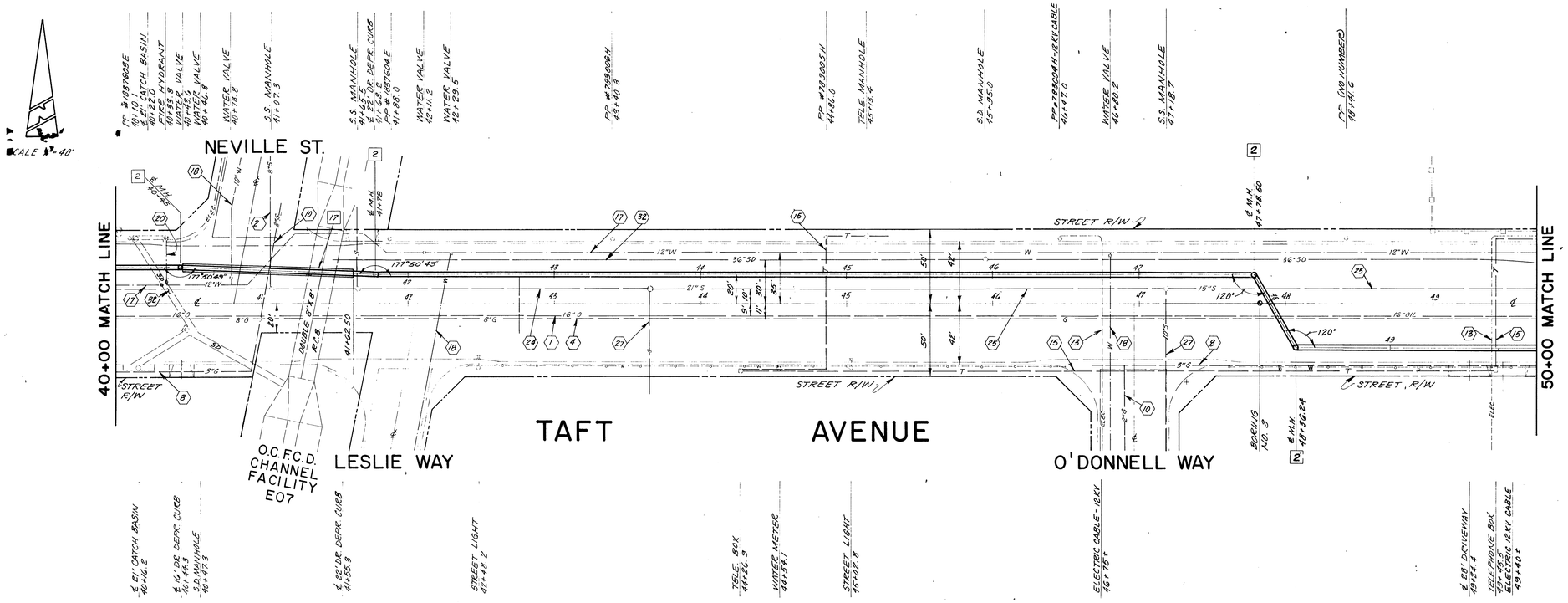
	DESCRIPTION	OWNER
1	16" STEEL OIL	FOUR CORNERS PIPELINE
4	8" STEEL H.P. GAS	SO. CALIF. GAS, TRANS.
8	3" PE GAS	SO. CALIF. GAS, TRANS.
10	2" PE GAS	SO. CALIF. GAS, TRANS.
11	1" PE GAS	SO. CALIF. GAS, TRANS.
13	12 KV ELECTRIC CABLE	SO. CALIF. EDISON
15	TELEPHONE CONDUIT	PACIFIC BELL
17	12" WATER	CITY OF ORANGE
18	10" WATER	CITY OF ORANGE
20	6" WATER	CITY OF ORANGE
24	21" V.C.P. SEWER	C.S.D.O.C.
25	15" V.C.P. SEWER	C.S.D.O.C.
27	10" V.C.P. SEWER	CITY OF ORANGE
28	8" V.C.P. SEWER	CITY OF ORANGE
31	42" R.C.P. STORM DRAIN	CITY OF ORANGE
32	36" R.C.P. STORM DRAIN	CITY OF ORANGE

CONSTRUCTION NOTES

2 — CONSTRUCT 60" I.D. STANDARD MANHOLE PER C.S.D.O.C. STANDARD DRAWING NO. S-25-1.
8 — CONSTRUCT 30" EXTRA STRENGTH V.C.P. WITH STANDARD BEDDING PER C.S.D.O.C. STANDARD DWG. NO. S-21-2.
9 — CONSTRUCT 24" EXTRA STRENGTH V.C.P. WITH STANDARD BEDDING PER C.S.D.O.C. STANDARD DWG. NO. S-21-2.
10 — CONSTRUCT 21" EXTRA STRENGTH V.C.P. WITH STANDARD BEDDING PER C.S.D.O.C. STANDARD DWG. NO. S-21-2.
17 — JACK 98" MIN. I.D. STEEL CASING, 0.500" MIN. WALL THICKNESS, AND 30" EXTRA STRENGTH V.C.P. PER O.S.D.O.C. STANDARD DRAWING NO. S-36-1.
20 — CONSTRUCT PIPE SUPPORT PER C.S.D.O.C. STANDARD DRAWING NO. S-37-1.

DISPOSITION NOTES

1 — PROTECT IN PLACE



"AS CONSTRUCTED"

SHEET 6 OF 18 SHEETS
5-215

BENCH MARK
Elevation 88.250 m
CONTROL POINT HV-55-09 Station 250+38.6 m Offset: 16.3 m Rt
Set "C" nail & tin 1.8 m east of Northbound SR-55 edge of travelled way, +/- 55 m north of the end of bridge over Orange Channel.

12-21-98
TO ACCOMPANY PLANS DATED

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	55	20.3/R28.6	446	481

REGISTERED GEOTECHNICAL ENGINEER

PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — R. KHIABANI — NO. 2202 — EXP. 6/30/00 — GEOTECHNICAL — STATE OF CALIFORNIA

LEIGHTON & ASSOCIATES, INC.
17781 COWAN AVENUE
IRVINE, CA-92714

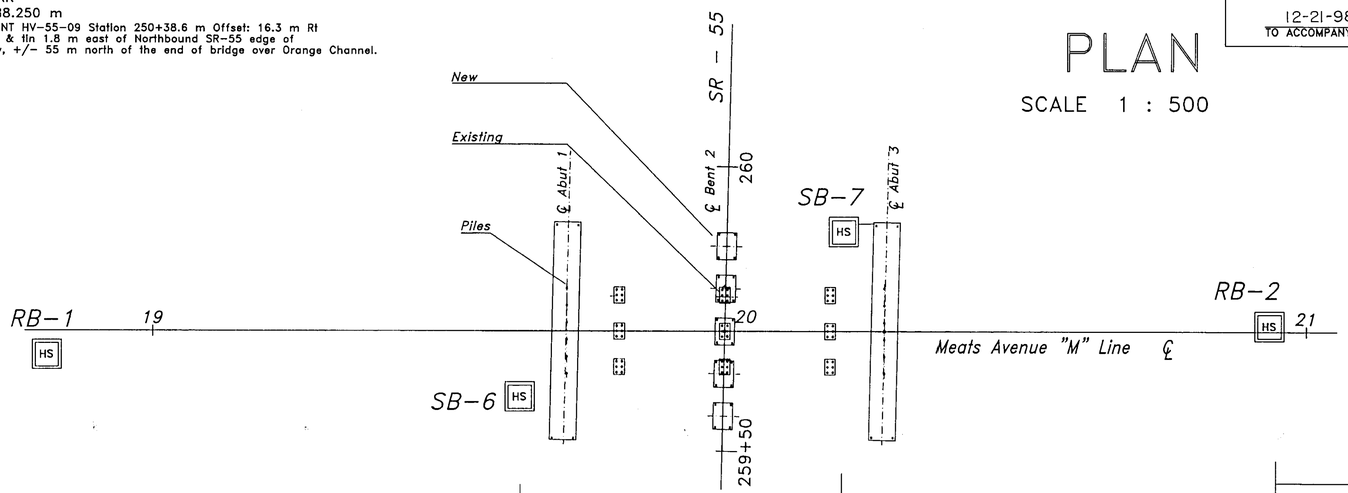
The State of California or its officers or agents shall not be responsible for the completeness or accuracy of electronic copies of this plan sheet.

AS BUILT
CONTRACTOR V. FRANCIS
CONTRACT NO. 12-013341
DATE 9/4/01
B.H. 4/4/54

NO AS BUILT CHANGES

PLAN

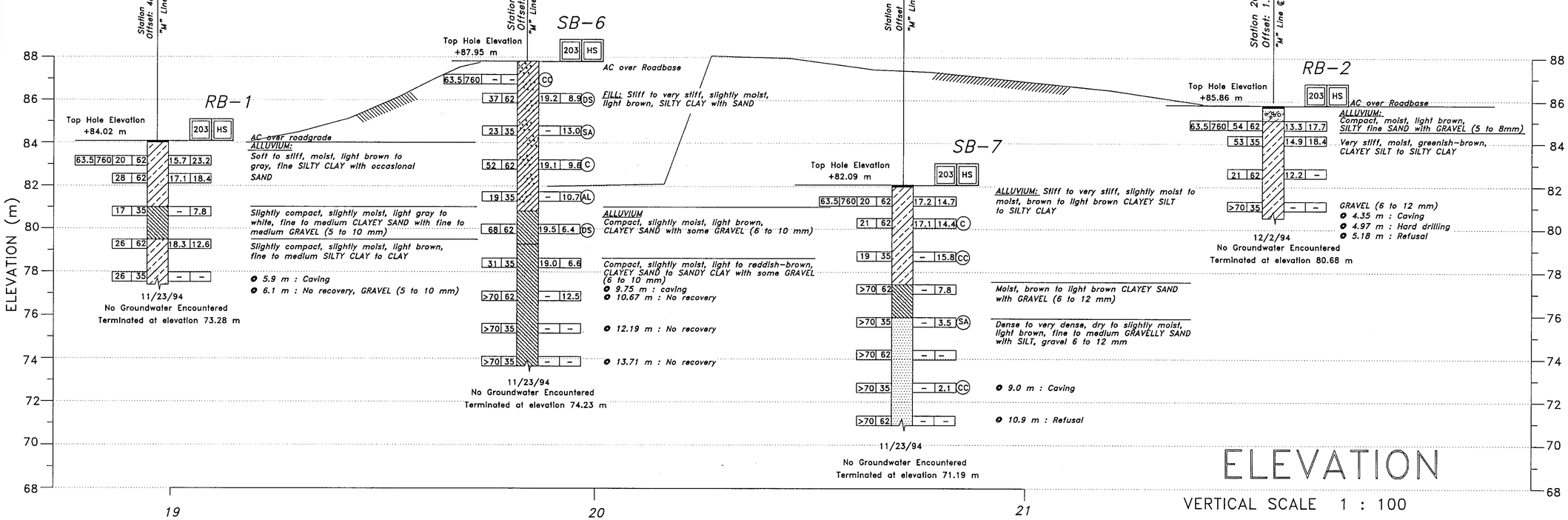
SCALE 1 : 500



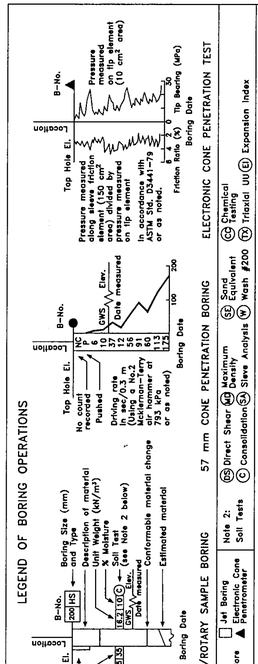
ELEVATION

VERTICAL SCALE 1 : 100

HORIZONTAL SCALE 1 : 500



LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · CLAYEY SILT · SILTY CLAY · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (blows/0.3m)	Granular	Cohesive
0 – 4	Very Loose	Very Soft
5 – 9	Loose	Soft
10 – 19	Slightly Compact	Stiff
20 – 34	Compact	Very Stiff
35 – 69	Dense	Hard
> 70	Very Dense	Very Hard

Note: Classification of earth material as shown on this sheet is based on visual inspection and/or mechanical analysis where indicated.

DESIGN OVERSIGHT BE NGUYEN
SIGNOFF DATE 7-13-98

DESIGN BY S. MALHOTRA
CHECKED BY D. CHANDRA
A. BHATTACHARYA FIELD INVESTIGATOR
DATE 11/22/94

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

R. KHIABANI PROJECT ENGINEER

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12211
EA 013341

BRIDGE No.	
55-0923	
KILOMETER POST	
25.97	

MEATS AVENUE O.C. (REPLACE)

LOG OF TEST BORINGS

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY): 3/27/98, 5/11/98, 7/7/98

PLATE 15 OF 16

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	55	20.3/R28.6	447	481

12-21-98
PLANS APPROVAL DATE

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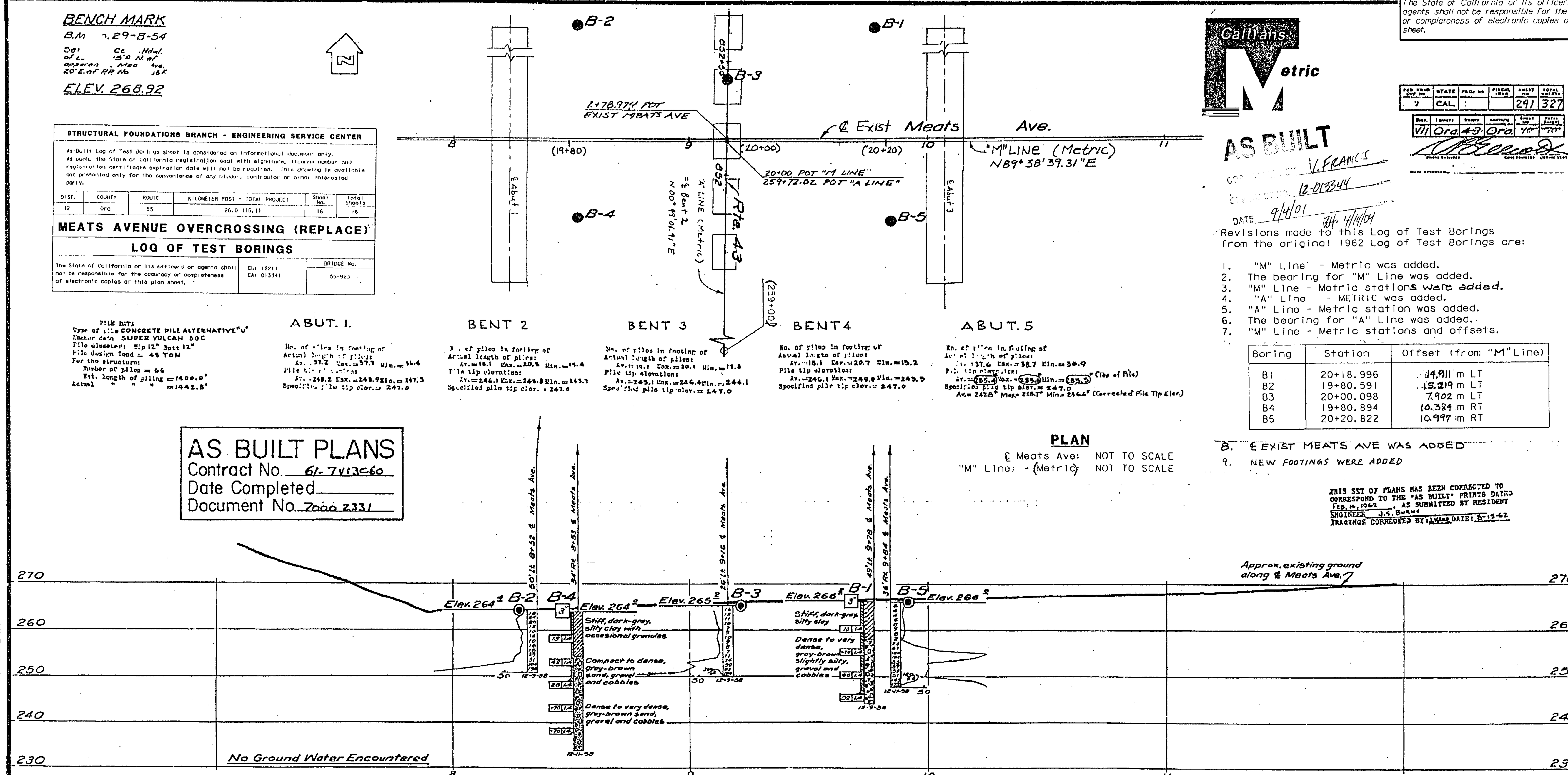
U-0269(9)
F-0269(10)



STRUCTURAL FOUNDATIONS BRANCH - ENGINEERING SERVICE CENTER

As-Built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date will not be required. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST.	COUNTY	ROUTE	KILOMETER POST - TOTAL PROJECT	Sheet No.	Total Sheets
12	Ora	55	26.0 (16.1)	16	16

MEATS AVENUE OVERCROSSING (REPLACE)

LOG OF TEST BORINGS

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CU: 12211
EA: 013341

BRIDGE No. 55-923

PILE DATA
Type of pile CONCRETE PILE ALTERNATIVE "U"
Hammer data SUPER VULCAN 50C
Pile diameter: Tip 12" Butt 12"
Pile design load = 45 TON

AS BUILT PLANS
Contract No. 61-7V13C60
Date Completed
Document No. 7000 2331

AS BUILT
V. FRANCIS
12-013344
DATE 9/4/01
BH. 4/14/04

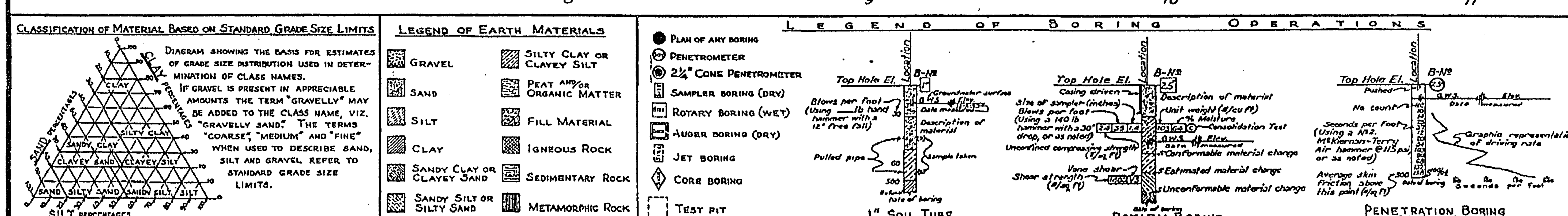
Revisions made to this Log of Test Borings from the original 1962 Log of Test Borings are:

1. "M" Line - Metric was added.
2. The bearing for "M" Line was added.
3. "M" Line - Metric stations were added.
4. "A" Line - METRIC was added.
5. "A" Line - Metric station was added.
6. The bearing for "A" Line was added.
7. "M" Line - Metric stations and offsets.

Boring	Station	Offset (from "M" Line)
B1	20+18.996	14.911 m LT
B2	19+80.591	15.219 m LT
B3	20+00.098	7.902 m LT
B4	19+80.894	10.384 m RT
B5	20+20.822	10.997 m RT

8. ℄ EXIST MEATS AVE WAS ADDED
9. NEW FOOTINGS WERE ADDED

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PRINTS DATED Feb. 14, 1962, AS SUBMITTED BY RESIDENT ENGINEER J.S. Burns
TRACINGS CORRECTED BY: LKing DATE: 6-15-62



NOTES

~~The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.~~

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

Meats Ave. O.C.

LOG OF TEST BORINGS

SCALE Vert: 1"=10' Horiz: 1"=20' | BRIDGE 55-327 | FILE | DRAWING C-6231-10

PREL. DRAWING NO. P-6231 | 10

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE ______ SIGNATURE ______ TITLE ______

SCALE 1"=20'   MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF PUBLIC WORKS - MICROFILM

291

DATE REVISED BY / DATE REVISED
CALCULATED/DESIGNED BY / CHECKED BY
PROJECT ENGINEER
BRIDGE DEPARTMENT
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES

CU 12211   EA 013341

LAST REVISION 00-00-00   DATE PLOTTED => $DATE   TIME PLOTTED => $TIME

BENCH MARK
Elevation 88.250 m
CONTROL POINT HV-55-09 Station 250+38.6 m Offset: 16.3 m Rt
Set "C" nail & tin 1.8 m east of Northbound SR-55 edge of travelled way, +/- 55 m north of the end of bridge over Orange Channel.

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	55	20.3/R28.6	430	481

REGISTERED GEOTECHNICAL ENGINEER

12-21-98
PLANS APPROVAL DATE

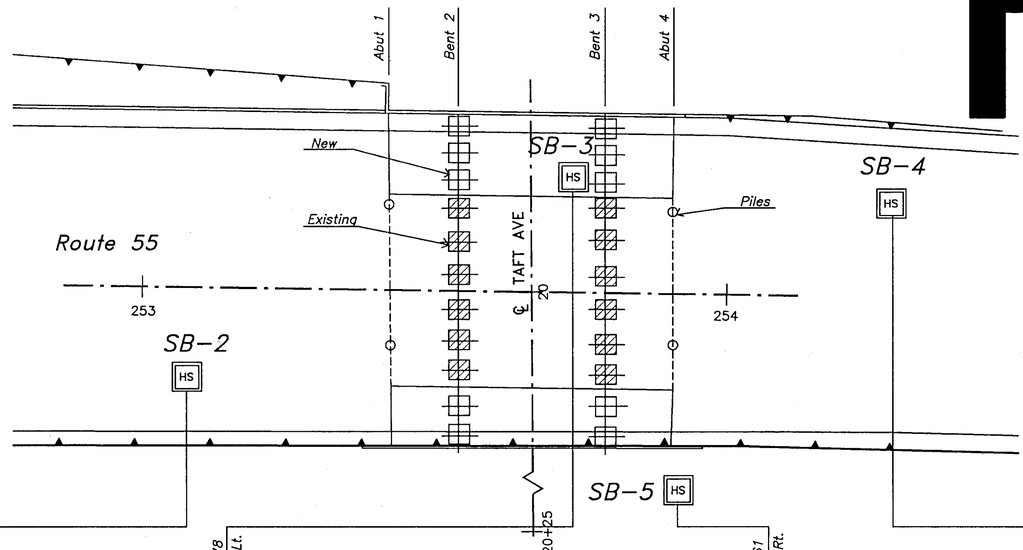
REGISTERED PROFESSIONAL ENGINEER — G. MUKHOPADHYAY — No. 624 — Exp. 3/31/99 — GEOTECHNICAL — STATE OF CALIFORNIA

LEIGHTON & ASSOCIATES, INC
17781 COWAN AVENUE
IRVINE, CA 92714

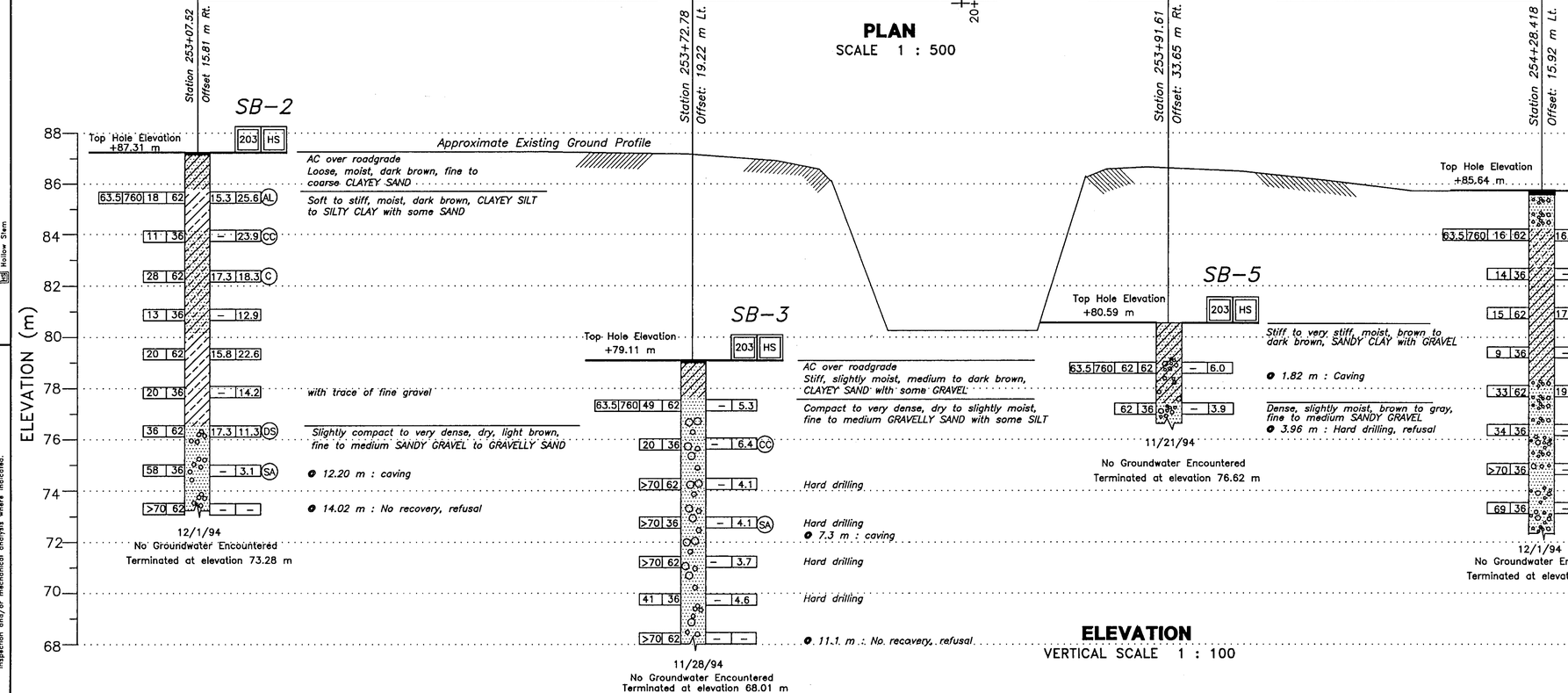
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

AS BUILT
CORRECTED BY V. FRANCIS
CONTRACT NO. 12-013344
DATE 9/4/01 B.H. 4/14/04
NO AS BUILT CHANGES

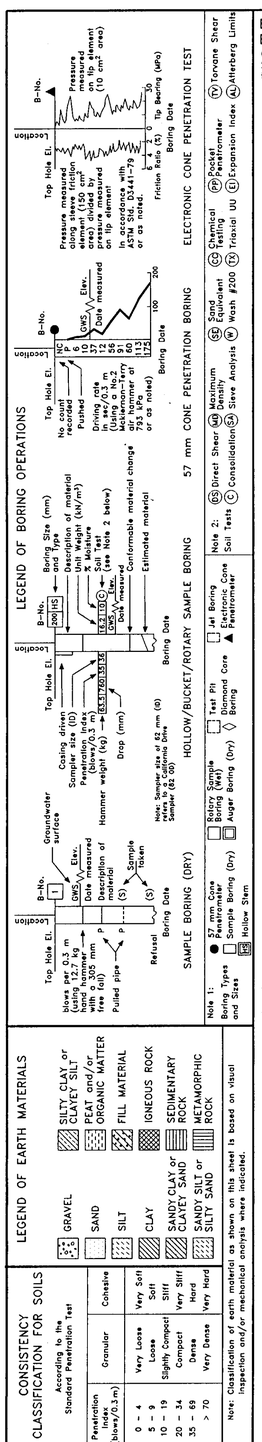
Metric



PLAN
SCALE 1 : 500



ELEVATION
VERTICAL SCALE 1 : 100



DESIGN OVERSIGHT BE NGUYEN	DESIGN	BY S. MALHOTRA	CHECKED K. MARKOUIZOS	A. BHATTACHARYA FIELD INVESTIGATOR	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
SIGN OFF DATE 9-11-96	DETAILS	BY	CHECKED	DATE 11/22/94	S. MALHOTRA PROJECT ENGINEER
	QUANTITIES	BY	CHECKED		

BRIDGE NO.	TAFT AVENUE UNDERCROSSING (WIDEN)
55-326	
KP (PM)	LOG OF TEST BORINGS
25.4 (15.8)	

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 20 40 60 80 100

CU 12211
EA 013341

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY): 7/28/95, 2/13/96, 2/18/96, 4/12/96

SHEET NO. 18 OF 19

K:\2929\PLANS\LOGS\LOTBTAFT.DWG

12-21-98 TO ACCOMPANY PLANS DATED	DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
	12	Ora	55	20.3/R28.6	431	481

Revisions made to this Log of Test Borings from the original 1962 Log of Test Borings are:

1. ("A" Line) - Metric was added.
2. The bearing for "A" Line was added.
3. "A" Line stations were added.
4. (℄ Taft Ave) - METRIC was added.
5. The bearing for ℄ Taft Ave was added.
6. ℄ Taft Ave stations were added.
7. "A" Line - Metric stations and offsets.

Boring	Station	Offset (from "A" Line)
B1	253+59.527	10.363m RT
B2	253+47.335	15.850m LT
B3	253+68.976	5.791m LT
B4	253+69.280	15.545m RT
B5	253+74.157	16.459m LT

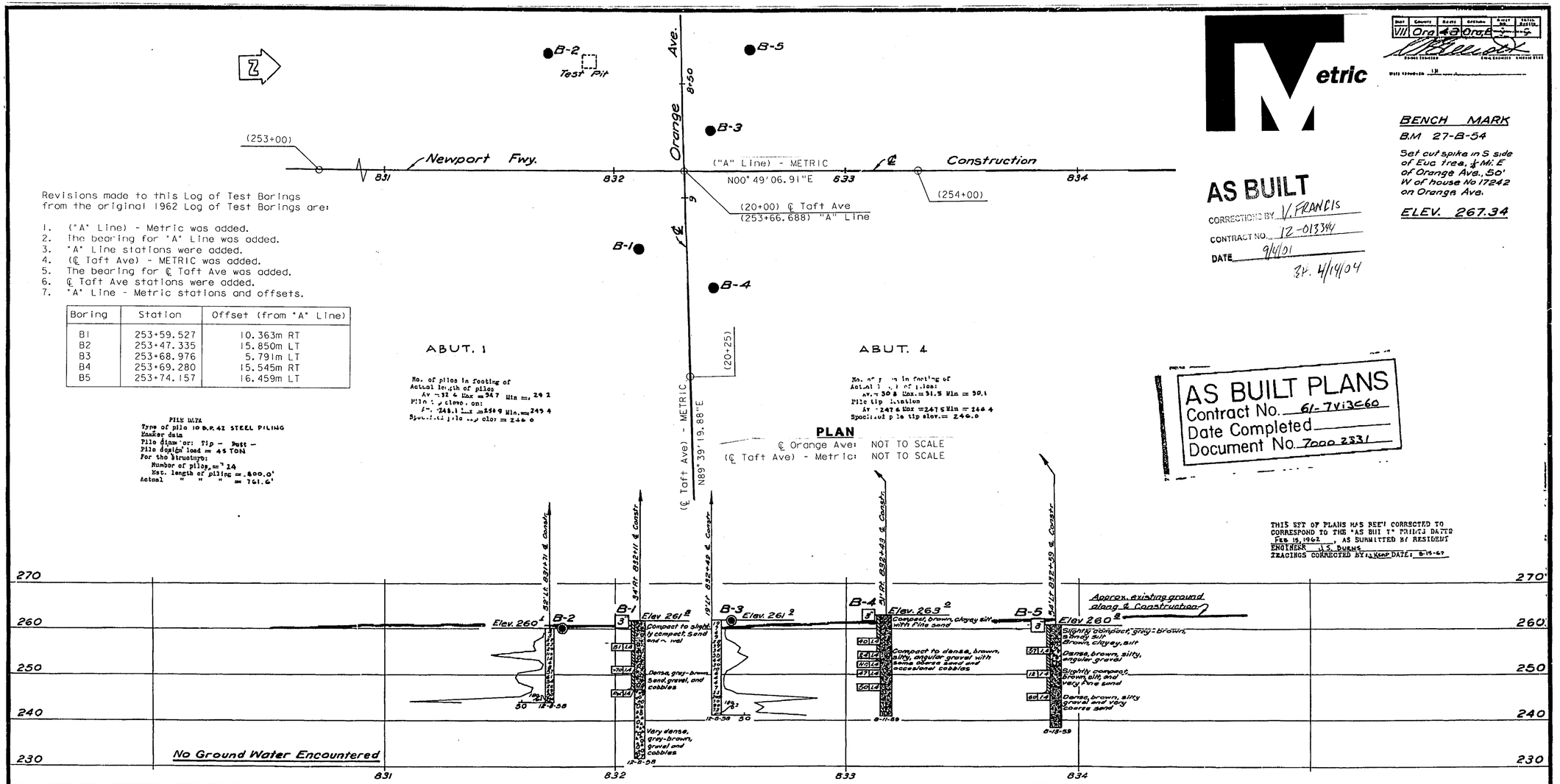
PILE DATA
Type of pile 10 B.P. 42 STEEL PILING
Hammer data
Pile diameter: Tip — Butt —
Pile design load = 45 TON
For the structure:
Number of piles = 14
Max. length of piling = 800.0'
Actual " " " = 761.6'

ABUT. 1

No. of piles in footing of
Actual length of piles
Av. = 32.4 Max. = 34.7 Min. = 29.2
Pile tip elevation:
Av. = 243.1 Max. = 248.9 Min. = 243.4
Specified pile tip elev. = 246.0

ABUT. 4

No. of piles in footing of
Actual length of piles:
Av. = 30.8 Max. = 31.5 Min. = 30.1
Pile tip elevation
Av. = 247.6 Max. = 247.5 Min. = 244.4
Specified pile tip elev. = 246.0



BENCH MARK
BM 27-B-54
Set cut spike in S. side of Eucalyptus, 1/4 Mi. E of Orange Ave., 50' W of house No 17242 on Orange Ave.
ELEV. 267.34

AS BUILT
CORRECTIONS BY V. FRANCIS
CONTRACT NO. 12-013341
DATE 9/4/01
BY 4/14/04

AS BUILT PLANS
Contract No. 61-7V13C60
Date Completed
Document No. 7000 2331

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PRINTS DATED FEB 15, 1962, AS SUBMITTED BY RESIDENT ENGINEER J.S. BURNS
TRACINGS CORRECTED BY [illegible] DATE: 8-15-67

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

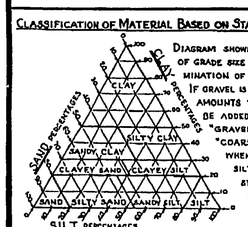


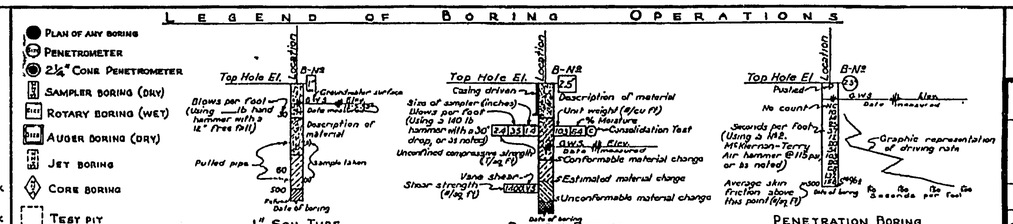
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND". THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

LEGEND OF BORING OPERATIONS

- Plan of any boring
- Penetrometer
- 2½" Cone Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



NOTES

~~The contractor's attention is directed to Section 7, Article (c) of the Standard Specifications and to the Special Provisions concerning this subject.~~

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

Orange Ave. Undercrossing

LOG OF TEST BORINGS

SCALE Vert. 1"=10' Horiz. 1"=20' BRIDGE 55-326 FILE — DRAWING ℄ 230-8

NOTE: ADDITIONAL AS-BUILT FOUNDATION DATA MAY BE AVAILABLE AT THE DIVISION OF NEW TECHNOLOGY, MATERIALS AND RESEARCH 5900 FOLSOM BOULEVARD, SACRAMENTO, CALIFORNIA 95819

	BY	CHECKED
DESIGN	F. KANG	G. SARAH
DETAILS	K. CHONG	G. SARAH
QUANTITIES	T. MORRIS	R. KHALAFBEIGI

DESIGN OVERSIGHT BE NGUYEN 9-16-96 SIGN OFF DATE

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

GREGORY V. BROWN PROJECT ENGINEER

CU 12211
EA 013341

BRIDGE NO.	TAFT AVENUE UNDERCROSSING (WIDEN)
55-326	
KP (PM)	AS-BUILT LOG OF TEST BORINGS
25.4 (15.8)	

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 2/16/95

SHEET 19 OF 19

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests
The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis
Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-5. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

200 Wash
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-6.

Atterberg Limits
Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the USCS. The test results and classifications are shown on Figure B-7.

Direct Shear Tests
Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figures B-8 through B-11.

Expansion Index Tests
The expansion index of selected materials was evaluated in general accordance with ASTM D 4829. Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The results of these tests are presented on Figure B-12.

Sand Equivalent
A sand equivalent (SE) test was performed on a selected representative sample in general accordance with CT 217/American Association of State Highway and Transportation Officials (AASHTO) T 176. The SE value reported on Figure B-13 is the ratio of the coarse- to fine-grained particles in the selected samples.

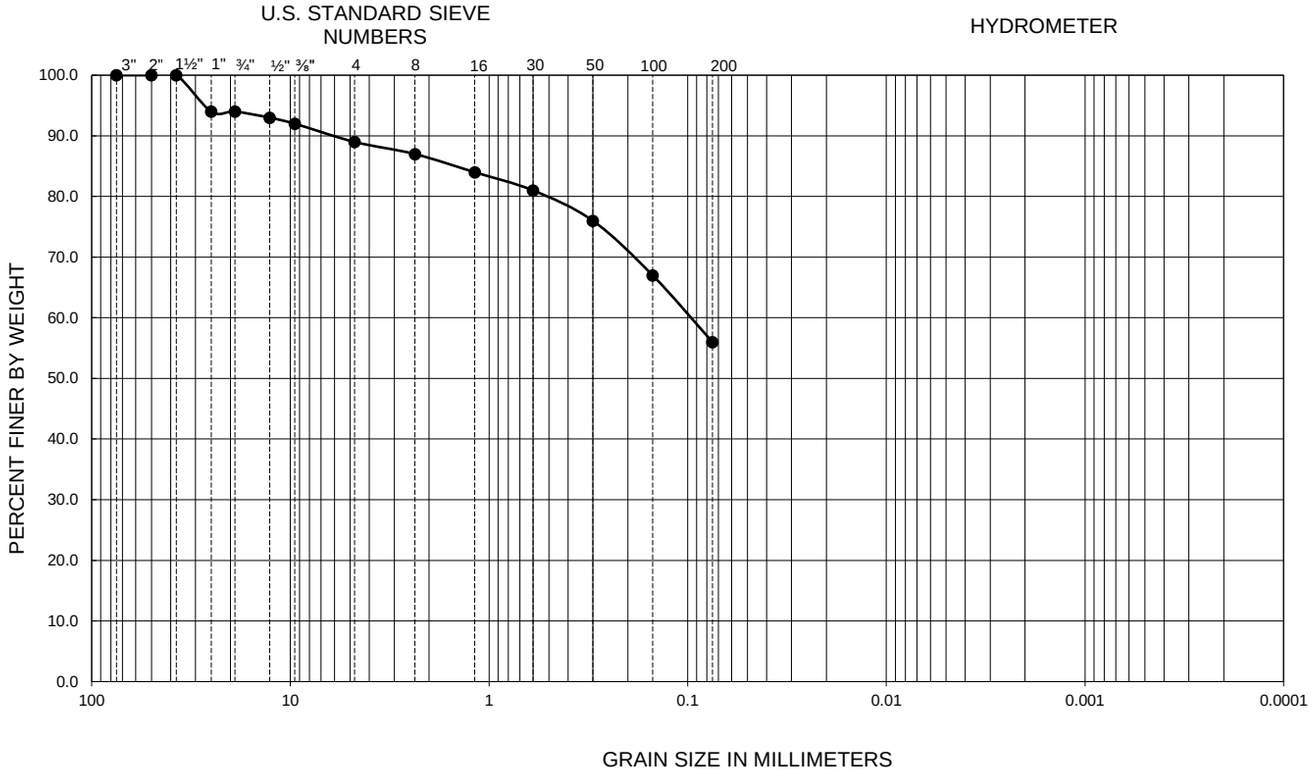
Soil Corrosivity Tests

Soil pH, and resistivity tests were performed on representative soils samples in general accordance with California Test (CT) 643. The soluble sulfate and chloride content of selected samples were evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-14.

R-Value

The resistance value, or R-value, for site soils was evaluated in general accordance with CT 301. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results. The test results are shown on Figure B-15.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-1	1.5-5.0	--	--	--	--	--	--	--	--	56	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

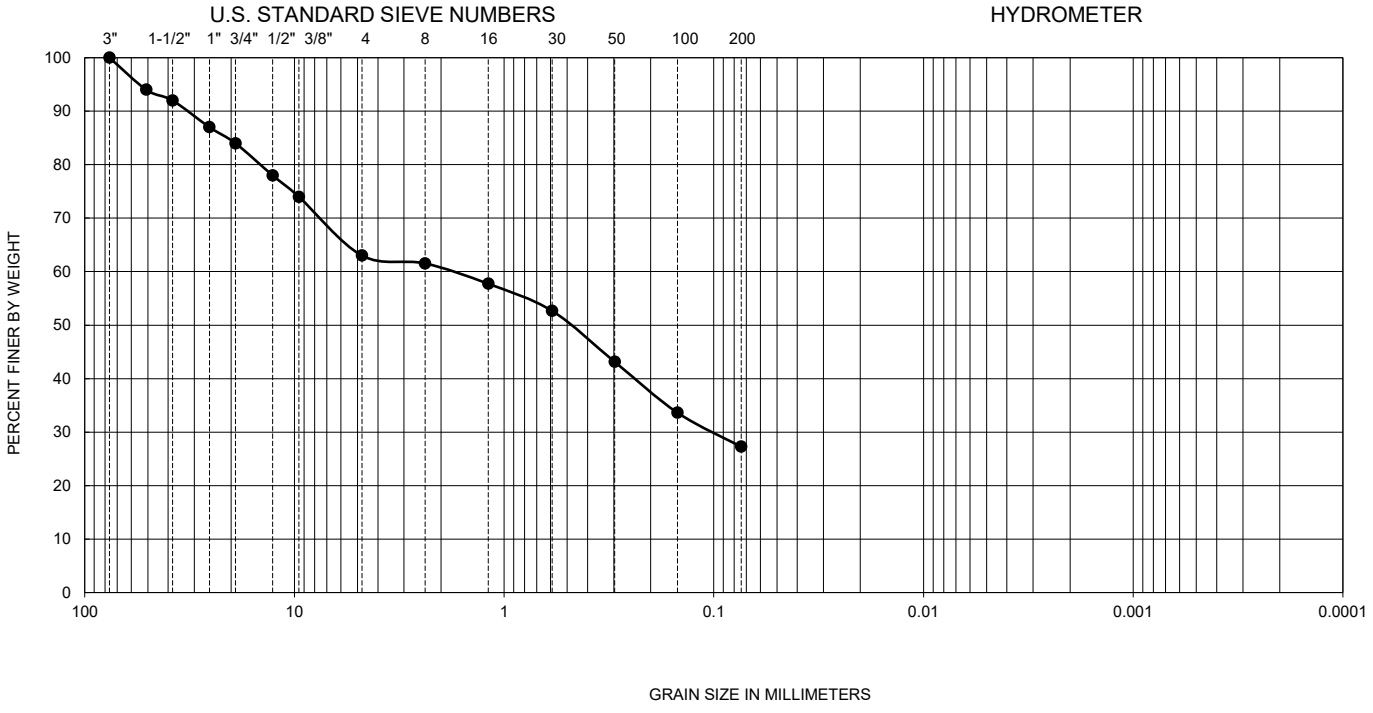
FIGURE B-1

GRADATION TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-8	1.5-5.0	--	--	--	--	--	--	--	--	27	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-2

GRADATION TEST RESULTS

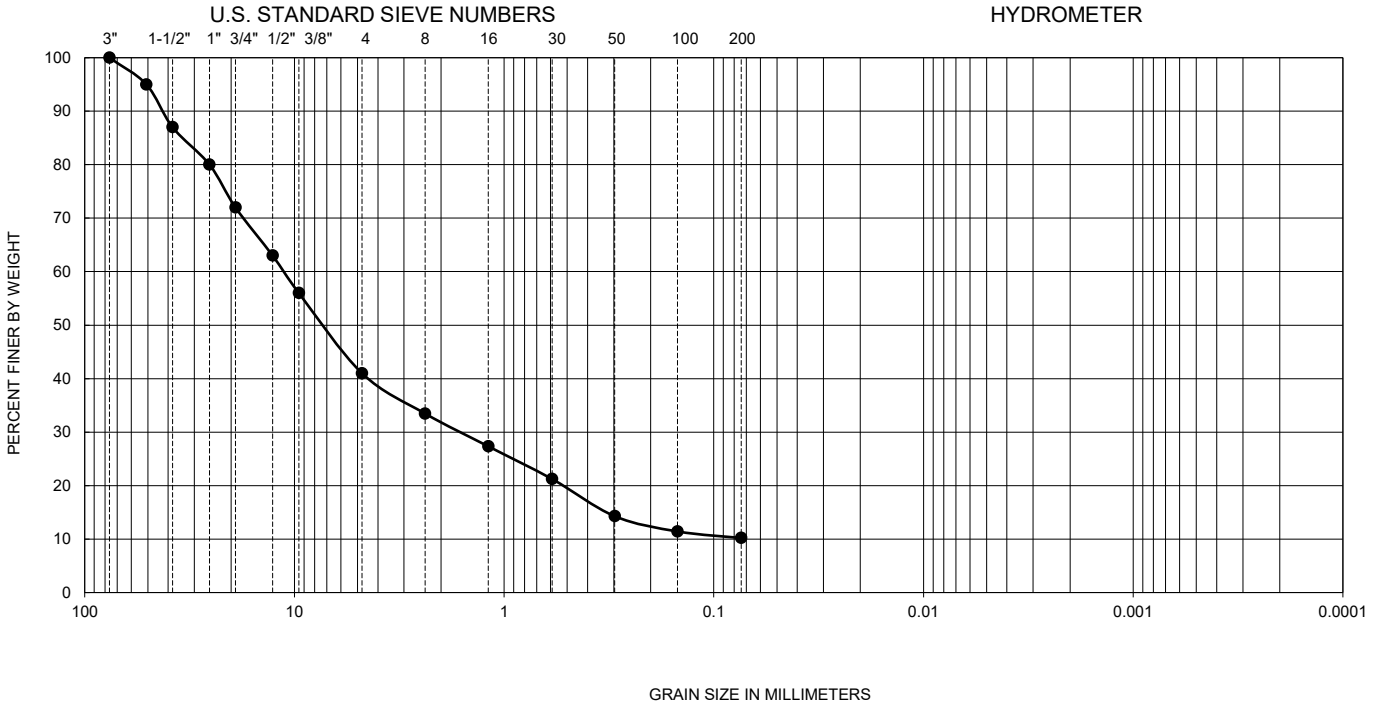
TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

211663001 | 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

211663001 Fig B-2 SPLITSIEVE @ B-8 1.3-5.0

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-14	1.0-5.0	--	--	--	0.07	1.45	11.34	153.2	2.5	10	GP-GC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-3

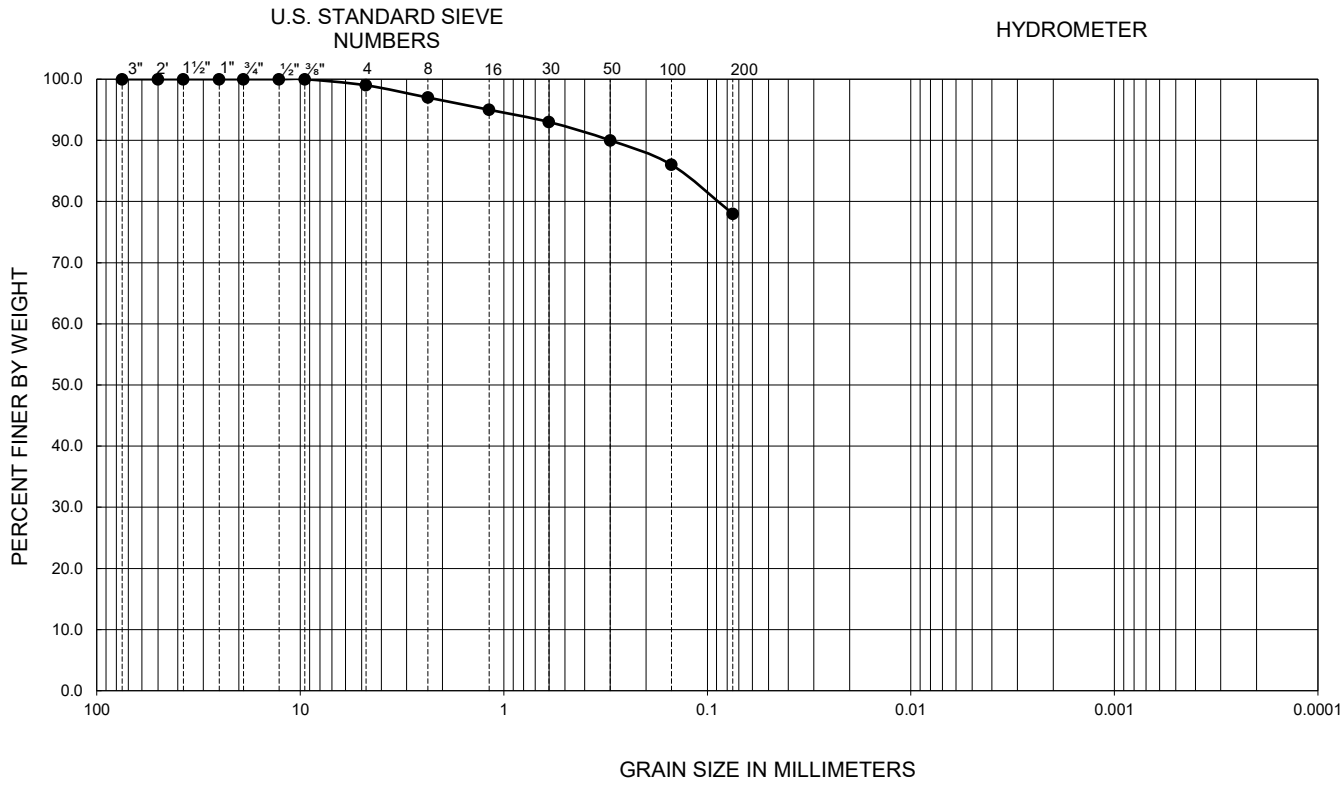
GRADATION TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

211663001 Fig B-3 SPLITSIEVE @ B-14 1.0-5.0

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-16	1.0-5.0	46	15	31	--	--	--	--	--	78	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-4

GRADATION TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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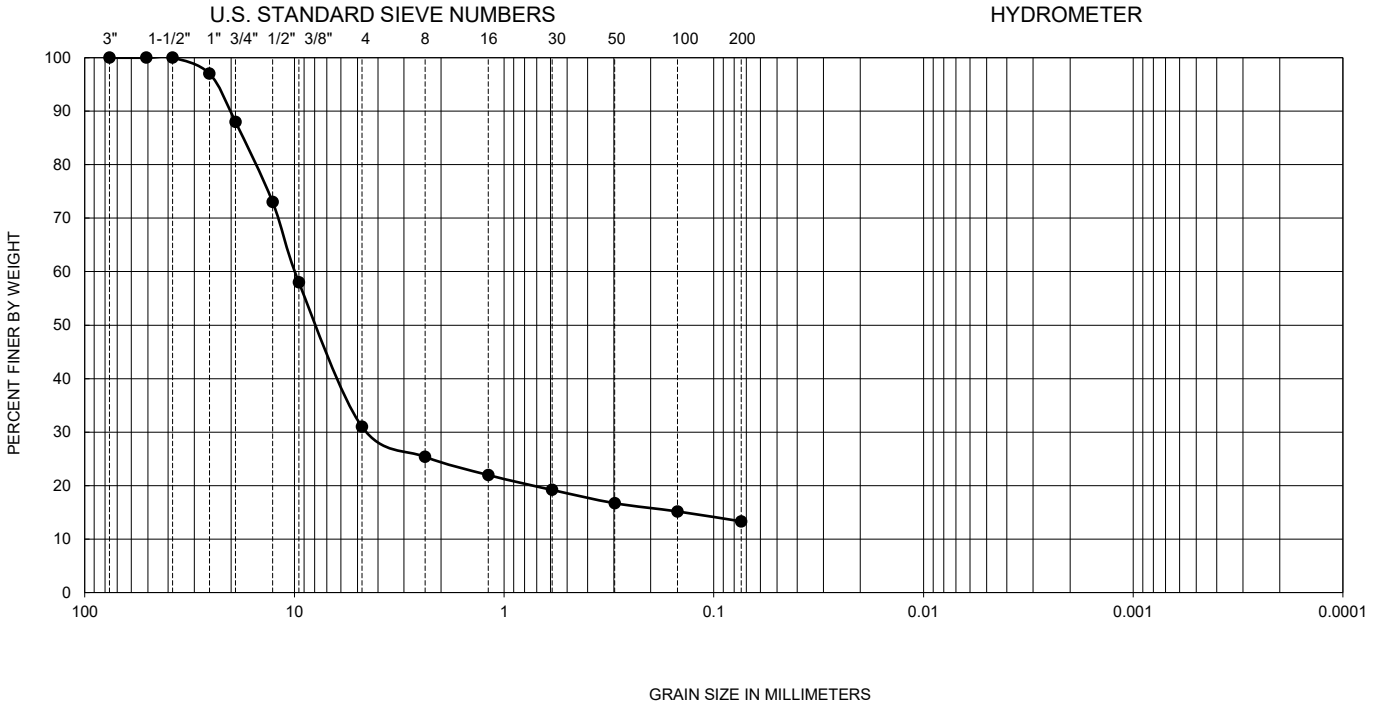
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-16	9.0-15.0	--	--	--	--	--	--	--	--	13	GM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-5

GRADATION TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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211663001 Fig B-5 SPLITSIEVE @ B-16 9.0-15.0

SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-4	1.5-5.0	LEAN CLAY	86	53	CL
B-15	1.0-5.0	LEAN CLAY	99	83	CL
B-17	1.0-5.0	LEAN CLAY	99	71	CL
B-18	9.0-15.0	FAT CLAY	100	86	CH

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE B-6

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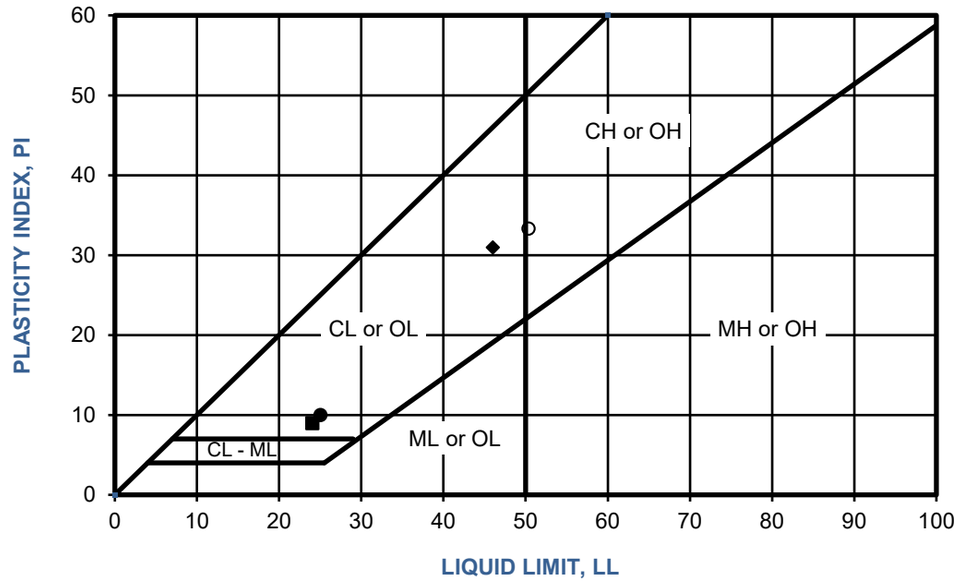
NO. 200 SIEVE ANALYSIS TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-7	1.0-4.5	25	15	10	CL	CL
■	B-11	2.0-3.0	24	15	9	CL	SC
◆	B-16	1.0-5.0	46	15	31	CL	CL
○	B-18	7.0-8.5	50	17	33	CH	CH

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE B-7

ATTERBERG LIMITS TEST RESULTS

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ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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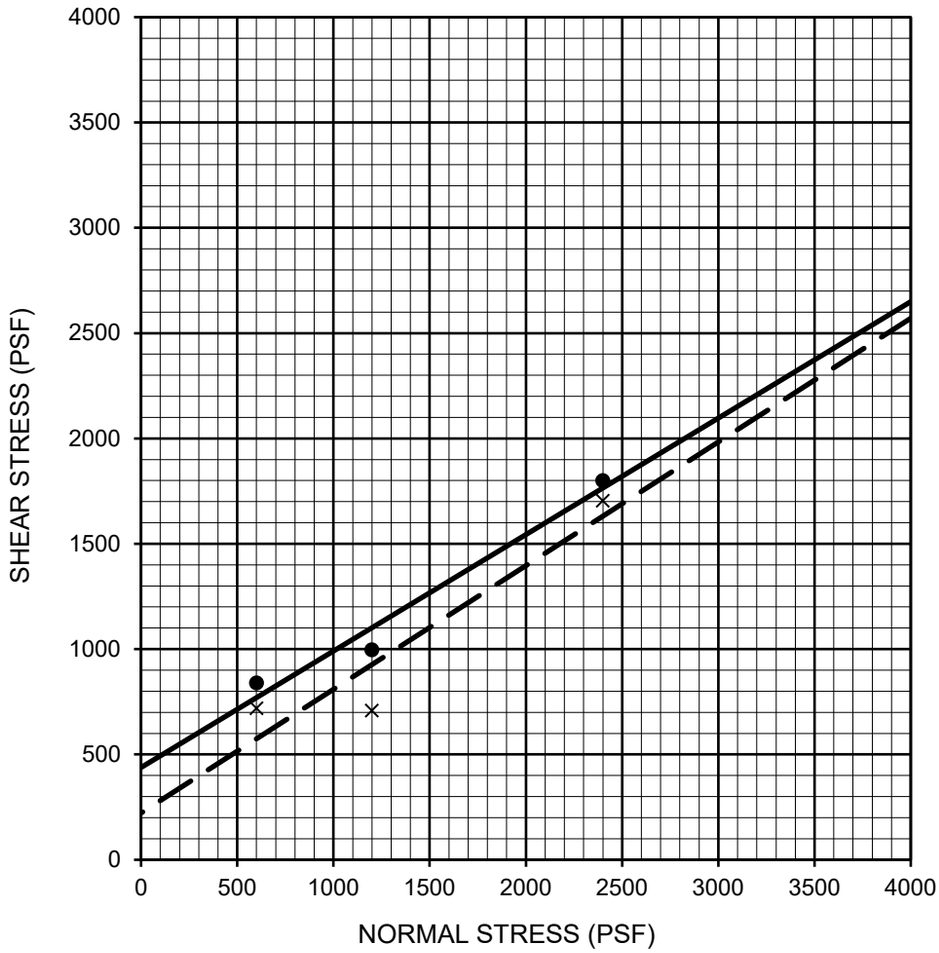

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
LEAN CLAY	—●—	B-2	9.0-10.5	Peak	438	29	CL
LEAN CLAY	– – X – –	B-2	9.0-10.5	Ultimate	222	30	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-8

DIRECT SHEAR TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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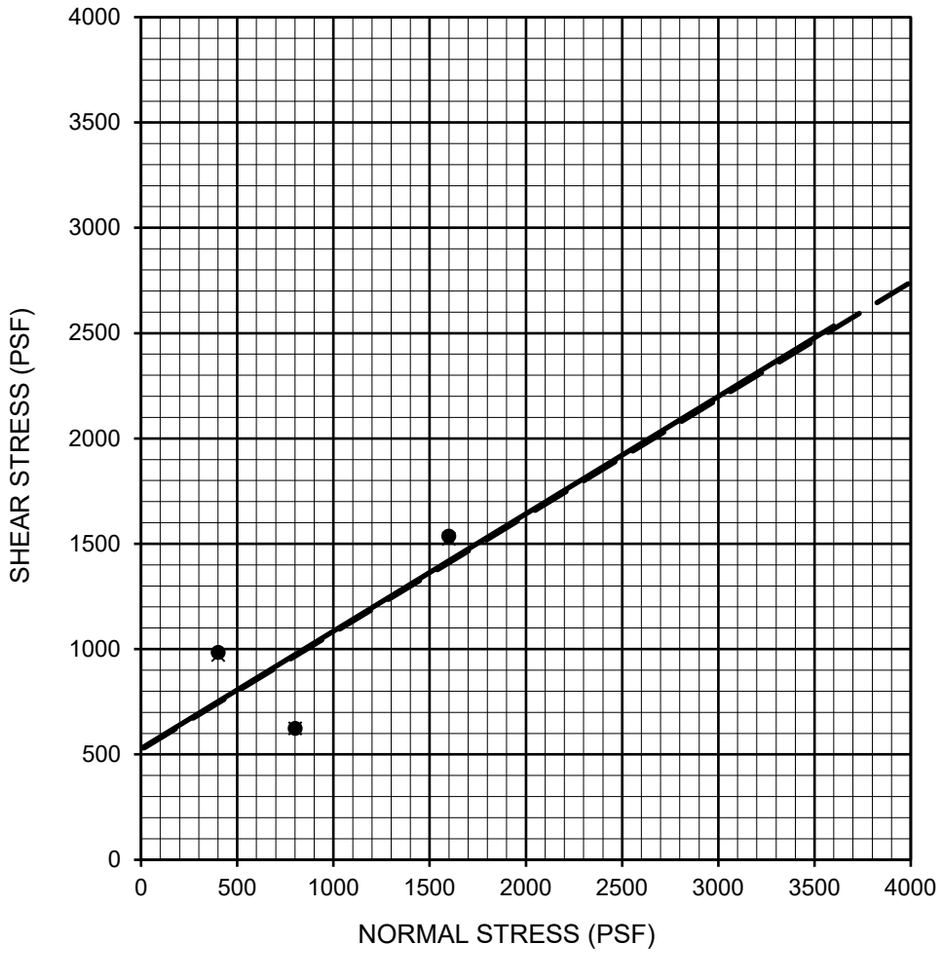

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
CLAYEY SAND	—●—	B-8	5.0-6.5	Peak	528	29	SC
CLAYEY SAND	– – X – –	B-8	5.0-6.5	Ultimate	522	29	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-9

DIRECT SHEAR TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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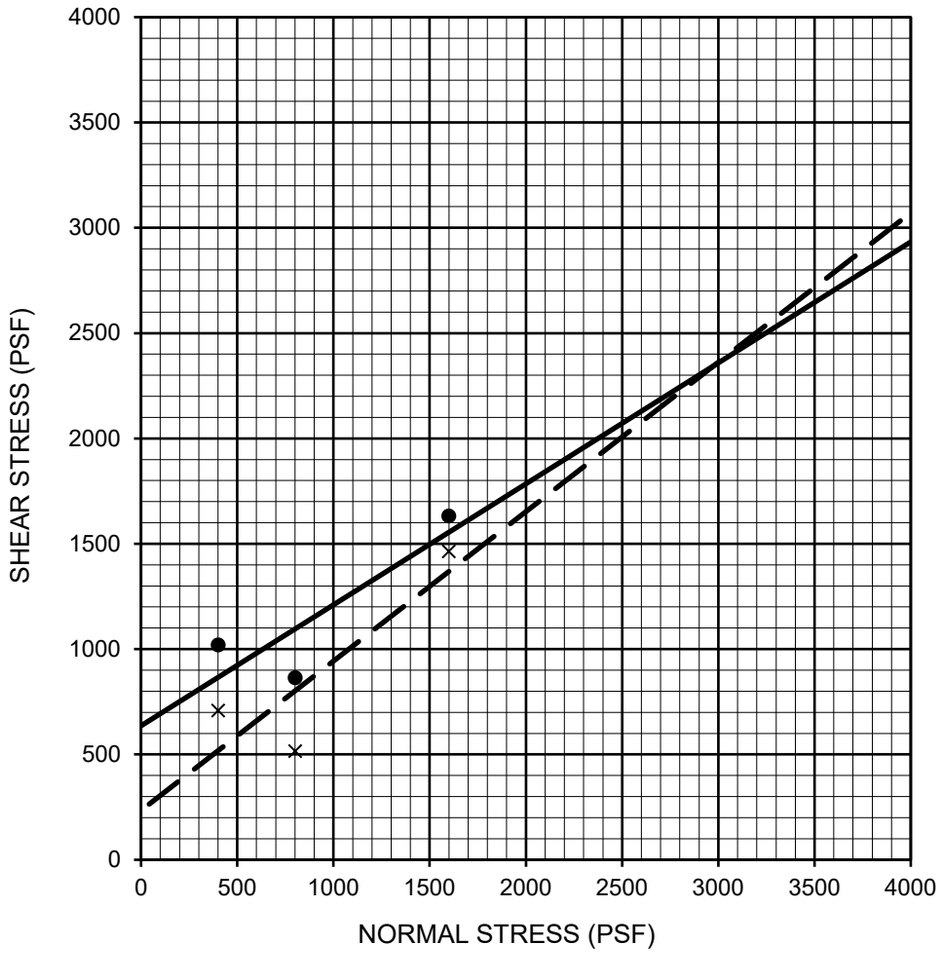

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
LEAN CLAY	—●—	B-16	5.0-6.5	Peak	636	30	CL
LEAN CLAY	– – X – –	B-16	5.0-6.5	Ultimate	234	35	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-10

DIRECT SHEAR TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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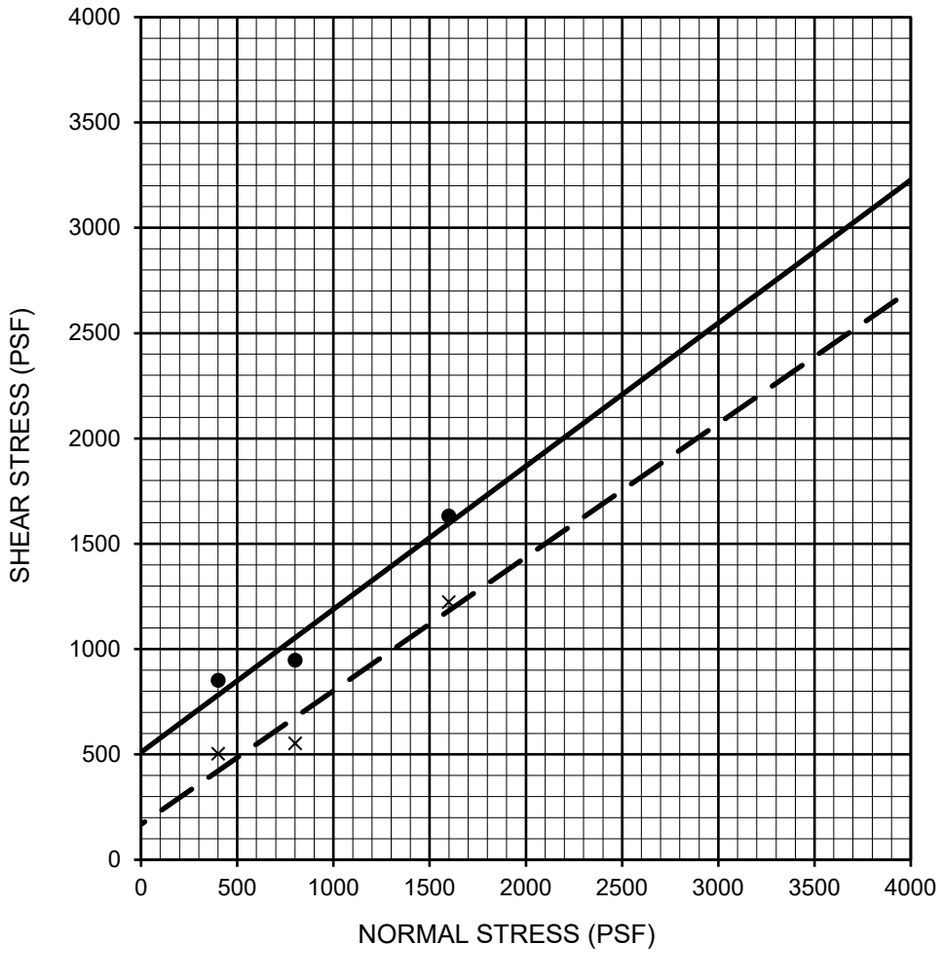

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
LEAN CLAY	—●—	B-20	5.0-6.5	Peak	510	34	CL
LEAN CLAY	– – X – –	B-20	5.0-6.5	Ultimate	168	32	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-11

DIRECT SHEAR TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	INITIAL MOISTURE (percent)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (percent)	VOLUMETRIC SWELL (in)	EXPANSION INDEX	POTENTIAL EXPANSION
B-15	1.0-5.0	13.5	98.0	29.5	0.057	57	Medium
B-18	1.0-5.0	13.2	99.4	27.1	0.028	28	Low

PERFORMED IN GENERAL ACCORDANCE WITH ☐ UBC STANDARD 18-2 ☑ ASTM D 4829

FIGURE B-12

EXPANSION INDEX TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	SOIL TYPE	SAND EQUIVALENT
B-14	1.0-5.0	GP-GC	19
B-16	9.0-15.0	GM	14

PERFORMED IN GENERAL ACCORDANCE WITH AASHTO T176/CT 217

FIGURE B-13

SAND EQUIVALENT VALUE

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [1] (ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-1	9.0-15.0	8.0	1,424	50	0.005	115
B-11	3.0-5.0	7.5	634	30	0.003	50
B-16	1.0-5.0	7.8	596	40	0.004	45
B-18	1.0-5.0	7.5	634	40	0.004	70

[1] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

FIGURE B-14

CORROSIVITY TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

211663001 | 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SAMPLE LOCATION	SAMPLE DEPTH (ft)	SOIL TYPE	R-VALUE
B-1	1.5-5.0	CL	27
B-17	1.0-5.0	CL	6

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844/CT 301

FIGURE B-15

R-VALUE TEST RESULTS

TAFT BRANCH IMPROVEMENTS PROJECT
ORANGE COUNTY SANITATION DISTRICT, ORANGE, CALIFORNIA

211663001 | 6/23

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

APPENDIX C

Analytical Testing

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

27 April 2022

Jennifer Schmidt
Ninyo & Moore
475 Goddard, Ste. 200
Irvine, CA 92618

RE: OCSAN / Taft Sewer Project

Enclosed are the results of analyses for samples received by the laboratory on 04/20/22 10:26. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Taili Iinuma
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-10-0-3.5	T221151-01	Soil	04/07/22 11:38	04/20/22 10:26
B-10-5-6.5	T221151-02	Soil	04/07/22 11:45	04/20/22 10:26
B-10-19-20.5	T221151-03	Soil	04/07/22 13:10	04/20/22 10:26
B-9-7-9	T221151-04	Soil	04/08/22 10:34	04/20/22 10:26
B-8-1.3-2.3	T221151-05	Soil	04/08/22 12:30	04/20/22 10:26
Drum # 1-B-8-B-9-B-10	T221151-06	Soil	04/08/22 12:56	04/20/22 10:26
Drum # 2-B-8-B-9-B-10	T221151-07	Soil	04/08/22 14:00	04/20/22 10:26
Composite 7:1 Drum # 3-B-8-B-9-B-10 - Drum # 9-E	T221151-22	Soil	04/12/22 10:30	04/20/22 10:26
Composite 7:1 Drum # 10-B-14 - Drum # 16-B-20	T221151-23	Soil	04/15/22 11:20	04/20/22 10:26

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

DETECTIONS SUMMARY

Sample ID: B-10-0-3.5 **Laboratory ID:** T221151-01

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**87**	1.0	mg/kg	EPA 6010b	
Chromium	**12**	2.0	mg/kg	EPA 6010b	
Cobalt	**5.9**	2.0	mg/kg	EPA 6010b	
Copper	**12**	1.0	mg/kg	EPA 6010b	
Lead	**5.3**	3.0	mg/kg	EPA 6010b	
Nickel	**9.5**	2.0	mg/kg	EPA 6010b	
Vanadium	**27**	5.0	mg/kg	EPA 6010b	
Zinc	**40**	1.0	mg/kg	EPA 6010b	

Sample ID: B-10-5-6.5 **Laboratory ID:** T221151-02

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**77**	1.0	mg/kg	EPA 6010b	
Chromium	**9.2**	2.0	mg/kg	EPA 6010b	
Cobalt	**5.1**	2.0	mg/kg	EPA 6010b	
Copper	**9.7**	1.0	mg/kg	EPA 6010b	
Lead	**4.5**	3.0	mg/kg	EPA 6010b	
Nickel	**7.6**	2.0	mg/kg	EPA 6010b	
Vanadium	**23**	5.0	mg/kg	EPA 6010b	
Zinc	**34**	1.0	mg/kg	EPA 6010b	

Sample ID: B-10-19-20.5 **Laboratory ID:** T221151-03

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**22**	10	mg/kg	EPA 8015B	D-06
Barium	**61**	1.0	mg/kg	EPA 6010b	
Chromium	**16**	2.0	mg/kg	EPA 6010b	
Cobalt	**4.1**	2.0	mg/kg	EPA 6010b	
Copper	**12**	1.0	mg/kg	EPA 6010b	
Lead	**4.1**	3.0	mg/kg	EPA 6010b	
Nickel	**7.1**	2.0	mg/kg	EPA 6010b	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Sample ID: B-10-19-20.5 **Laboratory ID:** T221151-03

Analyte	Result	Reporting Limit	Units	Method	Notes
Vanadium	**19**	5.0	mg/kg	EPA 6010b	
Zinc	**35**	1.0	mg/kg	EPA 6010b	

Sample ID: B-9-7-9 **Laboratory ID:** T221151-04

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**17**	10	mg/kg	EPA 8015B	D-09
C29-C40 (MORO)	**170**	10	mg/kg	EPA 8015B	D-06
Barium	**68**	1.0	mg/kg	EPA 6010b	
Chromium	**10**	2.0	mg/kg	EPA 6010b	
Cobalt	**5.0**	2.0	mg/kg	EPA 6010b	
Copper	**11**	1.0	mg/kg	EPA 6010b	
Lead	**4.7**	3.0	mg/kg	EPA 6010b	
Nickel	**7.8**	2.0	mg/kg	EPA 6010b	
Vanadium	**21**	5.0	mg/kg	EPA 6010b	
Zinc	**36**	1.0	mg/kg	EPA 6010b	
Acetone	**6.1**	5.0	ug/kg	EPA 8260B	

Sample ID: B-8-1.3-2.3 **Laboratory ID:** T221151-05

Analyte	Result	Reporting Limit	Units	Method	Notes
C29-C40 (MORO)	**23**	10	mg/kg	EPA 8015B	D-06, RE-03
Barium	**84**	1.0	mg/kg	EPA 6010b	
Chromium	**12**	2.0	mg/kg	EPA 6010b	
Cobalt	**6.0**	2.0	mg/kg	EPA 6010b	
Copper	**11**	1.0	mg/kg	EPA 6010b	
Lead	**4.1**	3.0	mg/kg	EPA 6010b	
Nickel	**8.7**	2.0	mg/kg	EPA 6010b	
Vanadium	**27**	5.0	mg/kg	EPA 6010b	
Zinc	**41**	1.0	mg/kg	EPA 6010b	
Acetone	**13**	5.0	ug/kg	EPA 8260B	

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Sample ID: Drum # 1-B-8-B-9-B-10 **Laboratory ID:** T221151-06

Analyte	Result	Reporting Limit	Units	Method	Notes
C13-C28 (DRO)	**23**	10	mg/kg	EPA 8015B	
C29-C40 (MORO)	**310**	10	mg/kg	EPA 8015B	D-06
Barium	**65**	1.0	mg/kg	EPA 6010b	
Chromium	**12**	2.0	mg/kg	EPA 6010b	
Cobalt	**4.9**	2.0	mg/kg	EPA 6010b	
Copper	**13**	1.0	mg/kg	EPA 6010b	
Lead	**5.3**	3.0	mg/kg	EPA 6010b	
Nickel	**8.1**	2.0	mg/kg	EPA 6010b	
Vanadium	**24**	5.0	mg/kg	EPA 6010b	
Zinc	**41**	1.0	mg/kg	EPA 6010b	
Acetone	**10**	5.0	ug/kg	EPA 8260B	

Sample ID: Drum # 2-B-8-B-9-B-10 **Laboratory ID:** T221151-07

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**96**	1.0	mg/kg	EPA 6010b	
Chromium	**10**	2.0	mg/kg	EPA 6010b	
Cobalt	**6.4**	2.0	mg/kg	EPA 6010b	
Copper	**14**	1.0	mg/kg	EPA 6010b	
Lead	**6.2**	3.0	mg/kg	EPA 6010b	
Nickel	**9.3**	2.0	mg/kg	EPA 6010b	
Vanadium	**26**	5.0	mg/kg	EPA 6010b	
Zinc	**47**	1.0	mg/kg	EPA 6010b	

Sample ID: Composite 7:1 Drum # 3-B-8-B-9-B-1(**Laboratory ID:** T221151-22

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**63**	1.0	mg/kg	EPA 6010b	
Chromium	**11**	2.0	mg/kg	EPA 6010b	
Cobalt	**5.2**	2.0	mg/kg	EPA 6010b	
Copper	**11**	1.0	mg/kg	EPA 6010b	
Lead	**4.9**	3.0	mg/kg	EPA 6010b	
Nickel	**8.3**	2.0	mg/kg	EPA 6010b	
Vanadium	**21**	5.0	mg/kg	EPA 6010b	
Zinc	**39**	1.0	mg/kg	EPA 6010b	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Sample ID: Composite 7:1 Drum # 3-B-8-B-9-B-1C **Laboratory ID:** T221151-22

Analyte	Result	Reporting Limit	Units	Method	Notes
Acetone	**12**	5.0	ug/kg	EPA 8260B	

Sample ID: Composite 7:1 Drum # 10-B-14 - Drum **Laboratory ID:** T221151-23

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**63**	1.0	mg/kg	EPA 6010b	
Chromium	**8.6**	2.0	mg/kg	EPA 6010b	
Cobalt	**3.5**	2.0	mg/kg	EPA 6010b	
Copper	**8.1**	1.0	mg/kg	EPA 6010b	
Nickel	**6.8**	2.0	mg/kg	EPA 6010b	
Vanadium	**17**	5.0	mg/kg	EPA 6010b	
Zinc	**23**	1.0	mg/kg	EPA 6010b	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-0-3.5

T221151-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*93.3 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**87**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**12**	2.0	"	"	"	"	"	"	
Cobalt	**5.9**	2.0	"	"	"	"	"	"	
Copper	**12**	1.0	"	"	"	"	"	"	
Lead	**5.3**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**9.5**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**27**	5.0	"	"	"	"	"	"	
Zinc	**40**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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B-10-0-3.5

T221151-01 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/25/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
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B-10-0-3.5

T221151-01 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/25/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	ND	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75.4-139*		"	"	"	"	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-0-3.5

T221151-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane		*110 %*	*73.1-125*		*22D0308*	*04/19/22*	*04/25/22*	*EPA 8260B*	
Surrogate: Toluene-d8		*95.4 %*	*82.6-117*		*"*	*"*	*"*	*"*	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-5-6.5

T221151-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*96.8 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**77**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	04/26/22	"	
Cadmium	ND	2.0	"	"	"	"	04/26/22	"	
Chromium	**9.2**	2.0	"	"	"	"	"	"	
Cobalt	**5.1**	2.0	"	"	"	"	"	"	
Copper	**9.7**	1.0	"	"	"	"	"	"	
Lead	**4.5**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**7.6**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**23**	5.0	"	"	"	"	"	"	
Zinc	**34**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

SunStar Laboratories, Inc.

Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-5-6.5

T221151-02 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/25/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Taili Iinuma, Project Manager

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-5-6.5

T221151-02 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/25/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	ND	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*106 %*	*75.4-139*		"	"	"	"	

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Taili Iinuma, Project Manager

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-5-6.5

T221151-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane		*106 %*	*73.1-125*		*22D0308*	*04/19/22*	*04/25/22*	*EPA 8260B*	
Surrogate: Toluene-d8		*96.2 %*	*82.6-117*		*"*	*"*	*"*	*"*	

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Taili Iinuma, Project Manager

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-19-20.5

T221151-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	D-06
C29-C40 (MORO)	**22**	10	"	"	"	"	"	"	D-06
Surrogate: p-Terphenyl		*94.9 %*		*65-135*		"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	04/26/22	"	
Arsenic	ND	5.0	"	"	"	"	04/26/22	"	
Barium	**61**	1.0	"	"	"	"	04/26/22	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	04/26/22	"	
Chromium	**16**	2.0	"	"	"	"	04/26/22	"	
Cobalt	**4.1**	2.0	"	"	"	"	04/26/22	"	
Copper	**12**	1.0	"	"	"	"	04/26/22	"	
Lead	**4.1**	3.0	"	"	"	"	04/26/22	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**7.1**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**19**	5.0	"	"	"	"	04/26/22	"	
Zinc	**35**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

SunStar Laboratories, Inc.

Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-19-20.5

T221151-03 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-19-20.5

T221151-03 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	ND	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75.4-139*		"	"	"	"	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-10-19-20.5

T221151-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane	*103 %*		*73.1-125*		*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8	*93.9 %*		*82.6-117*		*"*	*"*	*"*	*"*	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-9-7-9

T221151-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	**17**	10	"	"	"	"	"	"	D-09
C29-C40 (MORO)	**170**	10	"	"	"	"	"	"	D-06
Surrogate: p-Terphenyl		*97.9 %*		*65-135*	"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**68**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**10**	2.0	"	"	"	"	"	"	
Cobalt	**5.0**	2.0	"	"	"	"	"	"	
Copper	**11**	1.0	"	"	"	"	"	"	
Lead	**4.7**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**7.8**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**21**	5.0	"	"	"	"	"	"	
Zinc	**36**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-9-7-9

T221151-04 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-9-7-9

T221151-04 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	**6.1**	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*105 %*	*75.4-139*		"	"	"	"	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-9-7-9

T221151-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane		*102 %*		*73.1-125*	*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8		*97.6 %*		*82.6-117*	*"*	*"*	*"*	*"*	

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Taili Iinuma, Project Manager

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-8-1.3-2.3

T221151-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	RE-03
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	D-06, RE-03
C29-C40 (MORO)	**23**	10	"	"	"	"	"	"	D-06, RE-03
Surrogate: p-Terphenyl		*101 %*	*65-135*		"	"	"	"	*RE-03*
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**84**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	04/26/22	"	
Cadmium	ND	2.0	"	"	"	"	04/26/22	"	
Chromium	**12**	2.0	"	"	"	"	"	"	
Cobalt	**6.0**	2.0	"	"	"	"	"	"	
Copper	**11**	1.0	"	"	"	"	"	"	
Lead	**4.1**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**8.7**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**27**	5.0	"	"	"	"	"	"	
Zinc	**41**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-8-1.3-2.3

T221151-05 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-8-1.3-2.3

T221151-05 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	**13**	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*105 %*	*75.4-139*		"	"	"	"	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

B-8-1.3-2.3

T221151-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane		*104 %*		*73.1-125*	*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8		*90.6 %*		*82.6-117*	*"*	*"*	*"*	*"*	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 1-B-8-B-9-B-10

T221151-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	**23**	10	"	"	"	"	"	"	
C29-C40 (MORO)	**310**	10	"	"	"	"	"	"	D-06
Surrogate: p-Terphenyl		*94.3 %*		*65-135*	"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**65**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**12**	2.0	"	"	"	"	"	"	
Cobalt	**4.9**	2.0	"	"	"	"	"	"	
Copper	**13**	1.0	"	"	"	"	"	"	
Lead	**5.3**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**8.1**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**24**	5.0	"	"	"	"	"	"	
Zinc	**41**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 1-B-8-B-9-B-10

T221151-06 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 1-B-8-B-9-B-10

T221151-06 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	**10**	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.8 %*	*75.4-139*		"	"	"	"	

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Taili Iinuma, Project Manager

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949.297.5020 Phone
949.297.5027 Fax

Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 1-B-8-B-9-B-10

T221151-06 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Dibromofluoromethane	*101 %*		*73.1-125*		*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8	*95.1 %*		*82.6-117*		*"*	*"*	*"*	*"*	

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Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 2-B-8-B-9-B-10

T221151-07 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*94.2 %*		*65-135*	"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**96**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	04/26/22	"	
Cadmium	ND	2.0	"	"	"	"	04/26/22	"	
Chromium	**10**	2.0	"	"	"	"	"	"	
Cobalt	**6.4**	2.0	"	"	"	"	"	"	
Copper	**14**	1.0	"	"	"	"	"	"	
Lead	**6.2**	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**9.3**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**26**	5.0	"	"	"	"	"	"	
Zinc	**47**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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Taili Iinuma, Project Manager

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 2-B-8-B-9-B-10

T221151-07 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 2-B-8-B-9-B-10

T221151-07 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	ND	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*106 %*	*75.4-139*		"	"	"	"	

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Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Drum # 2-B-8-B-9-B-10

T221151-07 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Dibromofluoromethane	*102 %*		*73.1-125*	*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8	*89.0 %*		*82.6-117*	*"*	*"*	*"*	*"*	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 3-B-8-B-9-B-10 - Drum # 9-B-1

T221151-22 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*95.8 %*		*65-135*	"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	04/26/22	"	
Arsenic	ND	5.0	"	"	"	"	04/26/22	"	
Barium	**63**	1.0	"	"	"	"	04/26/22	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	04/26/22	"	
Chromium	**11**	2.0	"	"	"	"	04/26/22	"	
Cobalt	**5.2**	2.0	"	"	"	"	04/26/22	"	
Copper	**11**	1.0	"	"	"	"	04/26/22	"	
Lead	**4.9**	3.0	"	"	"	"	04/26/22	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**8.3**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**21**	5.0	"	"	"	"	04/26/22	"	
Zinc	**39**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 3-B-8-B-9-B-10 - Drum # 9-B-1

T221151-22 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 3-B-8-B-9-B-10 - Drum # 9-B-1

T221151-22 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	**12**	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75.4-139*		"	"	"	"	

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Taili Iinuma, Project Manager

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 3-B-8-B-9-B-10 - Drum # 9-B-1

T221151-22 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane	*101 %*		*73.1-125*		*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8	*99.0 %*		*82.6-117*		*"*	*"*	*"*	*"*	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 10-B-14 - Drum # 16-B-20

T221151-23 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015B									
C6-C12 (GRO)	ND	10	mg/kg	1	22D0261	04/20/22	04/22/22	EPA 8015B	
C13-C28 (DRO)	ND	10	"	"	"	"	"	"	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*95.5 %*	*65-135*		"	"	"	"	
Metals by EPA 6010B									
Antimony	ND	3.0	mg/kg	1	22D0252	04/19/22	04/26/22	EPA 6010b	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**63**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	2.0	"	"	"	"	"	"	
Chromium	**8.6**	2.0	"	"	"	"	"	"	
Cobalt	**3.5**	2.0	"	"	"	"	"	"	
Copper	**8.1**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	ND	5.0	"	"	"	"	"	"	
Nickel	**6.8**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Vanadium	**17**	5.0	"	"	"	"	"	"	
Zinc	**23**	1.0	"	"	"	"	"	"	
Boron	ND	5.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	22D0262	04/20/22	04/26/22	EPA 7471A Soil	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 10-B-14 - Drum # 16-B-20

T221151-23 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromobenzene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
Bromochloromethane	ND	2.5	"	"	"	"	"	"	
Bromodichloromethane	ND	2.5	"	"	"	"	"	"	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	2.5	"	"	"	"	"	"	
n-Butylbenzene	ND	2.5	"	"	"	"	"	"	
sec-Butylbenzene	ND	2.5	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	2.5	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	2.5	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.5	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	2.5	"	"	"	"	"	"	
Dibromomethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.5	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.5	"	"	"	"	"	"	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 10-B-14 - Drum # 16-B-20

T221151-23 (Soil)

SunStar Laboratories, Inc.

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
cis-1,3-Dichloropropene	ND	2.5	ug/kg	1	22D0308	04/19/22	04/23/22	EPA 8260B	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.5	"	"	"	"	"	"	
Isopropylbenzene	ND	2.5	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
Naphthalene	ND	2.5	"	"	"	"	"	"	
n-Propylbenzene	ND	2.5	"	"	"	"	"	"	
Styrene	ND	2.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	2.5	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	2.5	"	"	"	"	"	"	
Benzene	ND	2.5	"	"	"	"	"	"	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	2.5	"	"	"	"	"	"	
Acetone	ND	5.0	"	"	"	"	"	"	
Methyl ethyl ketone	ND	5.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	5.0	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	5.0	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*108 %*	*75.4-139*		"	"	"	"	

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Composite 7:1 Drum # 10-B-14 - Drum # 16-B-20

T221151-23 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
Volatile Organic Compounds by EPA Method 8260B									
Surrogate: Dibromofluoromethane	*107 %*		*73.1-125*		*22D0308*	*04/19/22*	*04/23/22*	*EPA 8260B*	
Surrogate: Toluene-d8	*90.1 %*		*82.6-117*		*"*	*"*	*"*	*"*	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Extractable Petroleum Hydrocarbons by 8015B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0261 - EPA 3550B GC										
Blank (22D0261-BLK1)				Prepared: 04/20/22 Analyzed: 04/21/22						
C6-C12 (GRO)	ND	10	mg/kg							
C13-C28 (DRO)	ND	10	"							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*96.5*		*"*	*100*		*96.5*	*65-135*			
LCS (22D0261-BS1)				Prepared: 04/20/22 Analyzed: 04/21/22						
C13-C28 (DRO)	450	10	mg/kg	500		89.5	75-125			
Surrogate: p-Terphenyl	*89.3*		*"*	*100*		*89.3*	*65-135*			
LCS Dup (22D0261-BSD1)				Prepared: 04/20/22 Analyzed: 04/21/22						
C13-C28 (DRO)	470	10	mg/kg	500		94.3	75-125	5.21	20	
Surrogate: p-Terphenyl	*93.8*		*"*	*100*		*93.8*	*65-135*			

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Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0252 - EPA 3050B										
Blank (22D0252-BLK1)				Prepared: 04/19/22 Analyzed: 04/26/22						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	5.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
Boron	ND	5.0	"							
LCS (22D0252-BS1)				Prepared: 04/19/22 Analyzed: 04/26/22						
Arsenic	99.5	5.0	mg/kg	100		99.5	75-125			
Barium	102	1.0	"	100		102	75-125			
Cadmium	102	2.0	"	100		102	75-125			
Chromium	101	2.0	"	100		101	75-125			
Lead	99.7	3.0	"	100		99.7	75-125			
Matrix Spike (22D0252-MS1)	**Source: T221139-01**			Prepared: 04/19/22 Analyzed: 04/26/22						
Arsenic	88.2	5.0	mg/kg	100	1.05	87.1	75-125			
Barium	177	1.0	"	100	119	58.3	75-125			QM-05
Cadmium	85.6	2.0	"	100	0.317	85.3	75-125			
Chromium	98.4	2.0	"	100	12.0	86.5	75-125			
Lead	130	3.0	"	100	69.8	60.7	75-125			QM-05

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0252 - EPA 3050B										
Matrix Spike Dup (22D0252-MSD1)	**Source: T221139-01**			Prepared: 04/19/22 Analyzed: 04/26/22						
Arsenic	84.7	5.0	mg/kg	100	1.05	83.7	75-125	3.97	20	
Barium	168	1.0	"	100	119	48.9	75-125	5.46	20	QM-05
Cadmium	83.2	2.0	"	100	0.317	82.9	75-125	2.88	20	
Chromium	90.4	2.0	"	100	12.0	78.5	75-125	8.48	20	
Lead	126	3.0	"	100	69.8	56.5	75-125	3.28	20	QM-05

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0262 - EPA 7471A Soil										
Blank (22D0262-BLK1)				Prepared: 04/20/22 Analyzed: 04/26/22						
Mercury	ND	0.10	mg/kg							
LCS (22D0262-BS1)				Prepared: 04/20/22 Analyzed: 04/26/22						
Mercury	0.362	0.10	mg/kg	0.385		94.0	80-120			
Matrix Spike (22D0262-MS1)	**Source: T221145-01**			Prepared: 04/20/22 Analyzed: 04/26/22						
Mercury	0.416	0.10	mg/kg	0.417	ND	99.9	75-125			
Matrix Spike Dup (22D0262-MSD1)	**Source: T221145-01**			Prepared: 04/20/22 Analyzed: 04/26/22						
Mercury	0.400	0.10	mg/kg	0.397	ND	101	75-125	3.97	20	

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Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0308 - EPA 5030 GCMS										
Blank (22D0308-BLK1)				Prepared: 04/22/22 Analyzed: 04/23/22						
Bromobenzene	ND	2.5	ug/kg							
Bromochloromethane	ND	2.5	"							
Bromodichloromethane	ND	2.5	"							
Bromoform	ND	2.5	"							
Bromomethane	ND	2.5	"							
n-Butylbenzene	ND	2.5	"							
sec-Butylbenzene	ND	2.5	"							
tert-Butylbenzene	ND	2.5	"							
Carbon tetrachloride	ND	2.5	"							
Chlorobenzene	ND	2.5	"							
Chloroethane	ND	2.5	"							
Chloroform	ND	2.5	"							
Chloromethane	ND	2.5	"							
2-Chlorotoluene	ND	2.5	"							
4-Chlorotoluene	ND	2.5	"							
Dibromochloromethane	ND	2.5	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2-Dibromoethane (EDB)	ND	2.5	"							
Dibromomethane	ND	2.5	"							
1,2-Dichlorobenzene	ND	2.5	"							
1,3-Dichlorobenzene	ND	2.5	"							
1,4-Dichlorobenzene	ND	2.5	"							
Dichlorodifluoromethane	ND	2.5	"							
1,1-Dichloroethane	ND	2.5	"							
1,2-Dichloroethane	ND	2.5	"							
1,1-Dichloroethene	ND	2.5	"							
cis-1,2-Dichloroethene	ND	2.5	"							
trans-1,2-Dichloroethene	ND	2.5	"							
1,2-Dichloropropane	ND	2.5	"							
1,3-Dichloropropane	ND	2.5	"							
2,2-Dichloropropane	ND	2.5	"							
1,1-Dichloropropene	ND	2.5	"							
cis-1,3-Dichloropropene	ND	2.5	"							
trans-1,3-Dichloropropene	ND	2.5	"							
Hexachlorobutadiene	ND	2.5	"							
Isopropylbenzene	ND	2.5	"							

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475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0308 - EPA 5030 GCMS										
Blank (22D0308-BLK1)				Prepared: 04/22/22 Analyzed: 04/23/22						
p-Isopropyltoluene	ND	2.5	ug/kg							
Methylene chloride	ND	10	"							
Naphthalene	ND	2.5	"							
n-Propylbenzene	ND	2.5	"							
Styrene	ND	2.5	"							
1,1,2,2-Tetrachloroethane	ND	2.5	"							
1,1,1,2-Tetrachloroethane	ND	2.5	"							
Tetrachloroethene	ND	2.5	"							
1,2,3-Trichlorobenzene	ND	2.5	"							
1,2,4-Trichlorobenzene	ND	2.5	"							
1,1,2-Trichloroethane	ND	2.5	"							
1,1,1-Trichloroethane	ND	2.5	"							
Trichloroethene	ND	2.5	"							
Trichlorofluoromethane	ND	2.5	"							
1,2,3-Trichloropropane	ND	2.5	"							
1,3,5-Trimethylbenzene	ND	2.5	"							
1,2,4-Trimethylbenzene	ND	2.5	"							
Vinyl chloride	ND	2.5	"							
Benzene	ND	2.5	"							
Toluene	ND	2.5	"							
Ethylbenzene	ND	2.5	"							
m,p-Xylene	ND	5.0	"							
o-Xylene	ND	2.5	"							
Acetone	ND	5.0	"							
Methyl ethyl ketone	ND	5.0	"							
Methyl isobutyl ketone	ND	5.0	"							
2-Hexanone (MBK)	ND	5.0	"							
Surrogate: 4-Bromofluorobenzene	*53.6*		"	*50.0*		*107*	*75.4-139*			
Surrogate: Dibromofluoromethane	*51.8*		"	*50.0*		*104*	*73.1-125*			
Surrogate: Toluene-d8	*50.3*		"	*50.0*		*101*	*82.6-117*			

SunStar Laboratories, Inc.

Taili Iinuma, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Volatile Organic Compounds by EPA Method 8260B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 22D0308 - EPA 5030 GCMS										
LCS (22D0308-BS1)				Prepared: 04/22/22 Analyzed: 04/23/22						
Chlorobenzene	48.8	2.5	ug/kg	50.0		97.6	65.2-124			
1,1-Dichloroethene	51.7	2.5	"	50.0		103	60.9-131			
Trichloroethene	50.2	2.5	"	50.0		100	62.1-126			
Benzene	44.9	2.5	"	50.0		89.8	65.3-127			
Toluene	49.2	2.5	"	50.0		98.3	64.3-122			
Surrogate: 4-Bromofluorobenzene	*49.9*		*"*	*50.0*		*99.9*	*75.4-139*			
Surrogate: Dibromofluoromethane	*49.2*		*"*	*50.0*		*98.3*	*73.1-125*			
Surrogate: Toluene-d8	*50.6*		*"*	*50.0*		*101*	*82.6-117*			
Matrix Spike (22D0308-MS1)		**Source: T221168-01**		Prepared: 04/22/22 Analyzed: 04/23/22						
Chlorobenzene	38.8	2.5	ug/kg	50.0	ND	77.7	65.2-125			
1,1-Dichloroethene	47.7	2.5	"	50.0	ND	95.5	60.9-131			
Trichloroethene	41.5	2.5	"	50.0	ND	83.0	62.1-126			
Benzene	39.4	2.5	"	50.0	ND	78.8	65.3-127			
Toluene	36.5	2.5	"	50.0	ND	72.9	64.3-125			
Surrogate: 4-Bromofluorobenzene	*52.3*		*"*	*50.0*		*105*	*75.4-139*			
Surrogate: Dibromofluoromethane	*47.6*		*"*	*50.0*		*95.2*	*73.1-125*			
Surrogate: Toluene-d8	*46.1*		*"*	*50.0*		*92.1*	*82.6-117*			
Matrix Spike Dup (22D0308-MSD1)		**Source: T221168-01**		Prepared: 04/22/22 Analyzed: 04/23/22						
Chlorobenzene	33.9	2.5	ug/kg	50.0	ND	67.8	65.2-125	13.7	20	
1,1-Dichloroethene	40.4	2.5	"	50.0	ND	80.8	60.9-131	16.6	20	
Trichloroethene	37.7	2.5	"	50.0	ND	75.5	62.1-126	9.54	20	
Benzene	33.6	2.5	"	50.0	ND	67.1	65.3-127	16.0	20	
Toluene	34.0	2.5	"	50.0	ND	68.0	64.3-125	7.04	20	
Surrogate: 4-Bromofluorobenzene	*47.9*		*"*	*50.0*		*95.8*	*75.4-139*			
Surrogate: Dibromofluoromethane	*51.7*		*"*	*50.0*		*103*	*73.1-125*			
Surrogate: Toluene-d8	*50.7*		*"*	*50.0*		*101*	*82.6-117*			

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Taili Iinuma, Project Manager

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25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Ninyo & Moore	Project: OCSAN / Taft Sewer Project	
475 Goddard, Ste. 200	Project Number: 211663001	**Reported:**
Irvine CA, 92618	Project Manager: Jennifer Schmidt	04/27/22 15:32

Notes and Definitions

RE-03	Sample was rerun for carry over
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS was within acceptance criteria. The data is acceptable as no negative impact on data is expected.
D-09	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.
D-06	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.

Taili Iinuma, Project Manager

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SunStar Laboratories, Inc.
25712 Commercentre Dr
Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: NINYO & MOORE
Address: 475 GODDARD, SUITE 200
Phone: 949-753-7070 Fax:
Project Manager: JENNIFER SCHMIDT

Date: 4/12/2022 Page: 1 Of 2
Project Name: OCSAN / TAFT SEWER PROJECT
Collector: VICKY MACKINNON Client Project #: 211663001
Batch #: T22115 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 (VOCs)	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals					Laboratory ID #	Comments/Preservative	Total # of containers
B-10_0-3.5	4/7/22	11:38	SOIL	JAR	X							X	X					1		
B-10_5-6.5	4/7/22	11:45	SOIL	JAR	X							X	X					2		
B-10_19-20.5	4/7/22	1:10	SOIL	JAR	X							X	X					3		
B-9_7-9	4/8/22	10:34	SOIL	JAR	X							X	X					4		
B-8_1.3-2.3	4/8/22	12:30	SOIL	JAR	X							X	X					5		
DRUM#1_B-8_B-9_B-10	4/8/22	12:56	SOIL	JAR	X							X	X					6		
DRUM#2_B-8_B9_B-10	4/8/22	2:00	SOIL	JAR	X							X	X					7		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
VAM	4/8/22		4-8-22
	4/20/22		4/20/22
	4/20/22 10:26		4-20-22 10:26

Total # of containers: 7
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold: 1.2°C

Turn around time: STD

Notes

Sample disposal/instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

SunStar Laboratories, Inc.
25712 Commercentre Dr
Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: NINYO & MOORE
Address: 475 GODDARD, SUITE 200
Phone: 949-753-7070 Fax:
Project Manager: JENNIFER SCHMIDT

Date: 4/12/22 Page: 2 Of 2
Project Name: OCSAN / TAFT SEWER PROJECT
Collector: ALLISON PRIZLOW Client Project #: 211663001
Batch #: T22-1151 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260 (VOCs)	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals					Laboratory ID #	Comments/Preservative	Total # of containers
DRUM#3_B-8_B-9_B10	4/12/22	10:30	SOIL	8oz JAR	X							X	X					8		
DRUM#4_B-11	4/12/22	12:55	SOIL	8oz JAR	X							X	X					9		
DRUM#5_B-7	4/13/22	9:55	SOIL	8oz JAR	X							X	X					10		
DRUM#6_B-5_B-8	4/13/22	12:25	SOIL	8oz JAR	X							X	X					11	COMPOSITE	
DRUM#7_B-4	4/13/22	2:00	SOIL	8oz JAR	X							X	X					12		
DRUM#8_B-3_B-2	4/14/22	12:38	SOIL	8oz JAR	X							X	X					13		
DRUM#9_B-1	4/14/22	2:13	SOIL	8oz JAR	X							X	X					14		
DRUM#10_B-14	4/15/22	11:20	SOIL	8oz JAR	X							X	X					15		
DRUM#11_B-15	4/15/22	1:40	SOIL	8oz JAR	X							X	X					16		
DRUM#12_B-16	4/18/22	10:10	SOIL	8oz JAR	X							X	X					17		
DRUM#13_B-17	4/18/22	12:12	SOIL	8oz JAR	X							X	X					18	COMPOSITE	
DRUM#14_B-18	4/18/22	1:55	SOIL	8oz JAR	X							X	X					19		
DRUM#15_B-19	4/19/22	10:45	SOIL	8oz JAR	X							X	X					20		
DRUM#16_B-20	4/19/22	1:10	SOIL	4oz JAR	X							X	X					21		

Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Allison Prizlow	4/20/22 10:20	[signature]	4-20-22 10:26
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time
Relinquished by: (signature)	Date / Time	Received by: (signature)	Date / Time

Total # of containers: 14
Chain of Custody seals Y/N/NA: 0
Seals intact? Y/N/NA: Y
Received good condition/cold: 1.2°

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each X Return to client ___ Pickup ___

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

Rev. 02 Date 07/19
Receiving Form 001

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T22151

Client Name: Ninyo & Moore Project: OCSAN/Taft Sewer Project

Delivered by: ☒ Client ☐ SunStar Courier ☐ GLS ☐ FedEx ☐ UPS

If Courier, Received by: _____ Date/Time Courier Received: _____

Lab Received by: Travis Date/Time Lab Received: 4.20.22 1026

Total number of coolers received: 1 Thermometer ID: SC-1 Calibration due: 8/24/22

Temperature: Cooler #1 1.1	°C +/- the CF (+0.1 °C) = 1.2	°C corrected temperature	
Temperature: Cooler #2	°C +/- the CF (+0.1 °C) =	°C corrected temperature	
Temperature: Cooler #3	°C +/- the CF (+0.1 °C) =	°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)	Within criteria?	☒ Yes ☐ No ☐ N/A	
If NO:			
Samples received on ice?	☐ Yes	☐ No → **Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?	☐ Yes → Acceptable	☐ No → **Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	☐ Yes	☐ No*	☒ N/A
Sample containers intact	☒ Yes	☐ No*	
Sample labels match Chain of Custody IDs	☒ Yes	☐ No*	
Total number of containers received match COC	☒ Yes	☐ No*	
Proper containers received for analyses requested on COC	☒ Yes	☐ No*	
Proper preservative indicated on COC/containers for analyses requested	☒ Yes	☐ No*	☐ N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	☒ **Yes**	☐ **No***	

* Complete Non-Conformance Receiving Sheet if checked

Cooler/Sample Review - Initials and date: BB 4.20.22

Comments:

(949) 297-5020 ■ www.sunstarlabs.com ■ 25712 Commercentre Drive ■ Lake Forest, CA 92630

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PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T221151

Client: Ninyo & Moore
Project: OCSAN / Taft Sewer Project
Project Manager: Taili Iinuma
Project Number: 211663001

Report To:
Ninyo & Moore
Jennifer Schmidt
475 Goddard, Ste. 200
Irvine, CA 92618

Date Due:	04/27/22 17:00 (5 day TAT)		
Received By:	Travis Berner	Date Received:	04/20/22 10:26
Logged In By:	Jennifer Berger	Date Logged In:	04/20/22 10:56

Samples Received at: **1.2°C**

Custody Seals	No	Received On Ice	Yes
Containers Intact	Yes		
COC/Labels Agree	Yes		
Preservation Confirı	No		

Analysis	Due	TAT	Expires	Comments
T221151-01 B-10-0-3.5 [Soil] Sampled 04/07/22 11:38 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/04/22 11:38	
8015 Carbon Chain	04/27/22 15:00	5	04/21/22 11:38	
8260	04/27/22 15:00	5	04/21/22 11:38	
T221151-02 B-10-5-6.5 [Soil] Sampled 04/07/22 11:45 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/04/22 11:45	
8015 Carbon Chain	04/27/22 15:00	5	04/21/22 11:45	
8260	04/27/22 15:00	5	04/21/22 11:45	
T221151-03 B-10-19-20.5 [Soil] Sampled 04/07/22 13:10 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/04/22 13:10	
8015 Carbon Chain	04/27/22 15:00	5	04/21/22 13:10	
8260	04/27/22 15:00	5	04/21/22 13:10	
T221151-04 B-9-7-9 [Soil] Sampled 04/08/22 10:34 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/05/22 10:34	
8015 Carbon Chain	04/27/22 15:00	5	04/22/22 10:34	
8260	04/27/22 15:00	5	04/22/22 10:34	

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

WORK ORDER

T221151

Client: Ninyo & Moore
Project: OCSAN / Taft Sewer Project
Project Manager: Taili Iinuma
Project Number: 211663001

Analysis	Due	TAT	Expires	Comments
T221151-05 B-8-1.3-2.3 [Soil] Sampled 04/08/22 12:30 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/05/22 12:30	
8015 Carbon Chain	04/27/22 15:00	5	04/22/22 12:30	
8260	04/27/22 15:00	5	04/22/22 12:30	
T221151-06 Drum # 1-B-8-B-9-B-10 [Soil] Sampled 04/08/22 12:56 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/05/22 12:56	
8015 Carbon Chain	04/27/22 15:00	5	04/22/22 12:56	
8260	04/27/22 15:00	5	04/22/22 12:56	
T221151-07 Drum # 2-B-8-B-9-B-10 [Soil] Sampled 04/08/22 14:00 (GMT-08:00) Pacific Time (US &				
6010 Title 22	04/27/22 15:00	5	10/05/22 14:00	
8015 Carbon Chain	04/27/22 15:00	5	04/22/22 14:00	
8260	04/27/22 15:00	5	04/22/22 14:00	
T221151-08 Drum # 3-B-8-B-9-B-10 [Soil] Sampled 04/12/22 10:30 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-09 Drum # 4-B-11 [Soil] Sampled 04/12/22 12:55 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-10 Drum # 5-B-7 [Soil] Sampled 04/13/22 09:55 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-11 Drum # 6-B-5-B-8 [Soil] Sampled 04/13/22 12:25 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-12 Drum # 7-B-4 [Soil] Sampled 04/13/22 14:00 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-13 Drum # 8-B-3-B-2 [Soil] Sampled 04/14/22 12:38 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				

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WORK ORDER

T221151

Client: Ninyo & Moore
Project: OCSAN / Taft Sewer Project
Project Manager: Taili Iinuma
Project Number: 211663001

Analysis	Due	TAT	Expires	Comments
T221151-14 Drum # 9-B-1 [Soil] Sampled 04/14/22 14:13 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-15 Drum # 10-B-14 [Soil] Sampled 04/15/22 11:20 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-16 Drum # 11-B-15 [Soil] Sampled 04/15/22 13:40 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-17 Drum # 12-B-16 [Soil] Sampled 04/18/22 10:10 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-18 Drum # 13-B-17 [Soil] Sampled 04/18/22 12:12 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-19 Drum # 14-B-18 [Soil] Sampled 04/18/22 13:55 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-20 Drum # 15-B-19 [Soil] Sampled 04/19/22 10:45 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-21 Drum # 16-B-20 [Soil] Sampled 04/19/22 13:10 (GMT-08:00) Pacific Time (US &				
[NO ANALYSES]				
T221151-22 Composite 7:1 Drum # 3-B-8-B-9-B-10 - Drum # 9-B-1 [Soil] Sampled 04/12/22 10:30 (GMT-08:00) Pacific Time (US &				**Composite samples Drum #3, Drum #4, Drum #5, Drum #6, Drum #7, Drum #8, Drum #9, # 8,9,10,11,12,13,1**
6010 Title 22	04/27/22 15:00	5	10/09/22 10:30	
8015 Carbon Chain	04/27/22 15:00	5	04/26/22 10:30	
8260	04/27/22 15:00	5	04/26/22 10:30	

SunStar Laboratories, Inc.
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WORK ORDER

T221151

Client: Ninyo & Moore
Project: OCSAN / Taft Sewer Project
Project Manager: Taili Iinuma
Project Number: 211663001

Analysis	Due	TAT	Expires	Comments
T221151-23 Composite 7:1 Drum # 10-B-14 - Drum # 16-B-20 [Soil] Sampled 04/15/22 11:20 (GMT-08:00) Pacific Time (US &				**Composite samples Drum #10, Drum #11, Drum #12, Drum #13, Drum #14, Drum #15, Drum #16, # 15,16,17,1**
6010 Title 22	04/27/22 15:00	5	10/12/22 11:20	
8015 Carbon Chain	04/27/22 15:00	5	04/29/22 11:20	
8260	04/27/22 15:00	5	04/29/22 11:20	

Analysis groups included in this work order

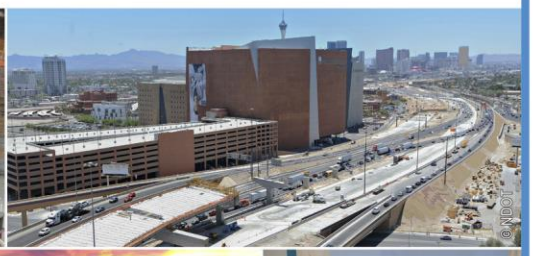
6010 Title 22

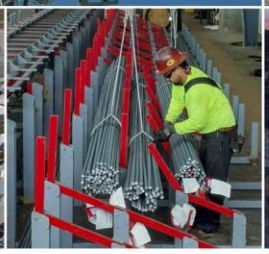
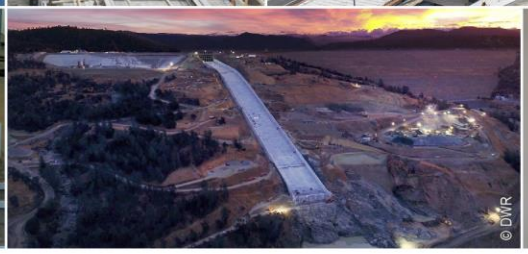
subgroup 6010B T22 7470/71 Hg

Reviewed By

Date



475 Goddard, Suite 200 | Irvine, California 92618 | p. 949.753.7070

ARIZONA | CALIFORNIA | COLORADO | NEVADA | TEXAS | UTAH

ninyoandmoore.com

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

APPENDIX E: NOISE IMPACT ANALYSIS

NOISE IMPACT ANALYSIS

TAFT SEWER IMPROVEMENT PROJECT

CITY OF ORANGE

Lead Agency:

Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92780

Prepared by:

Vista Environmental
1021 Didrickson Way
Laguna Beach, California 92651
949 510 5355
Greg Tonkovich, AICP

Project No. 20106

June 1, 2023

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APPENDICES

LIST OF FIGURES

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Orange
cmu	Concrete masonry unit
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
Ldn	Day-night average noise level
Leq	Equivalent sound level
Lmax	Maximum noise level
OC San	Orange County Sanitation District
ONAC	Federal Office of Noise Abatement and Control
OSB	Oriented Strand Board
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
UMTA	Federal Urban Mass Transit Administration
VdB	Vibration velocity level in decibels

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Taft Sewer Improvement project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise and vibration impacts from the proposed project; and,
- An analysis of long-term operations-related noise and vibration impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located in the City of Orange (City). The project would be located within the existing City right-of-way, along Meats Avenue west from Santiago Boulevard to Breckenridge Street, south along Sacramento Street, west along Taft Avenue (runs under State Route 55), south along Tustin Street, and west along Taft Avenue to Glassell Street. The project site plan is shown in Figure 1.

Orange County Sanitation District Facilities Master Plan

The proposed project has been identified as part of the Collection System Improvements in the Orange County Sanitation District Facilities Master Plan and the associated *Draft Orange County Sanitation District Facilities Master Plan Program Environmental Impact Report* (Facilities Master Plan PEIR), prepared by Dudek, September 2020.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the project site are homes located on both sides of Meats Avenue, Breckenridge Street, Sacramento Street, and on Taft Avenue west of Tustin Street. In addition, there are over a dozen schools and/or faith-based facilities located within one quarter mile of the project site and adjacent to Taft Avenue.

1.3 Proposed Project Description

The existing Taft Branch sewer line is a vitrified clay gravity sewer that varies in size from 12 to 18 inches and was built in 1960. Since that time the area has grown significantly. As identified in the Orange County Sanitation District (OC San) 2019 Master Plan Update (MPU) Report, this sewer line showed a potential risk of sanitary sewer outflows between maintenance holes #SAR250-0280 and #SAR250-0085. The proposed project would provide an overall design solution to increase the capacity of the Taft Branch sewer to convey wet-weather flows and replace 36 maintenance holes to OC San current standards.

The proposed project involves construction and operation of approximately 11,000 linear feet of vitrified clay sewer pipelines (VCP), ranging in size from 18 to 21 inches in diameter, and approximately 500 linear feet of 8-inch service laterals. The project would connect to existing City of Orange sewers at the intersection of Meats Avenue and Santiago Boulevard and would run to the existing OC San sewer at the intersection of Taft Avenue and Glassell Street. The project would abandon approximately 8,000 feet of existing OC San sewer pipeline and construct/replace 39 sanitary sewer maintenance holes.

Pipeline Construction

The proposed 11,000 linear foot pipeline would be placed within the City of Orange right-of-way using a combination of open-trench and trenchless construction methods. The trench width would be 4 – 6 feet, while the depth would range from 8 to 25 feet. The pipeline alignment would be designed to avoid conflict with existing utilities. An additional 12 inches of pavement on each side of the trench would be restored during trenching activities. The contractor would grind and overlay the new paving a lane width or more, depending on exact location where the alignment sits within the street. The width of resurfacing would be up to the nearest lane line or gutter in accordance with the City of Orange Trench Backfill and Roadway Repair Standard Plans.

Construction Schedule

Project construction is anticipated to begin approximately January 2024 and continue until December 2025. Construction would include the following four phases:

- Mobilization/utility potholing – January 2024 to April 2024
- Trenching/Pipeline/Maintenance Hole installation – May 2024 to June 2025. The pipelines would be constructed at an average rate of 50 linear feet per day, depending on the conditions, extent of existing utilities and traffic control, and permitted work hours. Maintenance holes would be constructed by a second crew following behind the pipeline installation. Therefore, the total duration of construction for the pipeline is estimated to last approximately 12 months.
- Final Paving/Restoration – July 2025 to October 2025
- Demobilization – November/December 2025

Construction of each pipeline segment would proceed in the following sequence with average invert depth shown in Table A.

Table A – Proposed Construction Sequence

Segment	Location	Activity	Length (LF)	Invert Depth (ft)	Construction Hours
1	Taft Ave (west)/ Glassell Street	Replace (E) 15-inch SS with 21-inch SS	1,150	17	Day-time, Monday – Friday, 8:30 a.m. – 4:30 p.m.
2	Taft Ave (west)/ Cambridge Street	Replace (E) 15-inch SS with 21-inch SS	1,450	16	Day-time, Monday – Friday, 8:30 a.m. – 4:30 p.m.
3	Taft Ave / Tustin St	Construct (N) 21-inch SS	2,500	13	Day-time, Monday – Friday, 8:30 a.m. – 4:30 p.m.
4	Tustin St	Replace (E) 18-inch SS with 21-inch SS	500	12	Night-time, Monday – Friday, 9:00 p.m. – 5:00 a.m.
5	Taft Ave (east)	Replace (E) 12-inch SS with 21-inch SS	1,400	23	Day-time, Monday – Friday, 8:30 a.m. – 4:30 p.m.

Segment	Location	Activity	Length (LF)	Invert Depth (ft)	Construction Hours
6	Sacramento St	Construct (N) 18-inch SS	2,300	17	Day-time, Monday – Friday, 8:30 a.m. – 4:30 p.m.
7	Meats Ave	Replace (E) 12-inch SS with 18-inch SS	1,400	13	Day-time, Monday – Friday, 8:30 a.m. – 4:30 p.m.

Equipment Staging

Two construction staging area options are included in this analysis, however, the size, location and number of staging areas would be finalized as part of the pre-construction. For the purposes of this analysis, it was assumed each construction staging area would be up to 200 by 200 feet in size and located in vacant land owned by SCE on Taft Avenue with access to proposed alignment. The two optional located for the staging areas are shown in Figure 1. If the identified staging area options cannot accommodate all equipment storage/staging for the proposed project, the construction contractor may use the Taft Avenue right-of-way for the purpose of storage, staging, and/or pipe stringing. Other existing OC San or City property would be utilized as necessary for staging and intermediate storage for the installation of the sewer pipelines, or the contractor would be responsible for securing suitable temporary equipment storage/staging sites prior to construction.

Operations

The pipeline and maintenance holes would not be associated with additional OC San operations and maintenance (O&M) activities above what is currently occurring with the existing pipeline. Project O&M activities would include inspection and repair, as necessary, of pipeline and maintenance holes.

1.4 Executive Summary

Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City of Orange and State of California.

City of Orange Noise Regulations

The following lists the noise and vibration regulations from the Municipal Code that are applicable, but not limited to the proposed project.

- Section 8.24.040 Exterior Noise
- Section 8.24.050(E) Construction Noise Exemptions

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 2700-27207 – On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 – Off-Road Vehicle Noise Limits

Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

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?

Potentially significant impact. Mitigation Measure Project-MM-NOI-1 has been provided to reduce this impact to less than significant.

Generation of excessive groundborne vibration or groundborne noise levels?

Less than significant impact.

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

No impact.

1.5 Applicable Measures from the Facilities Master Plan PEIR

The proposed project was previously analyzed as part of the Facilities Master Plan PEIR and as such the noise and vibration-related Project Design Features and Mitigation Measures from the Facilities Master Plan PEIR are applicable to the proposed project and are listed below.

PDF-NOI-1

To address construction noise impacts, the Orange County Sanitation District has a process in place as follows:

A. Public outreach is conducted in communities that could be impacted by construction activities so that the public is aware of the work that must be conducted, where the work will occur, and the timing of the proposed work.

B. At least five (5) days prior to the start of construction activities, the Sanitation District will notify the surrounding residents and businesses by mail or other means of distribution. For projects located outside of Plant 1 or Plant 2, the construction contractor will post signs in the project vicinity that identify the Orange County Sanitation District as the project owner and a general contract phone number. Sign location(s) will be identified with local jurisdiction approval.

C. Once work begins, the contractor has the responsibility to address noise and vibration-related complaints.

MM-NOI-1

For Facilities Master Plan (FMP) projects located within 500 feet of noise-sensitive receivers (residences, hotels and motels, educational institutions, libraries, hospitals, and clinics), the following measures shall be implemented:

A. All mobile or fixed noise-producing equipment used on an FMP project that is regulated for noise output by a local, state, or federal agency shall comply with such regulation while in the course of program activity.

B. Construction equipment shall be properly outfitted and maintained with manufacturer-recommended noise-reduction devices to minimize construction-generated noise.

C. Electrically powered equipment shall be used instead of pneumatic or internal-combustion-powered equipment, where feasible.

D. Stationary noise sources such as generators or pumps shall be located at least 100 feet from noise-sensitive land uses as feasible.

E. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.

F. Construction site and haul-road speed limits shall be established and enforced during the construction period.

G. As feasible, the hours of construction, including noise-generating activities and all spoils and material transport, shall be restricted to the time periods and days permitted by the local noise or other applicable ordinances. As necessary, the Sanitation District shall coordinate with the applicable local jurisdiction regarding activities that are not consistent with local ordinances to avoid/minimize impacts.

H. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. Additionally, pursuant to Occupational Safety and Health Act Sections 1926.601(b)(4) and 1926.602(a)(9), a device that uses broadband "white noise" instead of a single-tone alarm may be used if it is shown to be effective.

I. The Orange County Sanitation District or its designees shall coordinate with local jurisdictions and sensitive receptors regarding the proposed FMP to address any potential project-specific noise-related issues prior to commencement of construction activities.

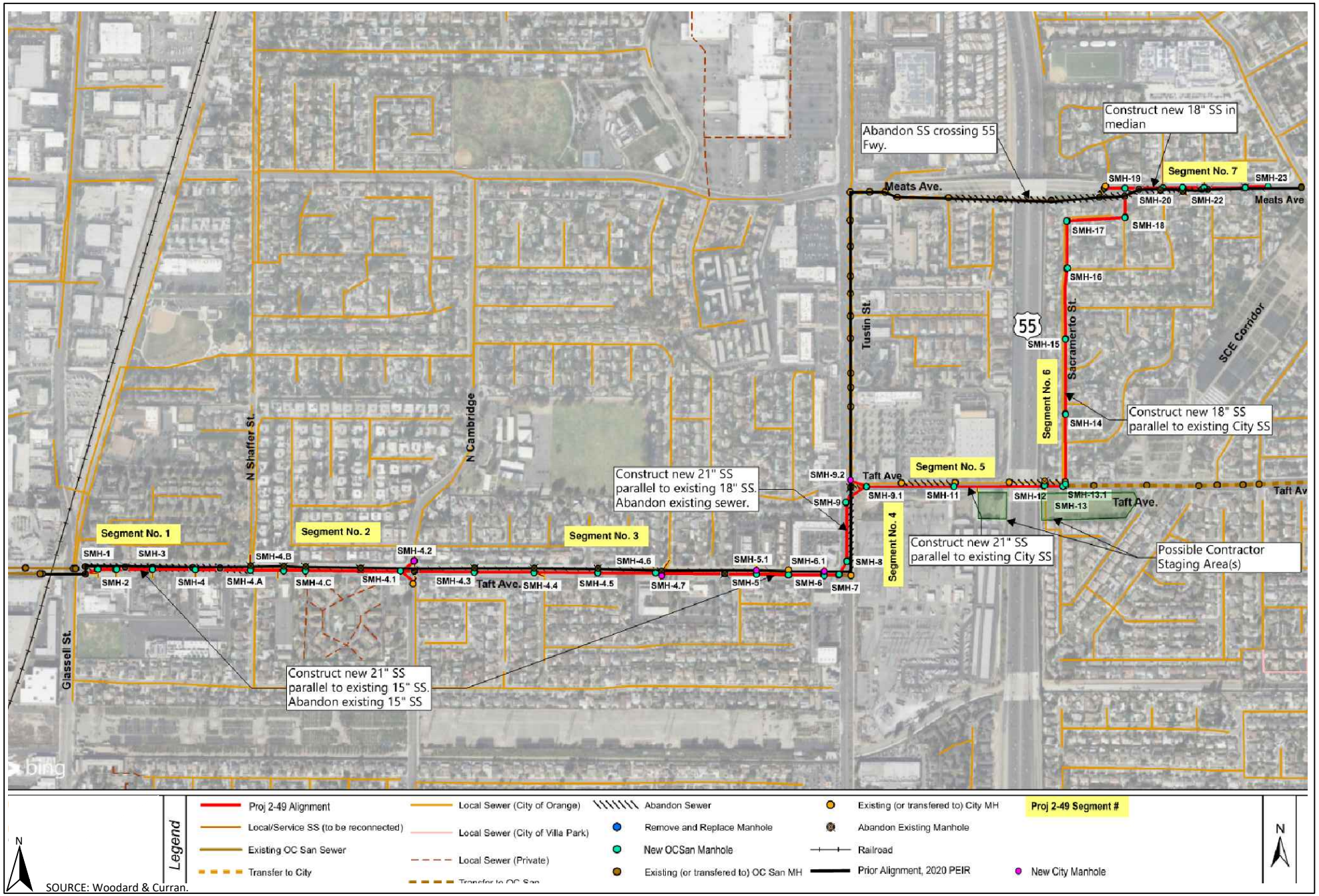
J. Noise-reduction measures such as sound blankets or temporary sound walls shall be used to reduce noise from noise-generating equipment and activities during construction.

1.6 Mitigation Measures for the Proposed Project

This analysis found through adherence to the noise and vibration regulations detailed in Section 1.4 above, adherence to the Facilities Master Plan PEIR measures, and through implementation of the following mitigation measure all noise and vibration impacts would be reduced to less than significant levels.

Project-MM-NOI-1

If the SCE Staging Area located on the east side of State Route 55 is utilized as part of the proposed project, all activities within this Staging Area shall be limited to when construction activities are exempt from the City noise standards as detailed in Section 8.24.050(E) of the City of Orange Municipal Code. No time of day restrictions are placed on the SCE Staging Area located on the west side of State Route 55.



SOURCE: Woodard & Curran.

VISTA ENVIRONMENTAL

Figure 1
Project Site Plan

2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has another addition of 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason, the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Orange relies on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a “pure tone,” there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to “stand out” against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound

from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is "VdB", which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation."

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 REGULATORY SETTING

The project site is located in the City of Orange. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA), which regulates transit noise, while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that provides specific guidance for construction noise. The FTA recommends developing construction noise criteria on a project-specific basis that utilizes local noise ordinances if possible. However, local noise ordinances usually relates to nuisance and hours of allowed activity and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the noise impacts of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings for a general construction noise assessment are provided below in Table B.

Table B – FTA General Assessment Construction Noise Criteria

Land Use	Day (dBA $Leq_{(1\text{-hour})}$)	Night (dBA $Leq_{(1\text{-hour})}$)
Residential	90	80
Commercial	100	100
Industrial	100	100

Source: Federal Transit Administration, 2018.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

California Vehicle Code Section 27200-27207 – On-Road Vehicle Noise

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle.

California Vehicle Section 38365-38380 – Off-Road Vehicle Noise

California Vehicle Code Section 38365-38380 provides noise limits for off-highway motor vehicles operated in California. 92 dBA for vehicles manufactured before 1973, 88 dBA for vehicles manufactured before 1975, 86 dBA for vehicles manufactured before 1986, and 82 dBA for vehicles manufactured after December 31, 1985. All measurements are based at 50 feet from the vehicle.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

The *Transportation- and Construction Vibration Guidance Manual*, prepared by Caltrans, April 2020, provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The City of Orange General Plan and Municipal Code establishes the following applicable policies related to noise and vibration.

City of Orange General Plan

The City of Orange has developed its own land use compatibility standards based on recommended parameters from the California Governor's Office of Planning and Research that rate compatibility. Using the State's land use compatibility guidelines, the City has established interior and exterior noise standards. The City's compatibility standards provide only for normally acceptable conditions based on State recommendations and City land use designations. The City's Land Use Compatibility standards are presented in Table C.

Table C – City of Orange Maximum Allowable Noise Exposure – Transportation Sources

Land Use		CNEL (dBA)	
Land Use Designations	**Uses**	**Interior[1,3]**	**Exterior[2]**
Estate Low Density Residential Low Density Residential Low Medium Density Residential	Single-family, duplex, and multiple-family	45	65
	Mobile home park	N/A	65
Medium Density Residential Neighborhood Mixed-Use Neighborhood Office Professional Old Towne Mixed-use General Commercial Yorba Commercial Overlay Urban Mixed-use Urban Office Professional	Single-family	45	65
	Mobile home park	N/A	65
	Multiple-family, mixed use	45	65[4,5]
	Transient lodging-motels, hotels	45	65
	Sports arenas, outdoor spectator sports	N/A	N/A
	Auditoriums, concert halls, amphitheaters	45	N/A
	Office buildings, business, commercial and professional	50	N/A
Light Industrial Industrial	Manufacturing, utilities, agriculture	N/A	N/A
Public Facilities and Institutions	Schools, nursing homes, day care facilities, hospitals, convalescent facilities, dormitories	45	65

Table C – City of Orange Maximum Allowable Noise Exposure – Transportation Sources

Land Use		CNEL (dBA)	
Land Use Designations	**Uses**	**Interior[1,3]**	**Exterior[2]**
	Government Facilities-offices, fire stations, community buildings	45	N/A
	Places of Worship, Churches	45	N/A
	Libraries	45	N/A
	Utilities	N/A	N/A
	Cemeteries	N/A	N/A
Recreation Commercial Open Space Open Space-Park Open Space-Ridgeline Resource Area	Playgrounds, neighborhood parks	N/A	70
	Golf courses, riding stables, water recreation, cemeteries	N/A	N/A

Notes:

(1) Interior habitable environment excludes bathrooms, closets and corridors.

(2) Exterior noise level standard to be applied at outdoor activity areas; such as private yards, private patio or balcony of a multi-family residence. Where the location of an outdoor activity area is unknown or not applicable, the noise standard shall be applied inside the property line of the receiving land use.

(3) Interior noise standards shall be satisfied with windows in the closed position. Mechanical ventilation shall be provided per Uniform Building Code (UBC) requirements.

(4) Within the Urban Mixed-Use, Neighborhood Mixed-Use, Old Towne Mixed-Use, and Medium Density Residential land use designations, exterior space standards apply only to common outdoor recreational areas.

(5) Within Urban Mixed-Use and Medium Density Residential land use designations, exterior noise levels on private patios or balconies located within 250 feet of freeways (I-5, SR-57, SR-55, SR-22, or SR-241) and Smart Streets and Principal Arterial identified in the Circulation & Mobility Element that exceed 70 dB should provide additional common open space.

N/A=Not Applicable to specified land use category or designation.

Source: City of Orange General Plan Table N-3.

The City's maximum allowable noise exposure levels from stationary sources are defined in Table N-4 of the General Plan and reprinted below in Table D.

Table D – City of Orange Maximum Allowable Noise Exposure – Stationary Sources

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Equivalent Level (Leq), dBA	55	45
Maximum Level (Lmax), dBA	70	65

Notes:

(1) These standards apply to new or existing noise sensitive land uses affected by new or existing non-transportation noise sources, as determined at the outdoor activity area of the receiving land use. However, these noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g. caretaker dwellings).

(2) Each of the noise levels specified above should be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g. caretaker dwellings).

(3) No standards have been included for interior noise levels. Standards construction practices that comply with exterior noise levels identified in this table generally result in acceptable interior noise levels.

(4) The City may impose noise level standards which are more or less restrictive than those specified above based upon determination of existing low or high ambient noise levels. If the existing ambient noise level exceeds the standards listed in Table N-4, then the noise level standards shall be increased at 3 dB increments to encompass the ambient noise environment. Noise level standards incorporating adjustments for existing ambient noise levels shall not exceed a maximum of 70 dB Leq.

Source: City of Orange General Plan Table N-4.

For City analysis of noise impacts and determining appropriate mitigation under the California Environmental Quality Act (CEQA), in addition to the maximum allowable noise level standards outlined in Tables N-3 (Table C above) and N-4 (Table D above) from the General Plan, an increase in ambient noise levels is assumed to be a significant noise impact if a project causes ambient noise levels to exceed the following:

- Where the existing ambient noise level is less than 60 dBA, a project related permanent increase in ambient noise levels of 5 dBA CNEL or greater.
- Where the existing ambient noise level is greater than 65 dBA, a project related permanent increase in ambient noise levels of 3 dBA CNEL or greater.

In addition to the standards provided above, the City of Orange General Plan includes the following goals and policies that are applicable to the proposed project

Goals and Policies

GOAL 2.0: Minimize vehicular traffic noise in residential areas and near noise-sensitive land uses.

Policy 2.2: Encourage coordinated site planning and traffic control measures that minimize traffic noise in noise-sensitive land use areas.

GOAL 7.0: Minimize construction, maintenance vehicle, and nuisance noise in residential areas and near noise-sensitive land uses.

Policy 7.2: Require developers and contractors to employ noise minimizing techniques during construction and maintenance operations.

Policy 7.3: Limit the hours of construction and maintenance operations located adjacent to noise-sensitive land uses.

Policy 7.4: Encourage limitations on the hours of operations and deliveries for commercial, mixed-use, and industrial uses abutting residential zones.

City of Orange Municipal Code

The City of Orange Municipal Code establishes the following applicable standards related to noise.

Section 8.24.020 Definitions.

The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

A. “Ambient noise level” means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

B. “Adjusted ambient noise level” means the measured ambient noise level plus 3 dB (A). Three (3) dB (A) is the industry-accepted threshold of human perceptibility for a change in noise environment.

Section 8.24.040 Exterior Noise Standards.

A. The following noise standards [Table E] for fixed noise sources, unless otherwise specifically indicated, shall apply to all residential property:

Table E – City of Orange Municipal Code Exterior Noise Standards

Standard	Noise Level	Time Period
Hourly Average (L_{eq})	55 dB (A)	7:00 a.m. – 10:00 p.m.
	50 dB (A)	10:00 p.m. – 7:00 a.m.
Maximum Level	70 dB (A)	7:00 a.m. – 10:00 p.m.
	65 dB (A)	10:00 p.m. – 7:00 a.m.

Source: City of Orange Municipal Code Section 8.24.040.

B. It is 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 other residential property to exceed the noise standards identified in Table 8.24.040. For multi-family residential or mixed use developments located within the City's Urban Mixed Use, Neighborhood Mixed Use, Old Towne Mixed Use or Medium Density Residential General Plan land use districts, exterior noise standards shall apply to common recreation areas only and shall not apply to private exterior space (such as a private yard, patio, or balcony)

C. In the event the ambient noise level exceeds the noise standards identified in Table 8.24.040 of this section, the "adjusted ambient noise level" shall be applied as the noise standard. In cases where the noise standard is adjusted due to a high ambient noise level, the noise standard shall not exceed the "adjusted ambient noise level", or 70 dB (A), whichever is less. In cases where the ambient noise level is already greater than 70 dB (A), the ambient noise level shall be applied as the noise standard.

D. Each of the noise limits specified in Table 8.240.040 shall be reduced by five dB(A) for impact or simple tone noises, recurring impulsive noises, or for noises consisting of speech or music. (Ord. No. 1-4 § I, 8-12-14)

8.24.050 Exemptions from Chapter Provisions.

The following activities shall be exempted from the provisions of this chapter:

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Noise generated outside of the hours specified are subject to the noise standards identified in Table 8.24.040;

I. Noise sources associated with the maintenance of real property, provided such activities take place between the hours of 7:00 A.M. and 8:00 P.M. on any day except Sunday or a Federal holiday, or between the hours of 9:00 A.M. and 8:00 P.M. on Sunday or a Federal holiday;

K. Any maintenance or construction activity undertaken by a public agency or utility within street right of way;

L. Mobile noise sources including but not limited to operational noise from trains, or automobiles or trucks traveling on roadways. Transportation noise as related to noise/land use compatibility is subject to the City's General Plan Noise Element;

M. Any activity to the extent regulation thereof has been preempted by State or Federal Law. (Ord. No. 1-4 § I, 8-12-14)

8.24.060 Special Provisions for Schools, Hospitals and Churches.

It is unlawful for any person to create any noise which causes the noise level at any school, hospital, or church, while the same is in use, to exceed the noise limits as specified in Section 8.24.040, or which noise level unreasonably interferes with the use of such institutions. (Ord. No. 1-4 § I, 8-12-14)

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, noise measurements have been taken in the vicinity of the project site. The field survey noted that noise within the proposed project area is generally characterized by vehicle traffic on the nearby roadways, including State Route 55. Since the portion of the sewer line that will be installed in the vicinity of Tustin Street, will occur during the nighttime, 24 hour noise measurements were taken at the nearest sensitive receptors to the Tustin Street portion of the project site. For the rest of the project area where construction would occur during the daytime, short-term noise measurements were taken. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Procedures

Noise Measurement Equipment

24-Hour Noise Measurements

The 24-hour noise measurements were taken using three Larson Davis Model LXT1 Type 1 sound level meters programmed in "slow" mode to record the sound pressure level at 1-second intervals for 24 hours in "A" weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded with the sound level meters. The sound level meters and microphones were mounted on poles and fences in the vicinity of the project site. The noise meters were placed between four and six feet above the ground and were equipped with windscreens during all measurements. The noise meters were calibrated before and after the monitoring using a Larson Davis Cal200 calibrator. All noise level measurement equipment meets American National Standards Institute specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Short-Term Noise Measurements

The short-term noise measurements were taken using a Larson-Davis Model 831 Type 1 precision sound level meter programmed in "slow" mode to record noise levels in "A" weighted form as well as the frequency spectrum of the noise broken down into 1/3 octaves. The sound level meter and microphone were mounted on a tripod five feet above the ground and were equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The unit meets the requirements of ANSI Standard S1.4-1984 and IEC Standard 942: 1988 for Class 1 equipment. All noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Locations

The noise monitoring locations were selected in order to obtain noise levels in the vicinity of the nearest homes to the project site. Descriptions of the noise monitoring sites are provided below in Table F and Table G and are shown in Figure 2. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

24-Hour Noise Measurements

The 24-hour noise measurements were recorded between 9:37 a.m. on Tuesday, April 4, 2023 and 9:54 a.m. on Wednesday, April 5, 2023. At the start of the noise measurements, the sky was clear (no clouds), the temperature was 60 degrees Fahrenheit, the humidity was 31 percent, barometric pressure was 29.79 inches of mercury, and the wind was blowing at an average rate of three miles per hour. Overnight, the temperature dropped to 44 degrees Fahrenheit and the humidity peaked at 75 percent. At the conclusion of the noise measurements, the sky was clear, the temperature was 65 degrees Fahrenheit, the humidity was 37 percent, barometric pressure was 29.82 inches of mercury, and the wind was blowing at an average rate of six miles per hour.

Short-Term Noise Measurements

Each short-term noise measurement was recorded for a 15 minute duration. The short-term noise measurements were recorded between 10:06 a.m. and 11:03 a.m. on Tuesday, April 4, 2023. At the start of the noise measurements, the sky was clear, the temperature was 60 degrees Fahrenheit, the humidity was 31 percent, barometric pressure was 29.79 inches of mercury, and the wind was blowing at an average rate of 3 miles per hour. At the conclusion of the short-term noise measurements, the sky was clear, the temperature was 60 degrees Fahrenheit, the humidity was 26 percent, barometric pressure was 29.77 inches of mercury, and the wind was blowing at an average rate of two miles per hour.

5.2 Noise Measurement Results

24-Hour Noise Measurements Results

The results of the 24-hour noise level measurements are presented in Table F. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table F also shows the daytime Leq and nighttime Leq and the CNEL based on the entire 24-hour measurement time. The CNEL was calculated through use of Equation 2-23 from *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (TeNS), prepared by Caltrans, September 2013. The noise monitoring data printouts are included in Appendix B. Figure 3 shows a graph of the 24-hour noise measurements.

Table F – Existing (Ambient) 24-hour Noise Level Measurements

Site No.	Site Description	Average (dBA L_{eq})		1-hr Average (dBA L_{eq}/Time)		Average (dBA CNEL)
		Daytime[1]	Nighttime[2]	Minimum	Maximum	
L1	Located on a wall on the south side of Taft Avenue (west) that is on shared property line with Firestone Auto Care and home at 1549 Candlewood Avenue, approximately 60 feet south of Taft Avenue centerline.	64.3	62.0	54.0 12:55 a.m.	67.0 2:42 p.m.	69.0
L2	Located on a street light on the north side of Briardale Avenue, approximately 20 feet north of Briardale Avenue centerline and 230 feet west of Tustin Street centerline.	61.4	59.1	50.7 12:55 a.m.	70.9 11:28 a.m.	66.0

Site No.	Site Description	Average (dBA L_{eq})		1-hr Average (dBA L_{eq}/Time)		Average (dBA CNEL)
		Daytime[1]	Nighttime[2]	Minimum	Maximum	
L3	Located on a power pole on the north side of Taft Avenue (east), approximately 30 feet north of Taft Avenue centerline and 55 feet west of Sacramento Street centerline.	69.8	64.0	54.1 1:40 a.m.	72.6 7:00 a.m.	72.1

Notes:
[1] Daytime is defined as 7:00 a.m. to 10:00 p.m. (Section 8.24.040 of the Municipal Code)
[2] Nighttime define as 10:00 p.m. to 7:00 a.m. (Section 8.24.040 of the Municipal Code)
Source: Noise measurements taken between Tuesday, April 4 and Wednesday, April 5, 2023.

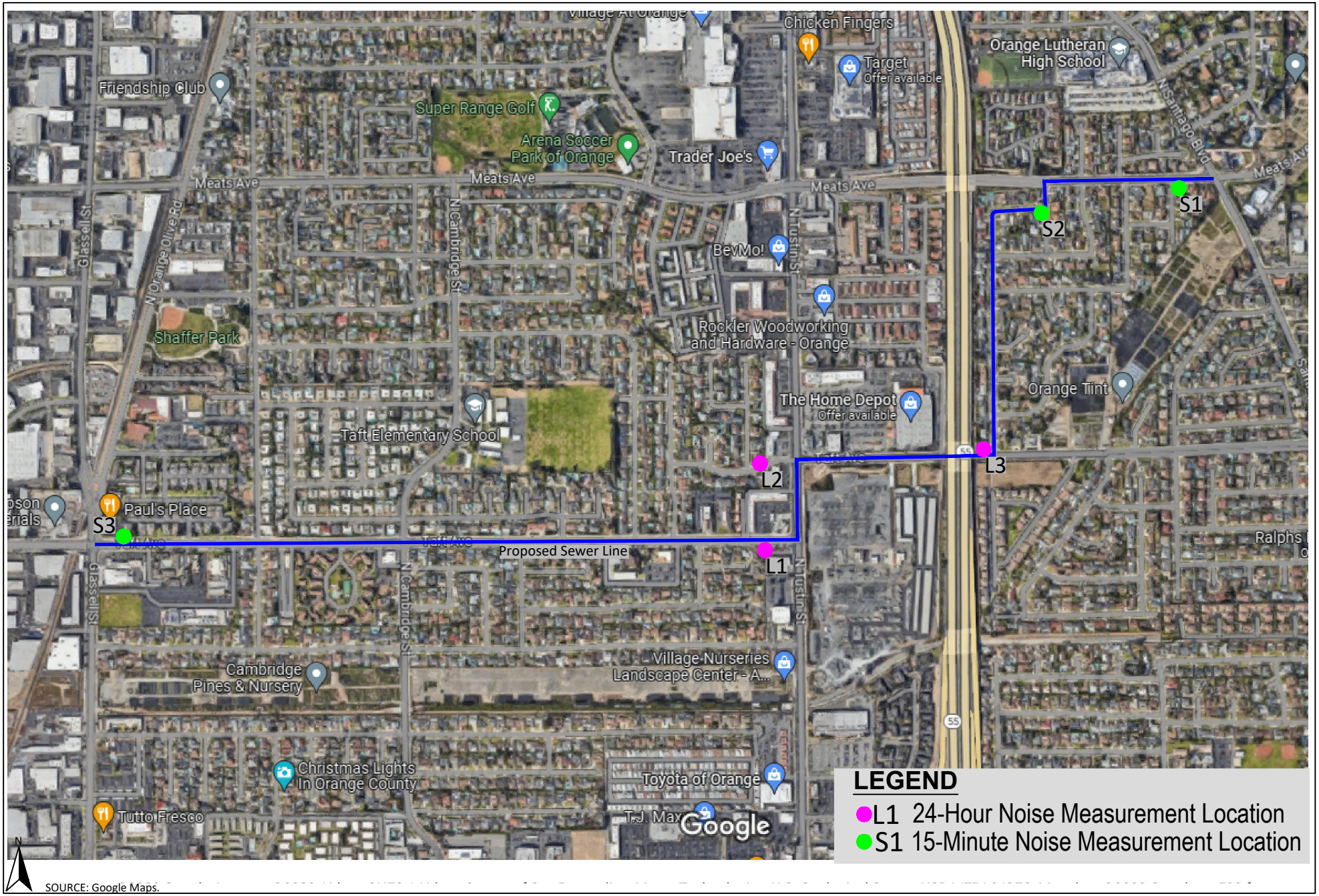
Short-Term Noise Measurements Results

The short-term noise level measurement results are presented in Table F and the noise monitoring data printouts are included in Appendix B.

Table G – Existing (Ambient) Short-Term Noise Level Measurements

Site No.	Description	Primary Noise Sources	Start Time of Measurement	Measured Noise Level	
				dBA Leq	dBA Lmax
S1	Located on the front yard of home at 2087 Mori Lane, approximately 50 feet south of Meats Avenue centerline and 35 feet east of Mori Lane centerline.	Vehicles on Meats Avenue	10:06 a.m.	63.8	74.1
S2	Located on the front yard of home at 2060 Breckenridge Street, approximately 40 feet west of Breckenridge Street centerline and 30 feet south of Sacramento Street centerline.	Vehicles on Breckenridge Street	10:26 a.m.	55.8	75.0
S3	Located on the front yard of home at 131 Taft Avenue, approximately 50 feet north of Taft Avenue centerline and 240 feet east of Glassell Street centerline.	Vehicles on Taft Avenue	10:48 a.m.	62.4	75.3

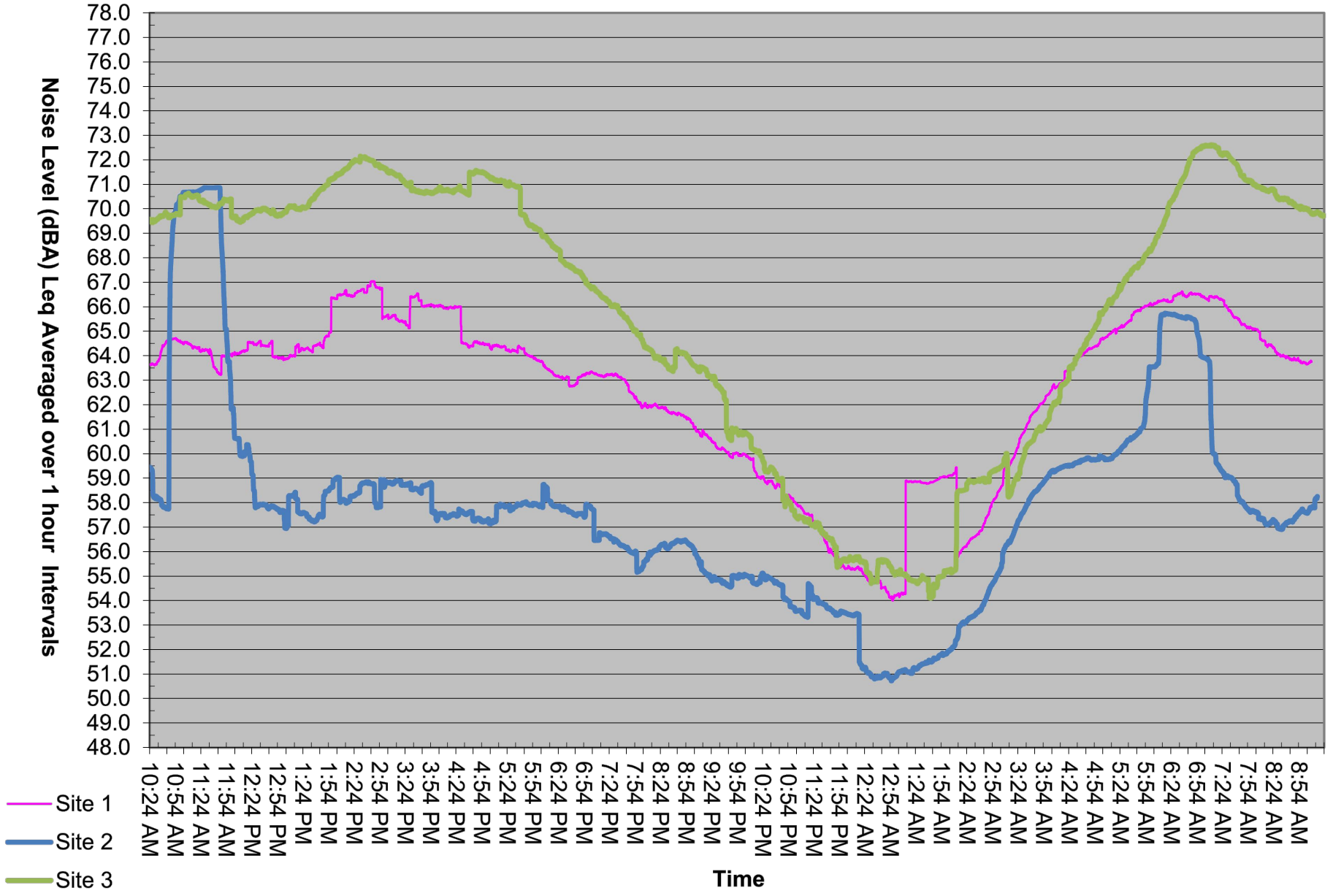
Source: Noise measurements taken on Tuesday, April 4, 2023.



SOURCE: Google Maps.

VISTA ENVIRONMENTAL

Figure 2
Field Noise Measurements Locations



SOURCE: Larson Davis LXT Type 1 Sound Level Meters.

VISTA ENVIRONMENTAL

Figure 3
24-Hour Field Noise Measurements Graph

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table H below provides a list of the construction equipment anticipated to be used during construction of the proposed project.

Table H – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
Backhoe	1	40	80	78
Front End Loader	1	40	80	79
Excavators	1	40	85	81
Crane	1	16	85	81
Drill Rig	1	20	84	79
Utility Truck	1	40	84	74
Water Truck	1	40	84	74
Welder	1	40	73	74
Air Compressor	1	40	80	78
Pump	1	50	77	81
Pickup Truck	2	40	55	75
Dump Truck	2	40	84	76
Concrete/Industrial Saw	1	20	90	83
Pavement Breaker	1	20	90	90
Sweeper	1	10	80	82
Generator	1	50	82	81
Paver	2	50	85	77

Notes:
[1] Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.
[2] Spec 721.560 is the equipment noise level utilized by the RCNM program.
[3] The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.
[4] Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.
Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table H also shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage factors listed in Table H and through use of the RCNM. For each phase of construction, the two noisiest pieces of construction equipment were analyzed based on being placed in the middle of the road, which is based on the analysis methodology detailed in FTA Manual for a General Assessment. As shown in Table H, the two noisiest pieces of equipment would be Concrete/Industrial Saw and Pavement Breaker that would operate in the street right of way. From Table H, the two noisiest pieces of equipment that would be operated in the staging area would be a dump truck and a generator.

The nearest homes to Tustin Street are located behind a row of commercial buildings. According to the TeNS (Caltrans, 2013), the row of commercial buildings would provide 5 dB of noise shielding, which was added to the RCNM model for the receivers located in the vicinity of Tustin Street. In addition, there is an existing 6-foot high cmu wall between the proposed SCE Staging Area on the east side of State Route 55 at the nearest homes to the south. In order to account for the 6-foot cmu wall, 5 dB of shielding was added to the RCNM model.

6.2 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table I gives approximate vibration levels for particular construction activities. The data in Table I provides a reasonable estimate for a wide range of soil conditions.

Table I – Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Federal Transit Administration, 2018.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table I and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table H.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The following section calculates the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the City standards.

Construction-Related Noise

The construction activities for the proposed project are anticipated to include: (1) Mobilization/Utility Potholing; (2) Trenching/Pipeline/Maintenance Hole Installation; (3) Final Paving/Restoration; and (4) Demobilization. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities.

The nearest sensitive receptors to the project site are homes located on both sides of Meats Avenue, Breckenridge Street, Sacramento Street, and on Taft Avenue west of Tustin Street. In addition, there are over a dozen schools and/or faith-based facilities located within one quarter mile of the project site and adjacent to Taft Avenue. However, it should be noted that none of the schools or faith based facilities are located closer than the nearest homes for each analyzed pipeline segment. As such, this analysis has focused on the impacts to the nearest homes.

Since the City provides different noise standards for the pipeline construction activities undertaken within a street right of way and at the proposed staging area on the SCE property, the pipeline construction activities and staging area activities have been analyzed separately below.

<u>Construction Activities within Street Right of Ways</u>

Section 8.24.050(K) of the Municipal Code exempts all maintenance and construction activity undertaken by a public agency within street right of way. The City does not provide any limits to the noise levels that may be created from construction activities that are exempt and even with adherence to the City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby sensitive receptors.

In order to determine if the proposed construction activities would create a significant substantial temporary noise increase, the FTA construction noise criteria thresholds detailed above in Section 4.1 have been utilized, which shows that a significant construction noise impact would occur if construction noise exceeds 90 dBA Leq during the daytime or 80 dBA Leq during the nighttime at any of the nearby sensitive receptors.

Construction noise impacts that occur within the street right of ways to the nearby homes have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1. The results are shown below in Table J and the RCNM printouts are provided in Appendix C.

Table J – Construction Noise Levels Within Street Right of Ways at the Nearby Homes

Pipeline Segment No. - Location - Length (LF)	Time of Construction	Distance to Nearest Home (feet)	Construction Noise Level (dBA Leq)	FTA Construction Noise Standard[1]/ Exceed?
1 - Taft Ave (west)/ Glassell – 1,150	Daytime	65	73	90/No
2 - Taft Ave (west)/ Cambridge St – 1,450	Daytime	60	83	90/No
3 - Taft Ave/Tustin St – 2,500	Daytime	55	84	90/No
4 – Tustin St – 500	Nighttime	220	67	80/No
5 – Taft Ave (east) – 1,400	Daytime	50	85	90/No
6 – Sacramento St – 2,300	Daytime	50	85	90/No
7 – Meats Ave – 1,400	Daytime	50	85	90/No

Notes:
[1] The FTA construction noise standards are shown above in Table B.
Source: RCNM, Federal Highway Administration, 2006 (See Appendix C)

Table J shows that greatest construction noise impacts would be as high as 85 dBA Leq at the pipeline Segments 5, 6, and 7 where construction would occur during the daytime and would be as high as 67 dBA Leq at pipeline Segment 4, where construction would occur during the nighttime. All calculated construction noise levels shown in Table J are within the FTA construction noise standards of 90 dBA Leq during the daytime and 80 dBA Leq during the nighttime. Therefore, with implementation of PDF-NOI-1 and MM-NOI-1 from the Facilities Master Plan PEIR, the proposed project's construction activities that will occur with street right of ways would not exceed any standards established in the General Plan or Noise Ordinance nor would construction activities create a substantial temporary increase in ambient noise levels. Impacts would be less than significant.

Construction Activities Outside of Street Right of Ways

The only anticipated construction activities that would occur outside of street right of ways would be the two potential construction staging areas that would be located in vacant land owned by SCE on Taft Avenue, which is anticipated to be utilized during the proposed nighttime construction work on Tustin Street. There may be other construction staging areas utilized during construction of the proposed project, however all other potential construction staging areas would only be utilized during the daytime when construction noise is exempt from the City noise standards.

Section 8.24.050(E) of the Municipal Code exempts construction noise from the City noise standards that occurs between 7:00 a.m. and 8:00 p.m. Monday through Saturday and between 9:00 a.m. and 8:00 p.m. on Sundays and holidays. For the construction activities that occur outside of those hours, construction

noise is limited to the exterior noise standards provided in Section 8.24.040 of the Municipal Code that limits the nighttime noise level to 50 dBA Leq and 65 dBA Lmax, or ambient noise level (up to 70 dBA), whichever is higher.

Construction noise impacts from the two proposed SCE staging areas to the nearby homes have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1. The results are shown below in Table K and the RCNM printouts are provided in Appendix D.

Table K – Construction Noise Levels from SCE Staging Areas at the Nearby Homes

Construction Staging Area Location on Taft Ave	Distance to Nearest Home[1] (feet)	Construction Noise Level (dBA Leq)	Nighttime Ambient Noise Level[2] (dBA Leq)	City Nighttime Noise Standard[3]/ Exceed?
West Side of SR-55	380	61	64.0	64/No
East Side of SR-55	100	68	64.0	64/**Yes**

Notes:
[1] The distance to nearest home is based on the distance from center of staging area to nearest home
[2] The nighttime noise level is from Table F above.
[3] The City nighttime noise standards are from Section 8.24.040(C) that limits nighttime noise and the nearby homes to ambient noise level.
Source: RCNM, Federal Highway Administration, 2006 (See Appendix D)

Table K shows that greatest construction noise impact would occur at the nearest homes to the proposed staging area on the east side of SR-55 with a noise level as high as 68 dBA Leq, which would exceed the City's residential nighttime noise standard of 64 dBA from Section 8.24.040 of the Municipal Code and is based on the nighttime ambient noise level, since the nighttime ambient noise level exceeds the nighttime hourly noise standard of 50 dBA Leq. This would be considered a significant impact.

Mitigation Measure Project-MM-NOI-1 is provided that if the SCE Staging Area on the east side of State Route 55 is utilized that all activities within this staging area shall be limited to when construction activities are exempt from the City noise standards as detailed in Section 8.24.050(E) of the City of Orange Municipal Code. With implementation of Mitigation Measure Project-MM-NOI-1, the staging area noise levels would not exceed any standards established in the General Plan or Noise Ordinance nor would construction activities create a substantial temporary increase in ambient noise levels. Impacts would be less than significant with implementation of Mitigation Measure Project-MM-NOI-1.

Operational-Related Noise

The pipeline and maintenance holes would not be associated with additional OC San O&M activities above what is currently occurring with the existing pipelines to be replaced/relocated. Project O&M activities would include inspection and repair, as necessary, of pipeline and maintenance holes. It is anticipated that all operational activities would occur within street right of ways. Section 8.24.050(K) of the Municipal Code exempts all maintenance and construction activity undertaken by a public agency within street right of way. In addition, all operational maintenance activities would be less intensive than the proposed pipeline construction activities, which was found above to create a less than significant noise impact. Therefore, operational onsite noise impacts would be less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Project-Specific Mitigation

Project-MM-NOI-1

If the SCE Staging Area located on the east side of State Route 55 is utilized as part of the proposed project, all activities within this Staging Area shall be limited to when construction activities are exempt from the City noise standards as detailed in Section 8.24.050(E) of the City of Orange Municipal Code. No time of day restrictions are placed on the SCE Staging Area located on the west side of State Route 55.

Level of Significance After Mitigation

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The following section analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

The construction activities for the proposed project are anticipated to include: (1) Mobilization/Utility Potholing; (2) Trenching/Pipeline/Maintenance Hole Installation; (3) Final Paving/Restoration; and (4) Demobilization. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are homes located on both sides of Meats Avenue, Breckenridge Street, Sacramento Street, and on Taft Avenue west of Tustin Street. There is a potential that off-road equipment would operate as near as 50 feet from residential structures.

Section 5.10.3 of the *City of Orange General Plan Program EIR* (General Plan EIR), March 2010, determined that a significant vibration impact would occur if vibration levels would exceed 0.2 inch per second PPV at any nearby building. In addition, the Facilities Master Plan PEIR details that annoyance to people in homes starts at approximately 75 VdB.

The primary source of vibration during construction would be from the operation of a pavement breaker (hoe ram). From Table I above a pavement breaker would create a vibration level of 0.089 inch per second PPV at 25 feet or 87 VdB at 25 feet. Based on typical propagation rates, the vibration level at the nearest residential structure (50 feet away) would be 0.04 inch per second PPV or 81 VdB. The vibration level at the nearest residential structure would be below the 0.2 inch per second PPV threshold from the General Plan EIR. Although, vibration activities would exceed the 75 VdB level where vibration starts to annoy people in homes, the Facilities Master Plan PEIR found that since the pipeline construction activities do not remain at any one location for long periods of time (i.e., less than a day in any location), since vibration levels diminish rapidly over short distances, and through adherence to PDF-NOI-1 that the contractor has the responsibility to notify the neighbors prior to the start of construction and respond to any complaints during construction, the human response to vibration would not be considered a significant impact. Impacts would be less than significant.

Operations-Related Vibration Impacts

The pipeline and maintenance holes would not be associated with additional OC San O&M activities above what is currently occurring with the existing pipelines to be replaced/relocated. Project O&M activities

would include inspection and repair, as necessary, of pipeline and maintenance holes. In addition, all operational maintenance activities would be less intensive than the proposed pipeline construction activities, which was found above to create a less than significant vibration impact. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

Level of Significance

Less than significant impact.

7.4 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport is John Wayne Airport that is located approximately nine miles south of the project site. The project site is located outside of the 60 dBA CNEL noise contours of John Wayne Airport. No impacts would occur from aircraft noise.

Level of Significance

No impact.

8.0 REFERENCES

California Department of Transportation, *2020 Annual Average Daily Truck Traffic on the California State Highway System*, 2022.

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analytics Protocol*, September 2013.

California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, April 2020.

California Natural Resources Agency, 2022 California Environmental Quality Act (CEQA) Statute and Guidelines, Association of Environmental Professionals, 2022.

City of Orange, *City of Orange General Plan*, March 9, 2010.

City of Orange, *Orange General Plan Program Environmental Impact Report*, March, 2010.

City of Orange, *Orange California Code of Ordinances Chapter 8.24 – Noise Control*, August 12, 2014.

Dudek, *Draft Orange County Sanitation District Facilities Master Plan Program Environmental Impact Report,* September 2020.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* September 2018.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide,* January, 2006.

APPENDIX A

Field Noise Measurements Photo Index

Noise Measurement Site S1 - looking north

Noise Measurement Site S1 - looking northeast

Noise Measurement Site S1 - looking east

Noise Measurement Site S1 - looking southeast

Noise Measurement Site S1 - looking south

Noise Measurement Site S1 - looking southwest

Noise Measurement Site S1 - looking west

Noise Measurement Site S1 - looking northwest

Noise Measurement Site S2 - looking north

Noise Measurement Site S2 - looking northeast

Noise Measurement Site S2 - looking east

Noise Measurement Site S2 - looking southeast


Noise Measurement Site S2 - looking south


Noise Measurement Site S2 - looking southwest


Noise Measurement Site S2 - looking west

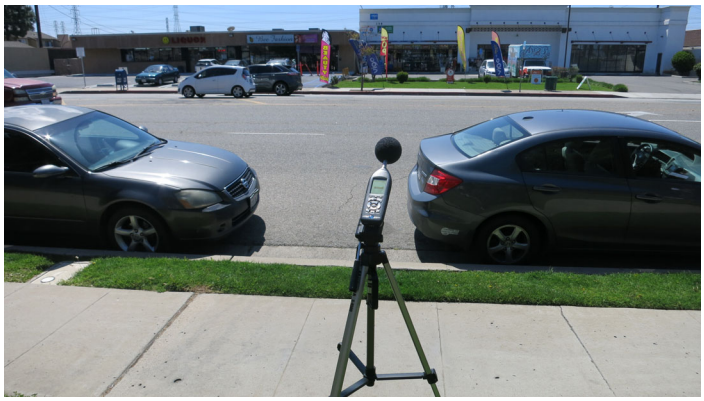

Noise Measurement Site S2 - looking northwest

Noise Measurement Site S3 - looking north

Noise Measurement Site S3 - looking northeast

Noise Measurement Site S3 - looking east

Noise Measurement Site S3 - looking southeast



Noise Measurement Site S3 - looking south

Noise Measurement Site S3 - looking west

Noise Measurement Site S3 - looking northwest

Noise Measurement Site S3 - looking northeast

Noise Measurement Site L1 - looking north

Noise Measurement Site L1 - looking northeast

Noise Measurement Site L1 - looking east

Noise Measurement Site L1 - looking southeast

Noise Measurement Site L1 - looking south

Noise Measurement Site L1 - looking southwest

Noise Measurement Site L1 - looking west

Noise Measurement Site L1 - looking northwest

Noise Measurement Site L2 - looking north

Noise Measurement Site L2 - looking northeast

Noise Measurement Site L2 - looking east

Noise Measurement Site L2 - looking southeast

Noise Measurement Site L2 - looking south

Noise Measurement Site L2 - looking southwest

Noise Measurement Site L2 - looking west

Noise Measurement Site L2 - looking northwest

Noise Measurement Site L3 - looking north

Noise Measurement Site L3 - looking northeast

Noise Measurement Site L3 - looking east

Noise Measurement Site L3 - looking southeast

Noise Measurement Site L3 - looking south

Noise Measurement Site L3 - looking southwest

Noise Measurement Site L3 - looking west

Noise Measurement Site L3 - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Site 1 - On Wall South of Taft Ave (West) west side of Firestone

April 4, 2023 9:37:47 AM
Sampling Time = 1 sec Freq Weighting=A
Record Num = 86402
Leq = 63.6
Min = 44.8
Max = 92.2

Leq Daytime = 64.3
Leq Nighttime = 62.0
CNEL(24hr)= 69.0
Ldn(24hr)= 68.8
Min Leq hr at 12:55 AM 54.0
Max Leq hr at 2:42 PM 67.0

Site 1 - On Wall South of Taft Ave (West) west side of Firestone

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
66.5	9:37:47		66.5	66.5
63.5	9:37:48		63.5	63.5
61.3	9:37:49		61.3	61.3
60.1	9:37:50		60.1	60.1
61.0	9:37:51		61.0	61.0
59.9	9:37:52		59.9	59.9
70.7	9:37:53		70.7	70.7
76.9	9:37:54		76.9	76.9
73.4	9:37:55		73.4	73.4
70.8	9:37:56		70.8	70.8
66.8	9:37:57		66.8	66.8
69.9	9:37:58		69.9	69.9
72.3	9:37:59		72.3	72.3
68.1	9:38:00		68.1	68.1
64.2	9:38:01		64.2	64.2
62.0	9:38:02		62.0	62.0
66.5	9:38:03		66.5	66.5
65.6	9:38:04		65.6	65.6
63.3	9:38:05		63.3	63.3
71.9	9:38:06		71.9	71.9
73.7	9:38:07		73.7	73.7
70.7	9:38:08		70.7	70.7
67.5	9:38:09		67.5	67.5
67.4	9:38:10		67.4	67.4
65.7	9:38:11		65.7	65.7
66.1	9:38:12		66.1	66.1
65.4	9:38:13		65.4	65.4
64.2	9:38:14		64.2	64.2
64.6	9:38:15		64.6	64.6
66.5	9:38:16		66.5	66.5
62.8	9:38:17		62.8	62.8
60.4	9:38:18		60.4	60.4
59.4	9:38:19		59.4	59.4
59.9	9:38:20		59.9	59.9
61.5	9:38:21		61.5	61.5
64.5	9:38:22		64.5	64.5
64.9	9:38:23		64.9	64.9
63.9	9:38:24		63.9	63.9
62.6	9:38:25		62.6	62.6
61.6	9:38:26		61.6	61.6
62.5	9:38:27		62.5	62.5
64.7	9:38:28		64.7	64.7
65.6	9:38:29		65.6	65.6
66.9	9:38:30		66.9	66.9
70.2	9:38:31		70.2	70.2
68.1	9:38:32		68.1	68.1
69.7	9:38:33		69.7	69.7
71.8	9:38:34		71.8	71.8
68.5	9:38:35		68.5	68.5
66.1	9:38:36		66.1	66.1
66.5	9:38:37		66.5	66.5
69.0	9:38:38		69.0	69.0
67.6	9:38:39		67.6	67.6
68.6	9:38:40		68.6	68.6
69.7	9:38:41		69.7	69.7
68.4	9:38:42		68.4	68.4
70.9	9:38:43		70.9	70.9
69.6	9:38:44		69.6	69.6
68.1	9:38:45		68.1	68.1
67.8	9:38:46		67.8	67.8
67.4	9:38:47		67.4	67.4
66.7	9:38:48		66.7	66.7
66.1	9:38:49		66.1	66.1
69.8	9:38:50		69.8	69.8
68.6	9:38:51		68.6	68.6
67.2	9:38:52		67.2	67.2
65.5	9:38:53		65.5	65.5
64.8	9:38:54		64.8	64.8
67.2	9:38:55		67.2	67.2
67.1	9:38:56		67.1	67.1
66.4	9:38:57		66.4	66.4
64.9	9:38:58		64.9	64.9
67.6	9:38:59		67.6	67.6
66.3	9:39:00		66.3	66.3
64.1	9:39:01		64.1	64.1
63.8	9:39:02		63.8	63.8
65.0	9:39:03		65.0	65.0
65.1	9:39:04		65.1	65.1
65.7	9:39:05		65.7	65.7
66.5	9:39:06		66.5	66.5
69.8	9:39:07		69.8	69.8
72.0	9:39:08		72.0	72.0
70.2	9:39:09		70.2	70.2
68.3	9:39:10		68.3	68.3
67.0	9:39:11		67.0	67.0
67.3	9:39:12		67.3	67.3
65.4	9:39:13		65.4	65.4
63.2	9:39:14		63.2	63.2
60.0	9:39:15		60.0	60.0
57.8	9:39:16		57.8	57.8
57.4	9:39:17		57.4	57.4
58.6	9:39:18		58.6	58.6
59.0	9:39:19		59.0	59.0
59.2	9:39:20		59.2	59.2
58.7	9:39:21		58.7	58.7
57.4	9:39:22		57.4	57.4
57.4	9:39:23		57.4	57.4
57.2	9:39:24		57.2	57.2
57.5	9:39:25		57.5	57.5
58.1	9:39:26		58.1	58.1
56.7	9:39:27		56.7	56.7
56.2	9:39:28		56.2	56.2
57.2	9:39:29		57.2	57.2
56.4	9:39:30		56.4	56.4
55.3	9:39:31		55.3	55.3
54.8	9:39:32		54.8	54.8
54.0	9:39:33		54.0	54.0
62.0	9:39:34		62.0	62.0
59.0	9:39:35		59.0	59.0
57.1	9:39:36		57.1	57.1
57.2	9:39:37		57.2	57.2
58.0	9:39:38		58.0	58.0
57.1	9:39:39		57.1	57.1
55.1	9:39:40		55.1	55.1
52.8	9:39:41		52.8	52.8
51.9	9:39:42		51.9	51.9
51.1	9:39:43		51.1	51.1
50.6	9:39:44		50.6	50.6
50.1	9:39:45		50.1	50.1
50.1	9:39:46		50.1	50.1
50.7	9:39:47		50.7	50.7
52.3	9:39:48		52.3	52.3
52.7	9:39:49		52.7	52.7
53.1	9:39:50		53.1	53.1
53.9	9:39:51		53.9	53.9
57.4	9:39:52		57.4	57.4
57.2	9:39:53		57.2	57.2
57.4	9:39:54		57.4	57.4
60.9	9:39:55		60.9	60.9
62.8	9:39:56		62.8	62.8
62.8	9:39:57		62.8	62.8
61.7	9:39:58		61.7	61.7
59.6	9:39:59		59.6	59.6
57.9	9:40:00		57.9	57.9
59.0	9:40:01		59.0	59.0
60.4	9:40:02		60.4	60.4
61.3	9:40:03		61.3	61.3
63.8	9:40:04		63.8	63.8
62.9	9:40:05		62.9	62.9
60.8	9:40:06		60.8	60.8
59.2	9:40:07		59.2	59.2
59.4	9:40:08		59.4	59.4
60.5	9:40:09		60.5	60.5
65.8	9:40:10		65.8	65.8
65.4	9:40:11		65.4	65.4
63.3	9:40:12		63.3	63.3
60.9	9:40:13		60.9	60.9
58.5	9:40:14		58.5	58.5
59.9	9:40:15		59.9	59.9
60.8	9:40:16		60.8	60.8
65.2	9:40:17		65.2	65.2
66.4	9:40:18		66.4	66.4
67.1	9:40:19		67.1	67.1
66.5	9:40:20		66.5	66.5
64.9	9:40:21		64.9	64.9
63.1	9:40:22		63.1	63.1
62.2	9:40:23		62.2	62.2
61.0	9:40:24		61.0	61.0
60.0	9:40:25		60.0	60.0
59.7	9:40:26		59.7	59.7
60.0	9:40:27		60.0	60.0
62.5	9:40:28		62.5	62.5
61.4	9:40:29		61.4	61.4
59.8	9:40:30		59.8	59.8

Site 2 - On Street Light North Side of Briardale Ave

April 4, 2023 9:46:29 AM
Sampling Time = 1 sec Freq Weighting=A
Record Num = 86402
Leq = 60.7
Min = 42.7
Max = 85.7

Leq Daytime = 61.4
Leq Nighttime = 59.1
CNEL(24hr)= 66.0
Ldn(24hr)= 65.9
Min Leq hr at 12:55 AM 50.7
Max Leq hr at 11:28 AM 70.9

Site 2 - On Street Light North Side of Briardale Ave

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
75.1	9:46:29		75.1	75.1
70.9	9:46:30		70.9	70.9
66.9	9:46:31		66.9	66.9
63.5	9:46:32		63.5	63.5
61.8	9:46:33		61.8	61.8
60.8	9:46:34		60.8	60.8
67.2	9:46:35		67.2	67.2
74.2	9:46:36		74.2	74.2
73.2	9:46:37		73.2	73.2
69.7	9:46:38		69.7	69.7
66.2	9:46:39		66.2	66.2
63.1	9:46:40		63.1	63.1
63.3	9:46:41		63.3	63.3
62.9	9:46:42		62.9	62.9
60.9	9:46:43		60.9	60.9
60.6	9:46:44		60.6	60.6
58.9	9:46:45		58.9	58.9
56.6	9:46:46		56.6	56.6
57.6	9:46:47		57.6	57.6
58.5	9:46:48		58.5	58.5
57.1	9:46:49		57.1	57.1
58.6	9:46:50		58.6	58.6
65.0	9:46:51		65.0	65.0
64.4	9:46:52		64.4	64.4
62.8	9:46:53		62.8	62.8
61.0	9:46:54		61.0	61.0
61.9	9:46:55		61.9	61.9
63.6	9:46:56		63.6	63.6
62.5	9:46:57		62.5	62.5
62.7	9:46:58		62.7	62.7
62.1	9:46:59		62.1	62.1
62.4	9:47:00		62.4	62.4
63.3	9:47:01		63.3	63.3
64.4	9:47:02		64.4	64.4
63.8	9:47:03		63.8	63.8
69.8	9:47:04		69.8	69.8
69.0	9:47:05		69.0	69.0
64.9	9:47:06		64.9	64.9
61.2	9:47:07		61.2	61.2
61.2	9:47:08		61.2	61.2
62.7	9:47:09		62.7	62.7
59.7	9:47:10		59.7	59.7
70.7	9:47:11		70.7	70.7
69.4	9:47:12		69.4	69.4
65.3	9:47:13		65.3	65.3
61.5	9:47:14		61.5	61.5
58.5	9:47:15		58.5	58.5
66.0	9:47:16		66.0	66.0
66.2	9:47:17		66.2	66.2
65.1	9:47:18		65.1	65.1
69.6	9:47:19		69.6	69.6
65.6	9:47:20		65.6	65.6
61.7	9:47:21		61.7	61.7
59.2	9:47:22		59.2	59.2
57.8	9:47:23		57.8	57.8
68.2	9:47:24		68.2	68.2
64.3	9:47:25		64.3	64.3
62.9	9:47:26		62.9	62.9
59.6	9:47:27		59.6	59.6
58.8	9:47:28		58.8	58.8
56.6	9:47:29		56.6	56.6
68.1	9:47:30		68.1	68.1
66.0	9:47:31		66.0	66.0
63.5	9:47:32		63.5	63.5
60.4	9:47:33		60.4	60.4
58.5	9:47:34		58.5	58.5
59.9	9:47:35		59.9	59.9
58.0	9:47:36		58.0	58.0
64.8	9:47:37		64.8	64.8
63.9	9:47:38		63.9	63.9
61.7	9:47:39		61.7	61.7
59.7	9:47:40		59.7	59.7
62.0	9:47:41		62.0	62.0
61.8	9:47:42		61.8	61.8
60.8	9:47:43		60.8	60.8
63.9	9:47:44		63.9	63.9
63.2	9:47:45		63.2	63.2
60.4	9:47:46		60.4	60.4
58.3	9:47:47		58.3	58.3
56.7	9:47:48		56.7	56.7
55.8	9:47:49		55.8	55.8
55.7	9:47:50		55.7	55.7
54.4	9:47:51		54.4	54.4
68.2	9:47:52		68.2	68.2
73.3	9:47:53		73.3	73.3
69.5	9:47:54		69.5	69.5
65.9	9:47:55		65.9	65.9
65.1	9:47:56		65.1	65.1
67.9	9:47:57		67.9	67.9
77.7	9:47:58		77.7	77.7
75.5	9:47:59		75.5	75.5
74.7	9:48:00		74.7	74.7
76.3	9:48:01		76.3	76.3
74.0	9:48:02		74.0	74.0
70.2	9:48:03		70.2	70.2
66.5	9:48:04		66.5	66.5
62.9	9:48:05		62.9	62.9
65.8	9:48:06		65.8	65.8
62.4	9:48:07		62.4	62.4
59.5	9:48:08		59.5	59.5
59.6	9:48:09		59.6	59.6
62.3	9:48:10		62.3	62.3
66.2	9:48:11		66.2	66.2
65.7	9:48:12		65.7	65.7
63.1	9:48:13		63.1	63.1
60.4	9:48:14		60.4	60.4
58.0	9:48:15		58.0	58.0
56.0	9:48:16		56.0	56.0
55.1	9:48:17		55.1	55.1
55.8	9:48:18		55.8	55.8
55.9	9:48:19		55.9	55.9
56.0	9:48:20		56.0	56.0
55.4	9:48:21		55.4	55.4
55.0	9:48:22		55.0	55.0
54.6	9:48:23		54.6	54.6
54.0	9:48:24		54.0	54.0
53.3	9:48:25		53.3	53.3
52.5	9:48:26		52.5	52.5
51.4	9:48:27		51.4	51.4
50.4	9:48:28		50.4	50.4
50.9	9:48:29		50.9	50.9
51.9	9:48:30		51.9	51.9
52.7	9:48:31		52.7	52.7
54.3	9:48:32		54.3	54.3
55.0	9:48:33		55.0	55.0
55.6	9:48:34		55.6	55.6
56.7	9:48:35		56.7	56.7
58.2	9:48:36		58.2	58.2
58.8	9:48:37		58.8	58.8
57.5	9:48:38		57.5	57.5
56.2	9:48:39		56.2	56.2
56.3	9:48:40		56.3	56.3
55.8	9:48:41		55.8	55.8
54.7	9:48:42		54.7	54.7
53.8	9:48:43		53.8	53.8
53.1	9:48:44		53.1	53.1
53.1	9:48:45		53.1	53.1
54.2	9:48:46		54.2	54.2
54.6	9:48:47		54.6	54.6
56.8	9:48:48		56.8	56.8
57.5	9:48:49		57.5	57.5
56.4	9:48:50		56.4	56.4
55.1	9:48:51		55.1	55.1
53.5	9:48:52		53.5	53.5
52.8	9:48:53		52.8	52.8
52.4	9:48:54		52.4	52.4
52.4	9:48:55		52.4	52.4
51.6	9:48:56		51.6	51.6
51.2	9:48:57		51.2	51.2
54.6	9:48:58		54.6	54.6
56.7	9:48:59		56.7	56.7
61.3	9:49:00		61.3	61.3
63.4	9:49:01		63.4	63.4
61.6	9:49:02		61.6	61.6
59.5	9:49:03		59.5	59.5
58.6	9:49:04		58.6	58.6
58.2	9:49:05		58.2	58.2
56.6	9:49:06		56.6	56.6
55.9	9:49:07		55.9	55.9
56.9	9:49:08		56.9	56.9
57.5	9:49:09		57.5	57.5
56.8	9:49:10		56.8	56.8
55.3	9:49:11		55.3	55.3
54.9	9:49:12		54.9	54.9

Site 3 - On Power Pole north of Taft Ave and west of Sacramento S

April 4, 2023 9:54:03 AM
Sampling Time = 1 se Freq Weighting=A
Record Num = 86401
Leq = 68.4
Min = 41.4
Max = 95.6

Leq Daytime = 69.8
Leq Nighttime = 64.0
CNEL(24hr)= 72.1
Ldn(24hr)= 71.9
Min Leq hr at 1:40 AM 54.1
Max Leq hr at 7:00 AM 72.6

Site 3 - On Power Pole north of Taft Ave and west of Sacramento S

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
72.3	9:54:03		72.3	72.3
70.6	9:54:04		70.6	70.6
69.4	9:54:05		69.4	69.4
69.4	9:54:06		69.4	69.4
69.6	9:54:07		69.6	69.6
73.5	9:54:08		73.5	73.5
73.2	9:54:09		73.2	73.2
71.4	9:54:10		71.4	71.4
69.5	9:54:11		69.5	69.5
69.5	9:54:12		69.5	69.5
70.5	9:54:13		70.5	70.5
70.5	9:54:14		70.5	70.5
68.8	9:54:15		68.8	68.8
68.8	9:54:16		68.8	68.8
72.2	9:54:17		72.2	72.2
71.1	9:54:18		71.1	71.1
68.2	9:54:19		68.2	68.2
69.3	9:54:20		69.3	69.3
67.6	9:54:21		67.6	67.6
65.3	9:54:22		65.3	65.3
64.4	9:54:23		64.4	64.4
65.3	9:54:24		65.3	65.3
68.9	9:54:25		68.9	68.9
73.2	9:54:26		73.2	73.2
73.0	9:54:27		73.0	73.0
72.3	9:54:28		72.3	72.3
73.7	9:54:29		73.7	73.7
73.6	9:54:30		73.6	73.6
75.1	9:54:31		75.1	75.1
74.1	9:54:32		74.1	74.1
72.2	9:54:33		72.2	72.2
73.1	9:54:34		73.1	73.1
74.2	9:54:35		74.2	74.2
72.1	9:54:36		72.1	72.1
70.6	9:54:37		70.6	70.6
73.2	9:54:38		73.2	73.2
73.8	9:54:39		73.8	73.8
71.0	9:54:40		71.0	71.0
68.2	9:54:41		68.2	68.2
66.2	9:54:42		66.2	66.2
69.0	9:54:43		69.0	69.0
71.2	9:54:44		71.2	71.2
71.7	9:54:45		71.7	71.7
71.8	9:54:46		71.8	71.8
70.1	9:54:47		70.1	70.1
68.7	9:54:48		68.7	68.7
67.4	9:54:49		67.4	67.4
65.9	9:54:50		65.9	65.9
64.7	9:54:51		64.7	64.7
63.7	9:54:52		63.7	63.7
65.7	9:54:53		65.7	65.7
74.0	9:54:54		74.0	74.0
73.8	9:54:55		73.8	73.8
70.8	9:54:56		70.8	70.8
68.1	9:54:57		68.1	68.1
67.0	9:54:58		67.0	67.0
67.7	9:54:59		67.7	67.7
69.8	9:55:00		69.8	69.8
71.5	9:55:01		71.5	71.5
72.9	9:55:02		72.9	72.9
74.8	9:55:03		74.8	74.8
72.8	9:55:04		72.8	72.8
70.8	9:55:05		70.8	70.8
68.3	9:55:06		68.3	68.3
66.2	9:55:07		66.2	66.2
67.3	9:55:08		67.3	67.3
66.7	9:55:09		66.7	66.7
66.8	9:55:10		66.8	66.8
66.7	9:55:11		66.7	66.7
66.3	9:55:12		66.3	66.3
66.3	9:55:13		66.3	66.3
70.5	9:55:14		70.5	70.5
71.4	9:55:15		71.4	71.4
69.7	9:55:16		69.7	69.7
68.7	9:55:17		68.7	68.7
68.0	9:55:18		68.0	68.0
67.7	9:55:19		67.7	67.7
66.2	9:55:20		66.2	66.2
65.6	9:55:21		65.6	65.6
64.6	9:55:22		64.6	64.6
64.8	9:55:23		64.8	64.8
65.6	9:55:24		65.6	65.6
67.2	9:55:25		67.2	67.2
73.2	9:55:26		73.2	73.2
73.6	9:55:27		73.6	73.6
73.0	9:55:28		73.0	73.0
77.0	9:55:29		77.0	77.0
79.6	9:55:30		79.6	79.6
76.4	9:55:31		76.4	76.4
73.3	9:55:32		73.3	73.3
70.2	9:55:33		70.2	70.2
69.7	9:55:34		69.7	69.7
68.1	9:55:35		68.1	68.1
66.6	9:55:36		66.6	66.6
65.8	9:55:37		65.8	65.8
64.1	9:55:38		64.1	64.1
63.4	9:55:39		63.4	63.4
63.8	9:55:40		63.8	63.8
64.3	9:55:41		64.3	64.3
66.1	9:55:42		66.1	66.1
71.9	9:55:43		71.9	71.9
75.6	9:55:44		75.6	75.6
73.6	9:55:45		73.6	73.6
71.7	9:55:46		71.7	71.7
73.8	9:55:47		73.8	73.8
73.4	9:55:48		73.4	73.4
72.2	9:55:49		72.2	72.2
71.9	9:55:50		71.9	71.9
70.0	9:55:51		70.0	70.0
69.4	9:55:52		69.4	69.4
74.2	9:55:53		74.2	74.2
73.5	9:55:54		73.5	73.5
71.0	9:55:55		71.0	71.0
69.0	9:55:56		69.0	69.0
67.5	9:55:57		67.5	67.5
66.4	9:55:58		66.4	66.4
65.4	9:55:59		65.4	65.4
65.0	9:56:00		65.0	65.0
65.8	9:56:01		65.8	65.8
69.1	9:56:02		69.1	69.1
70.7	9:56:03		70.7	70.7
69.5	9:56:04		69.5	69.5
68.2	9:56:05		68.2	68.2
67.1	9:56:06		67.1	67.1
68.3	9:56:07		68.3	68.3
72.9	9:56:08		72.9	72.9
72.9	9:56:09		72.9	72.9
74.5	9:56:10		74.5	74.5
77.1	9:56:11		77.1	77.1
76.0	9:56:12		76.0	76.0
73.2	9:56:13		73.2	73.2
70.9	9:56:14		70.9	70.9
70.5	9:56:15		70.5	70.5
69.4	9:56:16		69.4	69.4
68.3	9:56:17		68.3	68.3
67.7	9:56:18		67.7	67.7
68.9	9:56:19		68.9	68.9
68.7	9:56:20		68.7	68.7
67.3	9:56:21		67.3	67.3
67.4	9:56:22		67.4	67.4
66.3	9:56:23		66.3	66.3
64.3	9:56:24		64.3	64.3
63.3	9:56:25		63.3	63.3
63.8	9:56:26		63.8	63.8
64.8	9:56:27		64.8	64.8
65.3	9:56:28		65.3	65.3
66.6	9:56:29		66.6	66.6
69.0	9:56:30		69.0	69.0
68.8	9:56:31		68.8	68.8
66.5	9:56:32		66.5	66.5
65.0	9:56:33		65.0	65.0
64.0	9:56:34		64.0	64.0
63.5	9:56:35		63.5	63.5
64.5	9:56:36		64.5	64.5
66.2	9:56:37		66.2	66.2
71.0	9:56:38		71.0	71.0
73.2	9:56:39		73.2	73.2
74.0	9:56:40		74.0	74.0
76.0	9:56:41		76.0	76.0
73.3	9:56:42		73.3	73.3
72.9	9:56:43		72.9	72.9
72.2	9:56:44		72.2	72.2
69.4	9:56:45		69.4	69.4
66.7	9:56:46		66.7	66.7

Measurement Report

Report Summary

Meter's File Name	831_Data.001	Computer's File Name	SLM_0002509_831_Data_001.16.ldb
Meter	831		
Firmware	2.403		
User	GT		Location
Description	OCSD Taft Sewer		
Note	Front yard of home at 2087 Mori Ln, approx 50 ft south of Meats Ave CL & 35 ft east of Mori Ln CL		
Start Time	2023-04-04 10:06:51	Duration	0:15:00.0
End Time	2023-04-04 10:21:51	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	63.8 dB		
LAE	93.3 dB	SEA	--- dB
EA	239.3 µPa²h		
LZ_{peak}	105.1 dB	2023-04-04 10:06:52	
LAS_{max}	74.1 dB	2023-04-04 10:09:31	
LAS_{min}	44.1 dB	2023-04-04 10:21:03	
LA_{eq}	63.8 dB		
LC_{eq}	70.7 dB	LC_{eq} - LA_{eq}	6.9 dB
LAI_{eq}	65.3 dB	LAI_{eq} - LA_{eq}	1.6 dB

Exceedances

	Count	Duration
LAS > 65.0 dB	46	0:05:26.0
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
63.8 dB	63.8 dB	0.0 dB

LDEN	LDay	LEve	LNight
63.8 dB	63.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	63.8 dB		70.7 dB		73.2 dB	
$LS_{(max)}$	74.1 dB	2023-04-04 10:09:31	84.9 dB	2023-04-04 10:08:47	93.9 dB	2023-04-04 10:06:52
$LF_{(max)}$	76.9 dB	2023-04-04 10:18:08	87.7 dB	2023-04-04 10:08:26	99.7 dB	2023-04-04 10:06:52
$LI_{(max)}$	81.1 dB	2023-04-04 10:18:08	88.4 dB	2023-04-04 10:08:46	102.9 dB	2023-04-04 10:06:52
$LS_{(min)}$	44.1 dB	2023-04-04 10:21:03	58.6 dB	2023-04-04 10:21:02	63.3 dB	2023-04-04 10:21:05
$LF_{(min)}$	43.4 dB	2023-04-04 10:21:03	56.2 dB	2023-04-04 10:21:02	61.2 dB	2023-04-04 10:11:48
$LI_{(min)}$	43.8 dB	2023-04-04 10:21:02	58.9 dB	2023-04-04 10:11:48	64.5 dB	2023-04-04 10:21:05
$L_{Peak(max)}$	99.5 dB	2023-04-04 10:18:08	100.7 dB	2023-04-04 10:18:08	105.1 dB	2023-04-04 10:06:52

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	68.7 dB
LAS 10.0	67.3 dB
LAS 33.3	64.2 dB
LAS 50.0	62.2 dB
LAS 66.6	59.5 dB
LAS 90.0	52.8 dB

Measurement Report

Report Summary

Meter's File Name	831_Data.002	Computer's File Name	SLM_000
Meter	831		
Firmware	2.403		
User	GT		Location
Description	OCSD Taft Sewer		
Note	Front yard of home at 2060 Breckenridge St, approx 40 ft west of Breckenridge St CL and 30 ft south of Sacramento St CL		
Start Time	2023-04-04 10:26:29	Duration	0:15:00.0
End Time	2023-04-04 10:41:29	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	55.8 dB		
LAE	85.3 dB	SEA	--- dB
EA	37.8 µPa²h		
LZ_{peak}	100.7 dB	2023-04-04 10:28:46	
LAS_{max}	75.0 dB	2023-04-04 10:28:47	
LAS_{min}	46.3 dB	2023-04-04 10:31:53	
LA_{eq}	55.8 dB		
LC_{eq}	69.8 dB	LC_{eq} - LA_{eq}	14.1 dB
LAI_{eq}	60.2 dB	LAI_{eq} - LA_{eq}	4.4 dB

Exceedances	Count	Duration
LAS > 65.0 dB	3	0:00:11.0
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	55.8 dB	55.8 dB	0.0 dB

	LDEN	LDay	LEve	LNight
	55.8 dB	55.8 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	55.8 dB		69.8 dB		72.0 dB	
$LS_{(max)}$	75.0 dB	2023-04-04 10:28:47	92.1 dB	2023-04-04 10:28:47	92.4 dB	2023-04-04 10:28:47
$LF_{(max)}$	76.7 dB	2023-04-04 10:28:47	93.9 dB	2023-04-04 10:28:47	94.1 dB	2023-04-04 10:28:47
$LI_{(max)}$	77.3 dB	2023-04-04 10:28:47	94.5 dB	2023-04-04 10:28:47	94.7 dB	2023-04-04 10:26:29
$LS_{(min)}$	46.3 dB	2023-04-04 10:31:53	58.7 dB	2023-04-04 10:34:56	63.2 dB	2023-04-04 10:31:54
$LF_{(min)}$	45.7 dB	2023-04-04 10:31:52	57.6 dB	2023-04-04 10:31:52	61.4 dB	2023-04-04 10:31:49
$LI_{(min)}$	46.0 dB	2023-04-04 10:31:52	59.5 dB	2023-04-04 10:34:56	64.4 dB	2023-04-04 10:31:54
$L_{Peak(max)}$	87.2 dB	2023-04-04 10:39:19	100.2 dB	2023-04-04 10:28:46	100.7 dB	2023-04-04 10:28:46

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	60.2 dB
LAS 10.0	56.8 dB
LAS 33.3	53.1 dB
LAS 50.0	51.6 dB
LAS 66.6	50.4 dB
LAS 90.0	48.5 dB

Measurement Report

Report Summary

Meter's File Name	831_Data.003	Computer's File Name	SLM_0002509_831_Data_003.09
Meter	831		
Firmware	2.403		
User	GT		Location
Description	OCSD Taft Sewer		
Note	Front yard of home at 131 Taft Ave, approx 50 ft north of Taft Ave CL and 240 ft east of Glassell St CL		
Start Time	2023-04-04 10:48:28	Duration	0:15:00.0
End Time	2023-04-04 11:03:28	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	62.4 dB		
LAE	92.0 dB	SEA	--- dB
EA	175.1 µPa²h		
LZ_{peak}	101.5 dB	2023-04-04 10:48:28	
LAS_{max}	75.3 dB	2023-04-04 10:50:46	
LAS_{min}	48.0 dB	2023-04-04 10:56:24	
LA_{eq}	62.4 dB		
LC_{eq}	72.7 dB	LC_{eq} - LA_{eq}	10.2 dB
LAI_{eq}	65.1 dB	LAI_{eq} - LA_{eq}	2.7 dB

Exceedances

	Count	Duration
LAS > 65.0 dB	20	0:03:05.4
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
62.4 dB	62.4 dB	0.0 dB

LDEN	LDay	LEve	LNight
62.4 dB	62.4 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	62.4 dB		72.7 dB		74.5 dB	
$LS_{(max)}$	75.3 dB	2023-04-04 10:50:46	89.3 dB	2023-04-04 10:52:48	92.5 dB	2023-04-04 10:48:28
$LF_{(max)}$	80.6 dB	2023-04-04 10:50:43	92.9 dB	2023-04-04 10:52:48	96.3 dB	2023-04-04 10:48:28
$LI_{(max)}$	83.9 dB	2023-04-04 10:50:43	94.0 dB	2023-04-04 10:52:48	99.2 dB	2023-04-04 10:48:28
$LS_{(min)}$	48.0 dB	2023-04-04 10:56:24	62.8 dB	2023-04-04 10:56:24	66.0 dB	2023-04-04 10:56:23
$LF_{(min)}$	47.4 dB	2023-04-04 10:56:22	60.6 dB	2023-04-04 10:51:40	63.2 dB	2023-04-04 10:51:40
$LI_{(min)}$	47.6 dB	2023-04-04 10:56:21	63.1 dB	2023-04-04 10:51:40	66.5 dB	2023-04-04 10:51:40
$L_{Peak(max)}$	92.3 dB	2023-04-04 10:50:43	98.2 dB	2023-04-04 10:52:48	101.5 dB	2023-04-04 10:48:28

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	67.7 dB
LAS 10.0	66.4 dB
LAS 33.3	61.9 dB
LAS 50.0	58.8 dB
LAS 66.6	56.4 dB
LAS 90.0	53.0 dB

APPENDIX C

RCNM Model Construction Within Street Right of Ways Noise Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segment 1 Taft Ave (west)/Glassell

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	62.4	62.4	62.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	190	0
Hydra Break Ram	Yes	10	90		190	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw		78.0	71.0	N/A	N/A	N/A	N/A
Hydra Break Ram		78.4	68.4	N/A	N/A	N/A	N/A
	Total	**78**	**73**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segment 2 Taft Ave (west)/Cambridge St

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	62.4	62.4	62.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	60	0
Hydra Break Ram	Yes	10	90		60	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw	88.0	81.0	N/A	N/A	N/A	N/A
Hydra Break Ram	88.4	78.4	N/A	N/A	N/A	N/A
Total	**88**	**83**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segement 3 Taft Ave/Tustin St

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	64.3	64.3	62.0

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	55	0
Hydra Break Ram	Yes	10	90		55	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw		88.8	81.8	N/A	N/A	N/A	N/A
Hydra Break Ram		89.2	79.2	N/A	N/A	N/A	N/A
	Total	**89**	**84**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segment 4 Tustin St

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	61.4	61.4	59.1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	220	5
Hydra Break Ram	Yes	10	90		220	5

		Calculated (dBA)		Results			
				Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw		71.7	64.7	N/A	N/A	N/A	N/A
Hydra Break Ram		72.1	62.1	N/A	N/A	N/A	N/A
	Total	**72**	**67**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segment 5 Taft Ave (east)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	69.7	69.8	64.0

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50	0
Hydra Break Ram	Yes	10	90		50	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw		89.6	82.6	N/A	N/A	N/A	N/A
Hydra Break Ram		90.0	80.0	N/A	N/A	N/A	N/A
	Total	**90**	**85**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segment 6 Sacramento St
.

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	55.8	55.8	55.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50	0
Hydra Break Ram	Yes	10	90		50	0

Results

		Calculated (dBA)		Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw		89.6	82.6	N/A	N/A	N/A	N/A
Hydra Break Ram		90.0	80.0	N/A	N/A	N/A	N/A
	Total	**90**	**85**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/7/2023
Case Description: Taft Sewer - Segment 7 Meats Ave

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	62.4	62.4	62.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50	0
Hydra Break Ram	Yes	10	90		50	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Concrete Saw		89.6	82.6	N/A	N/A	N/A	N/A
Hydra Break Ram		90.0	80.0	N/A	N/A	N/A	N/A
	Total	**90**	**85**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX D

RCNM Model Construction Outside of Street Right of Ways Noise Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/1/2023
Case Description: Taft Sewer - SCE Staging Areas

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to West Staging Area	Residential	69.8	69.8	64

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dump Truck	No	40		76.5	380	0
Generator	No	50		80.6	380	0

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dump Truck		58.8	54.9	N/A	N/A	N/A	N/A
Generator		63	60	N/A	N/A	N/A	N/A
	Total	**63**	**61**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to East Staging Area	Residential	69.8	69.8	64.0

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dump Truck	No	40		76.5	100	5
Generator	No	50		80.6	100	5

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dump Truck		65.4	61.5	N/A	N/A	N/A	N/A
Generator		69.6	66.6	N/A	N/A	N/A	N/A
	Total	**70**	**68**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.