East Bay Municipal Utility District

Fontaine Pumping Plant Replacement Project

Final Noise Technical Report

September 2021

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Acoustics • Air Quality

PANORAMA ENVIRONMENTAL, INC.

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1 Introduction

1.1 Project Overview

The East Bay Municipal Utility District (EBMUD) is proposing to replace its existing Fontaine Pumping Plant (PP) to address aging water distribution infrastructure and improve operational reliability and redundancy. Specifically, the Fontaine Pumping Plant Replacement Project (Project) includes the following three primary components:

- Demolition of the existing 20-million-gallon-per-day (mgd) Fontaine PP and construction of a new retaining wall (shown on Figure 1) at 8445 Ney Avenue in the City of Oakland (Alameda County) and abandonment of existing pipelines by cutting, capping, and filling the pipelines with cellular concrete at three existing pipeline abandonment disconnection sites (shown on Figure 2);
- Construction of a new 20-mgd PP and 24-inch rate control station (shown on Figure 3) at 9601 MacArthur Boulevard in the City of Oakland (Alameda County); and
- Construction of approximately 1,300 feet of new 30-inch-diameter suction pipeline and approximately 3,600 feet of new 30-inch-diameter discharge pipeline (using open trench construction methods) that would connect the new PP to the distribution system (shown on Figure 4).

The new PP would consist of three pumps, associated mechanical and electrical equipment, and a 24-inch-diameter rate control station located inside an approximately 45-feet wide, 50-feet long, and 23-feet tall building. The new PP site would include an approximate 25-foot-tall antenna, outdoor light fixtures, site accesses, parking area, outdoor transformer and switchgear, and perimeter fencing. The Project would also include building architectural treatments and site landscaping as described in the *East Bay Municipal Utility District Fontaine Pumping Plant Replacement Project Aesthetics Conceptual Design Report* (Panorama Environmental, Inc., MWA Architects, and Dillingham Associates, 2021).

Figure 1 Existing Fontaine Pumping Plant (8445 Ney Avenue)

Figure 2 Existing Pipeline Abandonment Disconnection Sites

Figure 3 New Fontaine Pumping Plant (9601 MacArthur Boulevard)

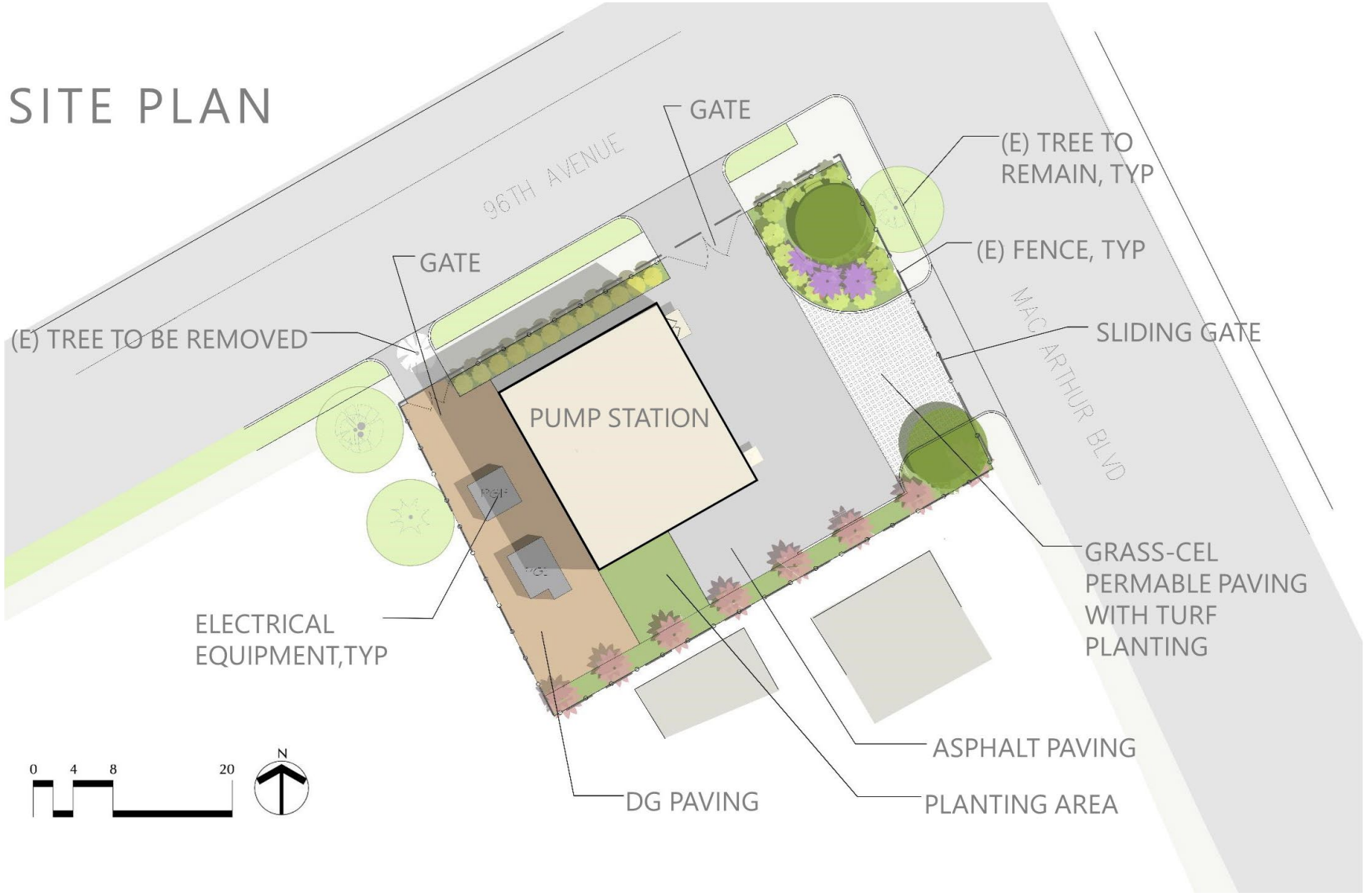

Figure 4 New Fontaine Pumping Plant and New Pipeline Location

1.2 Definitions

1.2.1 Noise

Noise is defined as unwanted sound. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Most of the sounds that we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound in accordance with a weighting that reflects the facts that human hearing is less sensitive at low frequencies and extremely high frequencies than in the mid-range frequency, called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 1, below, for different types of noise. A 10 dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented in this section are expressed in terms of dBA unless otherwise indicated.

Table 1 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**70 dBA**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**60 dBA**	
		Large business office
Quiet urban daytime	**50 dBA**	Dishwasher in next room
Quiet urban nighttime	**40 dBA**	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Noise Descriptors

To describe the time-varying character of environmental noise, a single number descriptor called the L_{eq} is widely used. The L_{eq} is the average A-weighted noise level during a specified period of time. For the purposes of the analyses in this report, L_{eq} is the primary descriptor used to provide a direct comparison between the construction and operational noise levels generated by the Project and the local noise ordinance thresholds. L_{max} is also used to represent the maximum A-weighted noise level during a single noise event (e.g., a vehicle passing).

Sensitivity to noise increases during the evening and at night because excessive noise interferes with the ability to sleep; therefore, 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is a measure of the cumulative noise exposure in a community, with a 10 dB addition to nocturnal (10:00 p.m. - 7:00 a.m.) noise levels. This report represents ambient noise levels using L_{dn} because it relies on the City of Oakland's General Plan noise contours, which represents noise levels in L_{dn}.[1] .

The *Community Noise Equivalent Level* (*CNEL*) is a 24-hour weighted average that, like L_{dn}, adds a 10 dBA "penalty" to noise events between 10:00 p.m. and 7:00 a.m. CNEL also adds a 4.77 dBA penalty to noise events during evening hours (7:00 p.m. to 10:00 p.m.) (FAA, 2018). CNEL is used to define the threshold for excessive exposure to aircraft noise (refer to Section 4.1.2).

Noise Attenuation

Attenuation describes the rate at which noise decreases over distance. Attenuation rates are affected by topography, ground absorption, and intervening structures.

Most noise sources can be classified as either point sources, such as stationary equipment, or line sources, such as a roadway. Sound generated by a point source (i.e., construction equipment) attenuates at an approximate rate of 6 dBA for each doubling of distance away from the source. For example, a 60-dBA noise level measured at 50 feet from a point source would be approximately 54 dBA at 100 feet from the source and 48 dBA at 200 feet from the source. Noise from a line source (i.e., roadways) attenuates at approximately 3 to 4.5 dBA[2] per doubling of distance (US DOT, 1995).

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[1] In general, L_{dn} is equivalent to $L_{eq}(24)$ with a 10 dB penalty applied to nighttime hours (between 10:00 p.m. and 7:00 a.m.). However, if a project does not generate nighttime noise between 10:00 p.m. and 7:00 a.m., no 10-dB penalty is applied and L_{dn} is directly equivalent to $L_{eq}(24)$.

[2] 3 dBA reduction is typically attributed to noise attenuation over hard surfaces, such as concrete or asphalt. 4.5 dBA reduction is typically attributed to noise attenuation over soft surfaces, such as residential yards or areas with vegetation. For the purpose of this analysis, 4.5 dBA attenuation is used since the Project occurs in a residential area where many residences have yards between the street and dwelling.

1.2.2 Vibration

Vibration caused by construction activities can be interpreted as energy transmitted in waves through the ground. Vibration attenuates as a function of the distance between the source and receptor. Vibration levels are highest closest to the source, and then attenuate with increasing distance depending on soil conditions and the characteristics of the vibration source.

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is used to assess the potential for damage to buildings and structures, and annoyance, and is expressed in inches per second (in/sec).

Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration.

1.2.3 Sensitive Noise Receptors

Human response to noise varies considerably from one individual to another. The effects of noise can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these noise effects, some land uses are considered more sensitive to noise levels than others. In general, residences, schools, hospitals, and nursing homes are considered the most sensitive to noise and are considered sensitive noise receptors.

2 Environmental Setting

2.1 Existing Noise Levels

The existing noise environment at receptors in the vicinity of the existing PP, new PP, new pipelines, and existing pipeline abandonment disconnection sites is typical of urban residential neighborhoods and commercial areas and consists primarily of local traffic noise.

2.1.1 Methodology

Due to the COVID-19 pandemic, traffic volumes have decreased, resulting in atypical and non-representative traffic noise levels in the Project area. As a result, the ambient noise environments at the Project sites were characterized using an alternative methodology that primarily relied on General Plan noise contour information. Noise contour information was then refined to account for site-specific conditions at the existing PP (including the disconnection site adjacent to the existing PP along Ney Avenue) and new PP, as these locations would experience Project-related construction noise for the longest periods of time and/or result in Project-related operational noise impacts. The methodology used to refine noise contour data at these two sites included the measurement of ambient noise levels and modeling of traffic noise levels to represent normal baseline conditions.

Ambient noise environments at the existing pipeline abandonment disconnection sites (with the exception of the Ney Avenue disconnection site located adjacent to the existing PP) and new pipeline alignments were characterized using General Plan noise contour information.

Further details regarding the methodology used are provided below.

Oakland General Plan

The Noise Element of the City of Oakland's General Plan provides ambient noise level information in L_{dn} for areas throughout the City. A roadway noise contour map provides predicted noise levels in 2025 along major traffic thoroughfares such as State and interstate freeways. As a supplement to noise contour information, the Noise Element of the General Plan also provides traffic noise level data for major local roadways, including measured existing noise levels and calculated future (2025) noise levels, along select roadway segments.

At the existing PP and existing pipeline abandonment disconnection sites, the noise contour map indicates that the ambient noise levels are between 60 and 65 dBA L_{dn}. The roadway segment closest to the existing PP and existing pipeline abandonment disconnection sites for which traffic noise level data is provided in the General Plan is Golf Links Road between Fontaine Street and 98th Avenue. Existing traffic noise data indicates that traffic noise levels for

this roadway segment is 65 dBA L_{dn} at a distance of 60 feet from the center of Golf Links Road (City of Oakland, 2005).[3]

The noise contour map indicates that the ambient noise level at the new PP site is between 60 and 65 dBA L_{dn}; however, the noise contour map does not account for roadway noise generated on local road streets such as MacArthur Boulevard. The General Plan's supplemental traffic noise data was also reviewed for relevant and available data for MacArthur Boulevard. The roadway segment closest to the new PP for which traffic noise data is provided in the General Plan is MacArthur Boulevard south of 90th Avenue. Existing traffic noise data indicates that traffic noise levels for this roadway segment is 70 dBA L_{dn} at a distance of 50 feet from the center of MacArthur Boulevard (City of Oakland, 2005)..

The new pipeline alignment crosses various noise environments, including smaller local roads with residential land uses (96th Avenue) and busier commercial areas along larger thoroughfares (MacArthur Boulevard). The eastern end of 99th Avenue also terminates approximately 85 feet from Interstate 580. The noise contour map indicates that the ambient noise levels along the pipeline alignment are between 60 and 70 dBA L_{dn}. The roadway segment closest to the pipeline alignment for which traffic noise level data is provided in the General Plan is 98th Avenue between Bancroft Avenue and Golf Links Road. Existing traffic noise level data indicates that traffic noise levels for this roadway segment is 65 dBA L_{dn} at a distance of 90 feet from the center of 98th Avenue (City of Oakland, 2005).[4]

Noise Measurements and Results

Noise measurements were taken at the existing PP and new PP sites, as construction would occur at these sites for the longest periods of time and the Project would generate operational noise at the new PP site. Noise specialists from Illingworth & Rodkin conducted site visits to the existing PP and new PP on Friday, June 5, 2020. During the site visits, noise specialists verified on-site conditions, monitored noise levels generated by existing nearby noise-generating sources and equipment, and independently developed site-specific ambient noise data to validate the ambient noise data from the General Plan. Short-term (10-minute) attended noise measurements were collected at one location along MacArthur Boulevard (ST-1) (approximately 32 feet from the centerline) near the new PP site and one location at the existing PP site (ST-2) (approximately 18 feet from the centerline of Ney Avenue). Noise measurement locations are shown on Figure 5 and Figure 6. The noise measurements results collected at the two monitored locations are described and summarized in Table 2.

[3] Noise level data at 50 feet is not available in the Noise Element of the General Plan for this roadway segment.

[4] Noise level data at 50 feet is not available in the Noise Element of the General Plan for this roadway segment.

Figure 5 Noise Measurement Location (New Fontaine Pumping Plant)

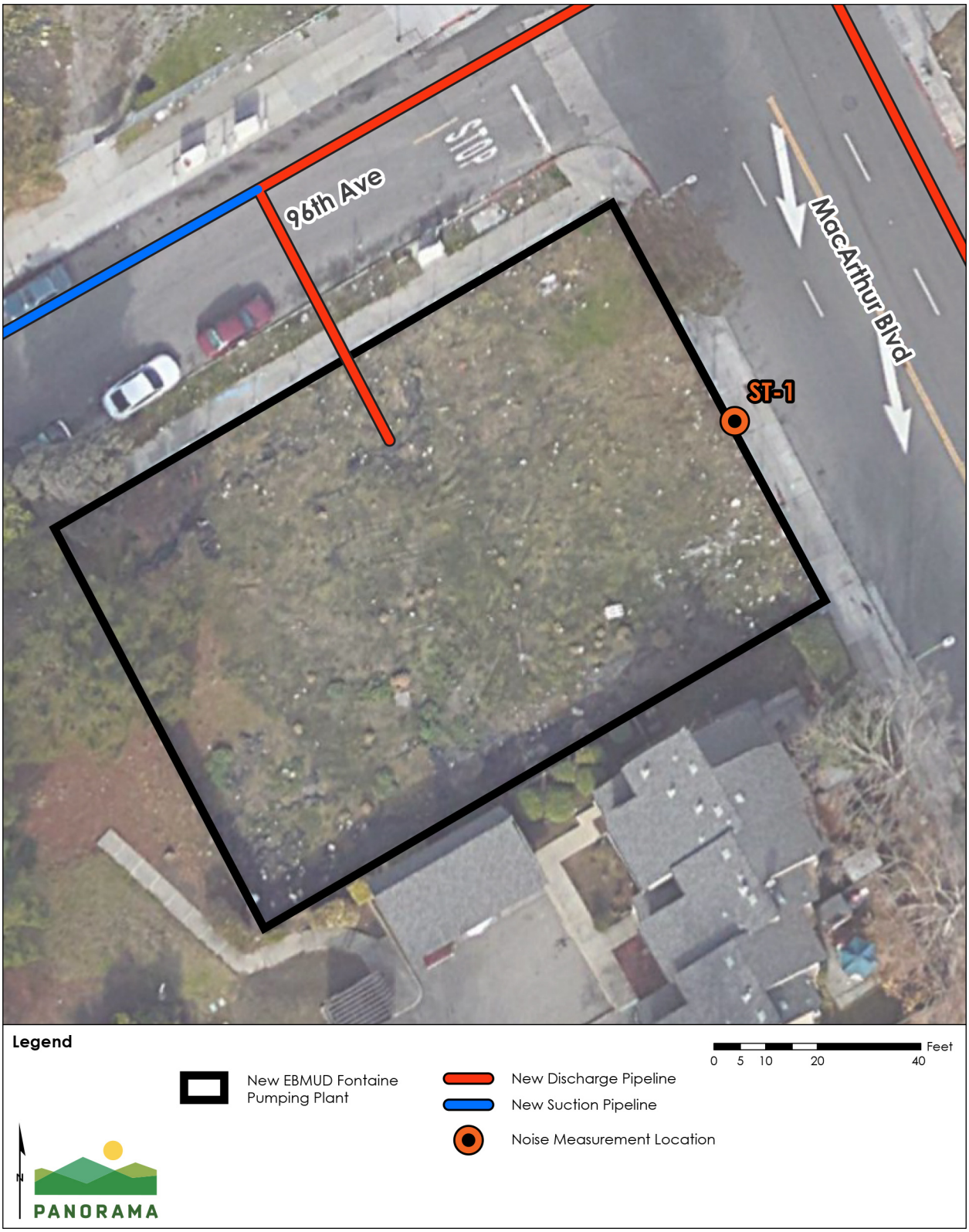


Figure 6 Noise Measurement Location (Existing Fontaine Pumping Plant)

Table 2 Summary of Noise Measurement Results

Measurement Sites (Date/Time) ST = Short-Term	Daytime Noise Levels (dBA)		
	Time of Day	L_{max}	L_{eq}
New Pumping Plant and New Pipelines			
ST-1: 32 feet from centerline of MacArthur Boulevard	10:20 to 10:30 a.m.	90	70
Note: Primary noise source was vehicular traffic on MacArthur Boulevard.			
Existing Pumping Plant			
ST-2: 18 feet from centerline of Ney Avenue	10:40 to 10:50 a.m.	72	54
Notes: An enclosed transformer located within the existing PP property line near Ney Avenue was measured to generate a steady noise level of 48 dBA at 3 feet from the enclosed transformer. Other noise sources included local traffic, construction activities, and distant sounding of train horns.			

Traffic Noise Modeling

Because noise measurements were taken during a period of reduced traffic volumes due to COVID restrictions, traffic noise modeling was conducted to calculate the contribution of traffic noise to the noise environment under normal conditions. Anticipated traffic noise contributions were modeled using the Federal Highway Administration's Traffic Noise Model (TNM) version 2.5.

The model was first validated using traffic and noise data taken during the noise monitoring survey and from the Oakland General Plan data described above. Following model validation, traffic volume inputs, provided in the Fontaine Pumping Plant Replacement Project Transportation and Traffic Technical Report (Panorama Environmental and Fehr & Peers, 2021), were used to calculate existing and future noise levels at the new and existing PP sites. The results of traffic noise modeling and noise measurements for the existing and new PP sites are presented in Table 3.

Summary

Table 3 lists the existing ambient noise levels occurring at locations in the vicinity of the Project sites. These ambient noise levels are used to provide context for the existing ambient noise environment at the various Project sites.

Table 3 Ambient Noise Levels near Project Sites

Project Site	Primary Noise Source	Source/Methodology	Ambient Noise Level [a]
Existing Pumping Plant and Existing Pipeline Abandonment			
Existing PP and Existing Pipeline Abandonment Disconnection Site on Ney Avenue	Vehicular traffic along Ney Avenue and Fontaine Street	Field noise measurement and traffic noise modeling	55 dBA L_{dn}
Existing Pipeline Abandonment Disconnection Sites on Golf Links Road and Aster Avenue	Vehicular traffic along Golf Links Road	General Plan noise contour and traffic noise level information for the Golf Links Road segment between Fontaine Street and 98th Avenue	60 to 65 dBA L_{dn}
New Pumping Plant and New Pipelines			
New PP Site	Vehicular traffic along MacArthur Boulevard	field noise measurement, and traffic noise modeling	70 dBA L_{dn}
New Pipelines on 96th Avenue and 99th Avenue	Vehicular traffic along 96th Avenue and 99th Avenue Interstate 580 freeway traffic influences noise along 99th Avenue	General Plan noise contour and traffic noise level information for the 98th Avenue segment between Bancroft Avenue and Golf Links Road	60 to 70 dBA L_{dn}

Notes:

[a] Ambient noise levels at the existing pipeline abandonment disconnection sites on Golf Links Road and Aster Avenue and new pipelines on 96th Avenue and 99th Avenue are represented in the table as a range because this information relies on General Plan noise contour and traffic noise level data, which provide existing ambient noise levels as a range.

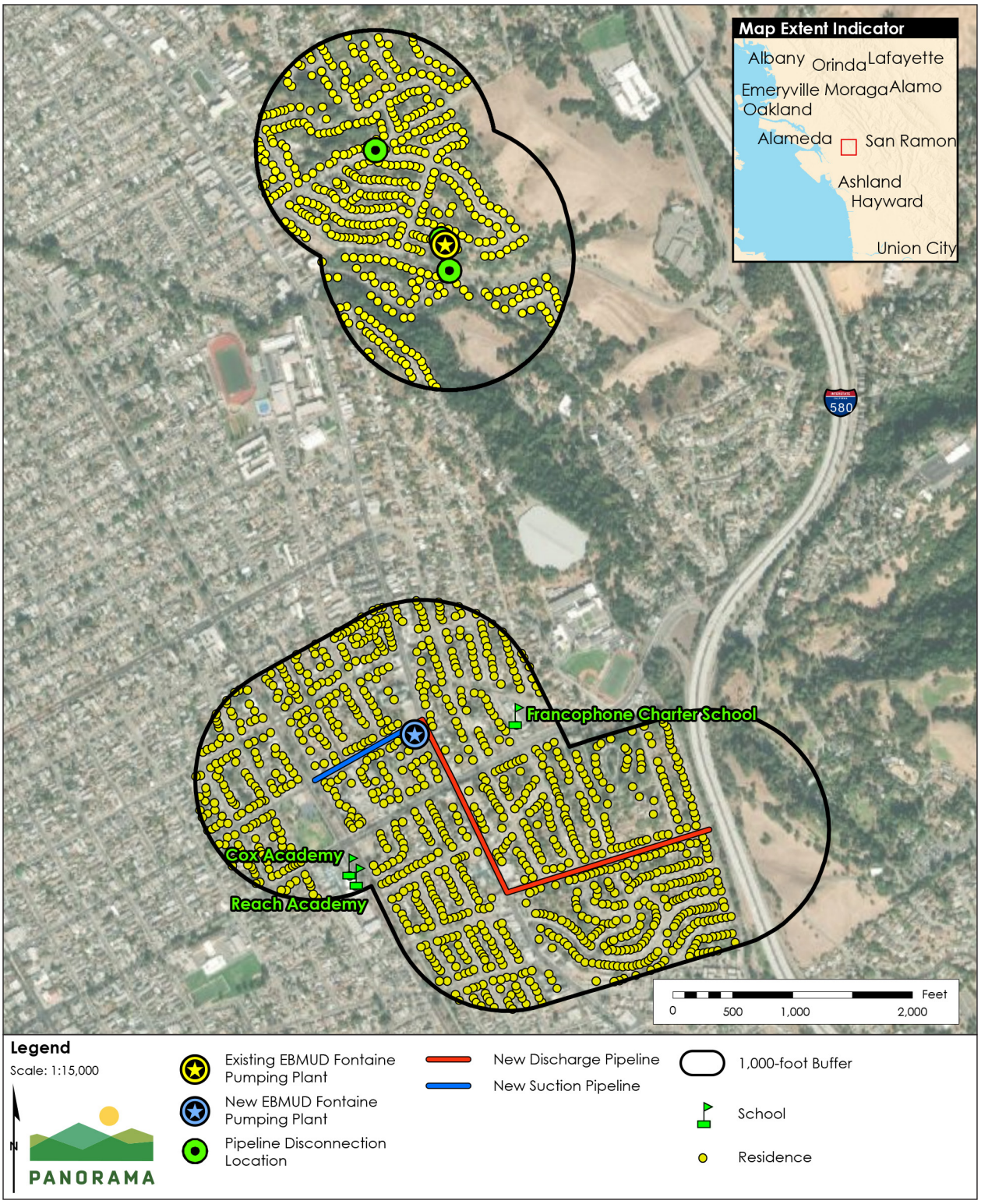
2.2 Sensitive Noise Receptors

Sensitive noise receptors, including residences and schools, located adjacent to or near the existing PP, existing pipeline abandonment disconnection sites, new PP, and new pipelines are identified in Table 4. Figure 7 shows the locations of receptors within 1,000 feet of the Project sites.

Table 4 Sensitive Receptors Near Project Sites

Sensitive Receptor	Location	Distance from Project Site
Existing Pumping Plant		
Residential Uses	Adjacent to PP	Residential property adjoins site; structures as close as 20 feet from the PP
Existing Pipeline Abandonment		
Residential Uses	Disconnection site at existing PP	Residential property as close as 33 feet; structures as close as 63 feet
Residential Uses	Southernmost disconnection site	Residential property as close as 22 feet; structures as close as 58 feet
Residential Uses	Northernmost disconnection site	Residential property as close as 27 feet; structures as close as 43 feet
New Pumping Plant		
Residential Uses	Adjacent to PP	Residential property adjoins site and is about 45 feet from center of construction; structures as close as 12 feet from PP site boundary
New Pipelines		
Residential Uses	Along 96th Avenue, MacArthur Boulevard, and 99th Avenue	Residential property and structures as close as 43 feet from the suction pipeline and 27 feet from the discharge pipeline
Francophone Charter School	9736 Lawlor Street	630 feet from the new discharge pipeline
Reach Academy	9860 Sunnyside Street	700 feet from the new suction pipeline
Cox Academy	9860 Sunnyside Street	700 feet from the new suction pipeline

Figure 7 Sensitive Receptors



3 Regulatory Setting

3.1 Federal and State Regulations

No federal or State standards related to noise are applicable to the Project. The Federal Noise Control Act of 1972 divides powers between federal, State, and local governments, in which the primary federal responsibility is for noise source emission control. State and local governments are responsible for controlling the use of noise sources and determining the levels of noise to be permitted in their environments (42 U.S. Code, Chapter 65: Noise Control).

3.2 Local Regulations

3.2.1 Overview

Pursuant to California Government Code Section 53091, EBMUD, as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances (such as noise ordinances) for projects involving facilities for the production, generation, storage, or transmission of water. However, it is the practice of EBMUD to work with local jurisdictions and neighboring communities during project planning, and to consider local environmental protection policies for guidance.

At the local level, noise is addressed through the implementation of Oakland General Plan policies, including noise and land use compatibility guidelines, and through enforcement of noise ordinances. Oakland General Plan policies provide guidelines for determining whether a noise environment is appropriate for a proposed or planned land use. Local noise ordinances regulate such sources as mechanical equipment and amplified sounds, as well as prescribe hours of heavy equipment operation.

3.2.2 Oakland Noise Ordinance

Oakland Municipal Code

The Oakland Municipal Code addresses noise under Chapter 8.18: Nuisances. Chapter 8.18 specifies that (1) noise resulting from construction and demolition activities, and (2) commercial or industrial noise associated with land use activities are regulated based on standards established in the Oakland Planning Code.

a. Chapter 8.18 also requires construction activities to be conducted in compliance with the following: All construction equipment powered by internal combustion engines shall be properly muffled and maintained.

b. Unnecessary idling of internal combustion engines is prohibited.
c. All stationary noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences.
d. Quiet construction equipment, particularly air compressors, are to be selected whenever possible.
e. Use of pile drivers and jack hammers shall be prohibited on Sundays and holidays, except for emergencies and as approved in advance by the Building Official.

Oakland Planning Code

The Oakland Planning Code (OPC) establishes operational and construction limits for noise levels for various land use types and specifies that noise levels are measured at the property line (City of Oakland, 2019). The OPC establishes noise limits for short-term construction activity (less than 10 days) and for repetitively scheduled and relatively long-term construction or demolition operation (10 days or more). Construction activities that exceed the short- and long-term construction thresholds are required to implement additional noise controls to ensure that the maximum feasible noise attenuation will be achieved.

Operational noise limits are established by the receiving land use type. Table 5 and Table 6 summarize the pertinent construction and operational noise ordinance time and noise limits, respectively, for the City of Oakland.

Table 5 Summary of City of Oakland Construction Noise Standards

Construction Time Limits		Construction Noise Limits [a] [b]
Weekdays	Weekends	
7 a.m. – 7 p.m. (daytime)	9 a.m. – 8 p.m. (daytime)	*Residential Zones* Short term (<10 days): 80 dBA on weekdays and 65 dBA on weekends and legal holidays Long-term (>10 days): 65 dBA on weekdays and 55 dBA on weekends and legal holidays *Commercial Zones* Short term (<10 days): 85 dBA on weekdays and 70 dBA on weekends and legal holidays Long-term (>10 days): 70 dBA on weekdays and 60 dBA on weekends and legal holidays

Notes:

[a] If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

[b] The noise ordinance does not specify a noise descriptor applicable to these noise limits; therefore, for the purposes of this analysis, Leq for an 8-hour period was used because active construction for the Project would occur across a typical 8-hour workday.

[c] Time limits for noise levels generated by construction activities are specified in Chapter 17.120, Performance Standards, Section 17.120.050, Noise, of the OPC.

Table 6 Summary of City of Oakland Operational Noise Standards

Receiving Land Use	Cumulative No. of Minutes in 1-Hr Period [b]	Maximum Allowable Noise Level (dBA)[a]	
		Daytime 7 a.m. – 10 p.m.	Nighttime 10 p.m.. – 7 a.m.
Residential and Civic [c]	20 (L_{33})	60	45
	10 ($L_{16.7}$)	65	50
	5 ($L_{8.3}$)	70	55
	1 ($L_{1.7}$)	75	60
	0 (L_{max})	80	65
		Anytime	
Commercial	20 (L_{33})	65	
	10 ($L_{16.7}$)	70	
	5 ($L_{8.3}$)	75	
	1 ($L_{1.7}$)	80	
	0 (L_{max})	85	

Notes:

[a] These standards are reduced 5 dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

[b] L_x represents the noise level that is exceeded X percent of a given period. L_{max} is the maximum instantaneous noise level.

[c] Legal residences, schools and childcare facilities, health care or nursing home, public open space, or similarly sensitive land uses.

[d] Operational (long-term) noise limits are specified in Section 17.120.050 of the OPC at the receiving land use during new project operations.

3.2.3 Oakland General Plan

The Noise Element for the City of Oakland General Plan provides policies to ensure that there is compatibility between a land use and a range of ambient noise levels (City of Oakland, 2005). The following policies are pertinent to the Project:

Policy 1 Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.

Policy 2 Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.

Policy 3 Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the City. (Policy 3 addresses the reception of noise whereas Policy 2 addresses the generation of noise.)

3.2.4 Oakland Department of Planning and Building

The City of Oakland implements standard conditions of approval that are applied to projects when they receive discretionary planning-related approval (City of Oakland, 2018). The standard conditions of approval related to construction noise are summarized below:

- **Construction Days/Hours.** The project applicant shall comply with restrictions concerning construction days and hours as stipulated in the City of Oakland Noise Ordinance
- **Construction Noise.** The project applicant shall implement noise reduction measures to reduce noise impacts due to construction.

3.3 Construction Vibration Guidance

The City of Oakland does not establish a vibration limit for construction. The California Department of Transportation recommends the following vibration limits to avoid cosmetic damage to structures:

- 0.25 in/sec PPV for historic structures
- 0.5 in/sec PPV for new residential and modern commercial/industrial structures

3.4 EBMUD Practices and Procedures

EBMUD requires implementation of various standard specifications, practices, and procedures as part of project planning and implementation for all EBMUD projects. EBMUD's Standard Construction Specifications and Procedures applicable to the Project are described further below.

3.4.1 EBMUD Standard Construction Specifications

EBMUD Standard Construction Specifications set forth the contract requirements for environmental compliance to which construction workers must adhere and stipulate that the construction contractor is responsible for maintaining compliance with applicable federal, State, and local requirements. These specifications are implemented on all EBMUD projects as part of standard construction procedures. Specifically, Standard Construction Specification 01 35 44, Environmental Requirements, requires implementation of standard practices to reduce noise and vibration (EBMUD, 2018a).

Standard Construction Specification 01 35 44, Environmental Requirements

EBMUD's Standard Construction Specification 01 35 44, Environmental Requirements, requires the implementation of various noise- and vibration-controlling requirements, including the following:

- Submitting a Noise Control and Monitoring Plan, which details the means and methods for controlling and monitoring noise generated by construction activities, including demolition, alteration repair or remodeling of or to existing structures and construction of new structures, as well as by items of machinery, equipment or devices used during construction activities on the site. The plan must also detail the equipment and methods used to monitor compliance with the plan. (Section 1.3.G.1)
- Complying with noise-level rules, regulations, and ordinances to the extent feasible. (Section 3.6.A)
- Implementing noise-reduction requirements such as muffling equipment, selecting quieter equipment, using noise barriers or noise control blankets around the construction site or major noise sources, etc. (Sections 3.6.B, 3.6.H.3, and 3.6.H.4)
- If using impact equipment (e.g., jack hammers, pavement breakers, and rock drills), using hydraulically or electric-powered equipment wherever feasible to avoid noise associated with compressed-air exhaust from pneumatically powered tools. Where use of pneumatically powered tools is unavoidable, using an exhaust muffler on the compressed-air exhaust (which could achieve a reduction of approximately 10 dB); using external jackets on the tools, where feasible (which could achieve a reduction of approximately 5 dB); and implementing quieter procedures, such as drilling rather than impact equipment, whenever feasible. (Section 3.6.H.1)
- Limiting of the noisiest phases of construction to 10 workdays at a time, where feasible. (Section 3.6.H.6)
- Notifying neighbors/occupants within 300 feet of Project construction regarding the estimated duration of the activity at least 30 days in advance of the extreme noise-generating activities. (Section 3.6.H.7)
- Limiting truck operations (haul trucks and concrete delivery trucks) to daytime hours. (Section 3.6.E)

- Preparing and implementing a Vibration Control and Monitoring Plan that details the means and methods for controlling and monitoring surface vibration generated by demolition and other work. (Section 1.3.H.1.)
- Limiting surface vibration to no more than 0.5 in/sec PPV measured at the nearest residence or other sensitive structure. (Section 3.5.A)

Standard Construction Specification, 01 14 00 Work Restrictions

EBMUD's Standard Construction Specification 01 14 00, Work Restrictions, restricts construction hours as described below (EBMUD, 2019a).

- Noise-generating activities greater than 90-dBA (impact construction such as concrete breaking, concrete crushing, tree grinding, etc.) shall be limited to the hours of 8:00 a.m. to 4:00 p.m., Monday through Friday (Section 1.8.A).[5]

Standard Construction Specification, 08 91 00 Louvers

EBMUD's Standard Construction Specification 08 91 00, Louvers, requires use of specific acoustic-rated and sound-attenuating devices and equipment as part of design standards for all EBMUD PPs (EBMUD, 2019c).

- Requires the installation of either 6-, 8-, or 12-inch-deep acoustical louvers, which use an acoustical-grade fibrous media to reduce transfer of interior noise from the PP to the exterior.

3.4.2 EBMUD Procedures

Procedures relevant to noise include Procedure 600, Public Outreach and Community Relations, which is summarized below.

EBMUD Procedure 600 Public Outreach and Community Relations

EBMUD Procedure 600, Public Outreach and Community Relations, requires that EBMUD implement and maintain community and public affairs outreach efforts on all EBMUD projects (EBMUD, 2018b). Specifically, this procedure identifies outreach goals and outlines responsibilities for EBMUD employees as well as the public affairs, capital project management, and operations and maintenance project management teams. With regards to construction noise, Procedure 600 requires the following standard practices:

- Designates a Public Affairs liaison to respond to construction-related issues, including noise. For Capital Projects, contact information for the Public Affairs liaison (i.e., name, phone number, email address) will be provided via conspicuous signage at construction sites, on all advance notifications, and on the EBMUD Project website. The Public Affairs liaison will be available to

[5] The 8:00 a.m. to 4:00 p.m. work restrictions applied to the Project are consistent with Oakland's Standard Conditions of Approval Number 62.

coordinate with the Construction Project Manager/Engineer and any contractors to resolve any issues.

- For Capital Projects, notifies residents at least seven (7) days (and preferably fourteen (14) days) in advance of potentially disruptive construction activities (e.g., noise, traffic) including geographical extent of activity and estimated duration of the activity. Public Affairs liaison will coordinate with the Project Manager/Engineer and any contractors to provide advance notification via email, mailed notices, door-hangers, social media or other means, as appropriate.

4 Project Impacts

4.1 Significance Criteria

4.1.1 Criteria

Consistent with Appendix G of the CEQA Guidelines, the Project is considered to have a significant impact related to noise if it would:

1. 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 other applicable standards of other agencies
2. Generate excessive groundborne vibration or groundborne noise levels
3. Expose people residing or working in the Project area to excessive noise levels, if the Project is 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

4.1.2 Thresholds of Significance

The criteria described below were used to evaluate the significance of environmental noise resulting from the Project.

Temporary or Permanent Noise Increases in Excess of Established Standards

The noise impact analysis and significance determination provided in this technical report utilizes the approach of the City of Oakland and reflects its interpretation of the City's Noise Ordinance and OPC. The City of Oakland OPC identifies noise level thresholds for short-term and long-term construction (refer to Table 5). The City requires projects that exceed the short- and long-term construction thresholds to incorporate noise controls to ensure that the maximum feasible noise attenuation is achieved. The City of Oakland requires the incorporation of Oakland Standard Conditions of Approval for all projects approved by the City. Similarly, EBMUD incorporates Standard Construction Specifications and Procedures into all projects. Section 3.6 of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, requires implementation of standard noise-reduction practices that are consistent with those required by the Oakland Standard Conditions of Approval. Noise-reducing requirements identified in both the Oakland Standard Conditions of Approval and EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, include muffling equipment, using hydraulically or electrically powered tools (in place of pneumatically powered tools), accessing temporary power from existing power poles instead of generators, and using noise barriers or noise control blankets around the construction site or

major noise sources, where feasible (refer to Appendix A). Additionally, the Oakland Standard Conditions of Approval and EBMUD Standard Construction Specification 01 14 00, Work Restrictions, both include restrictions on operating hours for excessive noise-generating equipment (generating noise greater than 90 dBA). Appendix A presents a table that includes all applicable Oakland Standard Conditions of Approval for noise as well as EBMUD's Standard Construction Specifications and Procedures relevant to and consistent with each Standard Condition of Approval. Project-related construction activities that generate noise levels in exceedance of the City of Oakland's short- and long-term construction noise thresholds would incorporate applicable EBMUD Standard Construction Specifications and Procedures, consistent with Oakland Standard Conditions of Approval, to ensure that construction noise has been reduced to the maximum extent feasible. Consistent with the City of Oakland's interpretation of the City's Noise Ordinance and OPC, a significant impact would be identified under the following circumstances.

a. Temporary Construction Noise in Excess of Standards. Construction noise impacts would be considered significant if Project construction were to exceed the construction noise level standards specified in the OPC (refer to Table 5) and no additional noise controls were applied to the Project.
b. Permanent Operational Noise in Excess of Standards. A significant impact would be identified if noise generated by new PP operational equipment were to exceed the noise level standards specified in in the OPC (refer to Table 6).

Generation of Excessive Groundborne Vibration

A significant impact would occur if the groundborne vibration levels from construction exceed 0.25 in/sec PPV at historic structures and/or 0.5 in/sec PPV at new residential or modern commercial/industrial structures.

Excessive Aircraft Noise Exposure

A significant impact would occur if the Project resulted in frequent exposure of people to aircraft noise that exceeds 70 dB CNEL.

4.2 Impact Discussion

Impact Noise-1: Potential to 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 other applicable standards of other agencies. ***(Less than Significant)***

Construction

Overview

Construction noise would be generated during construction activities associated with the Project, including demolition of the existing PP, construction of the new PP, activities at three existing pipeline abandonment disconnection sites, and construction of new pipelines. Variables that influence the level of noise generated include the type of construction equipment used, the timing and duration of noise-generating activities, the distance between construction noise

sources and noise-sensitive receptors, any shielding provided by intervening structures or terrain, ambient noise levels, and use of noise source controls. These variables as they relate specifically to the Project are described in further detail below.

- **Construction Equipment Type.** Each construction phase would include a different mix of active, noise-generating equipment. The highest noise levels are typically generated during the demolition of existing structures when impact tools are used (e.g., jackhammers, hoe rams). Site grading and excavation activities would also generate high noise levels as these phases often require the simultaneous use of multiple pieces of heavy equipment, such as dozers, excavators, scrapers, and loaders. Lower noise levels result from construction activities when less heavy equipment is required to complete the tasks. Table 7 provides the average (L_{eq}) and maximum (L_{max}) noise levels for construction equipment planned for use during Project demolition and construction activities. Individual equipment proposed for demolition and construction of the Project are anticipated to generate noise levels ranging from 66 to 92 dBA L_{eq} and 67 to 99 dBA L_{max}, respectively, at a distance of 50 feet from the source, as indicated in Table 7.
- **Timing and Duration of Noise-Generating Activities.** The total construction duration of all components of the Project is anticipated to last approximately 75 weeks; however, construction duration and noise exposure at any single location would vary depending on the Project component. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (i.e., early morning, evening, or nighttime hours), when construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction durations last over extended periods of time. Construction would be conducted during weekdays between 7:00 a.m. and 7:00 p.m. Although the City of Oakland's daytime construction noise limits allow for a 12-hour construction window, active construction would occur across a typical 8-hour workday. Noise levels generated during the 8-hour period of active construction serves as the basis of the noise impact analysis.
- **Distance and Shielding Between Noise-Sensitive Receptors and Noise Sources.** Construction-generated noise levels decrease at a rate of approximately 6 dBA per doubling of the distance between the construction equipment noise source and receptor. Shielding by buildings or terrain can provide an additional 5 to 20 dBA of noise reduction at distant receptors (Federal Highway Administration, 2017b). Given the density of development in the Project area, most surrounding properties other than those directly adjoining the sites would be provided approximately 20 dBA of shielding from intervening structures. For the purposes of the analysis below, a noise reduction of up to 5 dBA from shielding was conservatively assumed for receptors adjacent to Project construction sites.

Table 7 Construction Equipment 50-foot Noise Emission Levels (dBA)

Equipment Category	Leq[1,2,3]	Lmax[1,2]	Equipment Category	Leq[1,2,3]	Lmax[1,2]
Backhoe	76	84	Flatbed Truck	-	74
Chainsaw	79	83	Generator	67	68
Compactor (Plate)	-	75	Grader (Passby)	-	79
Compactor (Roller)	82	83	Hoe Ram	92	99
Compressor	66	67	Jackhammer	91	95
Concrete Mixer Truck	81	82	Paving – Asphalt (Paver, Dump Truck)	87	91
Concrete Pump Truck	84	88	Generator	67	68
Concrete Saw	85	88	Power Unit (Power Pack)	81	82
Dozer	80	86	Pump	73	74
Dump Truck (Cyclical)	82	92	Street Sweeper	-	81
Dump Truck (Passby)	-	73	Telescopic Handler (Forklift)	-	88
Excavator	76	87	Welding Machine	71	72

Notes: 1 Measured at 50 feet from the construction equipment.

2 Noise levels apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation. L_{eq} noise levels also consider the duration of an overall time period that the equipment is operating at full power, also known as the "usage factor".

3 Equipment without average (L_{eq}) noise levels are non-stationary and best represented only by maximum instantaneous noise level (L_{max}) because L_{eq} noise levels of mobile equipment vary as the proximity to the equipment changes.

Source: (National Cooperative Highway Research Program, 2018)

- **Ambient Noise Levels.** Ambient noise, or the existing, pre-Project noise level, is considered in the noise analysis. In some locations, such as along MacArthur Boulevard, ambient noise levels exceed the City of Oakland's long-term construction noise limit. The OPC states that if ambient noise levels exceed the short- or long-term construction noise limits, then the noise limit threshold will be adjusted to equal the ambient noise level (refer to Table 5).
- **Noise Source Controls**. Noise source controls (e.g., mufflers) on construction equipment have been found to reduce noise levels by 5 dBA (Federal Highway Administration, 2006). Implementation of both noise source controls on construction equipment and temporary noise barriers would result in cumulative noise reductions of 10 to 20 dBA, depending on the height of the barrier.

Expected noise levels originating from Project construction were calculated based on data used in the Federal Highway Administration's Roadway Construction Noise Model (RCNM) Version 2.0. Results are described by Project component below and presented in Table 8 and Table 9.

Existing Pumping Plant Demolition

Demolition of the existing PP is anticipated to occur over a period of approximately 8 weeks. The OPC long-term construction noise limits are defined as 65 dBA at residential properties and 70 dBA at commercial properties. As presented in Table 3, ambient noise levels were calculated to be 55 to 60 dBA L_{dn} at the existing PP site. There are no commercial properties in the vicinity of the existing PP site; therefore, the residential long-term construction noise threshold of 65 dBA would be applicable to existing PP demolition.

As indicated in Table 4, residential properties adjoin the existing PP site. Table 8 summarizes construction noise levels by phase and the approximate duration of noise exposure to sensitive receptors during demolition activities. Without implementation of EBMUD's standard construction specifications, noise levels during demolition of the existing PP are anticipated to range from approximately 69 to 94 dBA L_{eq} at the nearest sensitive receptor. Demolition noise would exceed the City of Oakland's daytime long-term construction limit (65 dBA) at adjacent unshielded sensitive receptors. As discussed in Section 1.2.1, noise decreases at a rate of 6 dBA per doubling of distance; therefore, noise at more distant receptors would experience reduced noise levels. In addition to the distance-attenuated noise level, receptors that are not directly adjacent to the demolition activities would receive an additional 20 dBA reduction due to the presence of the intervening residential structures. Noise levels are not anticipated to exceed thresholds at receptors that are not directly adjacent to the demolition site.

As detailed in Section 3.4, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated into the Project, including EBMUD Standard Construction Specification 01 35 44, Environmental Requirements. Specifically, Section 3.6, Noise Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, which is consistent with Oakland Standard Condition of Approval Number 63 (refer to Appendix A), includes use of equipment mufflers. The use of equipment mufflers or

similar source controls would reduce construction noise by up to approximately 5 dBA[6], depending on the phase (refer to Table 8). Section 3.6, Noise Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, also requires the use of noise control blankets and noise barriers, which is also included as part of Oakland Standard Condition of Approval Numbers 63 and 64 (refer to Appendix A). Approximately 6-foot-tall redwood fencing and 6-foot-tall plywood fencing currently line the western and southern perimeters, respectively, of the existing PP property. In addition, as part of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, which has been incorporated into the Project, EBMUD would install temporary noise control panels or acoustic barriers to the existing chain-link fencing and gates along the northern and eastern perimeters of the existing PP property. The presence of the existing wooden fence would be functionally equivalent to a temporary construction noise barrier, reducing construction noise by up to 5 dBA at the receptors west and south of the existing PP site. Similar to the existing wooden fencing, noise control panels would provide a construction noise reduction of up to 5 dBA at the receptors north and east of the PP site.[7] With implementation of these specific EBMUD Standard Construction Specifications (i.e., use of mufflers and noise source controls and noise barriers), construction noise levels would range from 59 to 89 dBA at the nearest receptors (refer to Table 8). As such, various phases of construction, including demolition, retaining wall construction, and backfilling, would still exceed the OPC daytime long-term construction limit of 65 dBA at the nearest sensitive receptors.

To further reduce noise impacts at the nearest sensitive receptors, EBMUD and its contractor would implement Section 1.3.G, Noise Control and Monitoring Plan, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, which is consistent with Oakland Standard Condition of Approval 64 (refer to Appendix A), into the Project. This specification requires the preparation and implementation of a Noise Control and Monitoring Plan that would define the means and methods for controlling and monitoring demolition noise to reduce construction noise for the Project.

Additionally, consistent with Oakland Standard Condition of Approval 64 (refer to Appendix A), Section 3.6, Noise Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, requires EBMUD and its contractor to notify residents within 300 feet of Project construction in advance of extreme noise-generating activity, thereby allowing residents to plan for construction activities and elevated noise levels. Also consistent with

[6] Source controls do not exist for concrete saws or chainsaws; therefore, noise levels adjusted for consideration of Standard Construction Specifications do not include reduction of concrete saw or chainsaw noise.

[7] A noise reduction of approximately 5 dBA would be achieved at ground-level receptors where the intervening fence and noise control panels break the receptors' lines of sight to demolition activities at the existing PP. The construction of taller noise control barriers cannot be feasibly implemented due to the rugged topography and space constraints at the site.

Oakland Standard Condition of Approval 64 (refer to Appendix A), EBMUD Procedure 600, Public Outreach and Community Relations, requires notification of residents 7 to 14 days in advance of potentially disruptive construction activities (e.g., noise, traffic) including geographical extent of activity and estimated duration of the activity. EBMUD Standard Construction Specification 01 14 00, Work Restrictions, which is consistent with Oakland Standard Condition of Approval Number 62 (refer to Appendix A), limits extreme noise-generating construction (i.e., greater than 90 dBA) to the hours of 8:00 a.m. to 4:00 p.m. to avoid the evening, nighttime, and early morning hours when people are most sensitive to noise. Furthermore, as part of EBMUD's Procedure 600, Public Outreach and Community Relations, which is consistent with Oakland Standard Condition of Approval Number 66 (refer to Appendix A), EBMUD would designate a Public Affairs liaison to respond to construction-related concerns, including noise levels, from the community. This Public Affairs liaison would be able to coordinate with the EBMUD Project team and contractor to resolve community concerns, including those related to construction noise.

With implementation of the EBMUD Standard Construction Specifications discussed above, noise from demolition of the existing PP site would occasionally exceed the City of Oakland daytime long-term noise threshold of 65 dBA. However, EBMUD Standard Construction Specifications 01 35 44, Environmental Requirements, Standard Construction Specification 01 14 00, Work Restrictions, and Procedure 600, Public Outreach and Community Relations, which would be incorporated into the Project, are consistent with the City of Oakland Standard Conditions of Approval, and would be implemented to reduce noise levels, avoid extreme noise-generating construction during the most sensitive periods of the day, require development and implementation of a Noise Control and Monitoring Plan, notify nearby residents of the construction schedule, and provide an EBMUD Public Affairs liaison to address noise concerns. Because EBMUD would implement all feasible noise control standard practices to reduce construction noise levels, impacts would be less than significant.

New Pumping Plant Construction

Construction of the new PP is anticipated to occur over a period of approximately 62 weeks. As previously discussed, the OPC long-term construction noise limits are defined as 65 dBA at residential properties and 70 dBA at commercial properties. Ambient noise levels are estimated to be 70 dBA L_{eq} at the new PP site. Because the ambient noise exceeds the residential long-term construction noise threshold, 70 dBA L_{eq} is the appropriate noise threshold at the new PP site (refer to Table 5).

As indicated in Table 4, residential properties adjoin the new PP site. Table 8 summarizes construction noise levels by phase and the approximate duration of noise exposure to sensitive receptors during construction activities. Because noise decreases at a rate of 6 dBA per doubling of distance, more distant receptors would experience reduced noise levels. Similar to more distant receptors at the existing PP site, receptors that are not directly adjacent to the new PP site would receive an additional 20 dBA reduction due to the presence of intervening structures and noise levels are not anticipated to exceed thresholds at these receptors.

At the nearest sensitive receptor, construction noise levels during construction of the new PP are anticipated to range from approximately 46 to 81 dBA L_{eq} without implementation of EBMUD's standard construction specifications, and would therefore exceed the City of Oakland's adjusted daytime long-term construction limit[8] (70 dBA at residential properties) at adjacent unshielded sensitive receptors during specific construction activities (refer to Table 8). However, as detailed in Section 3.4, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated into the Project, including EBMUD Standard Construction Specification 01 35 44, Environmental Requirements. Implementation of noise control standard practices identified in Section 3.6, Noise Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, which is consistent with Oakland Standard Condition of Approval 63 (refer to Appendix A) and includes use of equipment mufflers, would provide a reduction of up to approximately 5 dBA. Also, in accordance with Section 3.6, Noise Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements and consistent with Oakland Standard Condition of Approval 63 (refer to Appendix A), construction of a temporary 12-foot-tall noise barrier along the southern and western boundaries of the site would provide approximately 15 dBA reduction. As a result, implementation of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements is anticipated to reduce noise levels by a total of approximately 20 dBA during new PP construction. With implementation of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, construction noise levels would range from 26 to 61 dBA at the nearest receptors, as summarized in Table 8, thereby reducing construction noise levels to below the City of Oakland's adjusted daytime long-term construction limit.

With implementation of EBMUD Standard Construction Specification01 35 44, Environmental Requirements, which requires the use of equipment mufflers, noise control blankets, and noise barriers and is consistent with the City of Oakland Standard Conditions of Approval, noise from construction of the new PP would not exceed the OPC daytime long-term noise threshold of 70 dBA. Because these EBMUD Standard Construction Specifications would be implemented as part of the Project and noise levels would not exceed the OPC daytime long-term noise threshold, impacts would be less than significant.

New Pipeline Construction and Existing Pipeline Abandonment

Approximately 0.2 mile of new suction pipeline would be constructed underground within 96th Avenue near residential land uses. Approximately 0.6 mile of new underground discharge pipeline would be constructed along MacArthur Boulevard and 99th Avenue bordered by residential and commercial land uses. As indicated in Table 4, residential property lines are located as close as 43 feet from the new suction pipeline alignment, 27 feet from the new

[8] OPC defines the long-term construction noise threshold as 65 dBA unless ambient noise exceeds 65 dBA. Ambient noise along MacArthur Boulevard is estimated to be 70 dBA L_{dn}; therefore, the long-term construction noise threshold is adjusted to the ambient noise level (70 dBA).

discharge pipeline, and as close as 22 feet from the existing pipeline abandonment disconnection sites. Table 9 summarizes the construction noise levels by phase and the approximate duration of noise exposure to sensitive receptors during pipeline construction and abandonment work. Noise level impacts for both construction of the new pipelines and abandonment of the existing pipeline are discussed by Project component below.

- **New Pipeline Construction.** Given the linear nature of the pipeline activities, construction of the new suction and discharge pipelines would move along the alignment, with approximately 80 to 200 feet of pipeline being constructed in a day. Pipeline construction at any given location along the alignment would occur over a period of approximately 8 days. Figure 8 provides a graphic illustrating the progression of in-road pipeline construction activities. As such, the OPC short-term construction noise limits (80 dBA at residential sensitive receptors) (refer to Table 5) would be applicable to pipeline construction.

  Without implementation of EBMUD's standard construction specifications, noise levels generated during construction of the new suction and discharge pipelines would range from 84 to 90 dBA at the property line of the nearest receptors, which are located along 99th Avenue approximately 27 feet south of the discharge pipeline. As indicated in Table 9, without implementation of EBMUD's standard construction specifications, all construction phases associated with construction of the suction and discharge pipelines would exceed the OPC short-term construction noise limit of 80 dBA at the nearest residential property line, which is located 27 feet from the discharge pipeline alignment.

  The loudest construction noise associated with pipeline construction would occur during pavement cutting, when noise would reach up to 90 dBA L_{eq} at the residential property line. As shown in Figure 8, pipeline construction would move along the pipeline alignment and would not expose a receptor to more than 5 to 8 days of construction noise. Pavement cutting, the loudest phase of pipeline construction, may expose residents to approximately 5 days of elevated noise levels, with the loudest noise reaching 90 dBA at the property line when pavement cutting equipment is located directly in front of the residence. This maximum noise level of 90 dBA is anticipated to occur for less than one day at a single receptor. The majority of noise exposure from pavement cutting would range between 70 and 80 dBA L_{eq}. Other pipeline construction phases, including excavation, new pipeline construction, backfilling and repaving would generate less noise but would move slower along the alignment. Elevated noise levels are anticipated to occur for up to a total of 8 days at any single location, with 5 days of construction noise exceeding the OPC short-term construction noise limit (80 dBA at residential land uses).

- **Existing Pipeline Abandonment.** Abandonment of the existing pipeline would require 5 days to complete at each existing pipeline abandonment disconnection site. As such, the OPC short-term construction noise limits (80 dBA at residential sensitive receptors) (refer to Table 5) would be the applicable noise threshold for

pipeline abandonment activities. Without implementation of EBMUD's standard construction specifications, noise levels generated during abandonment of the existing pipeline would generate noise ranging from 84 to 92 dBA at the nearest property line, which is located approximately 22 feet from the existing pipeline abandonment disconnection sites. As indicated in Table 9, without implementation of EBMUD's standard construction specifications, all construction phases associated with abandonment of the existing pipeline would exceed the OPC short-term construction noise limit of 80 dBA at the nearest residential property line, which is located 22 feet from the existing pipeline abandonment disconnection sites.

The loudest construction phase would be pavement cutting, which would generate noise levels of 92 dBA at the closest receptor. Noise from pavement cutting activities would last less than one day at each existing pipeline abandonment disconnection site. Excavation, cutting, filling, and capping the pipe, and backfilling activities would also result in noise increases in excess of the daytime short-term construction noise limit.

Receptors that are not adjacent to pipeline construction and abandonment activities are anticipated to experience a 20-dBA reduction in noise levels due to shielding from intervening residential structures and increased distance from the noise source. Therefore, noise at shielded receptors would not exceed the OPC daytime short-term construction limit.

As detailed in Section 3.4, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated into the Project, including EBMUD Standard Construction Specification 01 35 44, Environmental Requirements. Section 3.6, Noise Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, which is consistent with Oakland Standard Condition of Approval Number 63 (refer to Appendix A), includes use of equipment mufflers or other noise source controls. The use of equipment noise source controls would reduce construction noise by up to approximately 5 dBA[9], depending on the phase, as presented in Table 8. With implementation of Standard Construction Specification 01 35 44, Environmental Requirements (i.e., use of mufflers and noise source controls), construction noise levels for new pipeline construction and existing pipeline abandonment would range from 79 to 92 dBA at the nearest receptors, as presented in Table 9.Various phases of construction, including pavement cutting, excavation, and pipeline construction, would still exceed the OPC daytime short-term construction limit of 80 dBA at the nearest sensitive receptors.

As detailed in Section 3.4, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated into the Project, including Section 1.3.G, Noise Control and Monitoring Plan, of EBMUD Standard Construction Specification 01 35 44,

[9] Source controls do not exist for concrete saws; therefore, noise levels adjusted for consideration of Standard Construction Specifications do not include reduction of concrete saw noise.

Environmental Requirements, which is consistent with Oakland Standard Condition of Approval 64 (refer to Appendix A) and would further reduce noise impacts at the nearest sensitive receptors. This specification requires the preparation and implementation of a Noise Control and Monitoring Plan that would define the means and methods for controlling and monitoring construction noise, including demolition noise, to reduce construction noise for the Project.

Additionally, consistent with Oakland Standard Condition of Approval 64 (refer to Appendix A), Section 3.6 of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, which would be incorporated into the Project, requires EBMUD and its contractor to notify residents within 300 feet of Project construction in advance of extreme noise-generating activity, thereby allowing residents to plan for construction activities and elevated noise levels. Also, consistent with Oakland Standard Condition of Approval 64 (refer to Appendix A), EBMUD Procedure 600, Public Outreach and Community Relations, also requires notification of residents 7 to 14 days in advance of potentially disruptive construction activities (e.g., noise, traffic) including geographical extent of activity and estimated duration of the activity. EBMUD Standard Construction Specification 01 14 00, Work Restrictions, which is consistent with Oakland Standard Condition of Approval Number 62 (refer to Appendix A), limits extreme noise-generating construction (i.e., greater than 90 dBA) to the hours of 8:00 a.m. to 4:00 p.m. to avoid the evening, nighttime, and early morning hours when people are most sensitive to noise. Furthermore, as part of EBMUD's Procedure 600, Public Outreach and Community Relations, which is consistent with Oakland Standard Condition of Approval Number 66 (refer to Appendix A), EBMUD would designate a Public Affairs liaison to respond to construction-related concerns, including noise levels, from the community. This Public Affairs liaison would be able to coordinate with the EBMUD Project team and contractor to resolve community concerns, including those related to construction noise.

Noise from construction of the new pipelines and abandonment of the existing pipeline would occasionally exceed the City of Oakland daytime long-term noise threshold of 65 dBA. However, EBMUD Standard Construction Specifications 01 35 44, Environmental Requirements, Standard Construction Specification 01 14 00, Work Restrictions, and Procedure 600, Public Outreach and Community Relations, which would be incorporated into the Project have been incorporated into the Project, are consistent with the City of Oakland Standard Conditions of Approval, and would be implemented to reduce noise levels, avoid extreme noise-generating construction during the most sensitive periods of the day, require development and implementation of a Noise Control and Monitoring Plan, notify nearby residents of the construction schedule, and provide an EBMUD Public Affairs liaison to address noise concerns. Because EBMUD would implement all feasible noise control standard practices to reduce construction noise levels, impacts would be less than significant.

Table 8 Calculated Construction Noise Levels at the Pumping Plant Sites (Long-term Construction Noise Limits)

Project Site	Construction Phase	Principal Noise Sources	Duration	Reference Noise Level (50 feet)		Distance to Closest Sensitive Receptor	Adjusted Noise Level at Nearest Receptor (L_{eq})[3]	Noise Reduction from EBMUD SCS[5] and District Procedures	L_{eq} with EBMUD SCS at Nearest Receptor[5]
				L_{max}[1]	L_{eq}[2]				
Demolition of Existing PP	Demolition	Concrete saw, dump truck, excavator, hoe ram, chainsaw	15 Days	99	86	Property line adjoining site. Primary construction, 20 feet from residential property.	94	-5 dBA for mufflers and similar source controls on dump truck, excavator, hoe ram only.[5] -5 dBA for use of noise control blankets and barriers. Restrict demolition to 8:00 a.m. to 4:00 p.m. Develop and implement Noise Control and Monitoring Plan. Notify residents within 300 feet prior to construction. Designate Public Affairs liaison to address noise concerns.	84 - 89
	Retaining Wall Construction	Mixer, pump truck	10 Days	88	78		86	-5 dBA for mufflers and similar source controls. Develop and implement Noise Control and Monitoring Plan. Notify residents within 300 feet prior to construction. Designate Public Affairs liaison to address noise concerns.	76
	Backfill	Backhoe, compactor (plate)	5 Days	84	69		77		67
	Site Restoration	Street sweeper	5 Days	81	61		69		59
Construction of New PP	Sidewalk Demolition	Backhoe, mixer, concrete saw, dump truck	2 Days	92	80	Property line adjoining site. Primary construction, 45 feet from residential property.	81	-15 dBA for a 12-foot-tall temporary noise barrier -5 dBA for mufflers and similar source controls on equipment (excluding concrete saw and chainsaw)	61
	Tree Removal	Chainsaw	3 Days	83	75		76		61
	Grading/ Excavation	Excavator, dozer, backhoe, dump truck, grader	10 Days	92	80		81		61
	Retaining Wall Construction	Mixer, backhoe	10 Days	84	77		58		38
	Building - Exterior	Mixer, pump truck	111 Days	88	81		62		42
	Paving	Compactor (roller), asphalt paving	10 Days	82	76		57		37
	Landscaping/ Fencing	Backhoe	5 Days	84	65		46		26

Notes:

1 L_{eq} is a 12-hour workday average noise level based on the maximum hours per 12-hour workday that each piece of equipment is anticipated to operate.

2 Since it is unlikely that the L_{max} from multiple pieces of construction equipment would occur simultaneously, the L_{max} level given is the highest L_{max} of the individual equipment proposed, not a cumulative L_{max} level.

3 Residential properties adjoin both the existing and new PP sites. The closest residential property line is approximately 20 feet from the primary on-site demolition activities at the existing pumping site and 45 feet from the primary construction activities at the new PP site; therefore, construction noise values provided in the "Adjusted Noise Level at Nearest Receptor" column of this table are calculated at 20 feet for demolition of the existing PP and 45 feet for construction of the new PP.

4 Long-term construction noise limit at the existing PP site is 65 dBA L_{eq}; Long-term construction noise limit at the new PP site is 70 dBA due to existing ambient noise levels L_{eq}

5 EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, includes use of noise source controls (e.g., mufflers), which provide approximately 5 dBA of reduction, and noise barriers, which provide an additional 15 dBA reduction, respectively, for a total of approximately 20 dBA of noise reduction. It is important to note that source controls do not exist for concrete saws or chainsaws; therefore, noise levels adjusted for consideration of Standard Construction Specifications do not include reduction of concrete saw or chainsaw noise. Standard Construction Specification 01 14 00, Work Restrictions, limits construction activities that may generate noise in excess of 90 dBA to the hours of 8:00 a.m. to 4:00 p.m., when people are less sensitive to noise.

SCS = EBMUD Standard Construction Specification

Table 9 Calculated Construction Noise Levels for Pipeline Construction and Abandonment (Short-term Construction Noise Limits)

Project Site	Construction Phase	Principal Noise Sources	Reference Noise Level (50 feet)		Distance to Closest Sensitive Receptor	Adjusted Noise Level at Nearest Receptor (L_{eq})[3]	Noise Reduction from EBMUD SCS[5] and District Procedures	L_{eq} with EBMUD SCS at Nearest Receptor[5]
			L_{max}[1]	L_{eq}[2]				
Construction of New Pipeline (8 Days at Any Given Location)	Pavement Cutting	Concrete saw	88	85	Property line as close as 43 feet from the suction pipeline and 27 feet from the discharge pipeline	90	Restrict pavement cutting to 8:00 a.m. to 4:00 p.m. Develop and implement Noise Control and Monitoring Plan. Notify residents within 300 feet prior to construction. Designate Public Affairs liaison to address noise concerns.	90
	Excavation	Excavator, backhoe, dump truck	87	81		86	-5 dBA for mufflers and similar source controls Develop and implement Noise Control and Monitoring Plan. Notify residents within 300 feet prior to construction. Designate Public Affairs liaison to address noise concerns.	81
	Pipeline Construction	Forklift, backhoe, generator, welding machine	88	83		88		83
	Backfill/Repaving	Asphalt paving equipment, compactor (roller)	82	79		84		79
Abandonment of Existing Pipeline (5 Days at Each Location)	Pavement Cutting	Concrete saw	92	80	Property line as close as 22 feet from existing pipeline abandonment disconnection sites	92	Restrict pavement cutting to 8:00 a.m. to 4:00 p.m. Develop and implement Noise Control and Monitoring Plan. Notify residents within 300 feet prior to construction. Designate Public Affairs liaison to address noise concerns.	92
	Excavation	Excavator, backhoe, dump truck	87	81		88	-5 dBA for mufflers and similar source controls. Restrict pavement cutting to 8:00 a.m. to 4:00 p.m. Develop and implement Noise Control and Monitoring Plan. Notify residents within 300 feet prior to construction. Designate Public Affairs liaison to address noise concerns	83
	Pipeline Cut/Fill/Cap	Mixer, generator, pump, welding machine	82	77		84		79
	Backfill/Repaving	Dump truck, compactor (plate), asphalt paver	92	78		85		80

Notes:

1 L_{eq} is a 12-hour workday average noise level based on the maximum hours per 8-hour workday that each piece of equipment is anticipated to operate.

2 Since it is unlikely that the L_{max} from multiple pieces of construction equipment would occur simultaneously, the L_{max} level given is the highest L_{max} of the individual equipment proposed, not a cumulative L_{max} level.

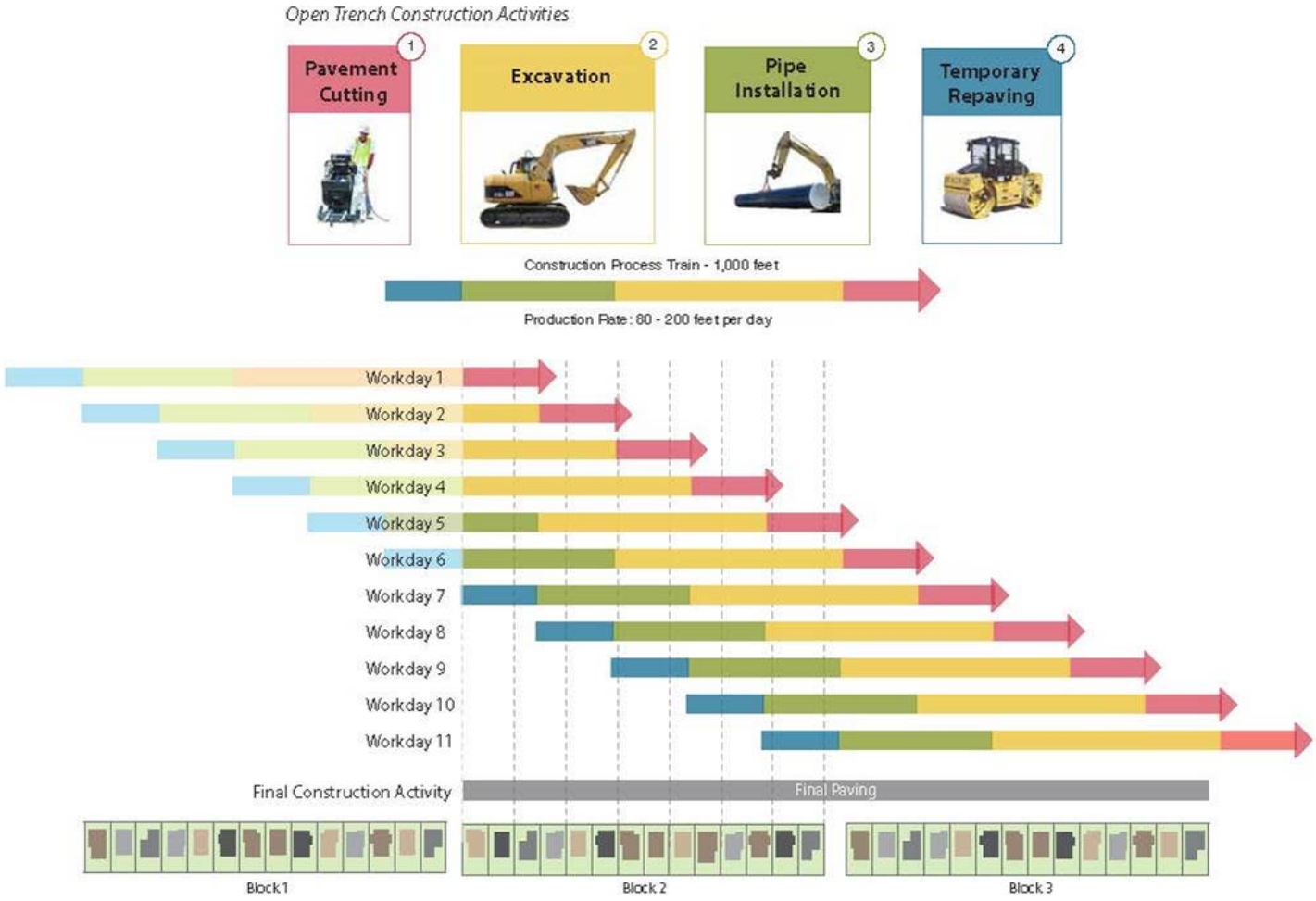
3 The closest receptors are approximately 27 feet from the discharge pipeline and 22 feet from the southernmost existing pipeline abandonment disconnection site; therefore, construction noise values provided in the "Adjusted Noise Level at Nearest Receptor" column of this table are calculated at the distance of 27 feet for new pipeline construction and 22 feet for pipeline abandonment.

4 Short-term construction noise limit for pipeline construction and abandonment is 80 dBA L_{eq}

5 EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, includes use of source controls (e.g., mufflers), which provides an approximately 5-dBA reduction. It is important to note that source controls do not exist for concrete saws; therefore, noise levels adjusted for consideration of Standard Construction Specifications do not include reduction of concrete saw noise. Use of noise barriers is not possible due to the mobile nature of pipeline construction. Standard Construction Specification 01 14 00, Work Restrictions, limits construction activities that may generate noise in excess of 90 dBA to the hours of 8:00 a.m. to 4:00 p.m., when people are less sensitive to noise.

SCS = EBMUD Standard Construction Specification

Figure 8 Typical Progression of Open Trench Construction



Construction Truck Trip Generation

Truck traffic for off-hauling, large equipment deliveries, and material deliveries would access the new PP and new pipeline construction sites via the City of Oakland designated truck routes on 73rd Avenue and I-880. These trucks would travel to the Project site via I-880 to 73rd Avenue to southbound MacArthur Boulevard, accessing the site on the MacArthur Boulevard side. Trucks exiting the site would exit onto MacArthur Boulevard, proceed south to westbound 98th Avenue, and back to I-880. Trucks traveling to the existing PP and existing pipeline abandonment disconnection sites would also use the City of Oakland designated truck routes on I-880 and Hegenberger Road/73rd Avenue and then would use MacArthur Boulevard to 82nd Avenue. Once on 82nd Avenue, trucks would be directed to use Golf Links Road and El Monte Avenue to access Ney Avenue and the existing PP.

As described in the Fontaine Pumping Plant Replacement Project Transportation and Traffic Technical Report (Panorama Environmental and Fehr & Peers, 2021), Project construction would result in a maximum of approximately 26 vehicle trips per hour, including approximately 10 trucks, during concurrent new pipeline and new PP construction. Once pipeline work is completed, a maximum of approximately 16 vehicles per hour, including approximately eight trucks, is anticipated. The traffic noise increase due to construction traffic was calculated through comparison of 2020 existing and 2020 existing plus Project traffic volumes. Construction could begin as late as 2025; therefore, a comparison between 2025 baseline and 2025 baseline plus Project traffic volumes was also considered. Both the 2020 and 2025 comparisons took into account the difference in noise levels between light vehicles and heavy trucks.

The City of Oakland does not define or provide thresholds for traffic noise level increase that is considered substantial. Typically, a permanent increase in the day-night average noise level of 3 dBA L_{dn} or greater at noise-sensitive receptors would be considered significant when projected noise levels would exceed those considered satisfactory for the affected land use (60 dBA L_{dn} for residences) and a permanent increase of 5 dBA L_{dn} or greater would be considered significant when projected noise levels would continue to meet those considered satisfactory for the affected land use (Federal Highway Administration, 2017a).

Based on a comparison of existing traffic volumes to existing plus Project construction traffic volumes, Project construction would result in traffic noise increases of approximately 1 dBA or less along Bancroft Avenue, MacArthur Boulevard, and 96th Avenue. This increase in traffic noise levels would not generally be noticeable or measurable. Due to the lower existing traffic volumes on 99th Avenue as compared to Bancroft Avenue and MacArthur Boulevard and the higher number of projected construction traffic trucks as compared to 96th Avenue, the relative contribution of Project construction traffic to 99th Avenue would be greater than that along Bancroft Avenue, MacArthur Boulevard, and 96th Avenue. Traffic noise levels along 99th Avenue would increase by approximately 3 dBA, from 49 dBA L_{dn} to 52 dBA L_{dn}, at a distance of 50 feet from the center of the roadway, with as many as four truck trips per hour traveling on the roadway during heavy construction. While this noise increase may be noticeable, the increase would be intermittent and temporary (only occur during construction of the Project),

and noise levels would continue to be considered compatible with the noise environment. Additionally, the construction traffic noise increases would be below the threshold generally considered for significance for permanent traffic noise increases. Because the increase in noise from Project construction traffic would be negligible (1 dBA or less) and temporary and would be below significance thresholds for permanent traffic noise increases, the noise from increased construction traffic would be less than significant.

Operation

The new PP would include three 10-mgd, 300-horsepower vertical turbine pumps with a total capacity of 20 mgd (accounting for one standby unit), switchgear, transformer, and 10-mgd Fontaine Rate Control Station. Approximately two vehicle trips occurring per month would be associated with Project operations.

Based on noise data collected from pumps with similar power and speed ratings, each pump is expected to produce an A-weighted sound level of 86 dBA at 3 feet in a non-reverberant, open air, environment (Hoover & Keith, 1996). The pumps at the new PP would be located inside a new building. Based on the consideration of a typical reverberant noise buildup within the PP building interior, the calculated sound level for one pump operating within the PP is 90 dBA at 3 feet and 88 dBA at the inside face of the building perimeter. The simultaneous operation of two pumps would result in a total noise level of 91 dBA at the inside face of the building perimeter.[10] Considering these interior levels, the noise level for two pumps operating inside of the enclosed PP would be 56 dBA at a distance of 50 feet from the building on the side with an open (non-acoustically rated) louver, and 26 dBA at a distance of 50 feet on the side of the building without any openings.

A review of the *East Bay Municipal Utility District Fontaine Pumping Plant Replacement Project Aesthetics Conceptual Design Report* (Panorama Environmental, Inc., MWA Architects, and Dillingham Associates, 2021) indicated that the nearest residential property lines to the new PP building are to the west and south at respective distances of 18 and 26 feet from the face of the new PP building. The western building façade would be solid with no openings, the northern and southern façades would have louvered openings installed, and the eastern façade would have a single and double door installed. Based on the relative dimensions of the solid wall to louver and door areas, and without consideration of the use of any interior to exterior noise control devices, the sound level produced by the simultaneous operation of two pumps would

[10] Individual decibel ratings for different noise sources cannot be added arithmetically to give the sound level for the combined noise from all sources. Instead, the combined noise level produced by multiple noise sources is calculated using logarithmic summation. For example, if one noise source produces a noise level of 50 dBA, then two of the identical sources side by side would generate a combined noise level of 53 dBA, or an increase of only 3 dBA. Equation: $10 \text{ Log}_{10} (10^{5.0}+10^{5.0}) = 53$ dBA

result in a total noise level of approximately 43 dBA at the western property line and approximately 56 dBA at the southern property line.

These results, which are summarized in Table 10, indicate that without the use of any interior-to-exterior noise control devices, the sound from operation of the PP would be below the daytime (60 dBA L_{eq}) and nighttime (45 dBA L_{eq}) thresholds established by the City of Oakland at the western property line, but nighttime operation would exceed the City's 45 dBA L_{eq} threshold at the southern residential property line.

As detailed in Section 3.4, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated into the Project, including Section 2.4, Stationary Acoustical Louvers, of EBMUD Design Standard 08 91 00, Louvers, which requires the installation of 6-inch-deep acoustical louvers such as Airolite C. Model CB9106, American Warming and Ventilating Model LAA 66, Ruskin Co. Model ACL 645, or acoustical equivalent. With the use of such acoustically rated louvers, the sound level produced by the simultaneous operation of two pumps would result in a noise level of approximately 44 dBA at the southern property line and comply with the City's 45 dBA L_{eq} nighttime threshold. Therefore, noise generated by the operation of the new pumps would be less than significant.

Table 10 Calculated Operational Noise Levels at Nearest Noise Sensitive Uses

Noise Source	Reference Noise Level, dBA L_{eq}	Adjustment Provided by Enclosure	Distance to Nearest Receptor	Distance Adjustment, dBA	Adjusted Noise Level, dBA L_{eq}	Exceeds Limit?
10-mgd vertical turbine pumps at western wall (3 total, 2 operating and 1 backup)	91 dBA at inner face of building for two pumps operating simultaneously	-32 dBA on western wall (no louver)	18 feet	-16 dBA	43 dBA	No
	91 dBA at inner face of building for two pumps operating simultaneously	-16 dBA on southern wall -12 dBA from acoustical louver Total adjustment: -28 dBA	26 feet	-19 dBA	44 dBA	No
Transformer	48 dBA at 3 feet	Included in measured level	7 feet	-7 dBA	41 dBA	No

The switchgear and transformer at the new PP site would be similar to the switchgear and transformer at the existing PP site and located approximately 7 feet from the nearest residential property line. The existing PP switchgear and transformer were measured to generate a steady noise level of 48 dBA L_{eq} at 3 feet from the equipment. At a distance of 7 feet, noise levels would be 7 dBA lower, resulting in a noise level of 41 dBA L_{eq}. This noise level is approximately 8 dBA below noise levels generated by vehicular traffic along 96th Avenue at this same property line

location during peak hours and below the daytime and nighttime thresholds established by the City of Oakland. Therefore, noise generated by the operation of the switchgear and transformer would be less than significant.

Impact Noise-2: Potential to generate excessive groundborne vibration or groundborne noise levels. ***(Less than Significant)***

Construction

Construction activities associated with the Project would include construction of a new PP, demolition of an existing PP, and construction of new pipeline. Pile driving, which typically produces the highest vibration levels, would not be used for Project construction.

Demolition and construction activities required for construction often generate perceptible vibration and levels that could affect nearby structures when heavy equipment or impact tools (e.g., jackhammers, hoe rams) are used in the vicinity of nearby sensitive land uses. Building damage generally falls into three categories:

- **Cosmetic damage** (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects.
- **Minor damage** is defined as hairline cracking in masonry or the loosening of plaster.
- **Major structural damage** is defined as wide cracking or the shifting of foundation or bearing walls.

As shown in Table 4, residential structures are as close as 20 feet from the existing PP, 12 feet from the new PP site, 43 feet from the new suction pipeline, and 27 feet from the new discharge pipeline. Table 11 presents construction vibration levels at a reference distance of 25 feet and at various distances (representative of nearby structures) from various heavy construction equipment. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Vibration levels are highest closest to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.

As shown in Table 11, construction vibration is not anticipated to exceed the threshold for cosmetic damage from normal conventional construction (0.5 in/sec PPV) if structures are located 12 feet or further from any Project construction activities. There are no structures located within 12 feet of proposed construction.

Construction vibration would be anticipated to exceed the threshold for cosmetic damage to historic structures (0.25 in/sec PPV) if historic structures are located 21 feet or closer to clam shovel drop activities or operation of vibratory rollers. All other Project construction equipment would be anticipated to generate vibration levels below the historic structure threshold at distances of 10 feet or greater. Vibration levels would be lower as construction moves away from nearby structures or when lower-vibration construction equipment and methods are used;

however, exceedance of cosmetic damage thresholds could occur when vibratory rollers are used within 21 feet of historic structures.

Table 11 Vibration Levels for Construction Equipment at Various Distances

Equipment		PPV (in/sec) at Given Distance				
		12 feet	20 feet	25 feet	50 feet	70 feet
Clam Shovel Drop		0.453	0.258	0.202	0.094	0.065
Hydromill (Slurry Wall)	In soil	0.018	0.010	0.008	0.004	0.003
	In rock	0.038	0.022	0.017	0.008	0.005
Vibratory Roller		0.471	0.268	0.210	0.098	0.068
Hoe Ram		0.200	0.114	0.089	0.042	0.029
Large bulldozer		0.200	0.114	0.089	0.042	0.029
Caisson drilling		0.200	0.114	0.089	0.042	0.029
Loaded trucks		0.170	0.097	0.076	0.035	0.024
Jackhammer		0.078	0.045	0.035	0.016	0.011
Small bulldozer		0.007	0.004	0.003	0.001	0.001

Source: (Federal Transit Administration, 2018) modified by Illingworth & Rodkin, Inc., August 2020.

Construction of the new PP, demolition of the existing PP, and pipeline construction would not require the use of a clam shovel drop; however, vibratory rollers would be used for compacting soils during construction of the new PP, demolition of the existing PP, and construction of suction and discharge pipelines. Historic structures are not located within 21 feet of any of the Project sites, where vibratory rollers may be periodically used.

As detailed in Section 3.4, a number of EBMUD standard practices and procedures, applicable to all EBMUD projects, would be incorporated as part of the Project, including EBMUD Standard Construction Specification 01 35 44, Environmental Requirements. Implementation of Section 3.5, Vibration Control, of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, would reduce impacts associated with groundborne vibration generation during construction by requiring the following:

- Preparing and implementing a Vibration Control and Monitoring Plan that details the means and methods for controlling and monitoring surface vibration generated by demolition and other work. (Section 1.3.H.1)
- Limiting surface vibration to no more than 0.5 in/sec PPV measured at the nearest residence or other sensitive structure. (Section 3.6.A)

Implementation of EBMUD Standard Construction Specification 01 35 44, Environmental Requirements, requires preparing and implementing a Vibration Control and Monitoring Plan

and limiting surface vibration to no more than 0.5 in/sec PPV which reduces potential cosmetic damage vibration impacts on conventional structures, resulting in a less than significant impact.

Operation

Operational equipment is not anticipated to generate perceptible levels of vibration off-site resulting in a less than significant impact.

Impact Noise-3: For a project located within the vicinity of a private airstrip or an airport land use plan, or, where such a plan has not been adopted, within two miles of a public airport or public use airport, potential to expose people residing or working in the project area to excessive noise. ***(No Impact)***

The Project is not located within the vicinity of a private airstrip or a public airport and would not expose people residing or working in the Project area to excessive aircraft noise levels resulting in no impact.

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City of Oakland Standard Conditions of Approval and East Bay Municipal Utility District Practices and Procedures Related to Construction Noise

1.1 Introduction

The City of Oakland's planning code identifies noise level thresholds for daytime short-term and long-term construction. The City of Oakland requires projects that exceed the short- and long-term construction thresholds to incorporate noise controls to ensure that feasible noise attenuation is included during project construction. The City of Oakland's Ordinance No. 12899 requires the incorporation of applicable Standard Conditions of Approval for all projects approved by the City.

Pursuant to California Government Code Section 53091, the East Bay Municipal Utility District (EBMUD), as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances, including noise ordinances, for projects involving facilities for the production, generation, storage, or transmission of water. Nonetheless, it is the practice of EBMUD to consider local environmental protection policies for guidance. EBMUD incorporates standard practices and procedures as part of all their projects.

EBMUD standard practices and procedures consistent with the City of Oakland's Standard Conditions of Approval applicable to construction noise control are identified in EBMUD's Standard Construction Specifications, and Procedures. Specifically, EBMUD's Standard Construction Specifications 01 14 00, Work Restrictions, 01 35 44, Environmental Requirements, and EBMUD Procedure 600, Public Outreach and Community Relations, include standard measures to reduce construction noise impacts. The following table presents the City's Standard Conditions of Approval applicable to construction noise and identifies the EBMUD Standard Construction Specifications and EBMUD Procedures that are applicable to the Fontaine Pumping Plant Replacement Project and consistent with each Standard Condition of Approval.

EBMUD Practices and Procedures Consistent with Oakland Standard Conditions of Approval for Construction Noise

Oakland Standard Condition of Approval		Applicable EBMUD Standard Construction Specification/Procedure
Condition	**Applicability**	
62. Construction Days/Hours Requirement: The project applicant shall comply with the following restrictions concerning construction days and hours: a. Construction activities are limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, except that pier drilling and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m. b. Construction activities are limited to between 9:00 a.m. and 5:00 p.m. on Saturday. In residential zones and within 300 feet of a residential zone, construction activities are allowed from 9:00 a.m. to 5:00 p.m. only within the interior of the building with the doors and windows closed. No pier drilling or other extreme noise generating activities greater than 90 dBA are allowed on Saturday. c. No construction is allowed on Sunday or federal holidays. Construction activities include, but are not limited to, truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area. Any construction activity proposed outside of the above days and hours for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case-by-case basis by the City, with criteria including the urgency/emergency nature of the work, the proximity of residential or other sensitive uses, and a consideration of nearby residents'/occupants' preferences. The project applicant shall notify property owners and occupants located within 300 feet at least 14 calendar days prior to construction activity proposed outside of the above days/hours.	Condition applies to all projects involving construction	**EBMUD STANDARD CONSTRUCTION SPECIFICATION SECTION 01 14 00, WORK RESTRICTIONS** **PART 1 - GENERAL** 1.3 WORK HOURS A. Work or activity of any kind shall be limited to the hours from 7:00 a.m. to 6:00 p.m. Monday through Friday with the exception of required outages, as described in Section 01 35 13 – Special Project Procedures. B. Work in excess of eight hours per day, work on Saturdays, work on Sundays, or work on District holidays requires prior consent of the Engineer and is subject to Cost of Overtime Construction Inspection. Notify the Engineer no less than 96 hours prior to beginning scheduled work at night or on a Saturday, Sunday or District holidays. C. District holidays 1. Holidays are: New Year's Day Martin Luther King Day (3rd Monday in January) Lincoln's Birthday Washington's Birthday (3rd Monday in February) Cesar Chavez's Birthday Memorial Day (last Monday in May) Independence Day Labor Day (1st Monday in September) Columbus Day (2nd Monday in October) Veteran's Day Thanksgiving Day and following Friday

Oakland Standard Condition of Approval Condition	Applicability	Applicable EBMUD Standard Construction Specification/Procedure
When submitting a request to the City to allow construction activity outside of the above days/hours, the project applicant shall submit information concerning the type and duration of proposed construction activity and the draft public notice for City review and approval prior to distribution of the public notice.		Christmas Day Day after Christmas 1.7 CONSTRUCTION NOISE A. Noise-generating activities greater than 90 dBA (impact construction such as concrete breaking, concrete crushing, tree grinding, etc.) shall be limited to the hours of 8:00 a.m. and 4:00 p.m., Monday through Friday. **EBMUD PROCEDURE 600, PUBLIC OUTREACH AND COMMUNITY RELATIONS** **Capital Project Management Responsibilities, Public Affairs**: • For Capital Projects, notifies residents at least seven (7) days (and preferably fourteen (14) days) in advance of potentially disruptive construction activities (e.g., noise, traffic) including geographical extent of activity and estimated duration of the activity. Public Affairs liaison will coordinate with the Project Manager/Engineer and any contractors to provide advance notification via email, mailed notices, door-hangers, social media or other means, as appropriate.
63. Construction Noise Requirement: The project applicant shall implement noise reduction measures to reduce noise impacts due to construction. Noise reduction measures include, but are not limited to, the following: a. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds) wherever feasible.	Condition applies to all projects involving construction	**EBMUD STANDARD CONSTRUCTION SPECIFICATION SECTION 01 35 44, ENVIRONMENTAL REQUIREMENTS** **PART 3 – EXECUTION** 3.4 EMISSIONS CONTROL A. Air Quality and Emissions Control 1. The Contractor shall ensure that line power is used instead of diesel generators at all construction sites where line power is available. 3.6 NOISE CONTROL

Oakland Standard Condition of Approval		Applicable EBMUD Standard Construction Specification/Procedure
Condition	Applicability	
b. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures. c. Applicant shall use temporary power poles instead of generators where feasible. d. Stationary noise sources shall be located as far from adjacent properties as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City to provide equivalent noise reduction. e. The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.		B. Contractor is responsible for taking appropriate measures, including muffling of equipment, selecting quieter equipment, erecting noise barriers, modifying work operations, and other measures as needed to bring construction noise into compliance. C. Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler. D. Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks, as necessary. F. Stationary noise sources (e.g., chippers, grinders, compressors) shall be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) shall be used. Enclosure opening or venting shall face away from sensitive receptors. Enclosures shall be designed by a registered engineer regularly involved in noise control analysis and design. G. Material stockpiles as well as maintenance/equipment staging and parking areas (all on-site) shall be located as far as practicable from residential receptors. H. If impact equipment (e.g., jack hammers, pavement breakers, rock drills etc.) is used during project construction, Contractor is responsible for taking appropriate measures, including but not limited to the following: 1. Hydraulically or electric-powered equipment shall be used wherever feasible to avoid the noise associated

Oakland Standard Condition of Approval Condition	Applicability	Applicable EBMUD Standard Construction Specification/Procedure
		with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust shall be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves shall be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, will be used whenever feasible. It is the Contractor's responsibility to implement any measures necessary to meet applicable noise requirements. 2. Impact construction including jackhammers, hydraulic backhoe, concrete crushing/recycling activities, vibratory pile drivers etc. shall be limited to the day time hours specified in Section 01 14 00 [Work Restrictions]. 6. Limit the noisiest phases of construction to 10 work days at a time, where feasible.
64. Extreme Construction Noise *a. Construction Noise Management Plan Required* Requirement: Prior to any extreme noise generating construction activities (e.g., pier drilling, pile driving and other activities generating greater than 90dBA), the project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction impacts associated with extreme noise generating activities. The project applicant shall implement the approved Plan during construction. Potential attenuation measures include, but are not limited to, the following:	Condition applies to all projects involving construction. The Construction Noise Management Plan may be required prior to project approval.	**EBMUD STANDARD CONSTRUCTION SPECIFICATION SECTION 01 35 44, ENVIRONMENTAL REQUIREMENTS** **PART 1 - GENERAL** 1.3 Submittals G. Noise Control and Monitoring Plan Submit a plan detailing the means and methods for controlling and monitoring noise generated by construction activities, including demolition, alteration, repair or remodeling of or to existing structures and construction of new structures, as well as by items of machinery, equipment or devices used during construction activities on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall

Oakland Standard Condition of Approval Condition	Applicability	Applicable EBMUD Standard Construction Specification/Procedure
i. Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings; ii. Implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions; iii. Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site; iv. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example and implement such measure if such measures are feasible and would noticeably reduce noise impacts; and v. Monitor the effectiveness of noise attenuation measures by taking noise measurements. ***b. Public Notification Required*** Requirement: The project applicant shall notify property owners and occupants located within 300 feet of the construction activities at least 14 calendar days prior to commencing extreme noise generating activities. Prior to providing the notice, the project applicant shall submit to the City for review and approval the proposed type and duration of extreme noise generating activities and the proposed public notice. The public notice shall provide the estimated start and end dates of the extreme noise generating activities and describe noise attenuation measures to be implemented.		detail the equipment and methods used to monitor compliance with the plan. **PART 3 - EXECUTION** 3.6 NOISE CONTROL H. If impact equipment (e.g., jack hammers, pavement breakers, rock drills etc.) is used during project construction, Contractor is responsible for taking appropriate measures, including but not limited to the following: 3. Erect temporary noise barriers or noise control blankets around the construction site, particularly along areas adjacent to residential buildings. 4. Utilize noise control blankets around the major noise sources to reduce noise emission from the site. 5. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example. 7. Notify neighbors/occupants within 300 feet of project construction at least thirty days in advance of extreme noise generating activities about the estimated duration of the activity. 8. Noise Monitoring shall be conducted periodically during noise generating activities. Monitoring shall be conducted using a precision sound-level meter that is in conformance with the American National Standards Institute (ANSI) Standard S1.4, Specification for Sound Level Meters. Monitoring results shall be submitted weekly to the Engineer.

Oakland Standard Condition of Approval		Applicable EBMUD Standard Construction Specification/Procedure
Condition	**Applicability**	
65. Project-Specific Construction Noise Reduction Measures Requirement: The project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction noise impacts on [ENTER ADJACENT SENSITIVE RECPTOR OR BUSINESS]. The project applicant shall implement the approved Plan during construction.	Condition applies to all projects for which a noise study was prepared during the project review process that resulted in preliminary recommended noise reduction measures to address specific adjacent sensitive receptors/ or businesses that may be impacted by construction noise more than typical (e.g., pre-school activity, meditation center, skilled nursing facility, etc.)	**EBMUD STANDARD CONSTRUCTION SPECIFICATION SECTION 01 35 44, ENVIRONMENTAL REQUIREMENTS** **PART 1 - General** 1.3 Submittals G. Noise Control and Monitoring Plan Submit a plan detailing the means and methods for controlling and monitoring noise generated by construction activities, including demolition, alteration, repair or remodeling of or to existing structures and construction of new structures, as well as by items of machinery, equipment or devices used during construction activities on the site for the Engineer's acceptance prior to any work at the jobsite. The plan shall detail the equipment and methods used to monitor compliance with the plan.
66. Construction Noise Complaints Requirement: The project applicant shall submit to the City for review and approval a set of procedures for responding to and tracking complaints received pertaining to construction noise, and shall implement the procedures during construction. At a minimum, the procedures shall include: a. Designation of an on-site construction complaint and enforcement manager for the project; b. A large on-site sign near the public right-of-way containing permitted construction days/hours, complaint procedures, and phone numbers for the project complaint manager and City Code Enforcement unit; c. Protocols for receiving, responding to, and tracking received complaints; and d. Maintenance of a complaint log that records received complaints and how complaints were addressed, which	Condition applies to all major development projects, specifically those involving: a. Construction of 50 or more residential dwelling units; b. Construction of 50,000 sq. ft. or more of nonresidential floor area; or c. CEQA review (e.g., negative declaration, mitigated negative	**EBMUD PROCEDURE 600, PUBLIC OUTREACH AND COMMUNITY RELATIONS** **PURPOSE -** This procedure establishes how EBMUD educates and engages the public about projects, programs, services, issues, and policies, and describes the methods EBMUD uses to communicate. **Public Affairs**: Public Affairs is the lead department for the communication efforts associated with public engagement, education and outreach. Staff should coordinate with Public Affairs and seek direction and/or assistance as needed in planning and implementing communication efforts. Public Affairs: • Designates a public liaison to respond to any construction-related issues, including noise. The public

Oakland Standard Condition of Approval Condition	Applicability	Applicable EBMUD Standard Construction Specification/Procedure
shall be submitted to the City for review upon the City's request.	declaration, or EIR).]	affairs liaison will be available to coordinate with the Construction Project Manager/Engineer and any contractors to resolve any issues. • For capital projects, contact information for the Public Affairs liaison (i.e., name, phone, number, email address) will be provided via conspicuous signage at construction sites, on all advance notifications, and on the EBMUD Project website. **Public Affairs Responsibilities:** Investigates issues on EBMUD's behalf and assists in responding to requests.

References:

City of Oakland, Department of Planning and Building, Bureau of Planning. Standard Conditions of Approval. Adopted by City Council on November 3, 2008 (Ordinance No. 12899 CMS), Revised November 5, 2018.

EBMUD. Standard Construction Specification 01 35 44, Environmental Requirements. August 31, 2018.

EBMUD. Standard Construction Specification 01 14 00, Work Restrictions. October 28, 2019.

EBMUD. Procedure 600, Public Outreach and Community Relations. December 3, 2018.