

APPENDIX F
Noise Report

**NOISE TECHNICAL REPORT for the
PURE WATER PROGRAM
City of San Diego, California**
City Project No. 438188

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ACRONYMS

Acronym	Definition
AWPF	advance water purification facilities
CalEEMod	California Emissions Estimator Model
CAAWPF	Central Area Advanced Water Purification Facility
CAWRP	Central Area Water Reclamation Plant
CEQA	California Environmental Quality Act
CNEL	community noise equivalent level
dB	decibel
dba	A-weighted decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
IPS	inches per second
L_{eq}	equivalent sound level
L_{max}	maximum sound level during the measurement interval
MGD	million gallons per day
NCAWPF	North City Advanced Water Purification Facility
NCWRP	North City Water Reclamation Plant
PLWTP	Point Loma Wastewater Treatment Plant
PPV	peak particle velocity
Program	Pure Water Program
RCNM	Roadway Construction Noise Model
SDG&E	San Diego Gas & Electric
SBAWPF	South Bay Advance Water Purification Facility
SBWRP	South Bay Water Reclamation Plant
VdB	velocity decibel
WWTP	Wastewater Treatment Plant
WRP	Water Reclamation Plant

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SUMMARY

The Pure Water Program (Program) consists of the design and construction of new advanced water purification facilities (AWPFs) and a new wastewater treatment plant (WWTP); upgrades to existing wastewater treatment facilities; and design and construction of new pump stations and pipelines. The Program would create up to 83 million gallons per day (MGD) of locally controlled potable water (approximately one-third of projected 2035 demand) and reduce flows to the Point Loma Wastewater Treatment Plant (PLWTP), which in turn would reduce total suspended solids discharged to the ocean. The Program would construct facilities that have the ability to produce 15 MGD by 2023, 30 MGD by 2027, and 83 MGD by 2035. The North City AWPF (NCAWPF) could produce 30 MGD of purified water. The Central Area AWPF (CAAWPF; part of the Central Area component) could produce between 38 to 53 MGD of purified water. The South Bay AWPF (SBAWPF) could produce up to 15 MGD of purified water.

The noise environments through most of the Program area are characterized by a background or “ambient” noise level generated by vehicular traffic. Typical secondary noise sources include truck backup alarms, landscaping maintenance, construction noise, distant aircraft, pedestrians, and barking dogs. The noise assessment in this report quantifies construction and operational noise generation and the resulting noise levels at vicinity noise-sensitive receptors that are generally representative of the areas surrounding the Program facilities.

Construction of the Program facilities would result in temporary localized increases in noise levels from on-site construction equipment and off-site trucks hauling construction materials. Noise generated by construction equipment will occur with varying intensities and durations during the various phases of construction. Section 5.3 of this report discusses the construction noise impacts in detail. Groundborne vibration from heavy equipment operations during Program construction is also discussed in Section 5.4 of this report. Following completion of construction activities, the Program would result in potential increases in noise levels from mobile sources (vehicular traffic), as a result of 271 new employees for Program components and associated operation and maintenance activities. Section 5.5 of this report discusses the operation noise impacts in detail.

This noise impact analysis evaluates the potential for significant adverse impacts due to construction, operation, and maintenance of the Program facilities. Potential noise impacts during construction was found to be potentially significant; with implementation of the recommended mitigation measures, noise impacts would be reduced to a level of less than significant. During operation and maintenance, noise impacts were determined to be less than significant; therefore, no mitigation would be required.

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Noise Technical Report for the Pure Water Program

1 INTRODUCTION

1.1 Purpose

The purpose of this report is to estimate and evaluate the potential noise and vibration impacts associated with implementation of the Program relative to the significance thresholds and noise / vibration standards of the City of San Diego and the other local jurisdictions in which it would be constructed.

1.2 Project Location

The Program includes a variety of facilities located throughout the central and southern coastal areas of San Diego County (see Figures 1 and 2). An overview of the overall Program is shown on Figure 3. The Program location can be generally described in three major geographic components: North City, South Bay, and the Central Area (see Figures 4, 5, and 6). New AWPFS and the majority of pump stations would be located within the corporate boundaries of the City of San Diego (City). Pipelines would traverse a number of local jurisdictions, including the Cities of San Diego, La Mesa, El Cajon, Santee, Chula Vista, National City and the community of Lakeside in unincorporated San Diego County, in addition to federal lands within Marine Corps Air Station Miramar, Naval Base Point Loma and the U.S. Marine Corp Recruit Depot. The Program also includes reservoir augmentation at two potential City-owned and operated reservoirs outside of the City limits: San Vicente Reservoir and Otay Reservoir.

1.3 Project Description

The City currently relies on imported water for over 85% of its water supply, including the California State Water Project and the Colorado Rivers (conveyed via the California Aqueduct and the Colorado River Aqueduct, respectively). The region's reliance on imported water causes San Diego's water supply to be vulnerable to impacts from shortages and susceptible to price increases. In addition, drought conditions further impact water supply availability. Due to severe drought in California, the 2015 water allocation from the State Water Project is only 15% of normal, forcing water agencies to draw down water reserves, implement mandatory conservation measures, and search for new, dependable sources of water. The Program would also divert wastewater from the PLWTP, thereby reducing the total suspended solids discharged by the PLWTP to the same or lower levels as would be achieved by implementing full secondary treatment.

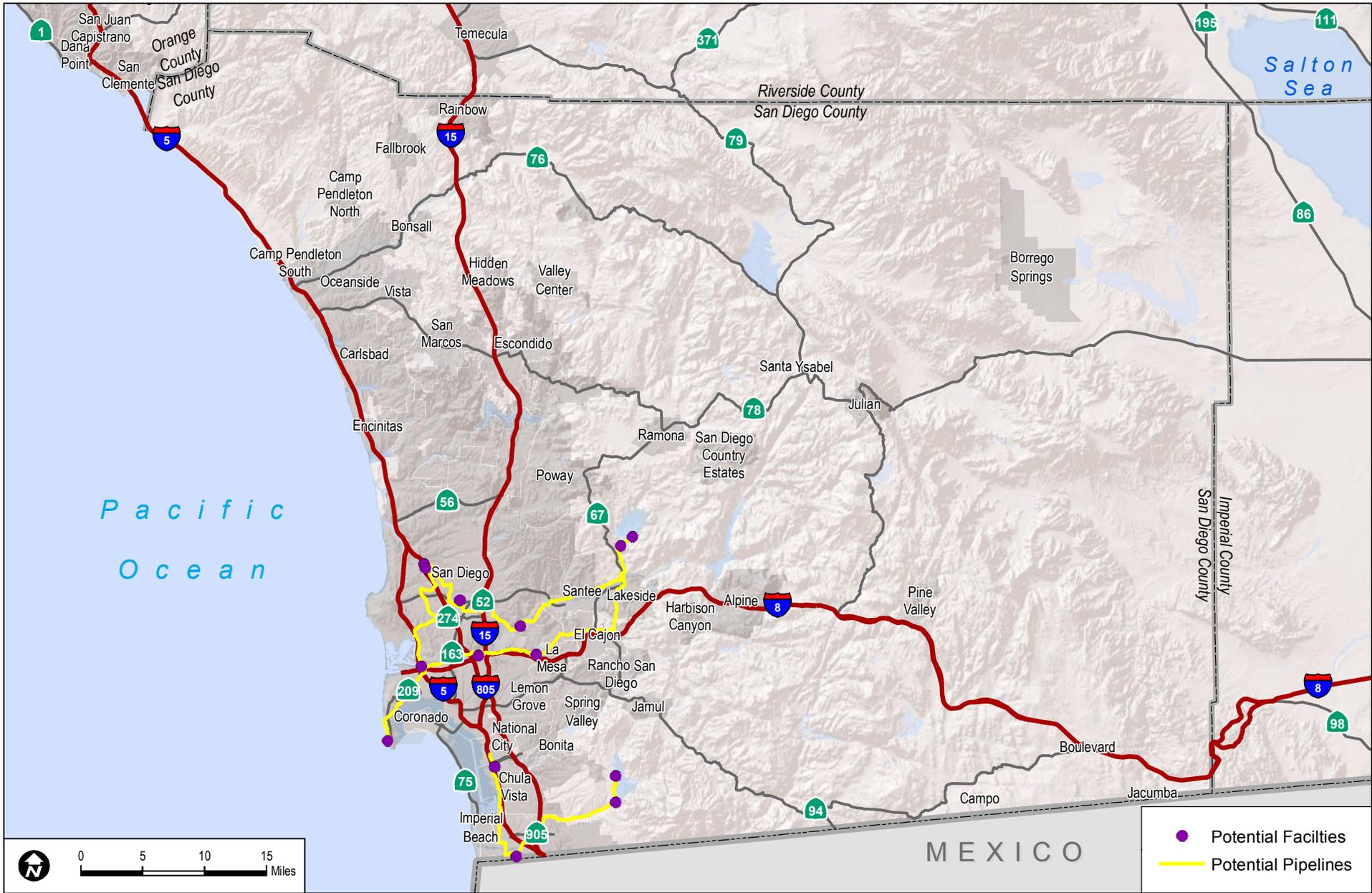
1.4 Project Characteristics

The Program would use advanced water purification technology to produce potable water from recycled water and provide a safe, reliable and cost-effective drinking water supply for San

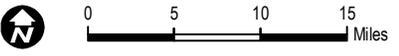
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Diego. The Program consists of the design and construction of new AWWPFs and a new water reclamation plant (WRP); upgrades to existing wastewater treatment facilities; and design and construction of new pump stations and pipelines. The Program would construct AWWPFs at the existing North City and South Bay WRPs; and a third AWWPF and new water reclamation plant would be constructed. Upgrades would occur at the existing North City Water Reclamation Plant (NCWRP) and South Bay Water Reclamation Plant (SBWRP) in order to provide sufficient tertiary influent for the AWWPFs. Pump station and pipeline facilities would convey different types of flows to and from the treatment facilities for: 1) diverting wastewater flows to water reclamation facilities; 2) conveying recycled water to AWWPFs; 3) conveying purified water from AWWPFs to either the San Vicente or Lower Otay Reservoirs; and 4) transporting waste flows (brine and sludge) from treatment processes to solids handling facilities or back into the Metro System. Upgrades would also occur at Metropolitan Biosolids Center and PLWTP to handle the additional brine and sludge produced by the WRP expansions and advanced water purification process (see Figure 3 for a conceptual map of facilities proposed by the Program).

The Program would create 83 MGD of locally controlled potable water and would reduce flows to the PLWTP, which in turn would reduce total suspended solids discharged to the ocean. The Program would construct facilities that have the ability to produce at least 15 MGD by 2023, 30 MGD by 2027, and 83 MGD by 2035. The NCAWWPF could produce a total of 30 MGD of purified water. The SBWWPF could produce up to 15 MGD of purified water. A third, Central Area AWWPF could produce up to 53 MGD of purified water.



- Potential Facilities
- Potential Pipelines



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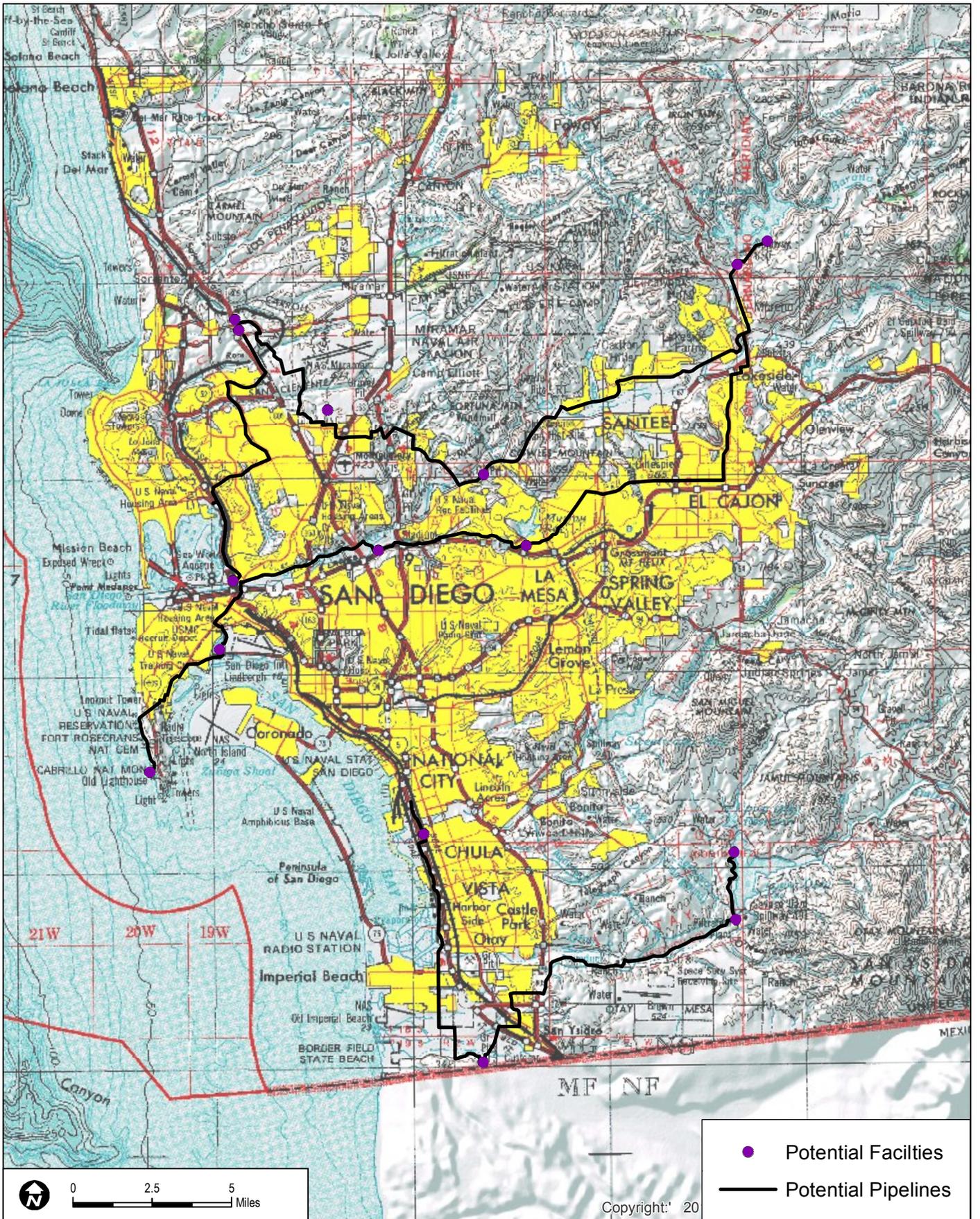
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Pure Water Program Noise Technical Report

FIGURE 1
Regional Map

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- Potential Facilities
- Potential Pipelines

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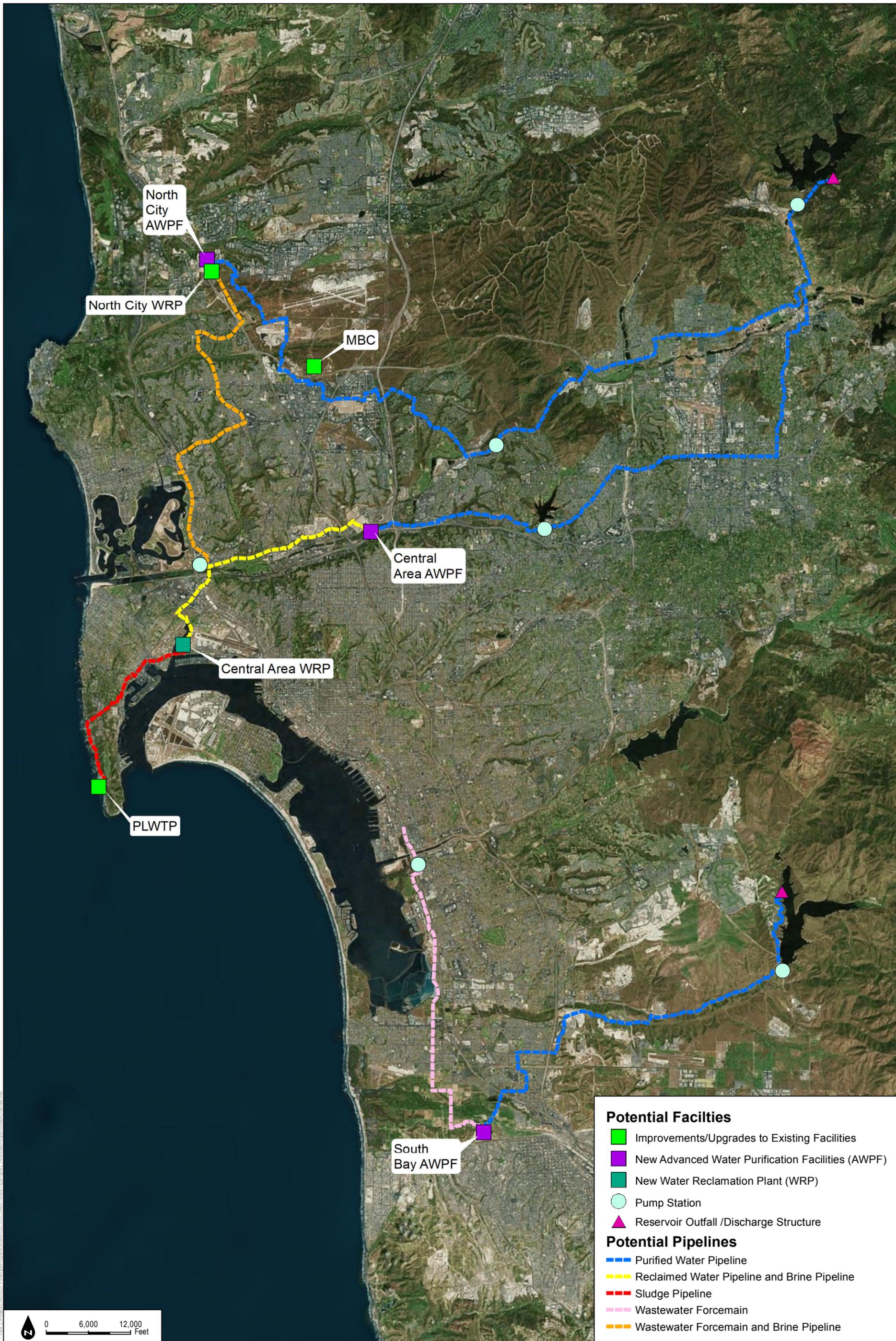
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SOURCE: USGS 7.5-Minute Series - Del Mar, El Cajon, Imperial Beach, Jamul Mountains, La Jolla, La Mesa, National City, Otay Mesa, Point Loma, and San Vicente Reservoir Quadrangles.

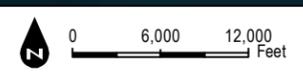
FIGURE 2
Vicinity Map

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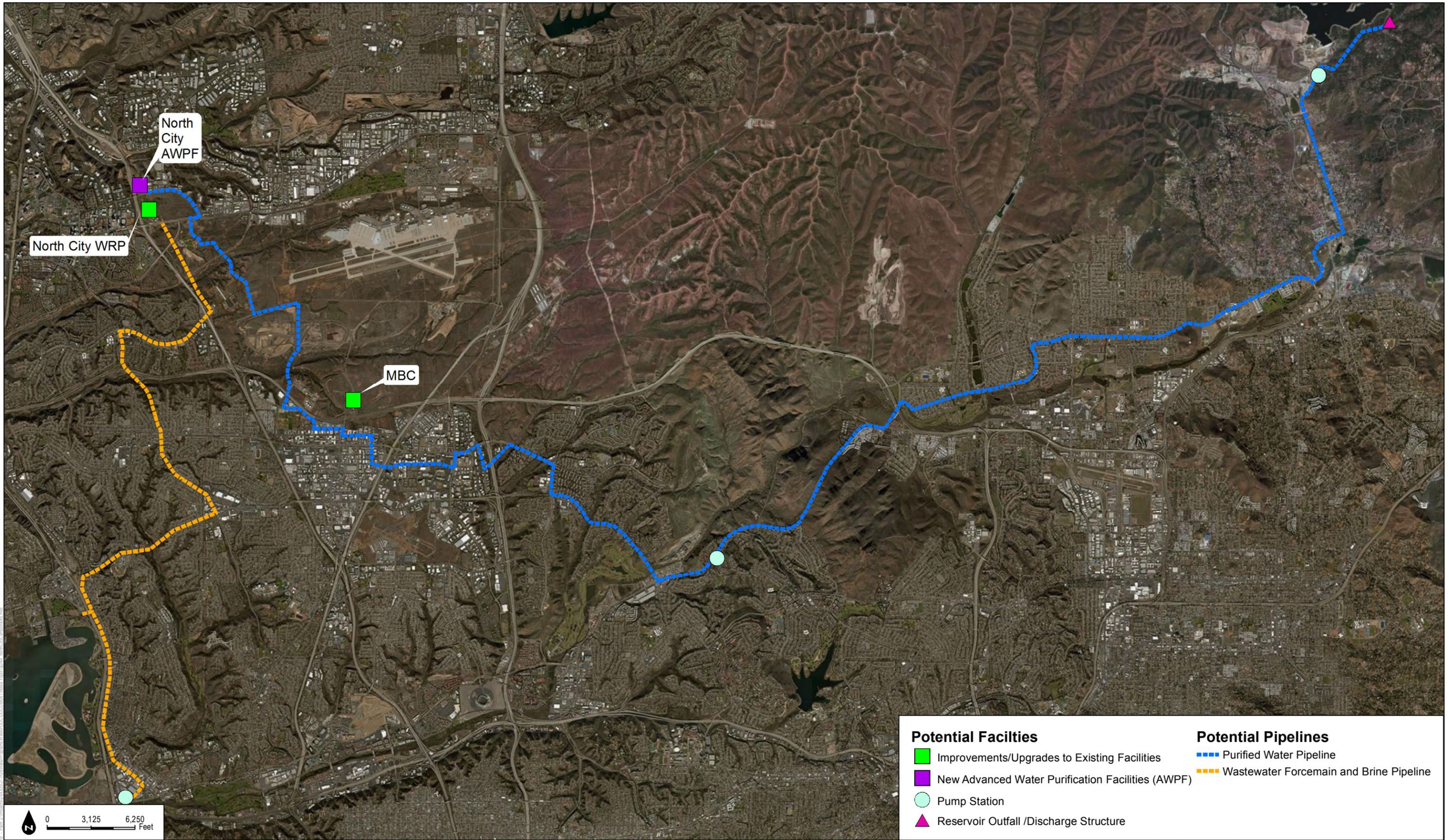
- Potential Facilities**
- Improvements/Upgrades to Existing Facilities
 - New Advanced Water Purification Facilities (AWPF)
 - New Water Reclamation Plant (WRP)
 - Pump Station
 - ▲ Reservoir Outfall /Discharge Structure
- Potential Pipelines**
- — — Purified Water Pipeline
 - — — Reclaimed Water Pipeline and Brine Pipeline
 - — — Sludge Pipeline
 - — — Wastewater Forcemain
 - — — Wastewater Forcemain and Brine Pipeline



SOURCE: Bing Imagery, 2015, SANGIS, 2015.

FIGURE 3
Pure Water Program System Overview

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Potential Facilities

- Improvements/Upgrades to Existing Facilities
- New Advanced Water Purification Facilities (AWPF)
- Pump Station
- ▲ Reservoir Outfall /Discharge Structure

Potential Pipelines

- - - Purified Water Pipeline
- - - Wastewater Forcemain and Brine Pipeline

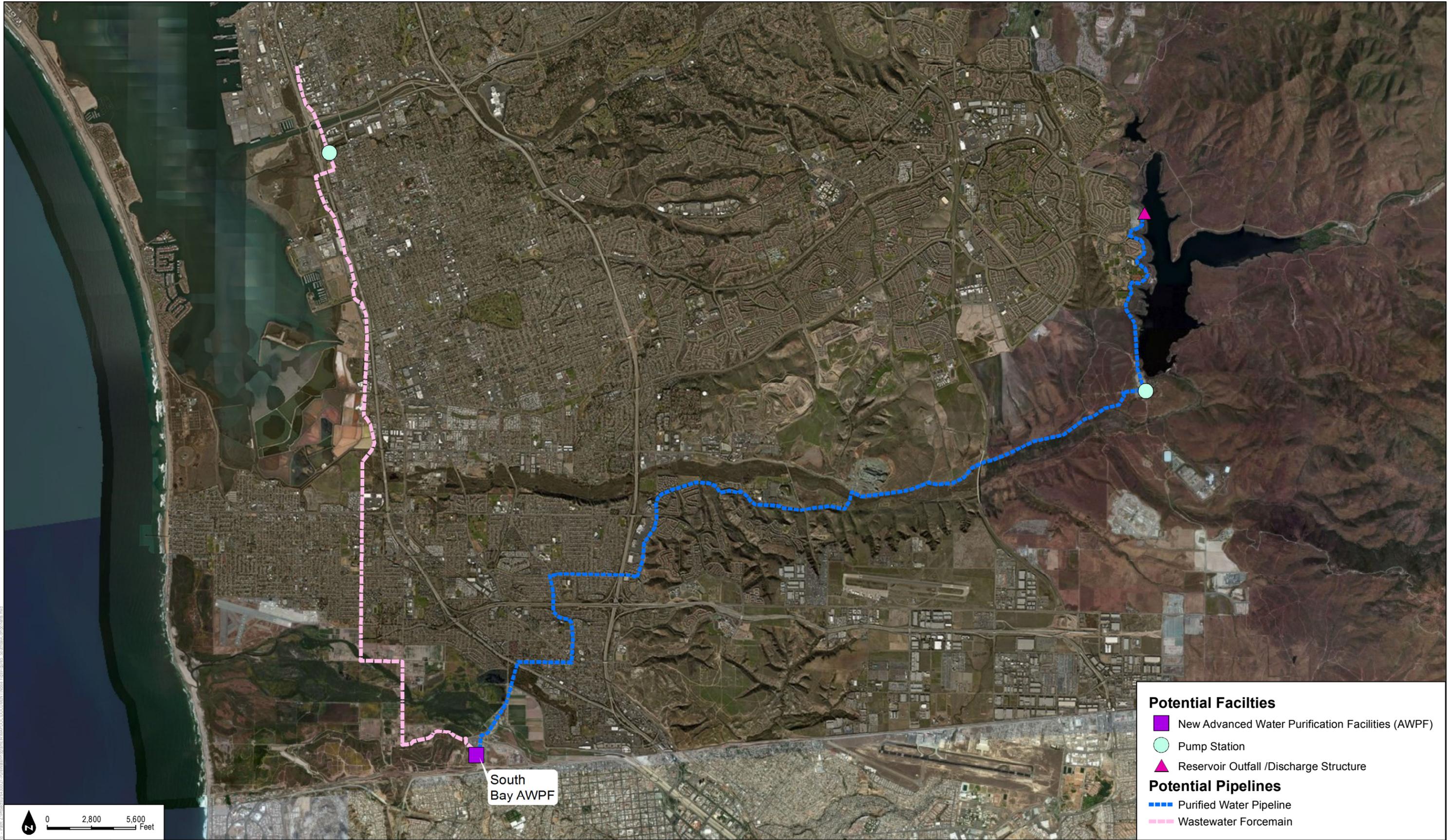
0 3,125 6,250 Feet

SOURCE: Bing Imagery, 2015; SANGIS, 2015.



FIGURE 4
North City Components

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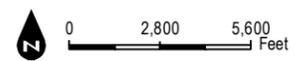
South Bay
AWPF

Potential Facilities

- New Advanced Water Purification Facilities (AWPF)
- Pump Station
- ▲ Reservoir Outfall /Discharge Structure

Potential Pipelines

- Purified Water Pipeline
- Wastewater Forcemain



SOURCE: Google Imagery, 2015, SANGIS, 2015.



Pure Water Program Noise Technical Report

FIGURE 5
South Bay Components

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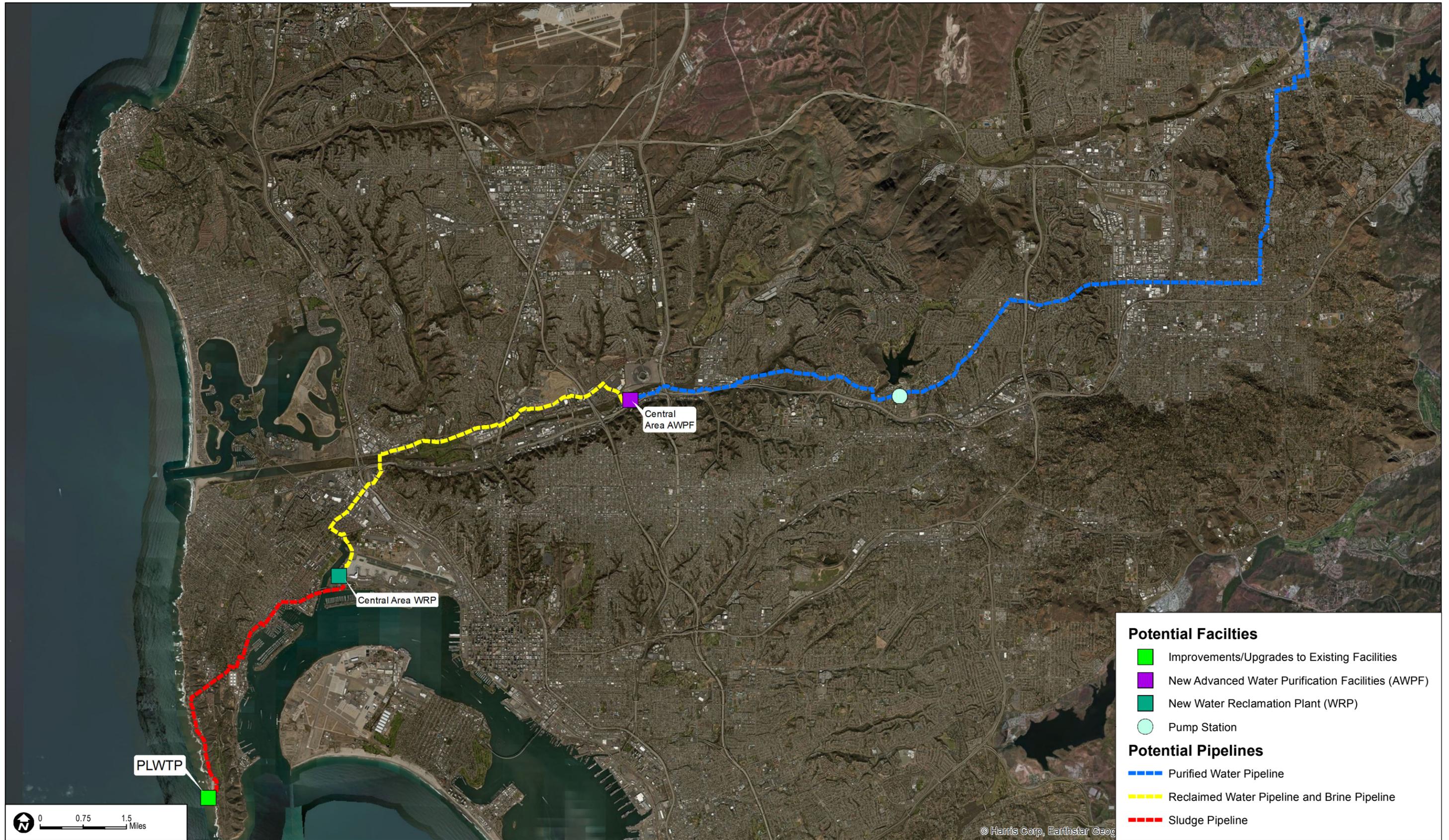


FIGURE 6
Central Area Components

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2 FUNDAMENTALS OF NOISE AND VIBRATION

The following is a brief discussion of fundamental noise concepts and terminology.

2.1 Sound, Noise, and Acoustics

Sound is actually a process that consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

2.2 Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. One micropascal is approximately one-hundred billionth (0.0000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels (dB).

2.3 A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 hertz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

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The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special situations (e.g., B-scale, C-scale, D-scale), but these scales are rarely used in conjunction with most environmental noise. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 1.

Table 1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
Jet fly over at 300 meters (1,000 feet)	110	Rock band
Gas lawn mower at 1 meter (3 feet)	100	Food blender at 1 meter (3 feet)
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour)	90	Garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime	80	Vacuum cleaner at 3 meters (10 feet);
Gas lawn mower at 30 meters (100 feet)	70	Normal speech at 1 meter (3 feet)
Commercial area;	60	Large business office
Heavy traffic at 90 meters (300 feet)	50	Dishwasher next room
Quiet urban, daytime	40	Theater; large conference room (background)
Quiet urban, nighttime	30	Library
Quiet suburban, nighttime	20	Bedroom at night; concert hall (background)
Quiet rural, nighttime	10	Broadcast/Recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2009.

2.4 Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice or half as loud. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level).

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2.5 Noise Descriptors

Additional units of measure have been developed to evaluate the long-term characteristics of sound. The equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. The 1-hour A-weighted equivalent sound level, $L_{eq}(h)$, is the energy average of the A-weighted sound levels occurring during a 1-hour period, and is the basis for the City of San Diego's noise ordinance criteria, as well as the basis for the County of San Diego and the other cities in which the Program would be constructed.

People are generally more sensitive and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments—the community noise equivalent level (CNEL)—was introduced. The CNEL scale represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7 p.m. to 10 p.m.) and nighttime hours (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during the evening and nighttime hours.

2.6 Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by geometric spreading, ground absorption, atmospheric effects, and shielding by natural and/or built features.

Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. Atmospheric conditions such as humidity, temperature, and wind gradients can also temporarily either increase or decrease sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects. Additional sound attenuation can result from built features such as intervening walls and buildings, and by natural features such as hills and dense woods.

2.7 Groundborne Vibration Fundamentals

Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of groundborne vibration attenuates fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration are peak particle velocity (PPV), in units

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of inches per second, and velocity decibel (VdB). The calculation to determine PPV at a given distance is as follows:

$$PPV_{\text{dist}} = PPV_{\text{ref}} * (25/D)^{1.5}$$

Where:

PPV_{dist} = the peak particle velocity in inches per second of the equipment adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D = the distance from the equipment to the receiver

The velocity parameter (instead of acceleration or displacement) best correlates with human perception of vibration. Thus, the response of humans, buildings, and sensitive equipment to vibration is described in this section in terms of the root-mean square velocity level in VdB units relative to 1 micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction). The calculation to determine the root-mean square at a given distance is as follows:

$$L_v(D) = L_v(25 \text{ feet}) - 30 * \log(D/25)$$

Where:

$L_v(D)$ = the vibration level at the receiver

$L_v(25 \text{ feet})$ = the reference source vibration level

D = the distance from the vibration activity to the receiver

Typical background vibration levels are between 50 and 60 VdB, and the level for minor cosmetic damage to fragile buildings or blasting generally begins at 100 VdB.

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3 REGULATORY SETTING

3.1 Federal

There are no applicable federal regulations related to noise that would apply to this Program.

3.2 State

Government Code Section 65302(g)

California Government Code Section 65302(g) requires the preparation of a Noise Element, which shall identify and appraise the noise problems in the community. The Noise Element shall recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for the following sources:

- Highways and freeways
- Primary arterials and major local streets
- Passenger and freight on-line railroad operations and ground rapid transit systems
- Aviation and airport-related operations
- Local industrial plants
- Other ground stationary noise sources contributing to the community noise environment

3.3 Local

Because the Program components may be located in a number of municipal and unincorporated areas in addition to the City of San Diego, the applicable regulatory provisions of those agencies are described in this section.

3.3.1 City of San Diego

City of San Diego Municipal Code 59.5.0401 (Noise Ordinance)

Section 59.5.0401 of the City of San Diego's Municipal Code sets forth sound level limits. It is unlawful for any person to cause noise by any means to the extent that the 1-hour average sound level exceeds the applicable limit given in the following table (Table 2) at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is the part of the total noise at the specified location that is due solely to the action of said person/event.

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Table 2
City of San Diego Applicable Limits

Land Use	Time of Day	1-Hour Average Sound Level (dBA)
Single-family residential	7 a.m. to 7 p.m.	50
	7 p.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	40
Multi-family residential (up to a maximum density of 1/2,000)	7 a.m. to 7 p.m.	55
	7 p.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
All other residential	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial	7 a.m. to 7 p.m.	65
	7 p.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	60
Industrial or agricultural	Any time	75

Source: City of San Diego 2010.

City of San Diego Municipal Code 59.5.0404 (Noise Ordinance)

Construction Noise

Section 59.5.0404 of the City of San Diego’s Municipal Code sets forth limitations related to construction noise (City of San Diego 2010).

- A. It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington’s Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter, or repair any building or structure in such a manner as to create disturbing, excessive, or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic, particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; and whether proposed night work is in the general public interest; and he/she shall

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prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he/she deems to be required in the public interest.

- B. Except as provided in Subsection C hereof, it shall be unlawful for any person, including the City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m.
- C. The provisions of Subsection B of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

City of San Diego Significance Determination Thresholds

The City of San Diego has guidance for determination of significance according to the California Environmental Quality Act (CEQA), including what would constitute a significant noise impact (City of San Diego 2011). These thresholds are used in this analysis and are provided in Section 5.2.

3.3.2 City of La Mesa Municipal Code 10.80 (Noise Regulation)

10.80.040 - Ambient base noise level.

Section 10.80.040 of the City of La Mesa’s Municipal Code sets forth standards for ambient base noise levels. Where the ambient noise level is less than designated in this section, the respective noise level in this section shall govern. The noise level to be observed in all measurements shall be that specified for the zone applicable to the property adjoining that on which the noise is generated and closest to the noise source. Table 3 outlines the sound levels within each zoning designations.

**Table 3
Sound Level A, Decibels**

Zone	Time	Level
R1 & R2	10:00 p.m. to 7:00 a.m.	50
R1 & R2	7:00 p.m. to 10:00 p.m.	55
R1 & R2	7:00 a.m. to 7:00 p.m.	60
R3 & RB	10:00 p.m. to 7:00 a.m.	55
R3 & RB	7:00 a.m. to 10:00 p.m.	60
C, CN, CD & CM	10:00 p.m. to 7:00 a.m.	60
C, CN, CD & CM	7:00 a.m. to 10:00 p.m.	65
M	Anytime	70

Source: City of La Mesa 1979.

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10.80.090 - Machinery, equipment, fans, and air conditioning

Section 10.80.090 of the City of La Mesa's Municipal Code sets forth conditions related to noise generated from machinery, equipment, fans, and air conditioning. It shall be unlawful for any person to install or operate any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device which can be or is operated in any manner so as to create noise which will cause the noise level at the property line of any property to exceed the ambient base noise level by more than five (5) decibels.

- a. Certificate of Compliance: Required. The installer of any such mechanical devices shall furnish to the Department of Building Inspection and Housing a certificate that the equipment installed as proposed can, without the addition of any baffling or construction, be operated within the sound limits specified above.
- b. Prima facie violation: The installation of any such mechanical device without permit or without furnishing the certificate referred to above shall be deemed to be prima facie evidence of violation of the provisions of this section and such device installed shall not be operated at any time unless the required permits are obtained and the certificate of compliance is furnished to the Department of Building Inspection and Housing (City of La Mesa 1979).

10.80.100 - Construction of buildings and projects

Section 10.80.100 of the City of La Mesa's Municipal Code sets forth conditions related to construction of buildings and projects. It shall be unlawful for any person within a residential zone or CN zone, or within a radius of five hundred feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction-type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day or on Sundays unless a special permit authorizing the activity has been duly obtained from the chief building official. No permit shall be required to perform emergency work as defined in this chapter. This section shall not apply to any work of improvement performed by a single-family residential occupant which is performed on the occupant's said premises.

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3.3.3 City of Santee Municipal Code

8.12.040 Sound level limits

Section 8.12.040 of the City of Santee’s Municipal Code sets forth sound level limits, as described below.

- A. Unless a variance has been applied for and granted pursuant to Title 8 of the City of Santee’s Municipal Code, it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property on which the sound is produced, exceeds the applicable limits set forth below except that construction noise level limits shall be governed by Section 8.12.290 of City of Santee’s Municipal Code.

Table 4 outlines the sound levels within each zoning designations.

Table 4
City of Santee One-Hour Average Sound Level

Zone		Applicable Limit One-Hour Average Sound Level (Decibels)
A-70, A-72, R-S, R-V, R-R, R-MH, S-87, S-88, S-90	7 a.m. to 7 p.m.	50
	7 p.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	40
R-U, R-C, and C-31	7 a.m. to 7 p.m.	55
	7 p.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
All other commercial zones	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
M-50, M-52	Anytime	70
All other industrial zones	Anytime	75
The sound level at the location on a boundary between an industrial zone and a residential zone	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50

Source: City of Santee 1984.

- B. For all other zones the sound level limit on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts; provided, however, that the noise level limit applicable to extractive industries, including but not limited to borrow pits and mines, shall be the noise level limit applicable to the M-52 zone, or other standard as required for industrial uses adjacent to a residential zone.

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- C. Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located (City of Santee 1984).

8.12.290 Construction equipment

Section 8.12.290 of the City of Santee’s Municipal Code sets forth noise limitations on construction equipment.

- A. Except for emergency work, it is unlawful for any person, including the city, to operate any single or combination of powered construction equipment at any construction site, except as outlined as follows:
1. It shall be unlawful for any person, including the city, to operate any single or combination of powered construction equipment at any construction site on Sundays, January 1st, the last Monday in May, known as “Memorial Day,” July 4th, the first Monday in September, December 25th, and every day appointed by the President, Governor, or the city council for a public fast, thanksgiving, or holiday. When January 1st, July 4th, or December 25th falls on a Sunday, it shall be unlawful for any person to operate any single or combination of powered construction equipment at any construction site on the following Monday. Notwithstanding the above, a person may operate powered construction equipment on the above-specified days between the hours of ten a.m. and five p.m. in compliance with the requirements of subdivision 2 of this subsection at his residence for himself, provided such operation of powered construction equipment is not carried on for profit or livelihood. In addition, it shall be unlawful for any person to operate any single or combination of powered construction equipment at any construction site on Mondays through Saturdays except between the hours of seven a.m. and seven p.m.
 2. No such equipment, or combination of equipment regardless of age or date of acquisition, shall be operated so as to cause noise at a level in excess of seventy-five decibels for more than eight hours during any twenty-four-hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes. These sound levels shall be corrected for time duration in accordance with the following table [Table 5]:

**Table 5
City of Santee Construction Noise Allowance**

Total Duration in 24 Hours	Decibel Level Allowance	Total Decibel Level
Up to 15 minutes	+15	90
Up to 30 minutes	+12	87

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Table 5
City of Santee Construction Noise Allowance

Total Duration in 24 Hours	Decibel Level Allowance	Total Decibel Level
Up to 1 hour	+9	84
Up to 2 hours	+6	81
Up to 4 hours	+3	78
Up to 8 hours	0	75

Source: City of Santee n.d.

- B. In the event that lower noise limit standards are established for construction equipment pursuant to state or federal law, the lower limits shall be used as a basis for revising and amending the noise level limits specified in subsection A2 of this section.

17.30.030 Performance standards.

The conduct and operation of all uses in all districts shall comply with the minimum standards of performance set forth in Section 17.30.030 of the City of Santee’s Municipal Code (City of Santee 1985).

- A. Noise.
 - 2. Commercial/Industrial. All commercial and industrial uses shall be established and operated in compliance with the city noise ordinance, commencing with Section 8.12.010 of the Santee Municipal Code, or as may be hereafter amended.
- E. Vibration. No operation or activity is permitted which will create vibration noticeable without instruments at the perimeter of the subject property.

3.3.4 City of El Cajon

17.115.130 Performance standards.

Section 17.115.130 of the City of El Cajon’s Municipal Code sets forth the following minimum noise performance standards:

- C. Noise.
 - 1. The sound level of any individual operation, land use, or activity other than rail, aircraft, street, or highway transportation, shall not exceed the sound levels indicated in the following table [Table 6]. For the purpose of determining compliance with these noise limitations, the sound levels shall be

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measured at the property lines of the property upon which the operation, land use, or activity is conducted.

Table 6
City of El Cajon One-Hour Average Sound Level

Zones	Time of Day	One-Hour Average Sound Level Decibels
All residentially zoned properties	7 a.m.—7 p.m.	60
	7 p.m.—10 p.m.	55
	10 p.m.—7 a.m.	50
All M-U and commercially zoned properties except the C-M zoned properties	7 a.m.—7 p.m.	65
	7 p.m.—10 p.m.	60
	10 p.m.—7 a.m.	55
All C-M and industrially zoned properties	Any time	75
	Conditionally*	80

Source: City of El Cajon 2011.

* Where outdoor noise levels are higher, additional noise attenuation measures (i.e., earphones for workers, increased insulation, double-pane glass, etc.) may make noise levels acceptable.

3. Equipment noise. It is unlawful for any person within any residential zone, or within a radius of 500 hundred feet from any residential zone, to operate equipment or perform any outside construction, maintenance or repair work on buildings, structures, landscapes or related facilities, or to operate any pile driver, power shovel, pneumatic hammer, power hoist, leaf blower, mower, or any other mechanical device, between the hours of 7 p.m. of one (1) day and 7 a.m. of the next day in such a manner that a reasonable person of normal sensitivities residing in the area is caused discomfort or annoyance. This subsection shall also apply to any property in the Mixed-Use zone having one or more residential units. This restriction does not apply to emergency work made necessary to restore property to a safe condition, restore utility service, or to protect persons or property from an imminent exposure to danger.

- D. Vibrations. Every use shall be so operated that the ground vibration generated by such use is not harmful or injurious to the use or development of surrounding properties. No vibration shall be permitted which is perceptible without instruments at any use along the property line on which such use is located. For the purpose of this determination, the boundary of any lease agreement or operating unit or properties operating as a unit shall be considered the same as the property line.

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3.3.5 City of Chula Vista

19.68.030 Exterior noise limits

Section 19.68.030 of the City of Chula Vista's Municipal Code sets forth exterior noise limits as described below.

A. Maximum Permissible Sound Levels by Receiving Land Use.

1. The noise standards for the various categories of land use as presented in [Table 7], and set forth in terms defined in the city land use code set forth in Chapter 19.04 of the City of Chula Vista's Municipal Code, shall, unless otherwise specifically indicated, apply to each property or portion of property substantially used for a particular type of land use reasonably similar to the land use types shown in [Table 7]. Where two or more dissimilar land uses occur on a single property, the more restrictive noise limits shall apply.
4. No person shall operate, or cause to be operated, any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level to exceed the environmental and/or nuisance interpretation of the applicable limits given in [Table 7].
 - a. Environmental noise shall be measured by the Leq for any hour.
 - b. Nuisance noise shall be measured as a sound level not to be exceeded at any time.
 - c. Sound levels by receiving land use shall be measured at the boundary or at any point within the boundary of the property affected.
 - d. Fixed-location public utility distribution or fixed transmission facilities, located on or adjacent to a property line, shall be subject to noise level limits of this section measured at or beyond six feet from the boundary of the easement upon which the equipment is located.

B. Corrections to Exterior Noise Level Limits.

1. If the noise is continuous, the Leq for any hour will be represented by any lesser time period within that hour. Noise measurements of a few minutes only will thus suffice to define the noise level.
2. If the noise is intermittent, the Leq for any hour may be represented by a time period typical of the operating cycle. Measurement should be made of a representative number of noisy/quiet periods. A measurement period of not less than 15 minutes is, however, strongly recommended when dealing with intermittent noise.

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3. In the event the alleged offensive noise, as judged by the enforcement officer, contains a steady, audible sound such as a whine, screech or hum, or contains a repetitive impulsive noise such as hammering or riveting, the standard limits set forth in [Table 7] shall be reduced by five dB.
4. If the measured ambient level exceeds that permissible in [Table 7], the allowable noise exposure standard shall be the ambient noise level. The ambient level shall be measured when the alleged noise violations source is not operating.

Table 7
Exterior Noise Limits^{1,2}

Receiving Land Use Category	Noise Level [dB(A)]	
	<i>10 p.m. to 7 a.m. (Weekdays)</i>	<i>7 a.m. to 10 p.m. (Weekdays)</i>
	<i>10 p.m. to 8 a.m. (Weekends)</i>	<i>8 a.m. to 10 p.m. (Weekends)</i>
All residential (except multiple dwelling)	45	55
Multiple dwelling residential	50	60
Commercial	60	65
Light industry – I-R and I-L zone	70	70
Heavy industry – I zone	80	80

Source: City of Chula Vista 1985.

¹ Environmental Noise – Leq in any hour.

² Nuisance Noise – Not to be exceeded any time.

17.24.040 Disturbing, excessive, offensive or unreasonable noises – Prohibited – Exceptions

Section 17.24.040 of the City of Chula Vista’s Noise Chapter sets forth limitations to prevent disturbing, excessive, offensive, or unreasonable noises, as well as exceptions.

- A. It is unlawful for any person in any commercial or residential zone in the City of Chula Vista to make, continue or cause to be made or continued any disturbing, excessive, offensive, or unreasonable noise which disturbs the health, safety, general welfare or quiet enjoyment of property of others in any commercial or residential zone within the limits of the City. This section shall not in any way affect, restrict, or prohibit any activities incidental to scientific or industrial activities carried out in a reasonable manner according to the usual customs of scientific or industrial activities, conducted in areas zoned for such purposes, or upon lands which are under the jurisdiction of the board of commissioners of the San Diego Unified Port District.
- C. The following activities, among others, are declared to cause disturbing, excessive, offensive, or unreasonable noises in violation of this section and to constitute a public nuisance:

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6. Exhausts. The discharge into the open air of the exhaust of any steam engine, stationary internal combustion engine, compressor, motor boat, or motor vehicle except through a muffler or other device which will effectively prevent loud or explosive noises therefrom;
7. Blowers. The operation of any noise-creating blower, power fan, or any internal combustion engine unless the noise from such blower or fan is muffled and the engine is equipped with a muffler device sufficient to deaden the noise;
8. Power Machinery, Tools, and Equipment. The use of any tools, power machinery, or equipment or the conduct of construction and building work in residential zones so as to cause noises disturbing to the peace, comfort, and quiet enjoyment of property of any person residing or working in the vicinity between the hours of 10:00 p.m. and 7:00 a.m., Monday through Friday, and between the hours of 10:00 p.m. and 8:00 a.m., Saturday and Sunday, except when the work is necessary for emergency repairs required for the health and safety of any member of the community.

19.68.050 Prohibited acts

Section 19.68.050 of the City of Chula Vista's Municipal Code sets for prohibited acts related to vibration.

- C. Vibration. Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property or at 150 feet from the source if on a public space or public right-of-way.

3.3.6 County of San Diego

36.404. General Sound Level Limits

Section 36.404 of the County of San Diego's Municipal Code sets forth general sound level limitations.

- a. Except as provided in section 36.409 of the County of San Diego's Municipal Code, it shall be unlawful for any person to cause or allow the creation of any noise, which exceeds the one-hour average sound level limits in [Table 8], when the one-hour average sound level is measured at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise.

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Table 8
Sound Level Limits In Decibels (dBA)

Zone	Time	One-Hour Average Sound Level Limits (Dba)
(1) RS, RD, RR, RMH, A70, A72, S80, S81, S90, S92, RV, and RU with a General Plan Land Use Designation density of less than 10.9 dwelling units per acre.	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
(2) RRO, RC, RM, S86, FB-V5, RV and RU with a General Plan Land Use Designation density of 10.9 or more dwelling units per acre.	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
(3) S94, FB-V4, AL-V2, AL-V1, AL-CD, RM-V5, RM-V4, RM-V3, RM-CD and all commercial zones.	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
(4) FB-V1, FB-V2, RM-V1, RM-V2	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
FB-V1, RM-V2	10 p.m. to 7 a.m.	55
FB-V2, RM-V1	10 p.m. to 7 a.m.	50
FB-V3	7 a.m. to 10 p.m.	70
	10 p.m. to 7 a.m.	65
(5) M50, M52, and M54	Anytime	70
		70
(6) S82, M56, and M58.	Anytime	75
(7) S88 (see subsection (c) below)		

Source: County of San Diego 2014.

- b. Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit, which authorizes the noise-generating use or activity and the decision making body approving the Major Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a) above.
- c. S88 zones are Specific Planning Areas which allow different uses. The sound level limits in Table 8 that apply in an S88 zone depend on the use being made of the property. The limits in Table 8, subsection (1) apply to property with a residential, agricultural or civic

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use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52 or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

- d. If the measured ambient noise level exceeds the applicable limit in Table 8, the allowable one-hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.
- e. The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones. The one-hour average sound level limit applicable to extractive industries, however, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone in which the extractive industry is located.
- f. A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section measured at or beyond six feet from the boundary of the easement upon which the facility is located.

36.408. Hours of Operation of Construction Equipment.

Section 36.408 of the County of San Diego's Municipal Code sets forth limitations on hours of operation of construction equipment. Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

- a. Between 7 p.m. and 7 a.m.
- b. On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, the fourth Thursday in November and December 25th. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410 of the County of San Diego's Municipal Code.

36.409. Sound Level Limitations on Construction Equipment.

Section 36.409 of the County of San Diego's Municipal Code sets forth sound level limitations on construction equipment. Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an 8-hour period, between 7 a.m. and 7 p.m., when

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measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

36.410. Sound Level Limitations on Impulsive Noise.

Section 36.410 of the County of San Diego's Municipal Code sets forth sound level limitations on impulsive noise. In addition to the general limitations on sound levels in section 36.404 of the County of San Diego's Municipal Code and the limitations on construction equipment in section 36.409 of the County of San Diego's Municipal Code, the following additional sound level limitations shall apply:

- a. Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in [Table 9], when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25% of the minutes in the measurement period. The maximum sound level depends on the use being made of the occupied property.

Table 9
Maximum Sound Level (Impulsive) Measured at Occupied Property In Decibels (Dba)

Occupied Property Use	Decibels (Dba)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

Source: County of San Diego 2009.

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4 EXISTING CONDITIONS

Given the wide geographical area encompassed by the Program, the existing noise environments are varied. In general, the northern portions of the Program area are predominantly suburban land uses, and the central and southern portions are predominantly urban land uses (i.e., more heavily developed with commercial and industrial uses, as well as more dense residential uses). The noise environments through most of the Program area are characterized by a background or “ambient” noise level generated by vehicular traffic. Typical secondary noise sources include truck backup alarms, landscaping maintenance, construction noise, distant aircraft, pedestrians, and barking dogs.

4.1 Ambient Noise Monitoring

Noise measurements were made using a SoftdB Piccolo integrating sound-level meter equipped with a 0.5-inch pre-polarized condenser microphone with pre-amplifier. The sound-level meter meets the current American National Standards Institute standard for a Type 2 (General Purpose) sound-level meter. The sound-level meter was calibrated before and after the measurements, and the measurements were conducted with the microphone positioned 5 feet above the ground and covered with a windscreen.

Short-term noise measurements were conducted at seventeen locations in the Program vicinity on April 16, 2015, and April 17, 2015, as depicted in Figure 7, Location of Ambient Noise Measurements. A brief description of where each noise measurement was conducted as well as the measured time-average sound level and maximum sound level during the measurement interval is summarized in Table 10 below. Detailed noise measurement data is included as Appendix A to this report.

Table 10
Measured Noise Levels

Receptor s	Description	L _{eq} (dBA)	L _{max} (dBA)
M1	Vacant parcel adjacent to industrial uses on Eastgate Mall San Diego, California; east of San Vicente Purified Water Pipeline and southeast of NCAWPF	51.2	61.6
M2	Standley Middle School on Radcliffe Drive San Diego, California; west of Wastewater Forcemain and Brine Pipeline	44.8	48.9
M3	California Institute of Arts & Technology and office complex on Aero Drive San Diego, California; no longer near Program alignment or facilities	60.4	73.1
M4	Elementary school on Baker Street San Diego, California; east of Wastewater Forcemain and Brine Pipeline	61.3	67.1
M5	Junipero Serra High School on Santo Road San Diego, California; west of San Vicente Purified Water Pipeline	54.8	60.6

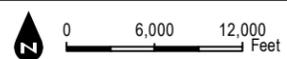
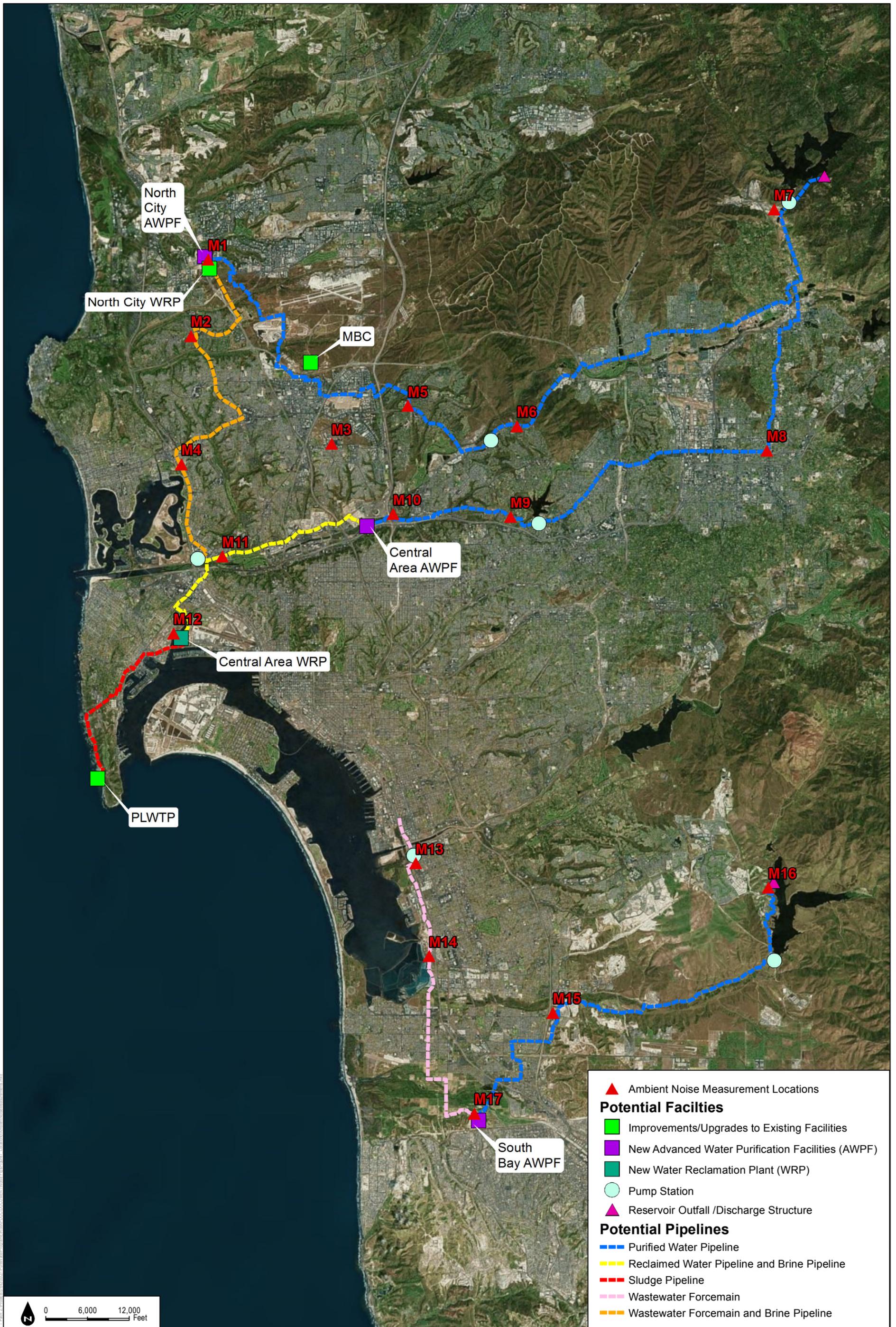
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Table 10
Measured Noise Levels

Receptor s	Description	Leq (dBA)	Lmax (dBA)
M6	Multi-family residential complex on Rancho Mission Road San Diego, California; south of San Vicente Purified Water Pipeline and northeast of Mission Trails Booster Station	56.7	74.7
M7	Industrial area on Vigilante Road Lakeside, California; west of San Vicente Purified Water Pipeline	58.5	76.2
M8	Vons shopping center on Broadway El Cajon, California; north and west of Purified Water Pipeline	61.2	75.5
M9	Single family residential home on Royal Gorge Drive San Diego, California; south of Purified Water Pipeline and northwest of Alvarado WTP Pump Station	53.6	68.4
M10	Single family residential home on Del Cerro Boulevard San Diego, California; north of Purified Water Pipeline and northeast of Central Area AWPF	62.4	67.5
M11	Multi-family residential complex on Friars Road San Diego, California; south of Tertiary Water Pipeline and Brine Pipeline and east of Morena Boulevard Pump Station	68.3	75.0
M12	NTC Park on Chauncy Road San Diego, California; southwest of Tertiary Water Pipeline and Brine Pipeline, northwest of Central Area Water Reclamation Plant; and north of Sludge Pipeline	59.5	74.2
M13	Bayscene Mobilehome Park on D Street Chula Vista, California; south of Wastewater Forcemain and southwest of South Bay Influent Pump Station	59.7	65.7
M14	Industrial complex on Bay Boulevard Chula Vista, California; west of Wastewater Forcemain	52.5	61.4
M15	Kaiser Permanente site on Palm Avenue San Diego, California; west of Purified Water Pipeline	56.1	63.5
M16	Mountain Hawk Park on Lake Crest Drive Chula Vista, California; north and west of Purified Water Pipeline and southwest of Reservoir Outfall/Discharge Structure	48.9	59.9
M17	Office complex on Dairy Mart Road San Diego, California; east of Wastewater Forcemain and northwest of South Bay AWPF	56.4	71.6

Source: Appendix A. Figure 7.

Note: Leq = equivalent continuous sound level (time-averaged sound level); Lmax = maximum sound level during the measurement interval



SOURCE: Bing Imagery, 2015, SANGIS, 2015.

FIGURE 7
Location of Ambient Noise Measurements

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5 PROJECT IMPACT ANALYSIS

5.1 Methodology

The noise assessment in this report quantifies construction and operational noise generation and the resulting noise levels at vicinity noise-sensitive receptors that are generally representative of the areas surrounding the Program facilities. Assumptions regarding construction activities, construction equipment, and duration of construction activities are based on information provided by the applicant and from similar projects. The Federal Highway Administration's Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at typical distance to the nearest noise-sensitive land uses. Input variables for RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two excavators, a loader, a dump truck), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver. The RCNM has default duty cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty cycle values were utilized for this analysis.

The operational noise impact assessment is based on our review of the Program documents and preliminary facility equipment information provided by the Program applicant. Ambient noise measurements were conducted to quantify the existing daytime noise environment at the site. The facility equipment noise levels were evaluated based on similar equipment from other projects. The criteria established in the cities' and County municipal codes are used to determine the significance of the potential noise impacts. Noise calculations are contained in Appendix B.

5.2 Thresholds of Significance

In order to determine the significance of the Program's noise generation, the City of San Diego's Scoping Letter for the Program (City of San Diego 2014) as well as the City's *Significance Determination Thresholds* (City of San Diego 2011) were used. With respect to noise, the Scoping Letter recommends the use of the following thresholds.

1. Would the Pure Water Program result in or create a significant increase in the existing ambient noise level?
2. Would construction noise associated with implementation for any component of the Pure Water Program exceed the City's adopted noise ordinance or noise levels as established in the General Plan?

The City of San Diego Development Services Department updated its CEQA *Significance Determination Thresholds* in January 2011 (City of San Diego 2011). This document provides

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guidance for City of San Diego staff, project proponents, and the public for determining whether, based on substantial evidence, a project may have a significant effect on the environment under Section 21082.2 of CEQA.

Supplemental Thresholds

Cities of La Mesa, Santee, El Cajon, Chula Vista and County of San Diego. In addition to the City of San Diego, the criteria listed above for the Cities of La Mesa, Santee, El Cajon, Chula Vista and the County of San Diego were used for determining CEQA significance levels for construction and operation of the Program facilities.

Substantial Noise Definition. CEQA does not define what constitutes a substantial increase in noise levels. However, the California Department of Transportation defines a substantial noise increase as being 12 dB above existing noise levels (Caltrans 2007).

5.3 Construction Noise Impacts

Construction of the Program facilities would result in temporary localized increases in noise levels from on-site construction equipment, as well as from off-site trucks hauling construction materials. Noise generated by construction equipment will occur with varying intensities and durations during the various phases of construction. The typical maximum noise levels at a distance of 50 feet for various pieces of construction equipment anticipated to be used during construction are depicted in Table 11. Note that these are maximum noise levels, not an average sound level. The equipment operates in alternating cycles of full power and low power, thus, producing noise levels less than the maximum level. The average sound level of the construction activity also depends upon the amount of time that the equipment operates and the intensity of the construction during the time period.

**Table 11
Construction Equipment Noise Levels**

Equipment Type	Typical Noise Level dB(A) at 50 feet
Backhoe	80
Compactor	82
Concrete Mixer	85
Crane	83
Generator	81
Loader	85
Paver	89
Roller	74
Truck	88
Saw	76

Source: FTA 2006.

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Table 12 provides the conceptual construction timeline and potential phasing of Program components. The conceptual construction schedule has been developed based on available information, typical construction practices, and best engineering judgment. Conceptual construction phasing is provided for informational purposes; however, construction phasing and assumptions may change upon final system programming and design.

Table 12
Pure Water Program Construction Phasing Assumptions

Facility	Construction Begin	Construction Complete
<i>North City Component</i>		
NCAWPF	May 2019	May 2021
NCAWPF Influent Conveyance	May 2019	November 2020
San Vicente Purified Water Pipeline	May 2019	May 2022
Mission Trails Booster Station	May 2019	May 2020
San Vicente Tunnel	May 2019	May 2022
Morena Boulevard Pump Station	May 2019	May 2020
WW Force Main and Brine Pipeline	May 2019	May 2021
NCWRP Expansion	May 2019	November 2020
North City Cogeneration Facilities Expansion	November 2020	February 2022
<i>Central Area Component</i>		
CAWRP	July 2025	December 2027
Central Area Tertiary Water Pipeline and Brine Pipeline	February 2026	January 2028
Sludge Conveyance	February 2026	January 2028
CAAWPF	April 2026	March 2028
Central Area Purified Water Pipeline	May 2026	April 2028
Alvarado WTP Booster Pump Station	May 2026	May 2027
PLWTP Improvements	May 2026	April 2028
Metropolitan Biosolids Center Improvements	May 2026	August 2027
Central Area SDG&E Power Supply Improvements	April 2026	March 2028
<i>South Bay Component</i>		
South Bay Influent Pump Station	November 2029	October 2031
SBWRP Expansion	November 2029	October 2031
SBAWPF	August 2029	July 2031
South Bay Purified Water Pipeline	February 2030	February 2032
Otay Reservoir Booster Station	February 2030	February 2031
South Bay Solids Processing Facility	July 2029	January 2032
South Bay SDG&E Power Supply Improvements	July 2029	January 2032

Typical construction equipment that may be employed during Program construction for a water infrastructure project such as the Program is shown in Tables 13, 14, and 15 for construction of

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pipelines, pump stations, and new AWPFS/WRP, and existing facility improvements, respectively. Equipment mix assumptions for construction activity are based on typical infrastructure construction practices, related projects conducted in the Southern California area,¹ and the South Coast Air Quality Management District's California Emissions Estimator Model (CalEEMod) default equipment where appropriate. The equipment mix is meant to represent a reasonably conservative estimate of construction activity. For the analysis, it is generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week.

Pipelines

The sequence of activity for pipeline construction would typically commence with trenching and excavation, followed by pipe installation and covering of the installed pipe, and finishing with paving the linear area of disturbance. For the purposes of quantifying daily construction activity from pipeline construction, it was assumed that each contractor would complete construction of approximately 150 to 200 linear feet of pipeline per day; however, daily activity and linear feet installed would vary depending on field conditions, site/easement access, and other factors associated with continual site location changes. Assuming concurrent construction by two contractors, approximately 300 to 400 linear feet of pipeline installation could occur each day depending on the component under construction and total linear feet of pipeline or conveyance infrastructure to be constructed over a given period. It was assumed typical construction phasing would generally occur as follows during pipeline construction:

- Trenching and excavation would be ongoing throughout pipeline construction phase.
- Pipe installation would occur intermittently as trenching and excavation occur throughout the pipeline construction phase.
- Paving, intermittent – approximately 2 weeks every 6 months for duration of pipeline construction.
- Final paving – 1 month at the end of the construction phase.

For the purposes of estimating daily construction activity and associated noise levels from off-road equipment during pipeline construction, it was assumed the construction equipment listed in

¹ City of Vista 2008 Sewer Master Plan Update (Dudek 2008), Vallecitos Water District 2008 Water, Wastewater and Recycled Water Master Plan PEIR (PBS&J 2011), Plano Lift Station Force Main Relocation Project (Dudek 2013a), El Toro Water District Recycled Water Distribution System Expansion Project and Addendum (Dudek 2012a; Dudek 2014), El Toro Water District Recycled Water Tertiary Treatment Plant (Dudek 2012b), Lee Lake Water District Temescal Canyon and Dawson Canyon Pipelines and Non-Potable Water Tank Project (Dudek 2012c), South Pasadena Sewer Rehabilitation and Replacement Project (Dudek 2013b), Carpinteria Sanitary District West Padaro Lane Main Sewer Extension Project (Dudek 2013c), South Orange County Wastewater Authority Export Sludge Force Main Replacement Project (Dudek 2013d).

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Table 13 would be employed, or similar equipment for pipeline construction. Table 13 presents the amount of equipment per potential contractor and total equipment, assuming simultaneous construction by two contractors working on several portions of a given Program alignment. Due to the length of the pipeline alignment, it was assumed two contractors would potentially be required for construction of the San Vicente Purified Water Pipeline alignment, and one contractor for all other pipeline alignments, as they would require fewer linear feet of total pipeline construction.

Table 13
Construction Equipment – Pipelines

Construction Phase	Equipment	Quantity per Contractor	Total Equipment*
Trenching	Dozers	1	2
	Excavators	1	2
	Tractors/loaders/backhoes	2	4
Installation	Crane	1	2
	Forklift	1	2
	Tractors/loaders/backhoes	1	2
Paving (continual)	Pavers	1	2
	Rollers	1	2
	Paving equipment	1	2

*Assumes simultaneous construction by two contractors for worst-case day construction scenario.

Pump Stations

It was assumed pump stations would take an average of 12 months to construct, and typical construction phasing would occur as follows:

- Site preparation and grading (4 weeks)
- Pump station construction (10 months)
- Paving (4 weeks)

For the purposes of estimating daily construction activity and associated noise levels from off-road equipment, it was assumed equipment shown in Table 14 would be employed, or similar equipment for the construction of a single pump station. For components that would involve the construction of more than one pump station, it was assumed that multiple pump stations would be constructed simultaneously.

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Table 14
Construction Equipment – Pump Stations

Construction Phase	Equipment	Total Equipment*
Site Preparation/Grading	Dozers	1
	Tractors/loaders/backhoes	1
Facility Construction	Excavator	1
	Tractors/loaders/backhoes	1
	Forklifts	1
	Pumps	1
	Welders	2
Paving	Pavers	1
	Rollers	1
	Paving equipment	1

Treatment Facilities It was assumed new facilities such as AWWPs and the CAWRP would take approximately 24 to 36 months to construct, and typical construction phasing would occur as follows during facility construction:

- Site preparation (4 weeks)
- Grading (8 weeks)
- Facility construction (28 – 44 months)
- Paving (4 weeks)

Improvements to existing facilities would take approximately 15 to 30 months depending on the type of facility and scope of facility improvements.

For the purposes of estimating daily construction activity and associated noise levels from off-road equipment, it was assumed equipment shown in Table 15 would be employed during construction of the AWWPs and the CAWRP, PLWTP upgrades and Metropolitan Biosolids Center improvements, the South Bay Solids Processing Facility, O&M building construction, and San Diego Gas & Electric (SDG&E) Power Supply Improvements. It was assumed improvements to existing facilities would only require equipment listed for “facility construction” as shown in Table 15 because it is anticipated site preparation, grading, and paving would not be required.

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Table 15
Construction Equipment – Treatment Facilities

Construction Phase	Equipment	Total Equipment*
Site Preparation	Dozers	1
	Tractors/loaders/backhoes	1
Grading	Excavators	1
	Tractors/loaders/backhoes	2
	Dozers	1
	Compactors	1
Facility Construction	Cranes	1
	Forklifts	1
	Generator sets	1
	Tractors/loaders/backhoes	2
	Welders	2
Paving	Pavers	1
	Paving equipment	1

5.3.1 Summary of Construction Noise Impacts

Table 16, Construction Noise Levels by Program Component and Phase, shows the estimated construction noise levels associated with the conceptual construction phases of the Program. Complete details of the noise modeling calculations are provided in Appendix B of this document.

Table 16
Construction Noise Levels by Program Component and Phase (dBA L_{eq})

Program Component	Distance to Receiver (feet)						
	50	100	250	500	1,000	1,500	2,000
<i>North City Component</i>							
North City pipelines – Trenching	87	81	73	67	61	57	55
North City pipelines - Paving	83	77	69	63	57	53	51
North City pump stations – Site Preparation / Grading	82	76	68	62	56	53	50
North City pump stations – Facility Construction	84	78	70	64	58	54	52
North City pump stations – Paving	83	77	69	63	57	53	51
North City Treatment Facilities– Site Preparation	82	76	68	62	56	53	50
North City Treatment Facilities – Grading	84	78	70	64	58	55	52
North City Treatment Facilities – Facility Construction	83	77	69	63	57	54	51
North City Treatment Facilities – Paving	80	74	66	60	54	50	48
<i>Central Area Component</i>							
Central Area pipelines – Trenching	87	81	73	67	61	57	55
Central Area pipelines – Paving	83	77	69	63	57	53	51

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Table 16
Construction Noise Levels by Program Component and Phase (dBA L_{eq})

Program Component	Distance to Receiver (feet)						
	50	100	250	500	1,000	1,500	2,000
Central Area pump stations – Site Preparation / Grading	82	76	68	62	56	53	50
Central Area pump stations – Facility Construction	84	78	70	64	58	54	52
Central Area pump stations – Paving	83	77	69	63	57	53	51
Central Area Treatment Facilities – Site Preparation	82	76	68	62	56	53	50
Central Area Treatment Facilities – Grading	84	78	70	64	58	55	52
Central Area Treatment Facilities – Facility Construction	83	77	69	63	57	54	51
Central Area Treatment Facilities – Paving	80	74	66	60	54	50	48
<i>South Bay Component</i>							
South Bay pipelines – Trenching	87	81	73	67	61	57	55
South Bay pipelines – Paving	83	77	69	63	57	53	51
South Bay pump stations – Site Preparation / Grading	82	76	68	62	56	53	50
South Bay pump stations – Facility Construction	84	78	70	64	58	54	52
South Bay pump stations – Paving	83	77	69	63	57	53	51
South Bay Treatment Facilities – Site Preparation	82	76	68	62	56	53	50
South Bay Treatment Facilities – Grading	84	78	70	64	58	55	52
South Bay Treatment Facilities – Facility Construction	83	77	69	63	57	54	51
South Bay Treatment Facilities – Paving	80	74	66	60	54	50	48

As shown in Table 16, construction noise levels at a reference distance of 50 feet are estimated to range from approximately 87 dBA L_{eq} during pipeline trenching to 80 dBA L_{eq} during paving of the treatment facilities. The highest construction noise levels would occur during pipeline trenching. During pump station work, the highest predicted noise levels (84 dBA L_{eq}) would occur during the facility construction phase. During construction of the treatment facilities, the highest predicted noise levels (84 dBA L_{eq}) would occur during grading. Construction noise levels would be similar for the North City, South Bay, and Central Area components.

Noise-sensitive receptors, such as residential development, schools, churches, and hospitals, may also be affected by Program-related noise, as further described in the discussion of individual components below. Noise impacts from construction activities would be minimal within industrial and manufacturing districts, as these areas do not contain sensitive receptors and their associated ambient noise levels are generally high. Similarly, Program-related construction noise would have no impact within Open Space areas, as these areas are located in remote locations and devoid of sensitive receptors. However, the associated noise could potentially affect wildlife species which utilize the affected Open Space areas for habitat or migration. Construction-related noise impacts to wildlife are discussed in the biological constraints report (Helix 2015). No

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significant noise related impacts would occur within industrial, manufacturing, or open space areas as a result of short-term construction activities.

Pipelines

As noted previously, pipeline work typically proceeds at a fairly rapid pace (approximately 150 to 200 feet per day). Thus, no one noise-sensitive receptor would be exposed to high noise levels from pipeline construction for a long period of time. Based on the current conceptual planned facility locations, noise-sensitive land uses (residences, churches, schools) exist within 50 to 100 feet of portions of the pipelines associated with the North City, South Bay, and Central Area components. The associated noise levels from pipeline construction at these distances could exceed the City of San Diego's noise standard for construction of 75 dBA $L_{eq(12hr)}$ between 7 a.m. and 7 p.m. as well as other jurisdictions through which the pipeline would pass with similar standards (i.e., the City of Santee's and the County of San Diego's 75 dBA $L_{eq(8-hour)}$ between 7 a.m. and 7 p.m.). Additionally, although most of the work would be conducted during permitted daytime hours, some work may be conducted during nighttime hours under special permit in order to minimize traffic congestion or for other logistical reasons. Noise levels during pipeline construction could therefore create temporary substantial noise increases and result in short-term exceedance of construction noise standards. Nighttime work, where necessary to avoid daytime traffic jams or service outages, would be planned to the extent practical to minimize the number and type of operating equipment, restrict the movement of equipment adjacent to the noise-sensitive receptors, and to minimize noise from back-up alarms.

Pump Stations

Based upon the current conceptual planned facility locations, noise-sensitive land uses (residences, churches, schools) exist within 50 to 100 feet of portions of the several pump stations associated with the North City, South Bay and Central Area components. The associated noise levels from construction of the pump stations at these distances could exceed the City of San Diego's numerical noise standard for construction of 75 dBA $L_{eq(12-hour)}$ between 7 a.m. and 7 p.m. as well as other jurisdictions through which the pump stations may be constructed.

Treatment Facilities

Based upon the current conceptual planned facility locations, noise-sensitive land uses (residences, churches, schools, recreational land uses) are 500 feet or more from treatment facility construction and upgrades. Treatment facilities, similar to pump stations, involve the use of large pumps and motors with similar high noise levels. However, treatment facilities are commonly located within or near residential communities and other noise-sensitive land uses and are designed and constructed to achieve compatible noise levels. Although, at a 500 foot

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distance, construction noise from these facilities is likely to be relatively low; however, subsequent changes in the Program design (i.e., alternate placement of facilities) may result in higher construction noise levels at noise-sensitive receivers.

Noise impacts from Program construction are considered **potentially significant**. Mitigation measures are provided to minimize the level of significance from construction noise to a level below significance.

5.4 Construction Vibration Impacts

Groundborne vibration from heavy equipment operations during Program construction were evaluated and compared with relevant vibration impact criteria. Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. Groundborne vibration diminishes (or “attenuates”) fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily “sandy” soils) do not. The FTA’s Transit Noise and Vibration Impact Assessment Manual (2006) provides vibration impact criteria and recommended methodologies and guidance for assessment of vibration effects.

Vibration resulting from activities during Program construction was analyzed using the methodology contained in Section 12.2 of the FTA Manual.

At a distance of approximately 50 feet, the typical distance to the nearest residences, the vibration levels from heavy construction machinery (such as a large bulldozer) would be 0.031 inches per second (IPS), or 0.074 IPS from a vibratory roller. Vibration levels of this magnitude would be below the threshold of perception of 0.10 IPS or the damage threshold for fragile structures (0.20 IPS). Therefore, the vibration levels from construction activities would be **less than significant**.

5.5 Operational Noise Impacts

Traffic Noise

Following the completion of construction activities, the Program would result in potential increases in noise levels from mobile sources (vehicular traffic), as a result of 12 new employees per AWPf and associated operation and maintenance activities. It was assumed 12 additional staff per new manned facility (36 new employees) would result in approximately 72 one-way trips during Program operation. Additionally, operational trips would be generated as a result of regular maintenance, periodic inspections, and repairs of system facilities, monitoring, maintenance, and other operational procedures similar to those under the current water and wastewater treatment and distribution system. It was assumed only a minor increase in operations and maintenance trips (in addition to the 36 new employees) would be required;

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therefore, it was assumed that approximately 10 additional trips per day per facility would occur for a total of 30 operations and maintenance trips per day. Because of the relatively small number of trips associated with Program operations compared to the number of non-Program vehicle trips (generally in the thousands to tens of thousands per day) on the same City and County roadways in the existing and future years, the noise increase from Program-related vehicular traffic would be well below one dB, and would not result in a measurable or audible increase. Therefore, impacts would be **less than significant**.

Pipelines

Once constructed, the pipeline segments would not result in noise impacts as the flow of water or wastewater within the underground pipelines would not be audible. Noise levels would not exceed the limits expressed in the respective City and County of San Diego municipal codes. Occasional maintenance and emergency repair activities will generate some additional noise; however, these activities are sporadic in nature and do not occur at the same location for long periods of time.

Pump Stations

The primary noise sources from pump station facilities are the motors and the pumps. In normal operation, the pumps are powered by electric motors; however, the pumps and motors can generate relatively high noise levels. Typical reference noise levels from large water pumps and motors are 88 to 90 dBA at 3 feet (City of Carlsbad 2006). Unmitigated, the noise levels from such pump station equipment would be a nuisance and/or would exceed local noise standards. However, pump stations are commonly located within or near residential communities and other noise-sensitive land uses and thus are successfully designed and constructed to achieve compatible noise levels (through the use of engineered enclosures with noise-attenuating louvers, etc.). Although pump stations typically would not generate substantial noise levels, details regarding exact location and facility / equipment specifications are not available. Thus, noise from pump stations are considered **potentially significant**. A mitigation measure in the form of requirement for subsequent noise analysis in the project-specific environmental design phase is provided, to ensure compliance with relevant City/County of San Diego noise standards.

Treatment Facilities

Based upon the current conceptual planned facility locations, noise-sensitive land uses (residences, churches, schools, recreational land uses) would be 500 feet or more from planned treatment facility construction and upgrades. Treatment facilities, similar to pump stations, involve the use of large pumps and motors with similar high noise levels. However, treatment facilities are commonly located within or near residential communities and other noise-sensitive

Noise Technical Report for the Pure Water Program

land uses and are designed and constructed to achieve compatible noise levels. Although noise from these facilities is likely to be relatively low, the lack of information on project-specific design precludes the ability to fully analyze and determine whether impacts would be less than significant, and therefore the operation of treatment facilities may result in a **potentially significant impact** on noise-sensitive receivers, at the program-level of analysis.

On-site noise impacts from operation of treatment facilities are considered **potentially significant**. Mitigation measures are provided to minimize the level of significance from operational noise to a level below significant.

5.6 Operational Vibration Impacts

Similar to operational noise, the Program's potential to result in excessive groundborne vibration to sensitive receptors would need to be assessed at the individual project-level review. Groundborne vibration can occur in areas adjacent to pump stations or other facilities with heavy rotating or reciprocating machinery and are considered **potentially significant**.

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6 MITIGATION MEASURES

6.1 Construction Mitigation Measures

Noise from construction work could exceed applicable City and County of San Diego noise standards unless mitigated. Project-level environmental analyses shall evaluate the noise and vibration impacts of subsequent project-specific features. The following measures will be considered and incorporated and/or modified and augmented as appropriate to address project-specific noise and vibration effects:

1. Pumps and associated equipment (e.g., portable generators etc.) used during nighttime hours (10 p.m. to 7 a.m.) and during construction activities shall be shielded from sensitive uses using local temporary noise barriers or enclosures, or shall otherwise be designed or configured so as to comply with applicable municipal code nighttime noise standards. The specific location and design of such barriers shall be determined in conjunction with construction plans for individual projects.
2. Construction activities shall not occur during nighttime restrictive time periods according to applicable requirements. The hours of construction, including noisy maintenance activities and all spoils and material transport, shall be restricted to the periods and days permitted by the local noise or other applicable ordinance.
3. Nighttime work, where necessary to avoid daytime traffic jams or service outages, shall be planned to the extent practical to minimize the number and type of operating equipment, restrict the movement of equipment adjacent to the noise-sensitive receivers, and minimize noise from back-up alarms.
4. All noise-producing equipment and vehicles using internal combustion engines shall be equipped with mufflers; air-inlet silencers where appropriate; and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed “package” equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
5. All mobile or fixed noise-producing equipment used on the Program facilities that are regulated for noise output by a local, state, or federal agency shall comply with such regulation while in the course of Program activity.
6. Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where feasible.
7. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.

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8. Construction site and access road speed limits shall be established and enforced during the construction period.
9. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.
10. No project-related public address or music system shall be audible at any adjacent receptor.

6.2 Operational Mitigation Measures

Subsequent Program components shall be evaluated at the project-specific environmental / design phase to determine if potential noise or groundborne vibration impacts in excess of applicable noise or vibration standards would result. If such a potential exists, a noise and vibration study shall be conducted including recommendations for mitigation. Mitigation shall be specific to the Program feature, and designed to assure that noise and vibration produced by operation of the facility shall not cause the limits in the municipal code to be exceeded, and any such mitigation shall be required as part of the subsequent Program component.

A site-specific acoustical analysis will be required for any project located within 500 feet of any residential dwellings, which would ensure compliance with construction noise and outdoor noise standards. It is reasonable to assume that feasible mitigation is available through project-specific design features that would provide appropriate sound and vibration attenuation for operational impacts from Program components, such as pump stations and treatment facilities. Such design features, including construction of attenuation walls or structures, and location/placement of noise/vibration generating equipment shall be applied to reduce potentially significant impacts to less than significant levels at the project-level of analysis.

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APPENDIX A
Noise Measurement Data

Field Noise Measurement Data

Record: 90

Project Name	Pure Water
Project #	7643
Observer(s)	Austin Melcher
Date	2015-04-16
autoemail	amelcher@dudek.com

Meteorological Conditions

Upload NOAA Forecast

The screenshot shows the NOAA weather app interface. At the top, it says "National Weather Service" and "3 Miles WSW San Diego-Clai...". Under "Current Conditions", it lists "Mount Soledad" with an update time of "16 Apr 9:30 am PDT". The current temperature is "71 °F", wind is "Wind NE 3 MPH", and dew point is "Dew Point 27 °F (19% RH)". A "No Weather Image Available" message is displayed. The "Forecast" section shows "16 Apr 09:30 am PDT" and three columns for "Today", "Tonight", and "Friday", each with a corresponding weather icon.

Temp (F)	71
Humidity % (R.H.)	19
Wind	Calm
Wind Speed (MPH)	3
Wind Direction	North East
Sky	Clear

Instrument and Calibrator Information

Instrument Name	Piccolo #9
Instrument Name	Piccolo #9
Instrument Name Lookup Key	Piccolo #9
Instrument Type	SLM
Instrument Manufacturer	Soft dB
Instrument Model	Piccolo
Serial #	140317001
Calibration Date	4/25/2014
Calibrator Name	LD CAL150
Calibrator Name	LD CAL150
Calibrator Name Lookup Key	LD CAL150
Calibrator Manufacturer	Larson Davis
Calibrator Model	LD CAL150
Calibrator Serial #	5152
Pre-Test (dBA SPL)	94
Post-Test (dBA SPL)	94
Windscreen	Yes

Weighting?	A-WTD
Slow/Fast?	Slow
ANSI?	Yes

Recordings

Record #	4
Site ID	4
Site Location	Latitude:32.800904, Longitude:-117.210209, Altitude:18.991688, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	10:00:00
End (Time)	10:20:00
Leq	61.3
Lmax	67.1
Lmin	58.2
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Traffic
Other Noise Sources Additional Description	Primary noise from I5 traffic and frontage roadway, minimal other noise sources
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	Yes

Description / Photos

Upload Google Maps Data	
Terrain	Mixed

Site Photos

Photo



Comments / Description

Looking southwest towards Baker Street, Morena Boulevard and I-5

Site Photos

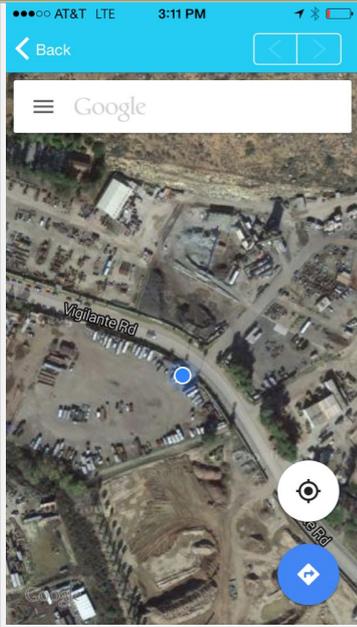
Photo



Comments / Description

Looking north towards Toler Elementary School

Recordings	
Record #	7
Site ID	7
Site Location	Latitude:32.903613, Longitude:-116.933904, Altitude:138.789059, Speed:0.680000, Horizontal Accuracy:5.000000, Vertical Accuracy:6.000000,
Begin (Time)	16:02:00
End (Time)	16:22:00
Leq	58.5
Lmax	76.2
Lmin	44.1
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Industrial, Distant Traffic
Other Noise Sources Additional Description	Primary noise from traffic along vigilante road, other noise from material banging and backup beepers at nearby industrial facilities, and very distant aircraft
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos	
Upload Google Maps Data	
Terrain	Hard

Site Photos

Photo



Comments / Description

Facing northeast towards vigilante road

Meteorological Conditions

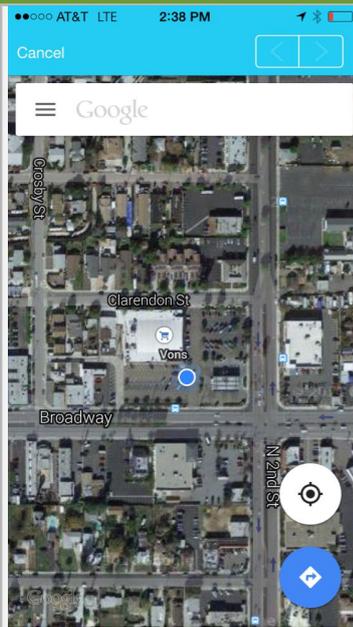
Temp (F)	83
Humidity % (R.H.)	9
Wind	Light
Wind Speed (MPH)	4
Wind Direction	North East
Sky	Clear

Recordings

Record #	8
Site ID	8
Site Location	Latitude:32.808093, Longitude:-116.936523, Altitude:146.756527, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	15:15:00
End (Time)	15:35:00
Leq	61.2
Lmax	75.5
Lmin	50.1
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Industrial, Distant Traffic
Other Noise Sources Additional Description	Primary noise from traffic along Broadway, noise from pumps and vehicles at adjacent gas station, almost no noise from traffic in parking lot
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Hard

Site Photos

Photo



Comments / Description

Looking southeast towards Broadway and gas station

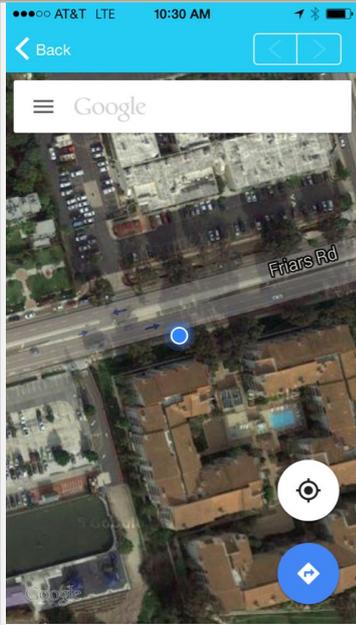
Meteorological Conditions

Temp (F)	84
Humidity % (R.H.)	15
Wind	Calm
Wind Speed (MPH)	2
Wind Direction	North West
Sky	Clear

Recordings

Record #	11
Site ID	11
Site Location	Latitude:32.764557, Longitude:-117.190776, Altitude:9.801250, Speed:0.000000, Horizontal Accuracy:10.000000, Vertical Accuracy:3.000000,
Begin (Time)	10:40:00
End (Time)	11:00:00
Leq	68.3
Lmax	75
Lmin	53.9
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Traffic
Other Noise Sources Additional Description	Primary noise source traffic along Friars road, measurements taken near apartments fronting road, few other noise sources
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data	
Terrain	Mixed

Site Photos

Photo



Comments / Description

Looking north towards Friars road

Site Photos

Photo

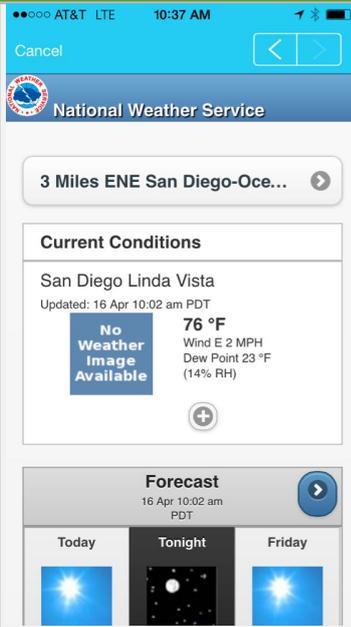


Comments / Description

Looking south towards apartment complex

Meteorological Conditions

Upload NOAA Forecast



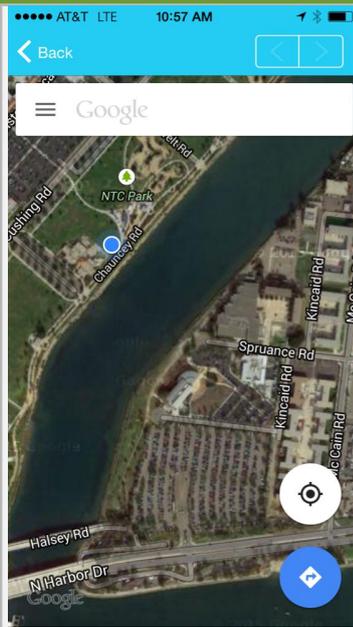
Temp (F)	76
Humidity % (R.H.)	19
Wind	Calm
Wind Speed (MPH)	3
Wind Direction	North East
Sky	Clear

Recordings

Record #	12
Site ID	12
Site Location	Latitude:32.733885, Longitude:-117.213239, Altitude:19.031933, Speed:0.200000, Horizontal Accuracy:5.000000, Vertical Accuracy:6.000000,
Begin (Time)	11:15:00
End (Time)	11:35:00
Leq	59.5
Lmax	74.2
Lmin	44.1
Other Lx?	No
Primary Noise Source	Aircraft
Other Noise Sources (Background)	Distant Aircraft, Distant Conversations / Yelling, Distant Kids Playing, Distant Traffic
Other Noise Sources Additional Description	Primary noise was aircraft from San Diego international airport and helicopters operating in distance, children playing at nearby playground, people running along water trail
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Soft

Site Photos

Photo



Comments / Description

Looking east towards proposed water reclamation and advanced purification facility

Site Photos

Photo



Comments / Description

Looking northeast towards playground and San Diego international airport

Meteorological Conditions

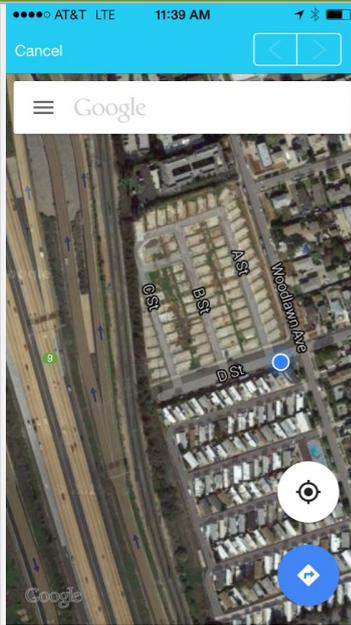
Temp (F)	77
Humidity % (R.H.)	9
Wind	Light
Wind Speed (MPH)	5
Wind Direction	North
Sky	Clear

Recordings

Record #	13
Site ID	13
Site Location	Latitude:32.643577, Longitude:-117.099120, Altitude:9.821011, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	12:02:00
End (Time)	12:22:00
Leq	59.7
Lmax	65.7
Lmin	56.9
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Aircraft, Distant Traffic
Other Noise Sources Additional Description	Primary noise from I5 traffic, very distant aircraft noise, almost no localized traffic noise, leaves rustling
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Flat

Site Photos

Photo



Comments / Description

Looking northeast towards Woodlawn avenue

Site Photos

Photo



Comments / Description

Looking northwest towards I5

Meteorological Conditions

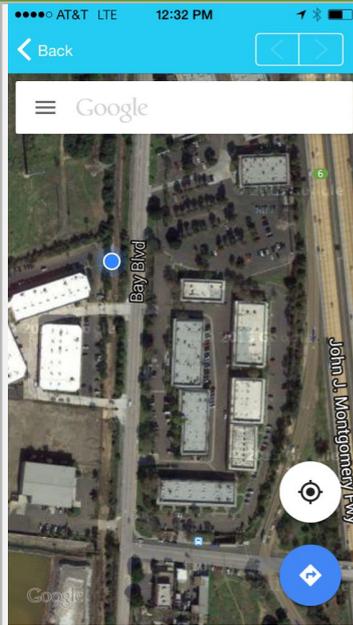
Temp (F)	78
Humidity % (R.H.)	14
Wind	Moderate
Wind Speed (MPH)	8
Wind Direction	North West
Sky	Clear

Recordings

Record #	14
Site ID	14
Site Location	Latitude:32.606928, Longitude:-117.092655, Altitude:6.490627, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	12:35:00
End (Time)	12:55:00
Leq	52.5
Lmax	61.4
Lmin	44.5
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Gardener / Landscape Noise, Rustling Leaves
Other Noise Sources Additional Description	Primary noise source traffic along bay boulevard, small amounts of bird and distant landscaping equipment noise.
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Mixed

Site Photos

Photo



Comments / Description

Looking east towards bay boulevard at unused railroad tracks

Site Photos

Photo



Comments / Description

Looking west towards commercial property

Meteorological Conditions

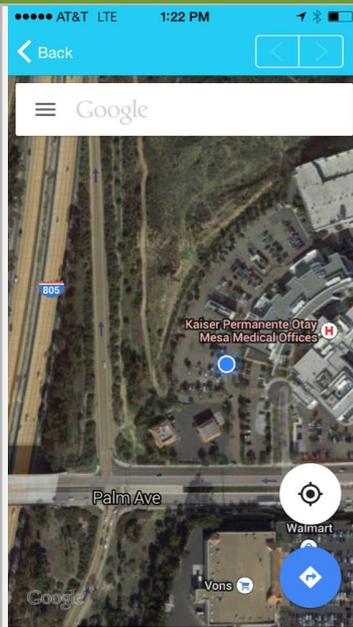
Temp (F)	79
Humidity % (R.H.)	14
Wind	Light
Wind Speed (MPH)	7
Wind Direction	North West
Sky	Clear

Recordings

Record #	15
Site ID	15
Site Location	Latitude:32.584873, Longitude:-117.034640, Altitude:73.682125, Speed:0.280000, Horizontal Accuracy:5.000000, Vertical Accuracy:8.000000,
Begin (Time)	13:45:00
End (Time)	14:05:00
Leq	56.1
Lmax	63.5
Lmin	53.7
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Industrial, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic on Palm avenue and I805. Faint noise from birds rustling leaves and low equipment noise from kaiser facility
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Mixed

Site Photos

Photo



Comments / Description

Looking south towards Palm avenue

Site Photos

Photo



Comments / Description

Looking east towards kaiser facility

Meteorological Conditions

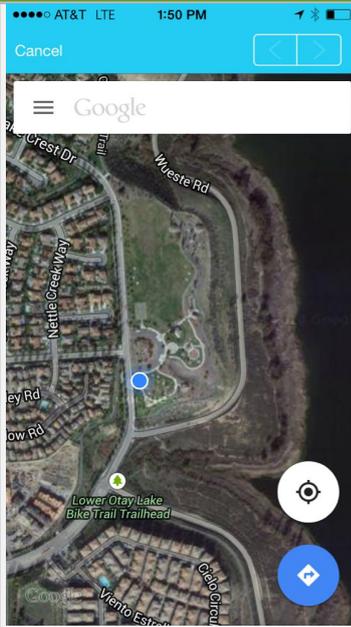
Temp (F)	82
Humidity % (R.H.)	8
Wind	Gusty
Wind Speed (MPH)	6
Wind Direction	West
Sky	Clear

Recordings

Record #	16
Site ID	16
Site Location	Latitude:32.634990, Longitude:-116.934559, Altitude:167.510433, Speed:0.290000, Horizontal Accuracy:5.000000, Vertical Accuracy:6.000000,
Begin (Time)	14:25:00
End (Time)	14:45:00
Leq	48.9
Lmax	59.9
Lmin	41.8
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Industrial, Distant Kids Playing, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic along lake crest drive, kids yelling in distance at adjacent park, distant home construction noise (hammering intermittently)
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Mixed

Site Photos

Photo



Comments / Description

Looking west towards lake crest drive and adjacent residential

Site Photos

Photo



Comments / Description

Looking southeast towards park

Meteorological Conditions

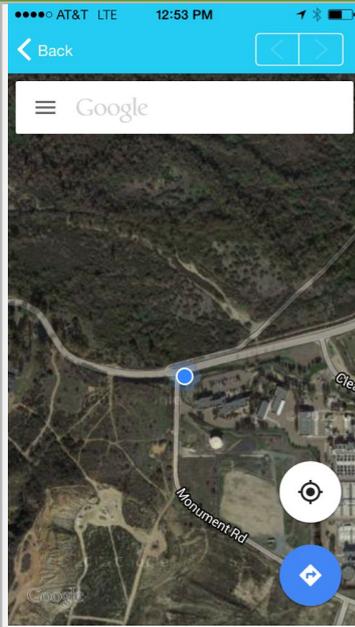
Temp (F)	83
Humidity % (R.H.)	10
Wind	Calm
Wind Speed (MPH)	2
Wind Direction	West
Sky	Clear

Recordings

Record #	17
Site ID	17
Site Location	Latitude:32.544676, Longitude:-117.070931, Altitude:10.222958, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:4.000000,
Begin (Time)	13:08:00
End (Time)	13:28:00
Leq	56.4
Lmax	71.6
Lmin	42.7
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Aircraft, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic along dairy mart road, one helicopter flyover, faint bird and leaf noise
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data



Terrain

Mixed

Site Photos

Photo



Comments / Description

Looking south towards dairy Mart road

Site Photos

Photo



Comments / Description

Looking east towards wastewater treatment facility

Meteorological Conditions

Temp (F)	82
Humidity % (R.H.)	9
Wind	Moderate
Wind Speed (MPH)	8
Wind Direction	West
Sky	Clear

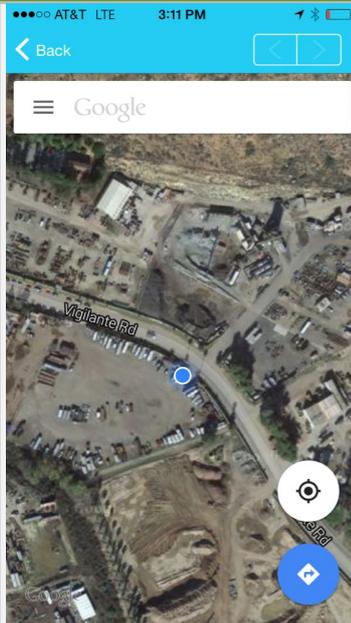
Field Noise Measurement Data

Record: 93

Project Name	Pure water
Project #	7643
Observer(s)	Austin Melcher
Date	2015-04-17
autoemail	amelcher@dudek.com

Meteorological Conditions

Upload NOAA Forecast



Temp (F)	64
Humidity % (R.H.)	38
Wind	Light
Wind Speed (MPH)	4
Wind Direction	North
Sky	Clear

Instrument and Calibrator Information

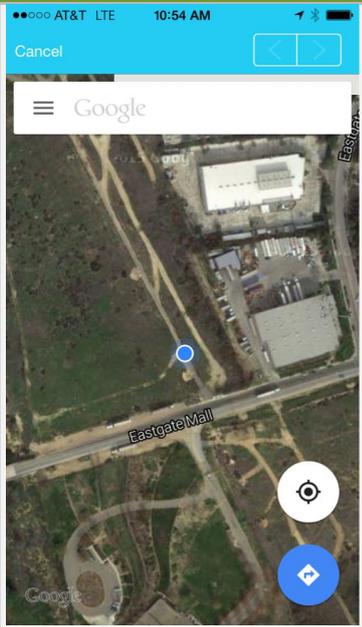
Instrument Name	Piccolo #9
Instrument Name	Piccolo #9
Instrument Name Lookup Key	Piccolo #9
Instrument Type	SLM
Instrument Manufacturer	Soft dB
Instrument Model	Piccolo
Serial #	140317001
Calibration Date	4/25/2014
Calibrator Name	LD CAL150
Calibrator Name	LD CAL150
Calibrator Name Lookup Key	LD CAL150
Calibrator Manufacturer	Larson Davis
Calibrator Model	LD CAL150
Calibrator Serial #	5152
Pre-Test (dBA SPL)	94
Post-Test (dBA SPL)	94
Windscreen	Yes

Weighting?	A-WTD
Slow/Fast?	Slow
ANSI?	Yes

Recordings

Record #	1
Site ID	1
Site Location	Latitude:32.882054, Longitude:-117.198631, Altitude:109.095047, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	10:29:00
End (Time)	10:49:00
Leq	51.2
Lmax	61.6
Lmin	45.1
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Aircraft, Distant Industrial
Other Noise Sources Additional Description	Primary noise from traffic along eastgate, audible backup beepers and industrial equipment from surrounding uses and distant construction
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	Yes

Description / Photos

Upload Google Maps Data	
Terrain	Flat

Site Photos

Photo



Comments / Description

Looking south towards eastgate

Site Photos

Photo



Comments / Description

Looking northeast towards adjacent industrial use

Recordings	
Record #	2
Site ID	2
Site Location	Latitude:32.851649, Longitude:-117.206276, Altitude:111.281208, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	11:05:00
End (Time)	11:25:00
Leq	44.8
Lmax	48.9
Lmin	41.8
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Aircraft, Distant Conversations / Yelling
Other Noise Sources Additional Description	Primary noise from traffic along Radcliffe, distant kids yelling, birds chirping, no parking lot noise during measurement, distant aircraft noise
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos	
Upload Google Maps Data	
Terrain	Flat

Site Photos

Photo



Comments / Description

Looking east towards Radcliffe

Site Photos

Photo



Comments / Description

Looking northeast towards middle school

Meteorological Conditions

Temp (F)	66
Humidity % (R.H.)	32
Wind	Calm
Wind Speed (MPH)	1
Wind Direction	North East
Sky	Clear

Recordings

Record #	3
Site ID	3
Site Location	Latitude:32.809473, Longitude:-117.140056, Altitude:127.559341, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	11:45:00
End (Time)	12:05:00
Leq	60.4
Lmax	73.1
Lmin	54.4
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Aircraft, Distant Industrial, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic along aero drive, construction noise from shoveling and engine operation, distant aircraft noise
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data	
Terrain	Mixed

Site Photos

Photo



Comments / Description

Looking north towards aero drive

Site Photos

Photo

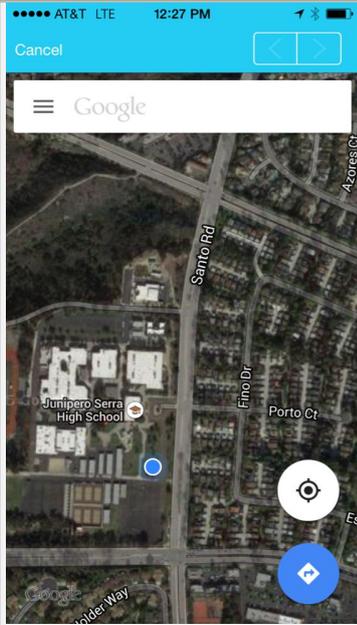


Comments / Description

Looking west towards sandrock road and construction

Meteorological Conditions	
Temp (F)	75
Humidity % (R.H.)	28
Wind	Moderate
Wind Speed (MPH)	8
Wind Direction	North West
Sky	Clear

Recordings	
Record #	4
Site ID	5
Site Location	Latitude:32.824755, Longitude:-117.104586, Altitude:124.340836, Speed:0.860000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	12:20:00
End (Time)	12:40:00
Leq	54.8
Lmax	60.6
Lmin	47.1
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Conversations / Yelling, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic along santo road, distant conversations, distant airplane noise, leaves rustling, little to no parking lot noise
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos	
Upload Google Maps Data	
Terrain	Mixed

Site Photos

Photo



Comments / Description

Looking east towards santo road

Site Photos

Photo

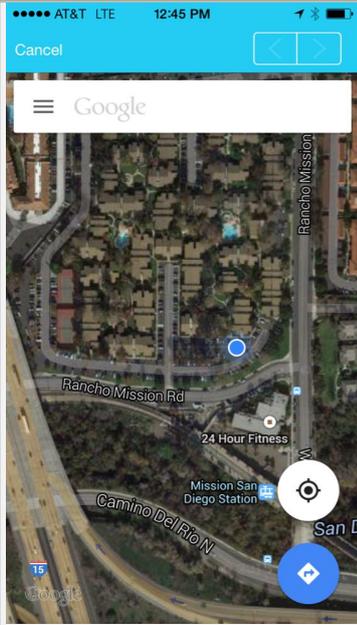


Comments / Description

Looking northwest towards Serra high school

Meteorological Conditions	
Temp (F)	76
Humidity % (R.H.)	18
Wind	Moderate
Wind Speed (MPH)	7
Wind Direction	North West
Sky	Clear

Recordings	
Record #	5
Site ID	10
Site Location	Latitude:32.781897, Longitude:-117.111070, Altitude:20.735180, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	12:56:00
End (Time)	13:16:00
Leq	62.4
Lmax	67.5
Lmin	58.6
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic along I15 and I8, less audible traffic along ward and rancho mission roads, distant conversations, birds, no trolleys during measurement
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos	
Upload Google Maps Data	
Terrain	Mixed

Site Photos

Photo



Comments / Description

Looking southwest towards I15 and I8

Site Photos

Photo

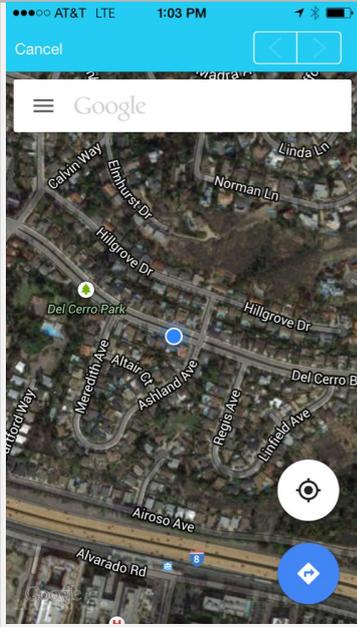


Comments / Description

Looking northeast towards residential complex

Meteorological Conditions	
Temp (F)	79
Humidity % (R.H.)	12
Wind	Moderate
Wind Speed (MPH)	9
Wind Direction	North West
Sky	Clear

Recordings	
Record #	6
Site ID	9
Site Location	Latitude:32.781066, Longitude:-117.056216, Altitude:143.453350, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000,
Begin (Time)	13:28:00
End (Time)	13:48:00
Leq	53.6
Lmax	68.4
Lmin	44.6
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Aircraft, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Primary noise from traffic along I8 and del cero boulevard, distant airplane noise, leaves rustling
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos	
Upload Google Maps Data	
Terrain	Flat

Site Photos

Photo



Comments / Description

Looking south towards residential homes

Site Photos

Photo



Comments / Description

Looking north towards del cero boulevard

Meteorological Conditions

Temp (F)	74
Humidity % (R.H.)	32
Wind	Moderate
Wind Speed (MPH)	10
Wind Direction	North West
Sky	Clear

Recordings

Record #	7
Site ID	6
Site Location	Latitude:32.817001, Longitude:-117.053572, Altitude:125.962078, Speed:1.100000, Horizontal Accuracy:5.000000, Vertical Accuracy:4.000000,
Begin (Time)	14:00:00
End (Time)	14:20:00
Leq	56.7
Lmax	74.7
Lmin	43.3
Other Lx?	No
Primary Noise Source	Traffic
Other Noise Sources (Background)	Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Primary noise traffic along. Mission gorge road, rustling leaves, no vehicles along royal George drive during measurement
Is the same instrument and calibrator being used as previously notated?	Yes
Are the meteorological conditions the same as previously notated?	No

Description / Photos

Upload Google Maps Data	
Terrain	Mixed

Site Photos

Photo



Comments / Description

Looking northeast towards mission gorge road

Site Photos

Photo



Comments / Description

Looking south at residential along royal George drive

Meteorological Conditions	
Temp (F)	78
Humidity % (R.H.)	13
Wind	Moderate
Wind Speed (MPH)	12
Wind Direction	North West
Sky	Clear

APPENDIX B

Noise Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 4/22/2015
 Case Description: Pipelines_Trenching

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
50'	Residential	60	55	50

Description	Device	Land Use	Equipment				
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	Residential	40		81.7	50	0
Dozer	No	Residential	40		81.7	50	0
Excavator	No	Residential	40		80.7	50	0
Excavator	No	Residential	40		80.7	50	0
Backhoe	No	Residential	40		77.6	50	0
Tractor	No	Residential	40	84		50	0
Backhoe	No	Residential	40		77.6	50	0
Tractor	No	Residential	40	84		50	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A
Tractor	84	80	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A
Tractor	84	80	N/A	N/A	N/A	N/A	N/A
Total	84	86.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
100'	Residential	60	55	50

Description	Device	Land Use	Equipment				
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	Residential	40		81.7	100	0
Dozer	No	Residential	40		81.7	100	0
Excavator	No	Residential	40		80.7	100	0
Excavator	No	Residential	40		80.7	100	0
Backhoe	No	Residential	40		77.6	100	0
Tractor	No	Residential	40	84		100	0
Backhoe	No	Residential	40		77.6	100	0
Tractor	No	Residential	40	84		100	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A
Tractor	78	74	N/A	N/A	N/A	N/A	N/A
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A
Tractor	78	74	N/A	N/A	N/A	N/A	N/A
Total	78	80.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
250'	Residential	60	55	50

Description	Device	Land Use	Equipment			
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)

Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0
Excavator	No	40		80.7	250	0
Excavator	No	40		80.7	250	0
Backhoe	No	40		77.6	250	0
Tractor	No	40	84		250	0
Backhoe	No	40		77.6	250	0
Tractor	No	40	84		250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Dozer	67.7	63.7	N/A	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A	N/A
Excavator	66.7	62.8	N/A	N/A	N/A	N/A	N/A
Excavator	66.7	62.8	N/A	N/A	N/A	N/A	N/A
Backhoe	63.6	59.6	N/A	N/A	N/A	N/A	N/A
Tractor	70	66	N/A	N/A	N/A	N/A	N/A
Backhoe	63.6	59.6	N/A	N/A	N/A	N/A	N/A
Tractor	70	66	N/A	N/A	N/A	N/A	N/A
Total	70	72.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)			Equipment		
		Daytime	Evening	Night	Spec Lmax	Actual Lmax	Receptor Distance
	500 Residential	60	55	50			
Description	Device	Usage(%)	Spec (dBA)	Actual (dBA)	Receptor (feet)	Estimated Shielding (dBA)	
Dozer	No	40		81.7	500	0	
Dozer	No	40		81.7	500	0	
Excavator	No	40		80.7	500	0	
Excavator	No	40		80.7	500	0	
Backhoe	No	40		77.6	500	0	
Tractor	No	40	84		500	0	
Backhoe	No	40		77.6	500	0	
Tractor	No	40	84		500	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Dozer	61.7	57.7	N/A	N/A	N/A	N/A	N/A
Dozer	61.7	57.7	N/A	N/A	N/A	N/A	N/A
Excavator	60.7	56.7	N/A	N/A	N/A	N/A	N/A
Excavator	60.7	56.7	N/A	N/A	N/A	N/A	N/A
Backhoe	57.6	53.6	N/A	N/A	N/A	N/A	N/A
Tractor	64	60	N/A	N/A	N/A	N/A	N/A
Backhoe	57.6	53.6	N/A	N/A	N/A	N/A	N/A
Tractor	64	60	N/A	N/A	N/A	N/A	N/A
Total	64	66.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)			Equipment		
		Daytime	Evening	Night	Spec Lmax	Actual Lmax	Receptor Distance
	1000 Residential	60	55	50			
Description	Device	Usage(%)	Spec (dBA)	Actual (dBA)	Receptor (feet)	Estimated Shielding (dBA)	
Dozer	No	40		81.7	1000	0	
Dozer	No	40		81.7	1000	0	
Excavator	No	40		80.7	1000	0	
Excavator	No	40		80.7	1000	0	
Backhoe	No	40		77.6	1000	0	
Tractor	No	40	84		1000	0	
Backhoe	No	40		77.6	1000	0	
Tractor	No	40	84		1000	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Dozer	55.6	51.7	N/A	N/A	N/A	N/A	N/A

Dozer	55.6	51.7	N/A	N/A	N/A	N/A	N/A
Excavator	54.7	50.7	N/A	N/A	N/A	N/A	N/A
Excavator	54.7	50.7	N/A	N/A	N/A	N/A	N/A
Backhoe	51.5	47.6	N/A	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A	N/A
Backhoe	51.5	47.6	N/A	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A	N/A
Total	58	60.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use
	1500 Residential

Baselines (dBA)		
Daytime	Evening	Night
60	55	50

Equipment							
Description	Device	Impact	Usage(%)	Spec	Actual	Receptor	Estimated
				(dBA)	(dBA)	Distance	Shielding
Dozer	No		40		81.7	1500	0
Dozer	No		40		81.7	1500	0
Excavator	No		40		80.7	1500	0
Excavator	No		40		80.7	1500	0
Backhoe	No		40		77.6	1500	0
Tractor	No		40	84		1500	0
Backhoe	No		40		77.6	1500	0
Tractor	No		40	84		1500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day	Evening	Night		
Dozer	52.1	48.1	N/A	N/A	N/A	N/A	
Dozer	52.1	48.1	N/A	N/A	N/A	N/A	
Excavator	51.2	47.2	N/A	N/A	N/A	N/A	
Excavator	51.2	47.2	N/A	N/A	N/A	N/A	
Backhoe	48	44	N/A	N/A	N/A	N/A	
Tractor	54.5	50.5	N/A	N/A	N/A	N/A	
Backhoe	48	44	N/A	N/A	N/A	N/A	
Tractor	54.5	50.5	N/A	N/A	N/A	N/A	
Total	54.5	57.1	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Description	Land Use
	2000 Residential

Baselines (dBA)		
Daytime	Evening	Night
60	55	50

Equipment							
Description	Device	Impact	Usage(%)	Spec	Actual	Receptor	Estimated
				(dBA)	(dBA)	Distance	Shielding
Dozer	No		40		81.7	2000	0
Dozer	No		40		81.7	2000	0
Excavator	No		40		80.7	2000	0
Excavator	No		40		80.7	2000	0
Backhoe	No		40		77.6	2000	0
Tractor	No		40	84		2000	0
Backhoe	No		40		77.6	2000	0
Tractor	No		40	84		2000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day	Evening	Night		
Dozer	49.6	45.6	N/A	N/A	N/A	N/A	
Dozer	49.6	45.6	N/A	N/A	N/A	N/A	
Excavator	48.7	44.7	N/A	N/A	N/A	N/A	
Excavator	48.7	44.7	N/A	N/A	N/A	N/A	
Backhoe	45.5	41.5	N/A	N/A	N/A	N/A	
Tractor	52	48	N/A	N/A	N/A	N/A	
Backhoe	45.5	41.5	N/A	N/A	N/A	N/A	
Tractor	52	48	N/A	N/A	N/A	N/A	
Total	52	54.6	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: Pipelines_Paving

---- Receptor #1 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
50'	Residential	60	55	50			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Drum Mixer	No	50	80	80	50	0	
Drum Mixer	No	50	80	80	50	0	
Roller	No	20	80	80	50	0	
Roller	No	20	80	80	50	0	
Paver	No	50	77.2	77.2	50	0	
Paver	No	50	77.2	77.2	50	0	
		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day	Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Drum Mixer		80	77	N/A	N/A	N/A	N/A
Drum Mixer		80	77	N/A	N/A	N/A	N/A
Roller		80	73	N/A	N/A	N/A	N/A
Roller		80	73	N/A	N/A	N/A	N/A
Paver		77.2	74.2	N/A	N/A	N/A	N/A
Paver		77.2	74.2	N/A	N/A	N/A	N/A
	Total	80	82.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
100'	Residential	60	55	50			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Drum Mixer	No	50	80	80	100	0	
Drum Mixer	No	50	80	80	100	0	
Roller	No	20	80	80	100	0	
Roller	No	20	80	80	100	0	
Paver	No	50	77.2	77.2	100	0	
Paver	No	50	77.2	77.2	100	0	
		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day	Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Drum Mixer		74	71	N/A	N/A	N/A	N/A
Drum Mixer		74	71	N/A	N/A	N/A	N/A
Roller		74	67	N/A	N/A	N/A	N/A
Roller		74	67	N/A	N/A	N/A	N/A
Paver		71.2	68.2	N/A	N/A	N/A	N/A
Paver		71.2	68.2	N/A	N/A	N/A	N/A
	Total	74	76.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
250'	Residential	60	55	50			
		Equipment					
		Spec	Actual	Receptor	Estimated		

Description	Impact Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Drum Mixer	No		50		80	250	0
Drum Mixer	No		50		80	250	0
Roller	No		20		80	250	0
Roller	No		20		80	250	0
Paver	No		50		77.2	250	0
Paver	No		50		77.2	250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)					
	*Lmax	Leq	Day		Evening		Night	
			Lmax	Leq	Lmax	Leq	Lmax	
Drum Mixer	66		63	N/A	N/A	N/A	N/A	N/A
Drum Mixer	66		63	N/A	N/A	N/A	N/A	N/A
Roller	66		59	N/A	N/A	N/A	N/A	N/A
Roller	66		59	N/A	N/A	N/A	N/A	N/A
Paver	63.2		60.2	N/A	N/A	N/A	N/A	N/A
Paver	63.2		60.2	N/A	N/A	N/A	N/A	N/A
Total	66		68.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	500 Residential	60	55	50

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)	
							Drum Mixer
Drum Mixer	No		50		80	500	0
Roller	No		20		80	500	0
Roller	No		20		80	500	0
Paver	No		50		77.2	500	0
Paver	No		50		77.2	500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)					
	*Lmax	Leq	Day		Evening		Night	
			Lmax	Leq	Lmax	Leq	Lmax	
Drum Mixer	60		57	N/A	N/A	N/A	N/A	N/A
Drum Mixer	60		57	N/A	N/A	N/A	N/A	N/A
Roller	60		53	N/A	N/A	N/A	N/A	N/A
Roller	60		53	N/A	N/A	N/A	N/A	N/A
Paver	57.2		54.2	N/A	N/A	N/A	N/A	N/A
Paver	57.2		54.2	N/A	N/A	N/A	N/A	N/A
Total	60		62.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	1000 Residential	60	55	50

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)	
							Drum Mixer
Drum Mixer	No		50		80	1000	0
Roller	No		20		80	1000	0
Roller	No		20		80	1000	0
Paver	No		50		77.2	1000	0
Paver	No		50		77.2	1000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)		
	Day	Evening	Evening	Night	Night

Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Drum Mixer	54		51 N/A	N/A	N/A	N/A	N/A
Drum Mixer	54		51 N/A	N/A	N/A	N/A	N/A
Roller	54		47 N/A	N/A	N/A	N/A	N/A
Roller	54		47 N/A	N/A	N/A	N/A	N/A
Paver	51.2		48.2 N/A	N/A	N/A	N/A	N/A
Paver	51.2		48.2 N/A	N/A	N/A	N/A	N/A
Total	54		56.8 N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Baselines (dBA)		Daytime	Evening	Night
Description	Land Use	60	55	50
	1500 Residential			

Description	Device	Impact	Equipment				
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drum Mixer	No		50		80	1500	0
Drum Mixer	No		50		80	1500	0
Roller	No		20		80	1500	0
Roller	No		20		80	1500	0
Paver	No		50		77.2	1500	0
Paver	No		50		77.2	1500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Drum Mixer	50.5	47.4	N/A	N/A	N/A	N/A	N/A
Drum Mixer	50.5	47.4	N/A	N/A	N/A	N/A	N/A
Roller	50.5	43.5	N/A	N/A	N/A	N/A	N/A
Roller	50.5	43.5	N/A	N/A	N/A	N/A	N/A
Paver	47.7	44.7	N/A	N/A	N/A	N/A	N/A
Paver	47.7	44.7	N/A	N/A	N/A	N/A	N/A
Total	50.5	53.3	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Baselines (dBA)		Daytime	Evening	Night
Description	Land Use	60	55	50
	2000 Residential			

Description	Device	Impact	Equipment				
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drum Mixer	No		50		80	2000	0
Drum Mixer	No		50		80	2000	0
Roller	No		20		80	2000	0
Roller	No		20		80	2000	0
Paver	No		50		77.2	2000	0
Paver	No		50		77.2	2000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Drum Mixer	48	44.9	N/A	N/A	N/A	N/A	N/A
Drum Mixer	48	44.9	N/A	N/A	N/A	N/A	N/A
Roller	48	41	N/A	N/A	N/A	N/A	N/A
Roller	48	41	N/A	N/A	N/A	N/A	N/A
Paver	45.2	42.2	N/A	N/A	N/A	N/A	N/A
Paver	45.2	42.2	N/A	N/A	N/A	N/A	N/A
Total	48	50.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: Pump Stations Site Prep_Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)			Equipment			
		Daytime	Evening	Night	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
50'	Residential	60	55	50				
Description	Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)		
Dozer	No	40		81.7	50	0		
Tractor	No	40	84		50	0		
		Results			Noise Limits (dBA)			
		Calculated (dBA)		Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A
Tractor		84	80	N/A	N/A	N/A	N/A	N/A
	Total	84	82	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)			Equipment			
		Daytime	Evening	Night	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
100'	Residential	60	55	50				
Description	Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)		
Dozer	No	40		81.7	100	0		
Tractor	No	40	84		100	0		
		Results			Noise Limits (dBA)			
		Calculated (dBA)		Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		75.6	71.7	N/A	N/A	N/A	N/A	N/A
Tractor		78	74	N/A	N/A	N/A	N/A	N/A
	Total	78	76	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)			Equipment			
		Daytime	Evening	Night	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
	250 Residential	60	55	50				
Impact	Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)		

Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40			81.7	250
Tractor	No	40	84			250

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening	Night	
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Tractor	70	66	N/A	N/A	N/A	N/A
Total	70	68	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	500 Residential	60	55	50

Equipment

Description	Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening	Night	
Dozer	61.7	57.7	N/A	N/A	N/A	N/A
Tractor	64	60	N/A	N/A	N/A	N/A
Total	64	62	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	1000 Residential	60	55	50

Equipment

Description	Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		1000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening	Night	
Dozer	55.6	51.7	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A
Total	58	56	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description		Land Use		Baselines (dBA)		
		Daytime	Evening	Night		
		60	55	50		
		1500 Residential				
Description		Equipment		Receptor		Estimated
Impact		Spec	Actual	Distance	Shielding	
Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	(feet)	(dBA)	
Dozer	No	40	81.7	1500	0	
Tractor	No	40	84	1500	0	
Equipment		Results		Noise Limits (dBA)		
Calculated (dBA)		Day		Evening		Night
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer	52.1	48.1	N/A	N/A	N/A	N/A
Tractor	54.5	50.5	N/A	N/A	N/A	N/A
Total		54.5	52.5	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Description		Land Use		Baselines (dBA)		
		Daytime	Evening	Night		
		60	55	50		
		2000 Residential				
Description		Equipment		Receptor		Estimated
Impact		Spec	Actual	Distance	Shielding	
Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	(feet)	(dBA)	
Dozer	No	40	81.7	2000	0	
Tractor	No	40	84	2000	0	
Equipment		Results		Noise Limits (dBA)		
Calculated (dBA)		Day		Evening		Night
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer	49.6	45.6	N/A	N/A	N/A	N/A
Tractor	52	48	N/A	N/A	N/A	N/A
Total		52	50	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: Pump Stations Site Prep_Grading

---- Receptor #1 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
50'	Residential	60	55	50			
		Equipment					
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)	
Excavator	No		40	80.7	50	0	
Tractor	No		40	84	50	0	
Man Lift	No		20	74.7	50	0	
Pumps	No		50	80.9	50	0	
Welder / Torch	No		40	74	50	0	
Welder / Torch	No		40	74	50	0	
		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day	Evening	Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A
Tractor	84	80	N/A	N/A	N/A	N/A	N/A
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A
Pumps	80.9	77.9	N/A	N/A	N/A	N/A	N/A
Welder / Torch	74	70	N/A	N/A	N/A	N/A	N/A
Welder / Torch	74	70	N/A	N/A	N/A	N/A	N/A
Total	84	83.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
100'	Residential	60	55	50			
		Equipment					
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)	
Excavator	No		40	80.7	100	0	
Tractor	No		40	84	100	0	
Man Lift	No		20	74.7	100	0	
Pumps	No		50	80.9	100	0	
Welder / Torch	No		40	74	100	0	
Welder / Torch	No		40	74	100	0	
		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day	Evening	Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A
Tractor	78	74	N/A	N/A	N/A	N/A	N/A
Man Lift	68.7	61.7	N/A	N/A	N/A	N/A	N/A
Pumps	74.9	71.9	N/A	N/A	N/A	N/A	N/A
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A
Total	78	77.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
250'	Residential	60	55	50			
		Equipment					
		Spec	Actual	Receptor	Estimated		

Description	Impact Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	250	0
Tractor	No	40	84		250	0
Man Lift	No	20		74.7	250	0
Pumps	No	50		80.9	250	0
Welder / Torch	No	40		74	250	0
Welder / Torch	No	40		74	250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Excavator	66.7	62.8	N/A	N/A	N/A	N/A	N/A
Tractor	70	66	N/A	N/A	N/A	N/A	N/A
Man Lift	60.7	53.7	N/A	N/A	N/A	N/A	N/A
Pumps	67	64	N/A	N/A	N/A	N/A	N/A
Welder / Torch	60	56	N/A	N/A	N/A	N/A	N/A
Welder / Torch	60	56	N/A	N/A	N/A	N/A	N/A
Total	70	69.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	500 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
			Excavator	No	40	80.7
Tractor	No	40	84	500	0	
Man Lift	No	20	74.7	500	0	
Pumps	No	50	80.9	500	0	
Welder / Torch	No	40	74	500	0	
Welder / Torch	No	40	74	500	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Excavator	60.7	56.7	N/A	N/A	N/A	N/A	N/A
Tractor	64	60	N/A	N/A	N/A	N/A	N/A
Man Lift	54.7	47.7	N/A	N/A	N/A	N/A	N/A
Pumps	60.9	57.9	N/A	N/A	N/A	N/A	N/A
Welder / Torch	54	50	N/A	N/A	N/A	N/A	N/A
Welder / Torch	54	50	N/A	N/A	N/A	N/A	N/A
Total	64	63.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	1000 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
			Excavator	No	40	80.7
Tractor	No	40	84	1000	0	
Man Lift	No	20	74.7	1000	0	
Pumps	No	50	80.9	1000	0	
Welder / Torch	No	40	74	1000	0	
Welder / Torch	No	40	74	1000	0	

Results

Calculated (dBA)	Noise Limits (dBA)		
	Day	Evening	Night

Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator	54.7	50.7	N/A	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A	N/A
Man Lift	48.7	41.7	N/A	N/A	N/A	N/A	N/A
Pumps	54.9	51.9	N/A	N/A	N/A	N/A	N/A
Welder / Torch	48	44	N/A	N/A	N/A	N/A	N/A
Welder / Torch	48	44	N/A	N/A	N/A	N/A	N/A
Total	58	57.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description		Land Use	Baselines (dBA)			Equipment	
		1500 Residential	Daytime	Evening	Night	Spec	Actual
			60	55	50	Lmax	Lmax
			Impact		Receptor	Estimated	
			Device	Usage(%)	Distance	Shielding	
				(dBA)	(feet)	(dBA)	
Excavator			No	40	80.7	1500	0
Tractor			No	40	84	1500	0
Man Lift			No	20	74.7	1500	0
Pumps			No	50	80.9	1500	0
Welder / Torch			No	40	74	1500	0
Welder / Torch			No	40	74	1500	0

Results

Equipment		Calculated (dBA)		Noise Limits (dBA)		
		Day	Evening	Day	Evening	Night
		*Lmax	Leq	Lmax	Leq	Lmax
Excavator		51.2	47.2	N/A	N/A	N/A
Tractor		54.5	50.5	N/A	N/A	N/A
Man Lift		45.2	38.2	N/A	N/A	N/A
Pumps		51.4	48.4	N/A	N/A	N/A
Welder / Torch		44.5	40.5	N/A	N/A	N/A
Welder / Torch		44.5	40.5	N/A	N/A	N/A
Total		54.5	54.2	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Description		Land Use	Baselines (dBA)			Equipment	
		2000 Residential	Daytime	Evening	Night	Spec	Actual
			60	55	50	Lmax	Lmax
			Impact		Receptor	Estimated	
			Device	Usage(%)	Distance	Shielding	
				(dBA)	(feet)	(dBA)	
Excavator			No	40	80.7	2000	0
Tractor			No	40	84	2000	0
Man Lift			No	20	74.7	2000	0
Pumps			No	50	80.9	2000	0
Welder / Torch			No	40	74	2000	0
Welder / Torch			No	40	74	2000	0

Results

Equipment		Calculated (dBA)		Noise Limits (dBA)		
		Day	Evening	Day	Evening	Night
		*Lmax	Leq	Lmax	Leq	Lmax
Excavator		48.7	44.7	N/A	N/A	N/A
Tractor		52	48	N/A	N/A	N/A
Man Lift		42.7	35.7	N/A	N/A	N/A
Pumps		48.9	45.9	N/A	N/A	N/A
Welder / Torch		42	38	N/A	N/A	N/A
Welder / Torch		42	38	N/A	N/A	N/A
Total		52	51.7	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: Pump Stations_Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
50'	Residential	60	55	50

Description	Impact Device	Land Use	Equipment			
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
Drum Mixer	No	Residential	50	80	50	0
Drum Mixer	No	Residential	50	80	50	0
Roller	No	Residential	20	80	50	0
Roller	No	Residential	20	80	50	0
Paver	No	Residential	50	77.2	50	0
Paver	No	Residential	50	77.2	50	0

Equipment	Calculated (dBA)		Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Evening Lmax	Night Lmax
Drum Mixer	80	77	N/A	N/A	N/A
Drum Mixer	80	77	N/A	N/A	N/A
Roller	80	73	N/A	N/A	N/A
Roller	80	73	N/A	N/A	N/A
Paver	77.2	74.2	N/A	N/A	N/A
Paver	77.2	74.2	N/A	N/A	N/A
Total	80	82.8	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
100'	Residential	60	55	50

Description	Impact Device	Land Use	Equipment			
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
Drum Mixer	No	Residential	50	80	100	0
Drum Mixer	No	Residential	50	80	100	0
Roller	No	Residential	20	80	100	0
Roller	No	Residential	20	80	100	0
Paver	No	Residential	50	77.2	100	0
Paver	No	Residential	50	77.2	100	0

Equipment	Calculated (dBA)		Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Evening Lmax	Night Lmax
Drum Mixer	74	71	N/A	N/A	N/A
Drum Mixer	74	71	N/A	N/A	N/A
Roller	74	67	N/A	N/A	N/A
Roller	74	67	N/A	N/A	N/A
Paver	71.2	68.2	N/A	N/A	N/A
Paver	71.2	68.2	N/A	N/A	N/A
Total	74	76.8	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
250'	Residential	60	55	50

Description	Impact Device	Land Use	Equipment			
			Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
		Residential				

Description	Impact Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Drum Mixer	No		50		80	250	0
Drum Mixer	No		50		80	250	0
Roller	No		20		80	250	0
Roller	No		20		80	250	0
Paver	No		50		77.2	250	0
Paver	No		50		77.2	250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Drum Mixer	66	63	N/A	N/A	N/A	N/A	N/A
Drum Mixer	66	63	N/A	N/A	N/A	N/A	N/A
Roller	66	59	N/A	N/A	N/A	N/A	N/A
Roller	66	59	N/A	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A	N/A
Total	66	68.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
	500 Residential	60	55	50

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drum Mixer	No	50		80	500	0
Roller	No	20		80	500	0
Roller	No	20		80	500	0
Paver	No	50		77.2	500	0
Paver	No	50		77.2	500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Drum Mixer	60	57	N/A	N/A	N/A	N/A	N/A
Drum Mixer	60	57	N/A	N/A	N/A	N/A	N/A
Roller	60	53	N/A	N/A	N/A	N/A	N/A
Roller	60	53	N/A	N/A	N/A	N/A	N/A
Paver	57.2	54.2	N/A	N/A	N/A	N/A	N/A
Paver	57.2	54.2	N/A	N/A	N/A	N/A	N/A
Total	60	62.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
	1000 Residential	60	55	50

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drum Mixer	No	50		80	1000	0
Roller	No	20		80	1000	0
Roller	No	20		80	1000	0
Paver	No	50		77.2	1000	0
Paver	No	50		77.2	1000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)		
	Day	Evening	Day	Evening	Night

Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Drum Mixer	54	51	N/A	N/A	N/A	N/A	N/A
Drum Mixer	54	51	N/A	N/A	N/A	N/A	N/A
Roller	54	47	N/A	N/A	N/A	N/A	N/A
Roller	54	47	N/A	N/A	N/A	N/A	N/A
Paver	51.2	48.2	N/A	N/A	N/A	N/A	N/A
Paver	51.2	48.2	N/A	N/A	N/A	N/A	N/A
Total	54	56.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description		Land Use	Baselines (dBA)		
			Daytime	Evening	Night
		1500 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Drum Mixer	No	50	50	80	1500	0
Drum Mixer	No	50	50	80	1500	0
Roller	No	20	20	80	1500	0
Roller	No	20	20	80	1500	0
Paver	No	50	50	77.2	1500	0
Paver	No	50	50	77.2	1500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Drum Mixer	50.5	47.4	N/A	N/A	N/A	N/A	N/A
Drum Mixer	50.5	47.4	N/A	N/A	N/A	N/A	N/A
Roller	50.5	43.5	N/A	N/A	N/A	N/A	N/A
Roller	50.5	43.5	N/A	N/A	N/A	N/A	N/A
Paver	47.7	44.7	N/A	N/A	N/A	N/A	N/A
Paver	47.7	44.7	N/A	N/A	N/A	N/A	N/A
Total	50.5	53.3	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Description		Land Use	Baselines (dBA)		
			Daytime	Evening	Night
		2000 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Drum Mixer	No	50	50	80	2000	0
Drum Mixer	No	50	50	80	2000	0
Roller	No	20	20	80	2000	0
Roller	No	20	20	80	2000	0
Paver	No	50	50	77.2	2000	0
Paver	No	50	50	77.2	2000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Drum Mixer	48	44.9	N/A	N/A	N/A	N/A	N/A
Drum Mixer	48	44.9	N/A	N/A	N/A	N/A	N/A
Roller	48	41	N/A	N/A	N/A	N/A	N/A
Roller	48	41	N/A	N/A	N/A	N/A	N/A
Paver	45.2	42.2	N/A	N/A	N/A	N/A	N/A
Paver	45.2	42.2	N/A	N/A	N/A	N/A	N/A
Total	48	50.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: AWPfFs, Rec Plant, WWTP Upgrades_Site Prep

---- Receptor #1 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
50'	Residential	60	55	50				
		Equipment						
		Spec	Actual	Receptor	Estimated			
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)		
Dozer	No	40		81.7	50	0		
Tractor	No	40	84		50	0		
		Results						
		Calculated (dBA)			Noise Limits (dBA)			
				Day	Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A
Tractor		84	80	N/A	N/A	N/A	N/A	N/A
	Total	84	82	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
100'	Residential	60	55	50				
		Equipment						
		Spec	Actual	Receptor	Estimated			
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)		
Dozer	No	40		81.7	100	0		
Tractor	No	40	84		100	0		
		Results						
		Calculated (dBA)			Noise Limits (dBA)			
				Day	Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		75.6	71.7	N/A	N/A	N/A	N/A	N/A
Tractor		78	74	N/A	N/A	N/A	N/A	N/A
	Total	78	76	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
250'	Residential	60	55	50				
		Equipment						
		Spec	Actual	Receptor	Estimated			
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)		
Dozer	No	40		81.7	250	0		
Tractor	No	40	84		250	0		

		Results						
		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		67.7	63.7	N/A	N/A	N/A	N/A	N/A
Tractor		70	66	N/A	N/A	N/A	N/A	N/A
	Total	70	68	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
		Daytime	Evening	Night
Description	Land Use			
	500 Residential	60	55	50

		Equipment				
		Spec	Actual	Receptor	Estimated	
		Lmax	Lmax	Distance	Shielding	
Description	Device	Usage(%)	(dBA)	(feet)	(dBA)	
Dozer	No	40	81.7	500	0	
Tractor	No	40	84	500	0	

		Results						
		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		61.7	57.7	N/A	N/A	N/A	N/A	N/A
Tractor		64	60	N/A	N/A	N/A	N/A	N/A
	Total	64	62	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

		Baselines (dBA)		
		Daytime	Evening	Night
Description	Land Use			
	1000 Residential	60	55	50

		Equipment				
		Spec	Actual	Receptor	Estimated	
		Lmax	Lmax	Distance	Shielding	
Description	Device	Usage(%)	(dBA)	(feet)	(dBA)	
Dozer	No	40	81.7	1000	0	
Tractor	No	40	84	1000	0	

		Results						
		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		55.6	51.7	N/A	N/A	N/A	N/A	N/A
Tractor		58	54	N/A	N/A	N/A	N/A	N/A
	Total	58	56	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

		Baselines (dBA)		
		Daytime	Evening	Night
Description	Land Use			
	1500 Residential	60	55	50

		Equipment				
		Spec	Actual	Receptor	Estimated	
		Lmax	Lmax	Distance	Shielding	
Impact	Device	Usage(%)	(dBA)	(feet)	(dBA)	
	No	40	81.7	1000	0	
	No	40	84	1000	0	

Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40			81.7	1500
Tractor	No	40		84		1500

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening	Night	
Dozer	52.1	48.1	N/A	N/A	N/A	N/A
Tractor	54.5	50.5	N/A	N/A	N/A	N/A
Total	54.5	52.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
	2000 Residential	60	55	50

Equipment

Description	Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40		84		2000

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening	Night	
Dozer	49.6	45.6	N/A	N/A	N/A	N/A
Tractor	52	48	N/A	N/A	N/A	N/A
Total	52	50	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: Pump Stations Site Prep_Grading

---- Receptor #1 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
50'	Residential	60	55	50			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Excavator	No		40	80.7	50	0	
Tractor	No		40	84	50	0	
Backhoe	No		40	77.6	50	0	
Dozer	No		40	81.7	50	0	
Compactor (ground)	No		20	83.2	50	0	
		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day	Evening	Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		80.7	76.7	N/A	N/A	N/A	N/A
Tractor		84	80	N/A	N/A	N/A	N/A
Backhoe		77.6	73.6	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A
Compactor (ground)		83.2	76.2	N/A	N/A	N/A	N/A
	Total	84	84.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
100'	Residential	60	55	50			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Excavator	No		40	80.7	100	0	
Tractor	No		40	84	100	0	
Backhoe	No		40	77.6	100	0	
Dozer	No		40	81.7	100	0	
Compactor (ground)	No		20	83.2	100	0	
		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day	Evening	Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		74.7	70.7	N/A	N/A	N/A	N/A
Tractor		78	74	N/A	N/A	N/A	N/A
Backhoe		71.5	67.6	N/A	N/A	N/A	N/A
Dozer		75.6	71.7	N/A	N/A	N/A	N/A
Compactor (ground)		77.2	70.2	N/A	N/A	N/A	N/A
	Total	78	78.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
	250 Residential	60	55	50
		Equipment		

Description	Impact Device	Usage(%)	Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	250	0
Tractor	No	40	84		250	0
Backhoe	No	40		77.6	250	0
Dozer	No	40		81.7	250	0
Compactor (ground)	No	20		83.2	250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Excavator	66.7	62.8	N/A	N/A	N/A	N/A	N/A
Tractor	70	66	N/A	N/A	N/A	N/A	N/A
Backhoe	63.6	59.6	N/A	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	69.3	62.3	N/A	N/A	N/A	N/A	N/A
Total	70	70.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	500 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment	Actual	Receptor	Estimated
			Spec Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	500	0
Tractor	No	40	84		500	0
Backhoe	No	40		77.6	500	0
Dozer	No	40		81.7	500	0
Compactor (ground)	No	20		83.2	500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Excavator	60.7	56.7	N/A	N/A	N/A	N/A	N/A
Tractor	64	60	N/A	N/A	N/A	N/A	N/A
Backhoe	57.6	53.6	N/A	N/A	N/A	N/A	N/A
Dozer	61.7	57.7	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	63.2	56.2	N/A	N/A	N/A	N/A	N/A
Total	64	64.3	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	1000 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment	Actual	Receptor	Estimated
			Spec Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	1000	0
Tractor	No	40	84		1000	0
Backhoe	No	40		77.6	1000	0
Dozer	No	40		81.7	1000	0
Compactor (ground)	No	20		83.2	1000	0

Results

Calculated (dBA)	Noise Limits (dBA)
------------------	--------------------

Equipment	*Lmax	Leq	Day		Evening		Night
			Lmax	Leq	Lmax	Leq	Lmax
Excavator	54.7	50.7	N/A	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A	N/A
Backhoe	51.5	47.6	N/A	N/A	N/A	N/A	N/A
Dozer	55.6	51.7	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	57.2	50.2	N/A	N/A	N/A	N/A	N/A
Total	58	58.3	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1500 Residential	Residential	60	55	50

Description	Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	1500	0
Tractor	No	40	84		1500	0
Backhoe	No	40		77.6	1500	0
Dozer	No	40		81.7	1500	0
Compactor (ground)	No	20		83.2	1500	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Excavator	51.2	47.2	N/A	N/A	N/A	N/A	N/A
Tractor	54.5	50.5	N/A	N/A	N/A	N/A	N/A
Backhoe	48	44	N/A	N/A	N/A	N/A	N/A
Dozer	52.1	48.1	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	53.7	46.7	N/A	N/A	N/A	N/A	N/A
Total	54.5	54.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
2000 Residential	Residential	60	55	50

Description	Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	2000	0
Tractor	No	40	84		2000	0
Backhoe	No	40		77.6	2000	0
Dozer	No	40		81.7	2000	0
Compactor (ground)	No	20		83.2	2000	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Excavator	48.7	44.7	N/A	N/A	N/A	N/A	N/A
Tractor	52	48	N/A	N/A	N/A	N/A	N/A
Backhoe	45.5	41.5	N/A	N/A	N/A	N/A	N/A
Dozer	49.6	45.6	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	51.2	44.2	N/A	N/A	N/A	N/A	N/A
Total	52	52.3	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: AWPfS. RecPlant, WWTP_Facility Const

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)			Equipment					
		Daytime	Evening	Night	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
50'	Residential	60	55	50	No	16		80.6	50	0
Crane					No	20		74.7	50	0
Man Lift					No	50		80.6	50	0
Generator					No	50		80.9	50	0
Pumps					No	40		79.1	50	0
Front End Loader					No	40		77.6	50	0
Backhoe					No	40		74	50	0
Welder / Torch					No	40		74	50	0
Welder / Torch					No	40		74	50	0
Results										
Calculated (dBA)				Noise Limits (dBA)						
		Day		Evening		Night				
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax			
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A			
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A			
Generator	80.6	77.6	N/A	N/A	N/A	N/A	N/A			
Pumps	80.9	77.9	N/A	N/A	N/A	N/A	N/A			
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A			
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A			
Welder / Torch	74	70	N/A	N/A	N/A	N/A	N/A			
Welder / Torch	74	70	N/A	N/A	N/A	N/A	N/A			
Total	80.9	83.4	N/A	N/A	N/A	N/A	N/A			
*Calculated Lmax is the Loudest value.										

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)			Equipment					
		Daytime	Evening	Night	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
100'	Residential	60	55	50	No	16		80.6	100	0
Crane					No	20		74.7	100	0
Man Lift					No	50		80.6	100	0
Generator					No	50		80.9	100	0
Pumps					No	40		79.1	100	0
Front End Loader					No	40		77.6	100	0
Backhoe					No	40		74	100	0
Welder / Torch					No	40		74	100	0
Welder / Torch					No	40		74	100	0
Results										
Calculated (dBA)				Noise Limits (dBA)						
		Day		Evening		Night				
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax			
Crane	74.5	66.6	N/A	N/A	N/A	N/A	N/A			
Man Lift	68.7	61.7	N/A	N/A	N/A	N/A	N/A			
Generator	74.6	71.6	N/A	N/A	N/A	N/A	N/A			
Pumps	74.9	71.9	N/A	N/A	N/A	N/A	N/A			
Front End Loader	73.1	69.1	N/A	N/A	N/A	N/A	N/A			
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A			
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A			
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A			
Total	74.9	77.4	N/A	N/A	N/A	N/A	N/A			
*Calculated Lmax is the Loudest value.										

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)			Equipment					
		Daytime	Evening	Night	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
250'	Residential	60	55	50						
Equipment										
		Spec Lmax (dBA)		Actual Lmax (dBA)		Receptor Distance (feet)		Estimated Shielding (dBA)		
Description		Device	Usage (%)	(dBA)	(dBA)	(feet)	(dBA)			

Crane	No	16	80.6	250	0
Man Lift	No	20	74.7	250	0
Generator	No	50	80.6	250	0
Pumps	No	50	80.9	250	0
Front End Loader	No	40	79.1	250	0
Backhoe	No	40	77.6	250	0
Welder / Torch	No	40	74	250	0
Welder / Torch	No	40	74	250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Crane	66.6	58.6	N/A	N/A	N/A	N/A	N/A
Man Lift	60.7	53.7	N/A	N/A	N/A	N/A	N/A
Generator	66.7	63.6	N/A	N/A	N/A	N/A	N/A
Pumps	67	64	N/A	N/A	N/A	N/A	N/A
Front End Loader	65.1	61.2	N/A	N/A	N/A	N/A	N/A
Backhoe	63.6	59.6	N/A	N/A	N/A	N/A	N/A
Welder / Torch	60	56	N/A	N/A	N/A	N/A	N/A
Welder / Torch	60	56	N/A	N/A	N/A	N/A	N/A
Total	67	69.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)			Equipment			
		Daytime	Evening	Night	Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
	500 Residential	60	55	50				
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Crane		No	16		80.6	500	0	
Man Lift		No	20		74.7	500	0	
Generator		No	50		80.6	500	0	
Pumps		No	50		80.9	500	0	
Front End Loader		No	40		79.1	500	0	
Backhoe		No	40		77.6	500	0	
Welder / Torch		No	40		74	500	0	
Welder / Torch		No	40		74	500	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Crane	60.6	52.6	N/A	N/A	N/A	N/A	N/A
Man Lift	54.7	47.7	N/A	N/A	N/A	N/A	N/A
Generator	60.6	57.6	N/A	N/A	N/A	N/A	N/A
Pumps	60.9	57.9	N/A	N/A	N/A	N/A	N/A
Front End Loader	59.1	55.1	N/A	N/A	N/A	N/A	N/A
Backhoe	57.6	53.6	N/A	N/A	N/A	N/A	N/A
Welder / Torch	54	50	N/A	N/A	N/A	N/A	N/A
Welder / Torch	54	50	N/A	N/A	N/A	N/A	N/A
Total	60.9	63.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)			Equipment			
		Daytime	Evening	Night	Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
	1000 Residential	60	55	50				
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Crane		No	16		80.6	1000	0	
Man Lift		No	20		74.7	1000	0	
Generator		No	50		80.6	1000	0	
Pumps		No	50		80.9	1000	0	
Front End Loader		No	40		79.1	1000	0	
Backhoe		No	40		77.6	1000	0	
Welder / Torch		No	40		74	1000	0	
Welder / Torch		No	40		74	1000	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Crane	54.5	46.6	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/22/2015
 Case Description: AWPfFs, RecPlnts, WWTP Upgrds_Paving

---- Receptor #1 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
50'	Residential	60	55	50				
		Equipment						
Description	Device	Impact	Usage(%)	Spec	Actual	Receptor	Estimated	
				Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Roller	No	No	20	80	80	50	0	
Roller	No	No	20	80	80	50	0	
Paver	No	No	50	77.2	77.2	50	0	
Paver	No	No	50	77.2	77.2	50	0	
		Results						
		Calculated (dBA)		Noise Limits (dBA)				
Equipment		*Lmax	Leq	Day	Evening		Night	
				Lmax	Leq	Lmax	Leq	
Roller		80	73	N/A	N/A	N/A	N/A	N/A
Roller		80	73	N/A	N/A	N/A	N/A	N/A
Paver		77.2	74.2	N/A	N/A	N/A	N/A	N/A
Paver		77.2	74.2	N/A	N/A	N/A	N/A	N/A
	Total	80	79.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
100'	Residential	60	55	50				
		Equipment						
Description	Device	Impact	Usage(%)	Spec	Actual	Receptor	Estimated	
				Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Roller	No	No	20	80	80	100	0	
Roller	No	No	20	80	80	100	0	
Paver	No	No	50	77.2	77.2	100	0	
Paver	No	No	50	77.2	77.2	100	0	
		Results						
		Calculated (dBA)		Noise Limits (dBA)				
Equipment		*Lmax	Leq	Day	Evening		Night	
				Lmax	Leq	Lmax	Leq	
Roller		74	67	N/A	N/A	N/A	N/A	N/A
Roller		74	67	N/A	N/A	N/A	N/A	N/A
Paver		71.2	68.2	N/A	N/A	N/A	N/A	N/A
Paver		71.2	68.2	N/A	N/A	N/A	N/A	N/A
	Total	74	73.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
250	Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Roller	No	20		80	250	0
Roller	No	20		80	250	0
Paver	No	50		77.2	250	0
Paver	No	50		77.2	250	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Roller	66	59	N/A	N/A	N/A	N/A	N/A
Roller	66	59	N/A	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A	N/A
Total	66	65.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	500 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Roller	No	20		80	500	0
Roller	No	20		80	500	0
Paver	No	50		77.2	500	0
Paver	No	50		77.2	500	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Roller	60	53	N/A	N/A	N/A	N/A	N/A
Roller	60	53	N/A	N/A	N/A	N/A	N/A
Paver	57.2	54.2	N/A	N/A	N/A	N/A	N/A
Paver	57.2	54.2	N/A	N/A	N/A	N/A	N/A
Total	60	59.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	1000 Residential	60	55	50

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Roller	No	20		80	1000	0
Roller	No	20		80	1000	0
Paver	No	50		77.2	1000	0
Paver	No	50		77.2	1000	0

Results

Equipment	Calculated (dBA)			Noise Limits (dBA)			Night
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	
Roller	54	47	N/A	N/A	N/A	N/A	N/A
Roller	54	47	N/A	N/A	N/A	N/A	N/A
Paver	51.2	48.2	N/A	N/A	N/A	N/A	N/A
Paver	51.2	48.2	N/A	N/A	N/A	N/A	N/A
Total	54	53.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	1500 Residential	60	55	50

Description	Device	Usage(%)	Equipment			Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	
Roller	No	20		80	1500	0
Roller	No	20		80	1500	0
Paver	No	50		77.2	1500	0
Paver	No	50		77.2	1500	0

Results

Equipment	Calculated (dBA)			Noise Limits (dBA)			Night
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	
Roller	50.5	43.5	N/A	N/A	N/A	N/A	N/A
Roller	50.5	43.5	N/A	N/A	N/A	N/A	N/A
Paver	47.7	44.7	N/A	N/A	N/A	N/A	N/A
Paver	47.7	44.7	N/A	N/A	N/A	N/A	N/A
Total	50.5	50.1	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
	2000 Residential	60	55	50

Description	Device	Usage(%)	Equipment			Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	
Roller	No	20		80	2000	0
Roller	No	20		80	2000	0
Paver	No	50		77.2	2000	0
Paver	No	50		77.2	2000	0

Results

Equipment	Calculated (dBA)			Noise Limits (dBA)			Night
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	
Roller	48	41	N/A	N/A	N/A	N/A	N/A
Roller	48	41	N/A	N/A	N/A	N/A	N/A
Paver	45.2	42.2	N/A	N/A	N/A	N/A	N/A
Paver	45.2	42.2	N/A	N/A	N/A	N/A	N/A
Total	48	47.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

