



Appendix H

ACOUSTICAL ANALYSIS REPORT FOR THE
PALMDALE REGIONAL GROUNDWATER
RECHARGE AND RECOVERY PROJECT



Addendum to the October 2015 Palmdale Regional Groundwater Recharge and Recovery Project Acoustical Analysis Report

This addendum to the October 2015 Palmdale Regional Groundwater Recharge and Recovery Project Acoustical Analysis Report (Report), prepared by HELIX Environmental Planning, provides additional analysis of the proposed Project's construction noise impacts.

It has been identified that nighttime construction may be required due to daytime traffic and transportation requirements for two locations along East Palmdale Boulevard where the pipeline is required to pass under the roadway. These two locations are identified as Station 72 and 153:

- Station 72 is approximately 750 feet east of the centerline of 70th Street East on East Palmdale Boulevard. The closest residential property is approximately 750 feet away from this station. The work and potential impacts would be the City of Palmdale.
- Station 153 is approximately 500 feet west of the centerline of 87th Street East along East Palmdale Boulevard, with the closest residential property at a distance of approximately 1,050 feet. The work and potential impacts would be within unincorporated Los Angeles County.

Los Angeles County provides a nighttime construction ordinance limit for mobile equipment (as would be used in this type of construction) of 60 dBA L_{EQ} . The City of Palmdale does not set specific property line noise limits for construction (day or night) noise. The only exclusion for nighttime work for the City of Palmdale is a notation the no construction will occur at night within 500 feet of a residence (as noted above, the distance for this work is greater than this specified distance for the work location in the City of Palmdale). Therefore, the Los Angeles County noise ordinance is used as a basis of analysis for determining noise impact significance. It is important to note that the nighttime construction for these two crossovers would be very short in duration and would have minimal impacts under any normal consideration.

Analysis

The estimated noise for the construction from a dump truck and an excavator at 500 feet would be approximately 55.1 dBA L_{EQ} and 49 dBA at 1,050 feet.

Impacts

Because nighttime construction (pipeline installation) noise impacts would only occur near any given residential property for a short duration—one or possibly two nights—and in consideration of the noise levels generated in comparison to the County of Los Angeles noise ordinance thresholds, noise impacts for nighttime construction operations in East Palmdale Boulevard would be less than significant.

Mitigation

Nighttime construction impacts would not generate a significant noise impact and noise mitigation for the nighttime installation of pipelines would not be required.

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Palmdale Regional Groundwater Recharge and Recovery Project

Acoustical Analysis Report

October 2015

Prepared for:
Palmdale Water District
2029 East Avenue Q
Palmdale, California 93550

Prepared by:
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**PALMDALE REGIONAL GROUNDWATER
RECHARGE AND RECOVERY PROJECT**

ACOUSTICAL ANALYSIS REPORT

Prepared for:
Palmdale Water District
2029 East Avenue Q
Palmdale, California 93550

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October 2015

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GLOSSARY OF TERMS AND ACRONYMS

AFY	acre-feet per year
ANSI	American National Standards Institute
CadnaA	Computer Aided Noise Abatement
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
cfs	cubic foot/second
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibels
Daytime	The period from 7:00 a.m. to 7:00 p.m. (Los Angeles County)
Evening	The period from 7:00 p.m. to 10:00 p.m.
gpm	gallons per minute
Hz	Hertz
in/sec	inches per second
kHz	kilohertz
L _{DN}	Day-Night sound level
L _{EQ}	equivalent sound level
mPa	micro-Pascals
NSLU	Noise-sensitive land uses
NRC	Noise Reduction Coefficient
PPV	peak particle velocity
Proposed Project	Palmdale Regional Groundwater Recharge and Recovery Project
PWD	Palmdale Water District
SPL	Sound pressure level
S _{WL}	Sound power level
SWP	State Water Project
USGS	U.S. Geological Survey

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EXECUTIVE SUMMARY

The Palmdale Water District (PWD) plans to develop groundwater banking programs with new spreading grounds to recharge imported water and recycled water, as well as develop recovery facilities to help meet future water demands and improve reliability. The proposed Palmdale Regional Groundwater Recharge and Recovery Project (proposed Project) would deliver raw, imported water from the East Branch of the California Aqueduct (State Water Project [SWP] water) to a new recharge basin located in the City of Palmdale. Water for groundwater recharge would be obtained from two sources: raw water from the East Branch of the California Aqueduct (SWP water) and recycled water from the Los Angeles County Sanitation District's (LACSD's) Palmdale Water Reclamation Plant. The SWP water would be the blending source for the recharge water. The recharge capacity of the proposed Project is estimated to be approximately 50,000 to 52,000 acre-feet per year (AFY). (An acre-foot is approximately 326,000 gallons.) For the magnitude of recharge proposed under the proposed Project, SWP water would need to be recharged nearly year-round during wet years, which is estimated to occur approximately 6 out of every 10 years. During dry years (anticipated to be approximately 4 out of every 10 years), no SWP recharge would occur. Recycled water produced locally also would be included in the recharge (compliant with applicable regulations); this source is anticipated to be available at an approximately constant rate year-round.

The proposed Project would potentially occur in phases. The preliminary phase is intended to meet the PWD's water demands for the first 22 years of the proposed Project's life, providing a water supply of 14,125 AFY. The second phase is sized to meet the PWD's water demand through the 50-year proposed Project evaluation period (through 2067), as well as through ultimate buildout, providing a water supply of up to 24,250 AFY. If a partner agency joins PWD, up to 30,000 AFY could be pumped back to the SWP for use by the partner agency.

The proposed Project site is located generally in the northeastern portion of the City of Palmdale and the eastern portion of the City of Lancaster in Los Angeles County, as well as in the surrounding unincorporated Los Angeles County. The proposed Project consists of several components at different locations, including a Recharge Site, a Distribution Site, a network of Recovery Wells surrounding the Recharge Site, and several associated pipelines. The Recharge Site is located south of East Avenue L, west of 105th Street East, north of Avenue L-8, and east of 100th Street. The Distribution Site is located approximately 0.5 mile south of the Recharge Site's southern boundary. The Recovery Wells are located along side of East Avenue K-8, 110th Street East, East Avenue M, and 95th Street East. The proposed Project also includes proposed alignments for raw, potable, and recycled water supply mains that would be located mostly within existing streets. The pipelines are bounded by the East Avenue K to the north, the East Branch of the California Aqueduct to the south, 106th Street to the east, and 60th Street East to the west.

Portions of the Potable Water and Raw Water/Return Water Pipelines, the Recharge Site, and some of the Recovery Wells would be located within the City of Palmdale. The portions of the proposed Project that would occur within the City of Lancaster would be limited to the Recovery Wells located north of East Avenue L, between 102nd Street East and 107th Street East. The portions of the proposed Project that would occur within unincorporated Los Angeles County would include portions of the Potable Water and Raw Water/Return Water Pipelines south of

East Avenue Q and east of 80th Street East, as well as the Recovery Wells north of East Avenue L outside of the Lancaster city limits.

The proposed Project site is undeveloped and contains natural vegetation and some dirt trails used by off-highway vehicles. The portion of the proposed Project site that is in the City of Palmdale is zoned Planned Industrial (M-4), and the portion of the site in the City of Lancaster is zoned Rural Residential (RR-2.5).

Land uses surrounding the proposed Project site include agriculture, some distant rural residential uses and vacant land.

The proposed Project would include the construction of pipelines, recharge basins, pump station (including Storage Tank and chlorination facilities), and Recovery Wells. Pipeline construction activities would include trenching, installation of pipes, backfilling, and (if applicable) repaving of the affected portions of streets. In addition, the proposed Raw Water/Return Water Pipeline alignment includes the following two locations where jack-and-bore procedures, also known as auger boring, would be used: (1) along 105th Street East where the pipeline would pass under East Palmdale Avenue; and (2) along 106th Street East where the pipeline would pass under railroad tracks. The jack-and-bore process at the noted locations would involve digging a pit with an excavator on each side of East Palmdale Avenue and the railroad tracks (an entrance and exit pit for the bore/auger), and boring under the roadway/tracks from the entrance pit to the exit pit on the other side of the roadway/tracks. The loudest activity associated with pipeline construction would be the excavator digging the trenches.

Recharge Site construction activities would include the excavation and movement of soils to create perimeter berms. The loudest activity associated with the construction at the Recharge Site would be the dozer work.

Recovery Well construction activities would include excavation to create a level pad, drilling of the well shaft (on a continuous 24 hours per day, 7 days per week schedule), paving of a concrete pad, and installation of above-ground pump equipment. The loudest activity associated with construction of the Recovery Wells would be an excavator during the daytime and the well rig (and associated equipment) at night.

Traffic noise also would be generated from haul trucks and construction worker vehicles.

This acoustical analysis assumes that no construction activities other than the Recovery Well drilling would occur between the hours of 8:00 p.m. and 7:00 a.m., on Sundays, or on legal holidays, as defined by the Los Angeles County Code of Ordinances.

Post-construction, the proposed Project would include the following noise sources: traffic trips associated with routine maintenance, operation of the recharge basins, pump station, pipelines, and Recovery Wells.

Excavators and dump trucks would create a noise level of 75 A-weighted decibels (dBA) at a distance of approximately 50 feet. Pipeline excavation might occur as close as approximately 40 feet to the nearest residence, with corresponding noise levels as high as 76.5 dBA. While this would be above the Los Angeles County noise control ordinance's 75-dBA limit for construction

noise levels at single-family residential structures, the impact at any given residence would be of limited duration. This is because pipeline construction is expected to occur at a rate of approximately 300 feet per day for each crew location (with two crews installing a combined 600 feet of pipeline each day). Thus, single residences would only be exposed to the maximum noise levels associated with pipeline construction during a single day, with construction activities continually moving further along the alignment. Additionally, as a water conveyance project being constructed by a water district, the proposed Project would not be subject to Los Angeles County's noise control ordinance. Based on the minimal exceedance of the threshold, and given the temporary nature of the worst-case noise levels for any single residence along the alignment, impacts would be less than significant.

The noise impacts from any of the Recovery Well pumps within the City of Lancaster (two are planned) and unincorporated Los Angeles County (five are planned) may exceed 45 dBA at a distance of up to 750 feet from the pump. Under the currently proposed Project design, the pumps in both jurisdictions would be located at distances as close as 50 feet from existing (undeveloped) residential-zoned property lines. Given the distance from the pumps to the noted property lines and the associated noise levels, impacts from Recovery Well pump noise within the City of Lancaster and County of Los Angeles would be potentially significant, with associated mitigation provided for Recovery Well enclosures. With implementation of this mitigation, all noise impacts associated with long-term Recovery Well pump operation would be controlled to below a level of significance.

Operational traffic associated with the proposed Project would be limited to a few vehicle trips to the site per month during maintenance visits. Such trips would not be of sufficient volume to generate an audible increase in noise levels on nearby roadways.

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1.0 INTRODUCTION

1.1 PROJECT LOCATION

The Palmdale Regional Groundwater Recharge and Recovery Project (proposed Project) site is located generally in the northeastern portion of the City of Palmdale and in the eastern portion of the City of Lancaster in Los Angeles County and in the surrounding unincorporated Los Angeles County (Figure 1, *Regional Location Map*). More specifically, the proposed Project site is situated north of State Route (SR) 138, east of SR 14, south of Edwards Air Force Base, and west of the community of Lake Los Angeles. The proposed Project site is located in portions of the Alpine Butte, Lancaster East, Littlerock, and Palmdale U.S. Geological Survey (USGS) 7.5-minute quadrangle maps (Figure 2, *Project Vicinity [USGS Topography]*). The proposed Project consists of a several components at different locations, including a Recharge Site, a Distribution Site, a network of Recovery Wells surrounding the Recharge Site, and several associated pipelines. The Recharge Site is located south of East Avenue L, west of 105th Street East, north of Avenue L-8, and east of 100th Street. The Distribution Site is located approximately 0.5 mile south of the Recharge Site's southern boundary. The Recovery Wells are located along side of East Avenue K-8, 110th Street East, East Avenue M, and 95th Street East. The proposed Project also includes proposed alignments for raw, potable, and recycled water supply mains that would be located mostly within (or adjacent to) existing streets (Figure 3, *Proposed Project - Aerial Photograph*). The pipelines are bounded by the East Avenue K-8 to the north, the East Branch of the California Aqueduct to the south, 106th Street to the east, and 60th Street East to the west. Refer to Figure 2 for the location of project features.

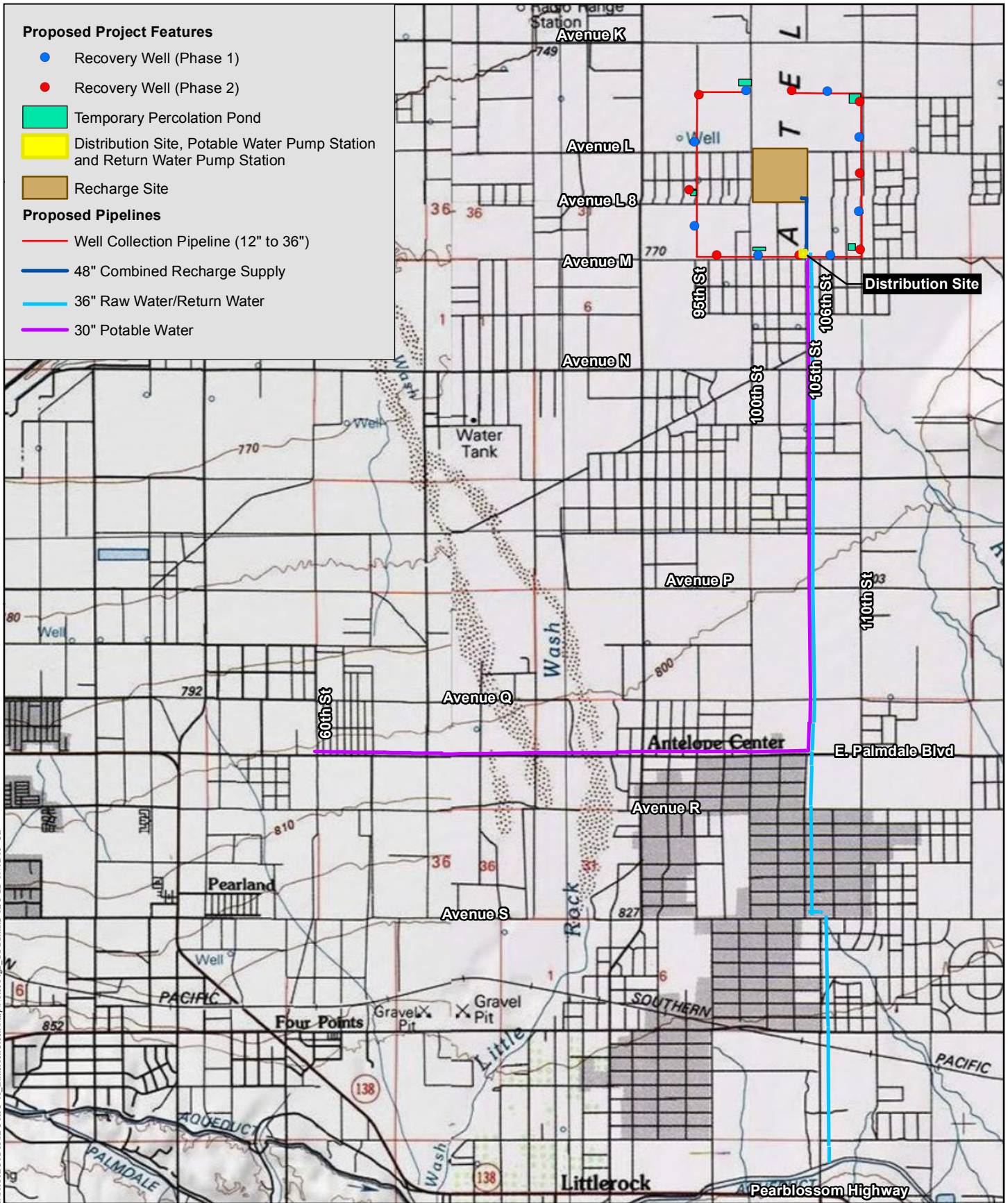
1.2 PROJECT DESCRIPTION

The Palmdale Water District (PWD) plans to develop groundwater banking programs with new spreading grounds to recharge imported water and recycled water, as well as develop recovery facilities to help meet future water demands and improve reliability. The proposed Project would deliver raw, imported water from the East Branch of the California Aqueduct (State Water Project [SWP] water) to a new recharge basin located in the City of Palmdale. Water for groundwater recharge would be obtained from two sources: raw water from the East Branch of the California Aqueduct (SWP water) and recycled water from the Los Angeles County Sanitation District's (LACSD's) Palmdale Water Reclamation Plant. The SWP water would be the blending source for the recharge water. The recharge capacity of the proposed Project is estimated to be approximately 50,000 to 52,000 acre-feet per year (AFY). (An acre-foot is approximately 326,000 gallons.). For the magnitude of recharge envisioned under the proposed Project, SWP water would need to be recharged nearly year-round during wet years, which are estimated to occur approximately 6 out of every 10 years. During dry years—anticipated to be approximately 4 out of every 10 years—no SWP recharge would occur. Recycled water produced locally also would be included in the recharge (compliant with applicable regulations); this source is anticipated to be available at an approximately constant rate year-round.

The proposed Project would occur in phases. The preliminary phase is intended to meet the PWD's water demands for the first 22 years of the proposed Project's life, providing a water supply of 14,125 AFY. The second phase is sized to meet the PWD's water demand through the 50-year proposed Project evaluation period (through 2067), as well as through ultimate buildout,

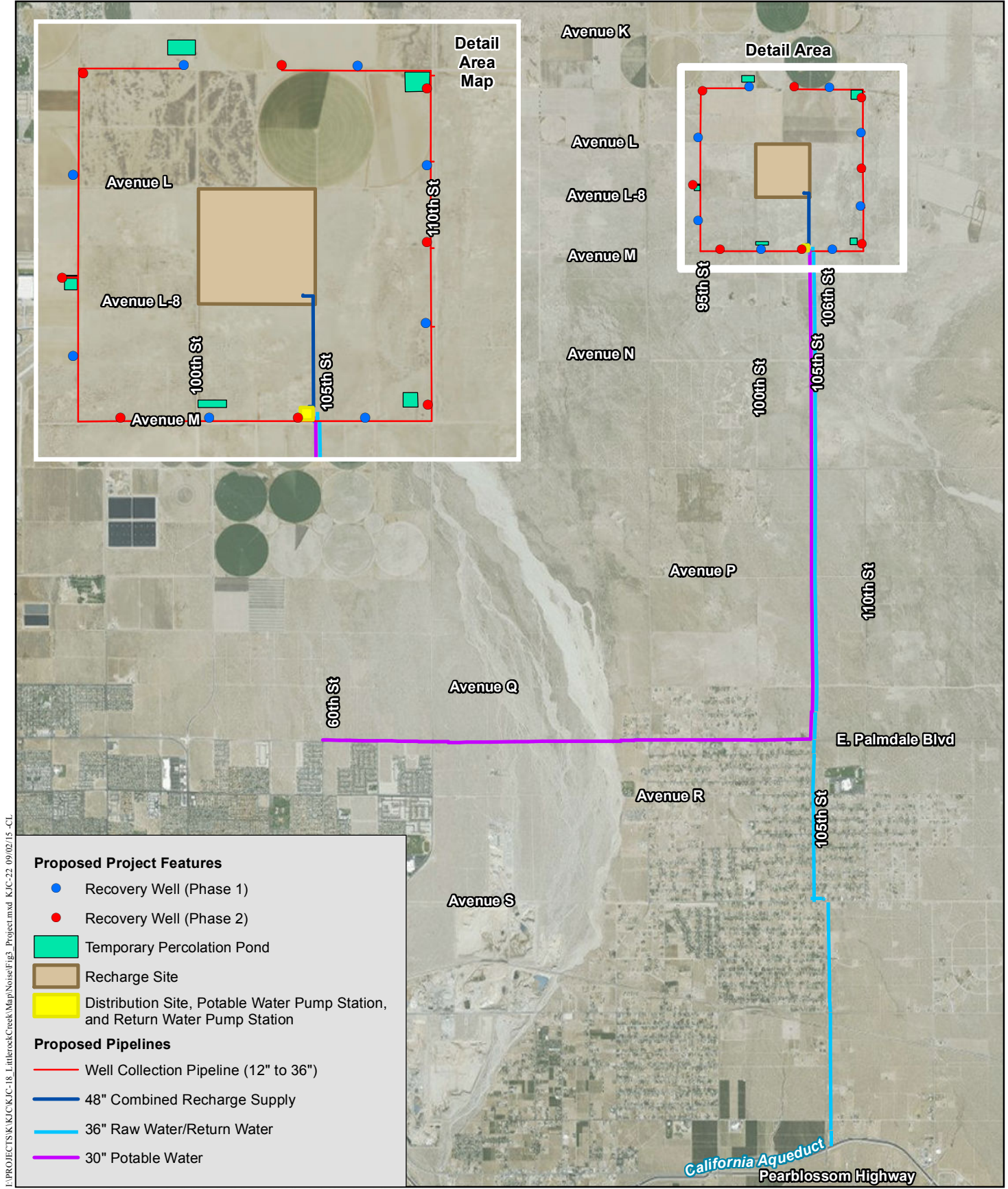
providing a water supply of up to 24,250 AFY. If a partner agency joins PWD, up to 30,000 AFY could be pumped back to the SWP for use by the partner agency. The components of the proposed Project, which are each designed to accommodate the ultimate demand of the proposed Project, are listed below:

- **State Water Project (SWP) Turnout:** The new 50-cubic foot/second (cfs) Turnout would be located at the intersection of the East Branch of the California Aqueduct and 106th Street East. (A turnout at the East Branch of the California Aqueduct is a connection/gate that allows water to leave the Aqueduct.) The Turnout consists of a rectangular cutout of the East Branch of the California Aqueduct concrete canal lining, approximately 25-feet-long by 10-feet-wide. A trashrack would be installed over the cutout section to prevent trash from entering the Turnout. A 36-inch pipe would enter the side of the East Branch of the California Aqueduct. Water would flow into the pipe, through a flow meter, then through the Raw Water/Return Water Pipeline to the recharge basins (both of which are discussed in more detail below). The new Turnout structure would be composed of reinforced concrete. Stop logs and a motor-actuated sluice gate would control the flow entering the pipeline.
- **Recharge Site:** The Recharge Site is 160 acres and is defined by East Avenue L to the north, East Avenue L-8 to the south, 100th Street East to the west, and 105th Street East to the east. The basins at the Recharge Site would consist of four 20-acre cut-and-fill earth embankment recharge basins with shotcrete interior slopes. The basins would occupy approximately 80 acres in the center of the 160-acre Recharge Site and would be surrounded by an 8-foot-high chain-link security fence. The side slope of the recharge basin embankments at the site would be 3:1, with a maximum height of approximately 8 feet. Each basin would have an emergency spillway. The entire 80 acres of recharge basins would be surrounded by a 26-foot-wide access road. An access road 20 feet wide would also be located between each basin.
- **Raw Water/Return Water Pipeline:** The Raw Water/Return Water Pipeline is approximately 8.6 miles in length and would connect the Distribution Site with the East Branch of the California Aqueduct at the proposed SWP Turnout described above. The 36-inch diameter Raw Water/Return Water Pipeline would travel north along 106th Street East from the SWP Turnout for approximately 2.3 miles. It would then traverse west along East Avenue S for approximately 0.1 mile, and then north along 105th Street East for approximately 1.5 miles to the terminus of 105th Street East at East Palmdale Boulevard. The Raw Water/Return Water Pipeline would continue north from the intersection of 105th Street East and East Palmdale Boulevard, along the future 105th Street East alignment through undeveloped land for approximately 4.7 miles to connect with the recharge basins at the Recharge Site.
- **Recycled Water Pipeline:** The Recycled Water Pipeline includes the construction of a 30-inch pipeline that would connect to an existing 48-inch recycled water pipeline at the intersection of 105th Street East and East Avenue M. The proposed 30-inch Recycled Water Pipeline would traverse north for approximately 0.1 mile along 105th Street East, paralleling the 36-inch Raw Water/Return Water Pipeline, until reaching the Distribution Box at the Distribution Site (Distribution Site is discussed in more detail below) where



Project Vicinity (USGS Topography)

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT



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Proposed Project - Aerial Photograph

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

the recycled water would flow by gravity through the Combined Recharge Supply Pipeline the last 0.6 mile to the Recharge Site.

- **Recovery Wells:** The proposed Project would include 16 Recovery Wells potentially occurring in two phases, with all Recovery Wells having an estimated capacity of 1,200 gallons per minute (gpm). The Recovery Wells are intended to be phased one half at a time with eight wells installed during the preliminary phase and the additional eight wells installed in the second phase. The Recovery Wells would be configured surrounding the Recharge Site, located on an approximately 1.5-mile-by-1.5-mile square, centered around the Recharge Site. The wells are set back a minimum of 0.5 mile on each side of the Recharge Site to provide more than one year of travel time, as required by the California Department of Drinking Water, for recycled water traveling from the recharge basins to the Recovery Wells. Four Recovery Wells would be located along 95th Street East, between Avenue M and Avenue K-8; five Recovery Wells would be located along 110th Street East, between Avenue M and Avenue K-8; three Recovery Wells would be located along Avenue K-8, between 95th Street East and 110th Street East; and four Recovery Wells would be located along Avenue M, between 95th Street East and 110th Street East. One of the Recovery Wells located along Avenue M would be located within the fenced Distribution Site (Distribution Site is discussed in more detail below). All 16 Recovery Wells would have approximately 200 horsepower pumps, would be housed in buildings, and would operate up to 97 percent of the year (with the well building requiring ventilation to maintain appropriate inside temperatures for pump operation). Approximately 6 miles of Well Collection Pipeline would connect the Recovery Wells to the Potable Water Pump Station. The Well Collection Pipeline for the preliminary phase is sized to deliver water from the Recovery Wells in both phases to the Recharge Site and is located either in existing or future street alignments. The Well Collection Pipeline would vary in size, ranging from 12-inch at the north of the site to 36-inch at the south of the site. The proposed Project would also include five temporary Percolation Ponds on parcels in close proximity to Recovery Wells for water collection and percolation into the groundwater basin during Recovery Well testing. These parcels would be bermed using soil within each parcel and would temporarily store water pumped up during Recovery Well testing. The water would remain on each parcel until it has percolated back into the groundwater basin. The berms on each parcel would then be redistributed around the parcel.
- **Distribution Site:** The one-million-gallon Storage Tank and Pump Station Building (with chlorination facilities) would be located on a two-acre parcel approximately 0.5 mile south of the Recharge Site, at the northwestern corner of the Avenue M and 105th Street East intersection. A 48-inch Combined Recharge Supply Pipeline would convey water between the Distribution Site and the Recharge Site. This 48-inch Combined Recharge Supply Pipeline would be approximately 0.5 mile in length and would convey water from the Distribution Box at the Potable Water Pump Station to the Splitter Box at Recharge Site. An access road would connect the Recharge Site and the Distribution Site.
- **Potable Water Pump Station and Potable Water Pipeline:** The Potable Water Pump Station is intended to accommodate the ultimate demand. However, the pumps

themselves are to be phased, meaning the four 3,000 gpm, 400-horsepower pumps (plus one additional pump as a spare) are intended to accommodate the 14,125 AFY demand; the ultimate demand would be supplied through an additional two pumps of the same size and capacity. Although most phasing for the proposed Project is intended to be within two parts, this Potable Water Pump Station is capable of being implemented through multiple phases as demand increases. The Potable Water Pump Station would be located on the same two-acre parcel as the one-million-gallon Storage Tank and Chlorination Room. The proposed Project would also include the installation of a 30-inch Potable Water Pipeline that originates at the Potable Water Pump Station and proceeds south along the same alignment as the Raw Water/Return Water Pipeline and then traverses west along East Palmdale Boulevard, until 60th Street East. The Potable Water Pipeline would be approximately 9.2 miles in length. The Potable Water Pump Station would operate continuously to meet PWD's potable demands.

- **Return Water Pump Station:** The optional Return Water Pump Station is designed to accommodate a water banking partner or partners in order to pump back to the East Branch of the California Aqueduct. The Return Water Pump Station would be located adjacent to the distribution system one-million-gallon Storage Tank and discharge back into the 30-inch diameter Raw Water/Return Water Pipeline. The Pump Station Building would house both the Return Water and Potable Water pumps in a single building. It is not required for this pump station to be implemented until a water banking partnership is achieved. The Return Water Pump Station may be combined with the Potable Water Pump Station, resulting in a 6-pump, 3,750 gpm, 600-horsepower pump station, with one additional pump as a spare. The pump station, if it is implemented, would operate the majority of the year for an anticipated 4 out of 10 years, which is the anticipated frequency of dry years.

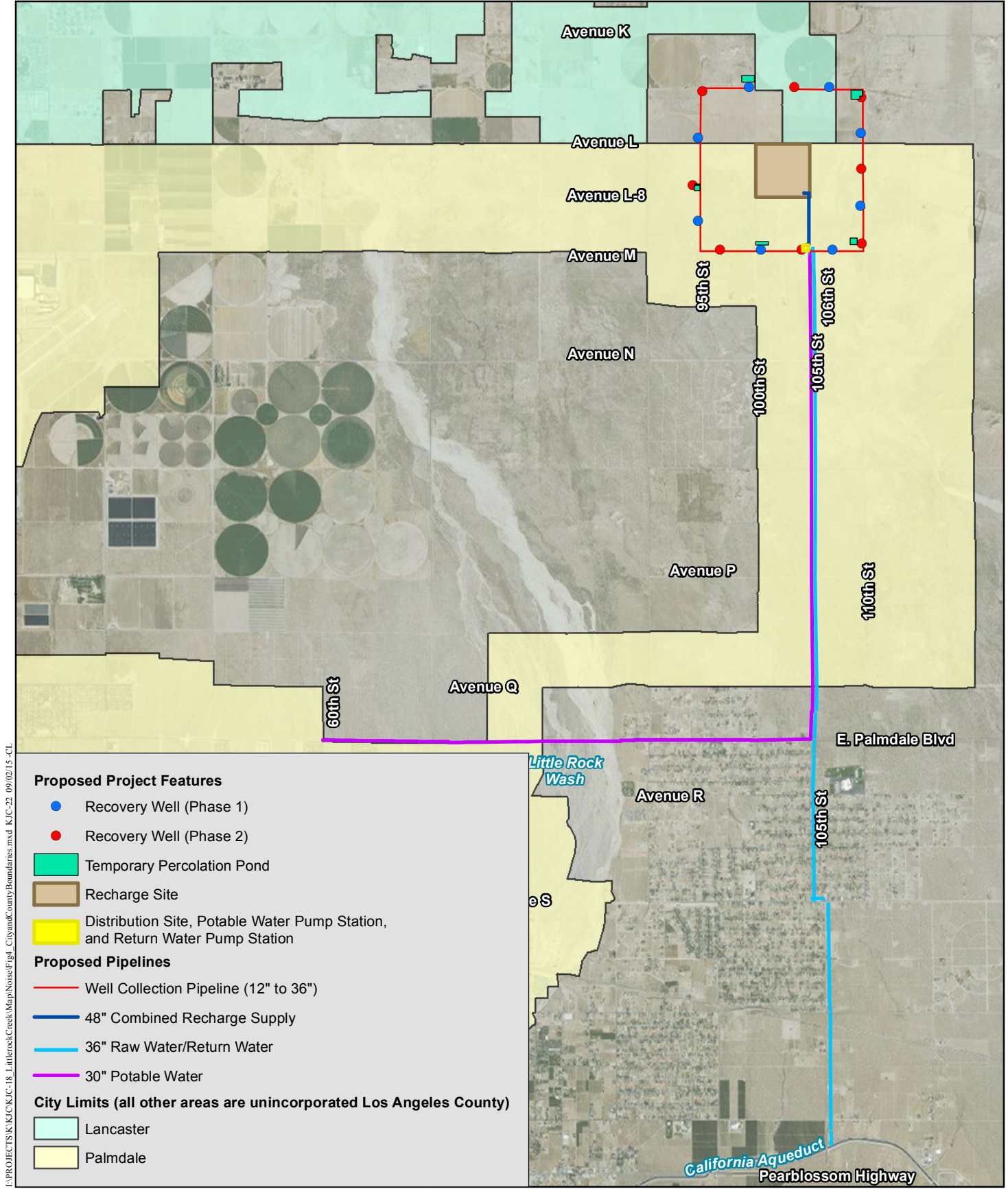
Portions of the Potable Water and Raw Water/Return Water Pipelines, the Recharge Site, and the Recovery Wells south of East Avenue L, as well as the Distribution Site, would be located within the City of Palmdale. The portions of the proposed Project that would occur within the City of Lancaster would be limited to the Recovery Wells located north of East Avenue L, between 102nd Street East and 107th Street East. The portions of the proposed Project that would occur within unincorporated Los Angeles County would include some of the Recovery Wells and portions of the Potable Water and Raw Water/Return Water pipelines south of East Avenue Q and east of 80th Street East. Figure 4, *Proposed Project and Local Jurisdictional Boundaries*, shows the proposed Project overlaid over the jurisdictional boundaries in the Project area.

2.0 ENVIRONMENTAL SETTING

2.1 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

Sound, Noise and Acoustics

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} , with a specified duration. The Community Noise



Proposed Project and Local Jurisdictional Boundaries

PALMDALE REGIONAL GROUNDWATER RECHARGE AND RECOVERY PROJECT

Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dB weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level (L_{DN}), which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

The amplitude of pressure waves generated by a sound source determines the loudness of that source. A logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels. The threshold of hearing for the human ear is about 0 dB, which corresponds to 20 micro-Pascals (mPa).

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when 2 identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions.

To create an overall 3 dBA L_{EQ} change in traffic noise, the traffic volume must double while maintaining the same speed. The subjective human perception of a doubling of loudness, however, will usually be different from what is measured with precise instrumentation. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible, although it is widely accepted that people begin to detect sound level increases of 3 dB. In addition, a 5-dB increase is generally perceived as distinctly noticeable, and a 10-dB increase is generally perceived as a doubling of loudness. Accordingly, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable by the human ear.

Vibration

Vibration is defined as any oscillatory motion induced in a structure or mechanical device as a direct result of some type of energy input. Sources of ground-borne vibrations can include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves or landslides) and human activities (e.g., trains, traffic or construction equipment/operations). Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads (with vibration from traffic on smooth roadways rarely perceptible). For purposes of this analysis, ambient and source vibration information is expressed in terms of peak particle velocity (PPV), given in inches per second (in/sec) over a range of 1 to 100 Hz.

2.2 NOISE AND VIBRATION SENSITIVE LAND USES

Noise Sensitive Land Uses

Noise sensitive land uses (NSLUs) are uses that may be subject to stress and/or interference from excessive noise. Noise-sensitive receptors include residences, schools, hospitals, and other areas where people live and/or sleep. The recharge/recovery area portion of the proposed Project site (including the proposed Recovery Wells, Recharge Site, and Distribution Site) does not contain any noise-sensitive receptors. The nearest existing NSLUs to this portion of the proposed Project site are residences located more than 1,500 feet to the south at East Avenue M-8.

The nearest residential areas to the proposed pipeline alignment construction (beyond those residences near the proposed Project site along East Avenue M-8, identified in the paragraph above) start about 4.25 miles south of the Recharge Site at the intersection of East Palmdale Boulevard and 105th Street East. The pipeline alignments would split at this location: the Potable Water Pipeline would travel west along East Palmdale Avenue, and the Raw Water/Return Water Pipeline would continue south (with a small jog west at East Avenue S to 106th Street East) to the East Branch of the California Aqueduct. There are several separate residential community areas along the noted portions of both pipeline routes, with houses as close as 30 feet to the edge of the roadway. Other NSLU locations in proximity to the pipeline routes include Daisy Gibson Elementary School on East Palmdale Avenue, Littlerock High School (to the east of 105th Street East), and a church on the north side of East Avenue S and 106th Street East.

Vibration Sensitive Land Uses

Vibration sensitive land uses include sites where vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and laboratory operations. The degree of sensitivity depends on the specific operations or equipment that would be affected by the ground-borne vibration. Excessive levels of ground-borne vibration of either a regular or an intermittent nature can also result in “annoyance effects” to residential uses. No vibration-sensitive land uses are located within or adjacent to the proposed Project site (other than residences as previously described), with the closest off-site vibration sensitive use consisting of health care facilities on East Palmdale Boulevard approximately 1.3 miles west of 60th Street East.

2.3 REGULATORY FRAMEWORK

When a local agency such as PWD is directly and immediately engaged in “the production, generation, storage, treatment, or transmission of water,” the agency has an absolute exemption from complying with local building and zoning ordinances for the location or construction of facilities (Government Code, § 53091, subds. (d),(e)). The proposed Project involves facilities directly and immediately engaged in the production, generation, treatment, and transmission of water. For this reason, and because the PWD is the applicable regulatory agency and California Environmental Quality Act (CEQA) lead agency for this proposed Project, the proposed Project is exempt from the noise limits for Los Angeles County and the cities of Palmdale and Lancaster.

Nevertheless, the proposed Project design and implementation would include measures to provide conformance with applicable local regulations wherever feasible, with associated regulatory standards provided below for informational purposes.

2.3.1 County of Los Angeles Noise Control Ordinance

2.3.1.1 Construction Noise and Vibration Limits

Construction noise and vibration limits are included in Chapter 12.08, Noise Control, of the Los Angeles County Code of Ordinances, as stated below:

12.08.440 Construction noise.

- A. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the health officer is prohibited.
- B. Noise Restrictions at Affected Structures. The contractor shall conduct construction activities in such a manner that the maximum noise levels at the affected buildings will not exceed those listed in the following schedule:
 - 1. At Residential Structures.
 - a. Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

Table 1 MOBILE CONSTRUCTION EQUIPMENT NOISE LIMITS			
Time	Single-family Residential	Multi-family Residential	Semi-residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA

Source: Los Angeles County Code of Ordinances

- b. Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

Table 2 STATIONARY CONSTRUCTION EQUIPMENT NOISE LIMITS			
Time	Single-family Residential	Multi-family Residential	Semi-residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

Source: Los Angeles County Code of Ordinances

2. At Business Structures.

- a. Mobile equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment.
- b. Daily, including Sunday and legal holidays, all hours: maximum of 85 dBA.
- c. All mobile or stationary internal-combustion-engine powered equipment or machinery shall be equipped with suitable exhaust and air-intake silencers in proper working order.
- d. In case of a conflict between this chapter and any other ordinance regulating construction activities, provisions of any specific ordinance regulating construction activities shall control.

(Ord. 11778 § 2 (Art. 5 § 501(c)), 1978; Ord. 11778 § 2 (Art. 5 § 501(c)), 1978.)

12.08.560 Vibration.

Operating or permitting the operation of any device that creates 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 (46 meters) from the source if on a public space or public right-of-way, is prohibited. The perception threshold shall be a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz.

(Ord. 11778 § 2 (Art. 5 § 501(d)), 1978; Ord. 11773 § 2 (Art. 5 § 501(d)), 1978.)

2.3.1.2 Operational Noise and Vibration Limits

Operational noise and vibration impacts from the proposed Project are governed by the Los Angeles County Code, as stated below:

12.08.390 Exterior noise standards.

- A. Unless otherwise herein provided, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

Table 3 OPERATIONAL EXTERIOR NOISE STANDARDS			
Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m. (nighttime)	45
		7:00 a.m. to 10:00 p.m. (daytime)	50
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime)	55
		7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties	Anytime	70

Source: Los Angeles County Code of Ordinances

Note: For the purposes of this report’s analysis, the noise level limits presented in this table are considered to be expressed in dBA instead of dB, per the measurement methodologies expressed in Section 12.08.370 of the County Ordinance.

- B. Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

Standard No. 1 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level from subsection A of this section; or, if the ambient L_{50} exceeds the foregoing level, then the ambient L_{50} becomes the exterior noise level for Standard No. 1.

Standard No. 2 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level from subsection A of this section plus 5 dB; or, if the ambient L_{25} exceeds the foregoing level, then the ambient L_{25} becomes the exterior noise level for Standard No. 2.

Standard No. 3 shall be the exterior noise level which may not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient $L_{8.3}$ exceeds the foregoing level, then the ambient $L_{8.3}$ becomes exterior noise level for Standard No. 3.

Standard No. 4 shall be the exterior noise level which may not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from subsection A of this section plus 15 dB; or, if the ambient $L_{1.7}$ exceeds the foregoing level, then the ambient $L_{1.7}$ becomes the exterior noise level for Standard No. 4.

Standard No. 5 shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient L_0 exceeds the foregoing level then the ambient L_0 becomes the exterior noise level for Standard No. 5.

(Ord. 11778 § 2 (Art. 4 § 403), 1978; Ord. 11773 § 2 (Art. 4 § 403), 1978.)

12.08.560 Vibration.

Operating or permitting the operation of any device that creates 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 (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz.

(Ord. 11778 § 2 (Art. 5 § 501(d)), 1978; Ord. 11773 § 2 (Art. 5 § 501(d)), 1978.)

2.3.2 County of Los Angeles Noise Element

Per the Noise Element of the County General Plan, noise levels up to 60 CNEL are considered “normally acceptable” for low-density residential development.

2.3.3 City of Palmdale Noise Ordinance

2.3.3.1 *Construction Noise*

8.28.030 Construction noise prohibited in residential zones.

Except as otherwise provided in this chapter, no person shall perform any construction or repair work on any Sunday, or any other day after 8:00 p.m. or before 6:30 a.m., in any residential zone or within 500 feet of any residence, hotel, motel or recreational vehicle park. For the purposes of this section, construction and repair work includes work of any kind upon any building or structure, earth excavating, filling, or moving, and delivery, preparation or operation of construction equipment, materials or supplies where any of the foregoing entails the use of an air compressor, jack hammer, power-driven drill, riveting machine, excavator, semi-truck, diesel power truck, tractor, cement truck, or earth moving equipment, hand hammer, or other machine, tool, device or equipment which makes loud noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness sleeping or residing in the area.

(Ord. 1335 § 1, 2007; Ord. 584 § 1, 1986)

2.3.3.2 *Operational Noise*

9.18.010 Noise.

- A. It shall be unlawful for any person to willfully make or continue, or cause or permit to be made or continued, any loud, unnecessary, or unusual noise which unreasonably disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.
- B. The characteristics and conditions, which may be considered in determining whether such noise violates the provisions of this section, shall include, but not be limited to, the following:
 - (1) The volume of the noise;
 - (2) The intensity of the noise;
 - (3) Whether the nature of the noise is usual or unusual;
 - (4) Whether the origin of the noise is natural or unnatural;
 - (5) The volume and intensity of the background noise, if any;
 - (6) The proximity of the noise to sleeping facilities;
 - (7) The nature and zoning of the area within which the noise emanates;
 - (8) The density of the inhabitation of the area within which the noise emanates;
 - (9) The time of the day or night the noise occurs;
 - (10) The duration of the noise;

- (11) Whether the noise is recurrent, intermittent, or constant;
- (12) Whether the noise is produced by a commercial or noncommercial activity.

(Ord. 1332 § 1, 2007)

2.3.4 City of Lancaster Noise Ordinance

2.3.4.1 *Construction Noise*

8.24.040 Loud, unnecessary and unusual noises prohibited—construction and building.

A person at any time on Sunday or any day between the hours of 8:00 p.m. and 7:00 a.m. shall not perform any construction or repair work of any kind upon any building or structure or perform any earth excavating, filling or moving where any of the foregoing entails the use of any air compressor, jack hammer, power-driven drill, riveting machine, excavator, diesel-powered truck, tractor or other earth-moving equipment, hard hammers on steel or iron or any other machine tool, device or equipment which makes loud noises within 500 feet of an occupied dwelling, apartment, hotel, mobile home or other place of residence.

2.3.4.2 *Operational Noise*

8.24.010 - Declaration of policy.

It is declared to be the policy of the city to prohibit unnecessary, excessive and annoying noises from all sources subject to its police power. At certain levels noises are detrimental to the health and welfare of the citizenry, and, in the public interests, such noise levels shall be systematically proscribed.

8.24.030 - Loud, unnecessary and unusual noises prohibited.

Notwithstanding any other provision of this chapter, and in addition thereto, no person shall make, cause or suffer, or permit to be made upon any premises owned, occupied or controlled by him/her any unnecessary noises or sounds which are physically annoying to persons of ordinary sensitiveness which are so harsh or so prolonged or unnatural or unusual in their use, time, or place as to occasion physical discomfort to the inhabitants of any neighborhood. All animals shall be so maintained.

2.4 EXISTING CONDITIONS

The proposed Project site and adjacent areas include a mix of low- to medium-density residential sites (and related commercial/institutional uses), agriculture, several small solar arrays, two recycled water seasonal storage ponds and undeveloped (vacant) areas. Specifically, the Recharge Site and related Recovery Wells, Distribution Site, and pipeline facilities are in an area that is predominantly undeveloped and contains natural vegetation and some dirt trails used by off-highway vehicles. The Raw Water/Return Water and Potable Water Pipelines encompass undeveloped areas, as well as urban development including uses such as residential (and related) sites, roads, agriculture, and other facilities as noted.

The portion of the proposed Project site that is within the City of Lancaster (i.e., two Recovery Wells, refer to Figure 4) is zoned Rural Residential (RR-2.5). The portions of the proposed Project site within the City of Palmdale are zoned Planned Industrial (M-4.), while proposed Project site zoning within the unincorporated County of Los Angeles includes Light Agriculture (A-1-1), Heavy Agriculture (A-2, A-2-1 and A-2-2), Commercial Recreation (C-R-U), and Light Manufacturing (M-1).

The proposed Project site is relatively level with an overall grade to the north and includes elevations of between approximately 2,500 and 2,900 feet above mean sea level.

2.4.1 Existing Noise Conditions

The proposed Project site and the surrounding areas are relatively quiet.

A series of 5-minute, manned, continuously recorded sound level noise measurements were conducted at the Recharge Site and along the pipeline alignments on Wednesday, July 15, 2015. The noise measurement locations are described below in Table 4, *Project Area Measured Noise Levels*, along with the measured noise levels. The measurement locations were at grade with the microphone positioned 5 feet above grade. During the noise measurements, there were moderate gusty winds (measurements were paused during higher wind speeds), humidity levels were moderate, and the temperature was between 90 degrees Fahrenheit and 94 degrees Fahrenheit.

#	Time	Location	dBA L _{EQ}	Noise Source
1	2:00 p.m.	106 th Street, east side, 75 feet north of the East Branch of the California Aqueduct	56.3	Traffic on Pear Blossom Highway
2	2:15 p.m.	106 th Street, east side, across from residence (110 feet north of East Avenue T-6)	43.3	Wind
3	2:30 p.m.	106 th Street, east side across from pumps at East Avenue T	48.4	Pumps
4	2:45 p.m.	106 th Street, east side at Avenue S	60.1	Traffic and Residential Stereo
5	3:05 p.m.	105 th Street and East Avenue R-6 (northeast corner)	55.7	Two Cars
6	3:30 p.m.	105 th Street East and East Avenue Q	46.8	Crow
7	3:50 p.m.	105 th Street East and Avenue N	45.9	Wind
8	4:10 p.m.	105 th Street East and Avenue M	44.4	Wind
9	4:50 p.m.	58 th Street East and East Palmdale Boulevard (southeast corner)	73.1	Traffic
10	5:20 p.m.	East Palmdale Boulevard in front of Daisy Gibson Elementary	72.1	Traffic and Solar Inverters

3.0 METHODOLOGY AND SIGNIFICANCE CRITERIA

3.1 METHODOLOGY AND EQUIPMENT

The following equipment was used to measure existing noise levels at the proposed Project site:

- Larson Davis System 831 Integrating Sound Level Meters
- Larson Davis Model CA250 Calibrator
- Windscreen and tripod for the sound level meter
- Digital camera

The sound level meter was field-calibrated immediately prior to the noise measurements to ensure accuracy. All measurements were made with a meter that conforms to the American National Standards Institute (ANSI) specifications for sound level meters (ANSI SI.4-1983 R2001). All instruments were maintained with National Bureau of Standards traceable calibration per the manufacturers' standards.

Typically, a "one-hour" equivalent sound level measurement (L_{EQ} , A-weighted) is recorded for at least one noise-sensitive location on the site. For measurements of less than one hour in duration, the measurement time must be long enough for a representative traffic volume to occur and the noise level (L_{EQ}) to stabilize.

Modeling of the exterior noise environment from the expected operation of the proposed Project was accomplished using Computer Aided Noise Abatement (CadnaA) version 4.4. CadnaA is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project information (e.g., noise source data, barriers, structures, and topography) to create a detailed computer model and uses the most up-to-date calculation standards to predict outdoor noise impacts.

3.2 ASSUMPTIONS

3.2.1 Construction

The proposed Project would include the construction of the Recharge Site, a Distribution Site, Recovery Wells and pipelines as outlined above in Section 1.2. Pipeline construction activities would include trenching, installation of pipes, backfilling, and (if applicable) repaving of the affected portions of streets. In addition, the proposed Raw Water/Return Water Pipeline alignment includes the following two locations where jack-and-bore procedures, also known as auger boring, would be used: (1) along 105th Street East where the pipeline would pass under East Palmdale Avenue; and (2) along 106th Street East where the pipeline would pass under railroad tracks. The jack-and-bore process at the noted locations would involve digging a pit with an excavator on each side of East Palmdale Avenue and the railroad tracks (an entrance and exit pit for the bore/auger), and boring under the roadway/tracks from the entrance pit to the exit pit on the other side of the roadway/tracks. The described jack-and-bore activities would require approximately two weeks at each noted location (one-month total). The loudest activity

associated with pipeline construction as described would be the excavator used to dig the pipeline trenches and jack-and-bore pits.

Recharge Site construction activities would include the excavation and movement of soils to create perimeter berms. Potable Water Pump Station construction at the Distribution Site would include excavation, movement of soils, fill compaction, and building/pavement (and related facility) installation. The loudest activity associated with the construction of the Recharge Site and Distribution Site would be the dozer work.

Recovery Well construction activities would include excavation to create a level pad, drilling of the Recovery Well shaft (on a continuous 24 hours per day, 7 days per week schedule), paving of a concrete pad, and installation of above-ground pump equipment. The loudest activity associated with construction of the Recovery Wells would be an excavator during the daytime and the well rig (and associated equipment) at night.

Traffic noise also would be generated from haul trucks and construction worker vehicles.

This acoustical analysis assumes that no construction activities other than the Recovery Well drilling would occur between the hours of 8:00 p.m. and 7:00 a.m., on Sundays, or on legal holidays, as defined by the Los Angeles County Code of Ordinance.

The noise source data for the equipment used in this analysis is shown in Table 5, *Construction Noise Source Data*, below.

Equipment	Noise Levels in dB ¹ Measured at Octave Frequencies in Hz									Overall Noise Level (dBA)
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
Excavator ²	117	122	115	114	114	110	118	105	100	116
Dozer as a Line Source	–	99.3	98.4	107.9	110.3	112.5	119.7	103.5	95.4	121.2
Well Rig		103.0	107.0	104.0	101.0	102.0	107.0	102.0	97.0	110.6

¹ Based on Sound Power Levels (S_{WL}).

² An excavator does not work continuously at full power; the listed value is the noise source for an hourly average assuming full power for 40 percent of the time.

3.2.2 Operation

Post-construction, the proposed Project would include the following: traffic trips associated with routine maintenance, operation of the recharge basins, Potable Water Pump Station, pipelines, and Recovery Wells.

4.0 IMPACTS

4.1 ISSUE 1: CONSTRUCTION NOISE LEVELS

Construction of the proposed Project would generate elevated noise levels that may disrupt nearby on- and/or off-site noise sensitive receptors, through construction activity or construction-related traffic. The noise levels generated to nearby NSLUs from each type of activity are described below. As noted in Section 2.3, PWD is not subject to local government building or zoning regulations (including noise control ordinances). For the purposes of this analysis, however, the following assessment of impact significance considers the limits set forth for construction activities in applicable local noise standards.

4.1.1 City of Palmdale

The City of Palmdale prohibits construction within 500 feet of residential or other noise sensitive locations on Sunday, or any other day after 8:00 p.m. or before 6:30 a.m. Only the Recovery Wells would have construction outside these hours and they are at minimum distances of 2,500 feet from any residential uses within the City of Palmdale. **Impact: Less than Significant.**

4.1.2 City of Lancaster

The City of Lancaster prohibits construction within 500 feet of residential or other noise sensitive location on Sunday, or any other day after 8:00 p.m. or before 6:30 a.m. Only the Recovery Wells would have construction outside these hours and they are at minimum distances of 5,000 feet from any developed residential uses within the City of Lancaster. **Impact: Less than Significant.**

4.1.3 Los Angeles County

As noted previously, the Los Angeles County noise control ordinance limits short-term, mobile operating equipment to 75 dBA at single-family residential structures between the hours of 7:00 a.m. and 8:00 p.m. on all days except Sunday and legal holidays.

It is assumed that the construction of the proposed Potable Water and Raw Water/Return Water Pipelines would be limited to the time frames noted above. Accordingly, the County-established noise limit used in this construction noise impact analysis is 75 dBA. Between 8:00 p.m. and 7:00 a.m. on Sundays and on legal holidays, the allowable maximum stationary source construction-related noise level at single-family residential structures is 60 dBA.

As noted above, both pipeline work and Recovery Wells occur within the Los Angeles County portion of the proposed Project. Specifically, this would encompass the following proposed Project elements: (1) pipeline work east of 87th Street East along East Palmdale Boulevard; (2) pipeline work south of East Palmdale Boulevard along 105th Street East, East Avenue S and 106th Street East; and (3) Recovery Wells north of East Avenue L but outside of the Lancaster city limits, as outlined below.

Mobile Pipeline Construction

Excavators and dump trucks associated with mobile pipeline construction would create a noise level of 75 dBA at a distance of approximately 50 feet. Pipeline excavation might occur as close as approximately 40 feet to the nearest residence, with corresponding noise levels as high as 76.5 dBA. While this would be above the Los Angeles County noise control ordinance's 75-dBA limit for construction noise levels at single-family residential structures, associated potential impacts at any given residence would be less than significant, based on the following considerations: (1) Construction activities are continually moving further along the alignment with pipeline construction expected to occur at a rate of approximately 300 feet per day; therefore, any individual residence would only be exposed to the maximum noise levels associated with pipeline construction during a single day. (2) the maximum potential noise level of 76.5 dBA is relatively low compared with the noted County limit of 75 dBA; and (3) as previously described, the proposed Project is technically not subject to the Los Angeles County noise control ordinance. **Impact: Less than Significant.**

Stationary (Jack-and-Bore) Pipeline Construction

Proposed jack-and-bore activities associated with pipeline construction would occur at minimum distances of 150 feet to the closest home along East Palmdale Boulevard, and 600 feet to the closest home at the railroad crossing. As a result, proposed jack-and-bore activities along East Palmdale Boulevard would generate higher noise levels at associated nearby residences than the railroad crossing. As previously described, the excavator associated with this activity would generate the highest noise levels, as the actual jack-and-bore activities would be conducted in the pit, which would provide noise shielding. Accordingly, the maximum calculated noise level associated with jack-and bore (excavation) at the closest home along East Palmdale Boulevard (150 feet) would be approximately 65 dBA, which is below the noted County limit of 75 dBA, **Impact: Less than Significant.**

Well Construction

The Recovery Well rig and related equipment used for installation of Recovery Wells would create a noise level of 60.0 dBA at a distance of approximately 300 feet. As described above in Section 2.2, the nearest NSLUs to this portion of the proposed Project site are residences located more than 1,500 feet to the south. As a result, associated noise levels would be below the noted maximum stationary source noise level limit for single-family residential structures of 60 dBA. **Impact: Less than Significant.**

Construction Traffic

The proposed Project would generate minimal traffic during construction. Some soil export material would be transported off site of the pipeline alignment construction via trucks. The haul trucks would temporarily elevate noise levels along the transport route during construction; at 55 miles per hour, truck noise for 5 trucks per hour (a conservative worst-case estimate) would be 56.5 dBA at 50 feet. In addition, these truck trips would be infrequent and occur intermittently during the construction; therefore, impacts would be less than significant. **Impact: Less than Significant.**

4.1.4 Mitigation Measures

Because impacts related to Issue 1 would be less than significant, no mitigation is required.

4.1.5 Significance After Mitigation

Impacts would be less than significant.

4.2 ISSUE 2: OPERATIONAL NOISE LEVELS

For transportation-related noise, a significant impact would occur if the proposed Project results in a 3 CNEL or greater increase in traffic noise on a roadway segment and the resultant noise levels exceeds 60 CNEL for residential uses in any of the areas of the proposed Project.

4.2.1 City of Palmdale

Operational noise impacts would be considered significant if noise levels exceed those established in the City of Palmdale. The Recharge and Distribution Sites in the City of Palmdale are zoned Planned Industrial, which has no specific noise limit or consideration of a noise limit. At 50 feet from a pump, the noise level may be as high as 68.5 dBA, with no associated significant impacts. **Impact: Less than Significant.**

4.2.1.1 *Operational Traffic*

The operational traffic for the proposed Project, which would consist of daily visits to the Recharge and Distribution Sites and quarterly and annual maintenance activities, would occur at the Recharge and Distribution Sites in the City of Palmdale. As noted above, this area is zoned Planned Industrial; therefore, operational traffic noise is not controlled. However, to create an overall 3-dBA L_{EQ} change in traffic noise, the traffic volume must double while maintaining the same speed. The operational traffic associated with the proposed Project would not result in a doubling of traffic on area roadways and, thus, would not result in a perceptible change in noise levels associated with traffic. **Impact: Less than Significant.**

4.2.2 City of Lancaster

The City of Lancaster provides a non-specific noise limit, stating that no person shall cause a noise impact that would disturb a normal person.

The City of Lancaster ordinances that apply to this Project are ones that set the nighttime residential property-line threshold of significance of 45 dBA. This is a typical and reasonable basis for planning and will be used as a basis for analysis. Based on the previously described pump design/operation (i.e., pumps located inside Recovery Well buildings with ventilation required for temperature control), associated noise impacts from any of the Recovery Well pumps within the City of Lancaster (2 are planned) may exceed 45 dBA at a distance of up to 750 feet from the pump. Under the currently proposed Project design, the pumps would be located at distances as close as 50 feet from existing (undeveloped) residential-zoned property lines within the City of Lancaster. Given the distance from the pumps to the noted property lines

and the associated noise levels, impacts from Recovery Well pump noise within the City of Lancaster would be potentially significant. **Impact: Potentially Significant.**

4.2.2.1 Operational Traffic

Operational traffic associated with the proposed Project would be limited to a few vehicle trips to the site per month during maintenance visits. As described above for the City of Palmdale analysis, such trips would be not of sufficient volume to generate an audible increase in noise levels on nearby roadways. **Impact: Less than Significant.**

4.2.3 Los Angeles County

Operational noise impacts would be considered significant if the noise levels exceed the Los Angeles County regulations for nighttime residential property-line threshold of significance of 45 dBA. As noted above under the City of Lancaster discussion, noise impacts from any of the Recovery Well pumps within Los Angeles County (5 are planned) may exceed 45 dBA at a distance of up to 750 feet from the pump. Based on currently proposed Project design, the pump locations within the County would be located at distances as close as 50 feet from existing (undeveloped) residential-zoned property lines in the County. Given the distance from the pumps to the noted property lines and the associated noise levels, impacts from Recovery Well pump noise within the County would be potentially significant. **Impact: Potentially Significant.**

4.2.3.1 Operational Traffic

Operational traffic associated with the proposed Project would be limited to a few vehicle trips to the site per month during maintenance visits. As described above for the City of Palmdale analysis, such trips would be not of sufficient volume to generate an audible increase in noise levels on nearby roadways. **Impact: Less than Significant.**

4.2.4 Mitigation Measures

Mitigation Measure 1 If the Palmdale Water District does not own all of the land within 750 feet of a planned well pump and pump building outside the City of Palmdale limits, the well building shall be designed and built to provide noise control reduction to the less-than-significant level of 45 dBA at 50 feet. Specifically, this could potentially include standard industry measures such as providing appropriately designed noise-control louvers or in-line duct silencers for the well building ventilation to reduce external noise levels.

4.2.5 Significance After Mitigation

Impacts would be less than significant.

4.3 ISSUE 3: GROUND-BORNE VIBRATION

4.3.1 Impact Analysis

4.3.1.1 *Construction Vibration*

There are no construction vibration ordinances in Los Angeles County or the cities of Palmdale and Lancaster. Therefore, construction vibration will be analyzed based on the “severe” criteria, as specified by Caltrans (2004) and illustrated in Table 6, *Vibration Source Amplitudes for Construction Equipment*:

- A maximum of 2 PPV inches per second (in/sec) for transient sources.¹
- A maximum of 0.4 PPV in/sec for continuous/frequent intermittent sources.²

Source	PPV at 25 ft
Pile Driver	0.65
Vibratory roller	0.21
Large dozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Small dozer	0.003
Crack-and-seat operations	2.4
Loaded Truck (flatbed)	0.027

Source: Caltrans 2004

A vibratory roller is the most likely source of construction-related vibration impacts for both the pipeline corridors and the recharge/recovery site. At 25 feet, the reference level of 0.21 PPV for a vibratory roller (as shown in Table 6) is below the identified significance threshold of 0.4 PPV. **Impact: Less than Significant.**

4.3.1.2 *Operational Vibration*

There are no operational vibration limits identified in applicable standards adopted by the cities of Lancaster and Palmdale. Accordingly, no significant vibration-related impacts would result from Project operation in either of these jurisdictions. Additionally, as noted below for the County of Los Angeles, operational vibration levels associated with the proposed Project would

¹ Transient sources create a single, isolated vibration event, such as blasting or drop balls.

² Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

be limited to pumps at the Recharge Site, with the level and extent of such vibration effects to be low. **Impact: Less than Significant.**

The Los Angeles County Code of Ordinances specify operational vibration would be considered a significant impact if a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz occurs at any individual location 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.

The pumps (both from Recovery Wells and the Distribution Site) are the only source of operational vibration. Based on proposed (and standard) pump operations, vibration levels exceeding the described County criterion would be limited to areas within approximately 5 to 10 feet from the Recovery Well pumps. As described above in Section, 2.2, the closest existing vibration-sensitive land uses to the proposed Recovery Well pumps are residential sites located more than 1,500 feet to the south. It should also be noted, as described above for operational noise impacts, that currently undeveloped properties zoned for residential use in the County are located as close as 50 feet from proposed Recovery Well sites. Based on the described vibration levels for Recovery Well pump operations, however, even if residential development occurs at distances of 50 feet, Project-related vibration levels from pump operations would not exceed the identified County criterion. **Impact: Less than Significant.**

4.3.2 Mitigation Measures

Because impacts related to Issue 3 would be less than significant, no mitigation is required.

4.3.3 Significance of Impacts After Mitigation

Impacts would be less than significant.

5.0 LIST OF PREPARERS

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6.0 REFERENCES

Caltrans

2004. Caltrans Technical Noise Supplement (TENS). November.

City of Lancaster

2015. Lancaster, California Code of Ordinances. May 11.

City of Palmdale

2015. Palmdale Municipal Code. February 4.

County of Los Angeles

2007. Zoning Designations. GIS-NET. County Department of Regional Planning.

1978. Los Angeles County Code of Ordinance. Chapter 12.08 – Noise Control.

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