NOISE IMPACT ANALYSIS

MONITORING WELL OCWD-M43R AT ORANGE COAST COLLEGE PROJECT

CITY OF COSTA MESA

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
Ldn	Day-night average noise level
Leq	Equivalent sound level
Lmax	Maximum noise level
ONAC	Federal Office of Noise Abatement and Control
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
UMTA	Federal Urban Mass Transit Administration

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Monitoring Well OCWD-M43R at Orange Coast College project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- Information regarding the fundamentals of vibration
- A description of the local noise guidelines and standards
- An evaluation of the current noise environment
- An analysis of the potential short-term construction-related noise impacts from the proposed project
- An analysis of long-term operations-related noise impacts from the proposed project

1.2 Proposed Project Description

The proposed project involves the construction and operation of a multi-depth monitoring well named OCWD-M43R that will be located on the Orange Coast College (OCC) campus in the City of Costa Mesa (City). The project regional location is shown in Figure 1. The proposed 5-casing nested monitoring well would replace existing well OCWD-M43 that is currently maintained by the Orange County Water District (OCWD). The purpose of the Well is to monitor potential seawater intrusion and groundwater flow beneath the Newport Mesa. The existing monitoring well (OCWD-M43) is located within the planned footprint development of a future student housing construction project and would be removed by OCC as part of the student housing project.

1.3 Proposed Well Site Location

As shown in Figure 2, the planned replacement monitoring well OCWD-M43R would be located on the northern end of the OCC campus, next to the OCC Recycling Center, approximately 275 feet south of Adams Avenue centerline and approximately 1,065 feet west of Fairview Road. The well site is located on the USGS Newport Beach Quadrangle Map, Township 6 South, Range 10 West and Section 3.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the proposed well site are the Orange Coast College athletic fields that are located adjacent to east side of the proposed well site. Other nearby sensitive receptors include multi-family residential uses located as near as 390 feet to the north, a church located as near as 985 feet to the east, and Costa Mesa High School that is located as near as 1,670 feet to the southeast.

1.4 Monitoring Well Construction Assumptions

Monitoring Wells Construction Phases

The proposed construction activities of the proposed monitoring wells will occur in four construction phases. Phase 1 involves surveying the site for possible underground utilities, installation of temporary noise panels, and installation of a six-foot high protective chain link fence around the perimeter of the

well site and construction work area. Phase 2 involves drilling and well construction activities that would be a 24-hour operation until the well casing and the annular materials are installed. Phase 3 involves well development. Phase 4 involves site clean-up and vault installation.

Monitoring Wells Construction Equipment Assumptions

The following provides the anticipated construction equipment to be utilized for each phase of construction.

Phase 1: Noise Panel and Protective Fencing Installation / Utility Clearance

Phase 1 of the proposed project involves installation of the temporary noise barrier, protective fencing, and utility clearance of the well site. The equipment mix for Phase 1 is shown in Table A.

Table A – Phase 1 Noise Panel/Protective Fencing/Utility Clearance Equipment Mix

Activity	Equipment	Pieces of Equipment	Hours of Operation	Days of Operation	Horsepower
Delivery of Fencing	Support Truck	1	10	1	550
Utility Clearance	Vacuum Truck	1	10	1	550
Install Fencing	No Equipment	--	--	--	--

Construction Trips: 1 round trip mobilizing, 1 round trip demobilizing. All round trips assumed 50 miles.
Source: OCWD.

Phase 2: Monitor Well Drilling and Construction

Phase 2 of construction involves the drilling and construction of the monitoring well. The proposed monitoring well would be drilled by using flooded reverse circulation rotary drilling method. To reduce the risk of a borehole collapse during the drilling and well construction phase, a 24-hour operation of activities will be required. The monitoring well would include up to five 4-inch diameter PVC casings installed into a single 24-inch diameter wide borehole to an approximate depth of 560 feet below ground surface (bgs). Once the borehole drilling is completed, the well would then be constructed. The depth of the borehole and depth of each of the five well casings and associated screened intervals would be determined based on the lithology observed during drilling and the acquired borehole geophysical logs. The well would have a 2 foot by 3-foot concrete apron with a 2-foot by 3-foot traffic-rated subgrade protective vault. The equipment mix for Phase 2 is shown in Table B.

Table B – Phase 2 Well Drilling/Construction Equipment Mix

Activity	Equipment	Pieces of Equipment	Hours of Operation	Days of Operation	Horsepower
Well Drilling & Construction	Flood Reverse Circulation Rotary Drilling Rig	1	24	6	550
	Mud Tank	1	24	6	75
	Fork Lift	1	24	6	75

Construction Trips: 1 round trip mobilizing, 1 round trip demobilizing. All round trips assumed 50 miles.
Source: OCWD.

Phase 3: Monitoring Well Development

Phase 3 of construction involves the mechanical and pumping development for each of the five well casings. The equipment mix for well development is shown in Table C.

Table C – Phase 3 Well Development Equipment Mix

Activity	Equipment	Pieces of Equipment	Hours of Operation	Days of Operation	Horsepower
Well Development	Pump Rig	1	10	17	325
	Air Compressor	1	10	17	200
	Electrical Generator	1	10	17	20

Construction Trips: 1 round trip mobilizing, 1 round trip demobilizing. All round trips assumed 50 miles.
Source: OCWD.

Phase 4: Site Cleanup and Traffic-Rated Vault Installation

Phase 4 of the proposed project involves site cleanup and installation of the below ground traffic-rated well vault. The equipment mix for Phase 4 is shown in Table C.

Table D – Subgrade Protective Well Vault Installation Equipment Mix

Activity	Equipment	Pieces of Equipment	Hours of Operation	Days of Operation	Horsepower
Delivery of Installation of Pre-Cast Concrete Vault	Truck	1	8	1	550
	Forklift	1	8	1	75
Install Well Vault	No Equipment	--	--	--	--

Source: OCWD.

1.5 Monitoring Well Long-Term Operation and Maintenance Activities

In general, operation of the monitoring wells would be passive as there would be no permanent equipment installed in the well. Monitoring well operation involves periodically measuring the depth to groundwater and collecting groundwater samples for laboratory analysis. The depth to groundwater would be measured by hand using a battery-powered wire-line sounder. During a groundwater sampling event, a portable submersible pump would be lowered in each of the well casings. Operation of a submersible pump to lift water from the well would require the use of a small portable generator. OCWD staff would collect groundwater samples and record water levels on a semi-annual basis. In total, the 5-casing monitoring well would be visited by OCWD staff up to two times a year. One truck and two workers would access the well site during sampling, assuming a round trip length of 10 miles per trip. One truck and one worker would access the well site during collection of water levels, assuming a round trip length of 10 miles. Every three to five years OCWD would conduct maintenance activities to redevelop the well. A typical monitoring well redevelopment process would be completed in one day. All sampling and redevelopment activities would occur during daylight hours. The mix of construction equipment involved with well sampling, gauging, maintenance/redevelopment is shown in Table E.

Table E – Monitoring Well Sampling and Redevelopment Equipment Mix

Activity	Equipment	Pieces of Equipment	Hours of Operation	Days of Operation	Horsepower
Sampling	Generator	1	9	1	20
Redevelopment	Pump Rig	1	9	1	325
	Air Compressor	1	9	1	200
	Pick-up Truck	1	2	1	300

Sampling & Redevelopment Trips: 1 round trip, all trips assumed 10 miles.
Source: OCWD.

1.6 Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City of Costa Mesa and State of California.

City of Costa Mesa Municipal Code

The following lists the City of Costa Mesa Municipal Code regulations that are applicable to all development projects in the City.

Section 13-279 Construction Noise Exceptions

Section 13-279(a) of the City's Municipal Code exempts construction activities from the City's noise level standards provided that they take place between the hours of 7:00 a.m. and 7:00 p.m. on Mondays through Fridays and between the hours of 9:00 a.m. and 6:00 p.m. on Saturdays. Construction activities are not exempt from the Municipal Code at any time on Sundays or federal holidays.

Section 13-280 Residential Noise Standards

Section 13-280(a) of the City's Municipal Code limits exterior noise impacts to all residential properties to 55 dBA from 7:00 a.m. to 11:00 p.m. and 50 dBA from 11:00 p.m. to 7:00 a.m.

Section 13-282 School Noise Standards

Section 13-282(a) of the City's Municipal Code limits exterior noise impacts to all school properties while the school is in use to 55 dBA from 7:00 a.m. to 11:00 p.m. and 50 dBA from 11:00 p.m. to 7:00 a.m.

State of California Rules

The following lists the State of California rules that are applicable to all industrial projects in the State.

California Vehicle Code Section 27200-27207 – On-Road Vehicle Noise

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle. Compliance with this regulation will reduce the construction noise impacts to the nearby sensitive receptors.

California Vehicle Section 38365-38380 – Off-Road Vehicle Noise

California Vehicle Code Section 38365-38380 provides noise limits for off-highway motor vehicles operated in California. The limit is 92 dBA for vehicles manufactured before 1973, 88 dBA for vehicles manufactured before 1975, 86 dBA for vehicles manufactured before 1986, and 82 dBA for vehicles manufactured after December 31, 1985. All measurements are based at 50 feet from the vehicle. Compliance with this regulation will reduce the construction noise impacts to the nearby sensitive receptors.

1.7 Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less than significant impact.

Generation of excessive groundborne vibration or groundborne noise levels?

Less than significant impact.

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

No impact.

1.8 Project Design Features Incorporated into the Proposed Project

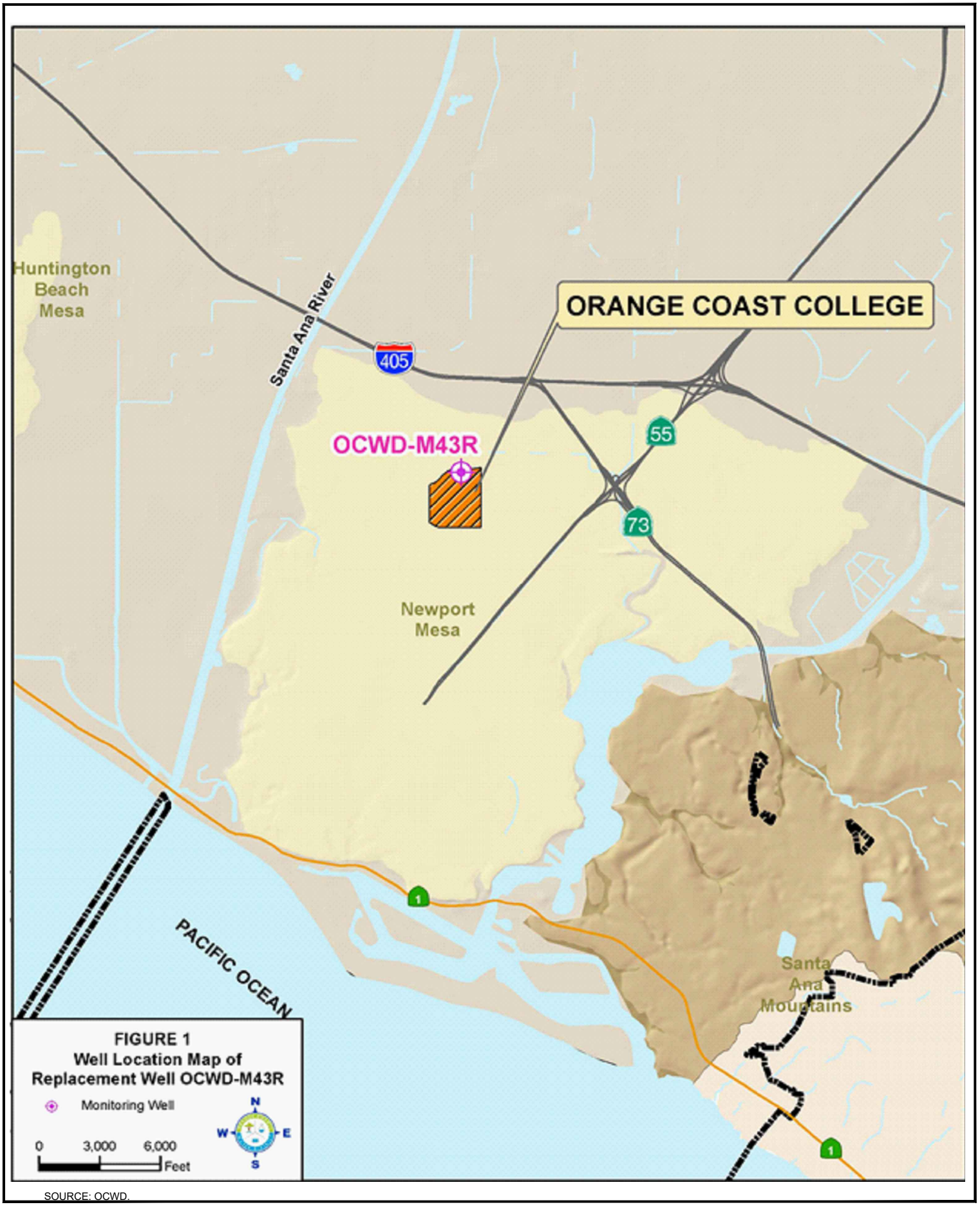
This analysis was based on implementation of the following project design features that are either already depicted on the proposed project site plan or are features that have detailed by the applicant.

Project Design Feature 1:

The project applicant will construct a minimum 24-foot high temporary sound barrier around the perimeter of the northern half of the construction boundaries and a minimum 14-foot high temporary sound barrier around the perimeter of the southern half of the construction boundary for Monitoring Well M43R. The temporary sound wall shall be constructed of solid material, with no cutouts or openings.

1.9 Mitigation Measures Required for the Proposed Project

This analysis found that adherence to the noise and vibration regulations detailed in Section 1.6 above and through implementation of Project Design Feature 1 are adequate to limit all noise and vibration impacts to less than significant levels. No mitigation measures are required for the proposed project with respect to noise and vibration impacts.



SOURCE: OCWD.

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VISTA ENVIRONMENTAL

Figure 1
Regional Location Map

SOURCE: OCWD.

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VISTA ENVIRONMENTAL

Figure 2
Proposed Site Map

2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has another addition of 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Costa Mesa relies on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a "pure tone," there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to "stand out" against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away

from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is "VdB", which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation."

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 REGULATORY SETTING

The proposed project is located on the Orange Coast College Campus, which is within the jurisdiction of the City of Costa Mesa. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA recommends developing construction noise criteria on a project-specific basis that utilizes local noise ordinances if possible. However, local noise ordinances usually relates to nuisance and hours of allowed activity and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the noise impacts of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings for a detailed construction noise assessment are provided below in Table F.

Table F – FTA Construction Noise Criteria

Land Use	Day (dBA $Leq_{(8\text{-hour})}$)	Night (dBA $Leq_{(8\text{-hour})}$)	30-day Average (dBA Ldn)
Residential	80	70	75[1]
Commercial	85	85	80[2]
Industrial	90	90	85[2]

Notes:
[1] In urban areas with very high ambient noise levels (Ldn > 65 dB), Ldn from construction operations should not exceed existing ambient +10 dB
[2] 24-hour Leq not Ldn.
Source: Federal Transit Administration, 2006.

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise and which is shown below in Figure 2.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous and transient sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources. The manual also found that damage to new residential structures occurs at 1.0 inch per second PPV and damage to industrial and commercial buildings occur at 2.0 inch per second.

4.3 Local Regulations

The City of Costa Mesa General Plan and Municipal Code establish the following applicable policies related to noise and vibration.

City of Costa Mesa General Plan

The following applicable goals, objectives, and policies to the proposed project are from the Noise Element of the General Plan.

Goal N 1 – Noise Hazards and Conditions

The City of Costa Mesa aims to protect residents, local workers, and property from injury, damage, or destruction from noise hazards and to work toward improved noise abatement.

Goal N 1 – Noise Hazards and Conditions

Control noise levels within the City for the protection of residential areas, park areas, and other sensitive land uses from excessive and unhealthful noise.

Policies:

N-1.1 Enforce the maximum acceptable exterior noise levels for residential areas at 65 CNEL.

City of Costa Mesa Municipal Code

The City of Costa Mesa Municipal Code establishes the following applicable standards related to noise.

Sec. 13-279. Exceptions for construction.

The provisions of this chapter shall not apply to the following:

(b) Construction equipment, vehicles, or work between the following approved hours, provided that all required permits for such construction, repair, or remodeling have been obtained from the appropriate city departments.

Table G – City of Costa Mesa Hours for Construction Times

Noise Zone	Noise Level Time Period
7:00 a.m. through 7:00 p.m.	Mondays through Fridays
9:00 a.m. through 6:00 p.m.	Saturdays
Prohibited all hours	Sundays and the following specified federal holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day

Source: City of Costa Mesa Municipal Code, Sec. 13-279(b).

(c) Waiver procedure. An applicant may request approval of a minor modification for a temporary waiver for construction equipment, vehicle, or work outside these permitted hours. The minor modification may be granted by the development services director or his/her designee. Any temporary waiver shall take into consideration the unusual circumstances requiring construction activity outside the permitted hours and the short-term impacts upon nearby residential and business communities.

Minor modification findings shall indicate whether or not the extended construction hours will be materially detrimental to the health, safety, and general welfare of persons residing or working within the immediate vicinity of the construction site.

Unless a temporary waiver is approved, the construction activity outside the permitted hours shall still be subject to the city's noise regulations.

Sec. 13-280. Exterior noise standards

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within the city:

Table H – City of Costa Mesa Exterior Noise Standards

Noise Level	Time Period
55 dB(A)	7:00 a.m. – 11:00 p.m.
50 dB(A)	11:00 p.m. – 7:00 a.m.

Source: City of Costa Mesa Municipal Code, Sec. 13-280(a).

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either within or outside the city, to exceed:

(a) The noise standard for a cumulative period of more than thirty (30) minutes in any hour;

(b) The noise standard plus five (5) dB(A) for cumulative period of more than fifteen (15) minutes in any hour;

(c) The noise standard plus ten (10) dB(A) for cumulative period of more than five (5) minutes in any hour;

(d) The noise standard plus 15 dB(A) for cumulative period of more than one (1) minute in any hour; or

(e) The noise standard plus 20 dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Sec. 13-282. Noise near schools, hospitals, churches.

It shall be unlawful for any person to create, maintain or cause to be created or maintained any noise or sound which:

(a) Exceeds the noise standards specified in Section 13-280, Exterior Noise Standards, near any school, hospital or church while it is in use, regardless of the zone within which it is located; or

(b) The noise level unreasonably interferes with the working of such installations or which disturbs or unduly annoys patients in a hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth of a mile indicating the presence of a school, church, or hospital.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise level environment noise, measurements have been taken in the vicinity of the proposed project. The field survey noted that noise within the proposed project area is generally characterized by vehicular traffic on Adams Avenue as well as from operational activities associated with the recycling facility that currently operates at the proposed well site. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using two Extech Model 407780 Type 2 integrating sound level meters programmed in "slow" mode to record the sound pressure level at 3-second intervals for approximately 24 hours in "A" weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded. The sound level meters and microphones were mounted approximately five to seven feet above the ground and were equipped with a windscreen. The sound level meters were calibrated before and after the monitoring using an Extech calibrator, Model 407766. The noise level measurement equipment meets American National Standards Institute specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Location

The noise monitoring locations were selected in order to obtain noise measurements of the current noise levels in the project study areas and to provide a baseline for any potential noise impacts that may be created by development of the proposed well. The noise measurement sites were selected to provide a representative sampling of the noise levels created by nearby noise sources. Descriptions of the noise monitoring sites are provided below in Table I. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 1:42 p.m. on Wednesday, November 7, 2018 and 2:11 p.m. on Thursday, November 8, 2018. When the noise measurements were started the sky was clear, the temperature was 72 degrees Fahrenheit, the humidity was 52 percent, barometric pressure was 29.84 inches of mercury, and the wind was blowing around five miles per hour. Overnight there was fog and the temperature dropped to 57 degrees Fahrenheit. At the conclusion of the noise measurements, the sky was hazy, the temperature was 74 degrees Fahrenheit, the humidity was 56 percent, barometric pressure was 29.82 inches of mercury, and the wind was blowing around three miles per hour.

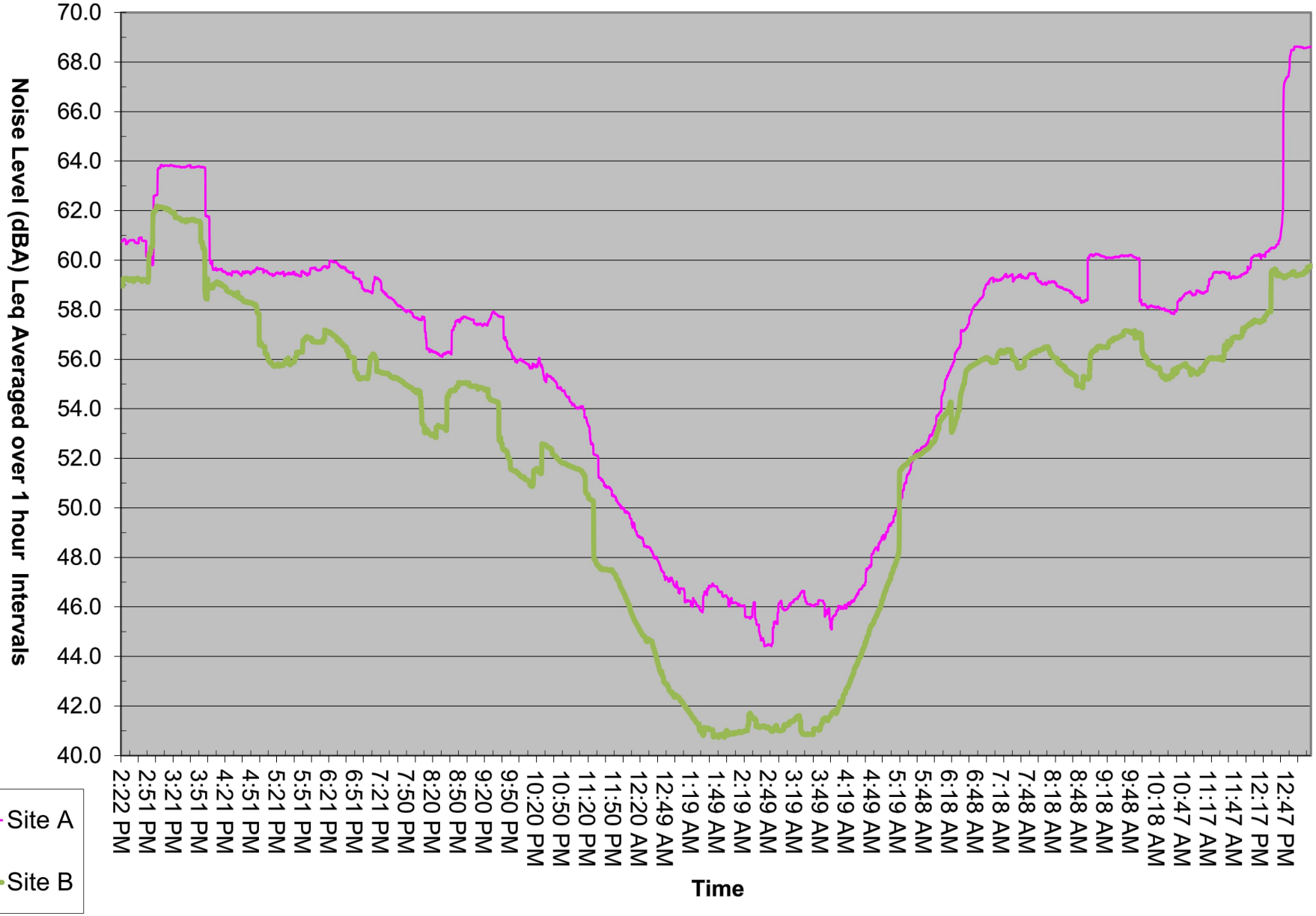
5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table I. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table I also shows the Leq, Lmax, and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B. Figure 3 shows a graph of the 24-hour noise measurements.

Table I – Existing (Ambient) Noise Level Measurements

Site No.	Site Description	Average (dBA L_{eq})	Maximum (dBA L_{max})	Min. 1-Hour Interval (dBA L_{eq}/Time)	Max. 1-Hour Interval (dBA L_{eq}/Time)	Average (dBA CNEL)
A	Located on a tree in front of Building 6 at Pine Creek Village, approximately 95 feet north of Adams Avenue centerline	59.5	89.5	44.4 2:39 a.m.	68.6 12:52 p.m.	61.9
B	Located on a fence on the east side of the well site, approximately 280 feet south of the Adams Avenue centerline	55.8	82.8	40.7 1:46 a.m.	62.2 3:02 p.m.	58.5

Source: Noise measurements taken with two Extech Model 407780 Type 2 integrating sound level meters between November 7 and 8, 2018.



SOURCE: Extech Model 407780 Type 2 Integrated Sound Level Meters.

VISTA ENVIRONMENTAL

Figure 3
Field Noise Measurements Graph

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 SoundPlan Model

Since the proposed project would require the simultaneous use of multiple pieces of construction equipment behind a sound wall, the SoundPlan Version 8.0 noise modeling software was used. The SoundPlan Model allows for the input of stationary noise sources with associated frequency spectrums, sound barriers, terrain contour lines, building placement, and specific ground coverage zones may be incorporated as well. The site plan and aerial photos were used to determine the placement of the existing structures in the project vicinity. The default temperature of 20 degrees Celsius (68 degrees Fahrenheit) and default humidity of 50 percent, which can vary the propagation of noise, were used in the analysis and represent reasonable assumptions, since they are near the averages experienced in the project vicinity.

Monitor Well Construction Assumptions

The SoundPlan model was utilized to analyze the noise impacts from each phase of monitor well construction activities for the proposed monitoring well. In order to determine the anticipated noise impacts created from borehole drilling equipment, noise measurements were taken of various pieces of equipment during construction of OCWD's Mid Basin Monitoring Well SAR-11. For the various equipment pieces that were not measured with the SAR-11 project, the equipment noise levels provided in the FHWA's Roadway Construction Noise Model (RCNM) was utilized. The results of the measured reference noise levels and operating times of each piece of equipment utilized during each phase of well construction activities are shown in Table J.

Table J – Well Construction Equipment Inventory and Reference Noise Levels

Equipment	Height of Noise Source (feet)	Distance from Noise Source (feet)	Noise Level (dBA Leq)	Operating Time[1]
Phase 1 – Noise Panel and Protective Fencing Installation and Utility Clearance				
Support Truck	4	50	70.3	7 a.m.-5 p.m.
Vacuum Truck[3]	8	50	81.3	7 a.m.-5 p.m.
Phase 2 – Well Drilling and Construction				
Drill Rig[2]	11	15	86.7	24 hours
Mud System[2]	9	10	74.5	24 hours
Forklift[2]	4	10	74.4	24 hours
Phase 3 – Well Development				
Air Compressor[2]	7	10	88.9	7 a.m.-5 p.m.
Pump Rig[3]	11	50	77.9	7 a.m.-5 p.m.
Generator[2]	4	10	71.0	7 a.m.-5 p.m.
Phase 4 - Site Clean Up and Vault Installation				
Support Truck	4	50	70.3	7 a.m.-3 p.m.
Forklift[2]	4	10	74.4	7 a.m.-3 p.m.

Notes:
[1] Operating times and percent usage provided by project applicant.
[2] Obtained from *Noise Abatement Plan Mid-Basin Monitoring Well SAR-11*, prepared by Vista Environmental, August 11, 2011.
[3] Obtained from FHWA Roadway Construction Noise Model, 2006.

Monitor Well Long-Term Operation and Maintenance Assumptions

The SoundPlan model was utilized to analyze the noise impacts from the monitor well long-term operations and maintenance activities. For the various equipment pieces that were not measured with the SAR-11 project, the equipment noise levels provided in the FHWA's Roadway Construction Noise Model (RCNM) was utilized. The results of the measured reference noise levels and operating times of each piece of equipment utilized during each of long-term operation and maintenance activities are shown in Table K.

Table K – Monitor Well Operational Equipment Inventory and Reference Noise Levels

Equipment	Height of Noise Source (feet)	Distance from Noise Source (feet)	Noise Level (dBA Leq)	Operating Time[1]
Monitor Well Sampling Equipment				
Generator[3]	4	50	77.6	7 a.m.-5 p.m.
Redevelopment Equipment				
Pump Rig[3]	11	50	77.9	7 a.m.-5 p.m.
Air Compressor[2]	7	10	88.9	7 a.m.-5 p.m.
Pick-Up Truck[3]	4	50	70.3	7 a.m.-5 p.m.

Notes:
[1] Operating times provided by project applicant.
[2] Obtained from *Noise Abatement Plan Mid-Basin Monitoring Well SAR-11*, prepared by Vista Environmental, August 11, 2011.
[3] Obtained from FHWA Roadway Construction Noise Model, 2006.

6.2 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table L gives approximate vibration levels for particular construction activities. The data in Table L provides a reasonable estimate for a wide range of soil conditions.

Table L – Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drill		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, May 2006.

The construction-related and operational vibration impacts have been calculated through the vibration levels shown above in Table L and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table J.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the Draft State CEQA Guidelines (July 2, 2018), a significant impact related to noise would occur if a proposed project is determined to result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

7.2 Generation of Substantial Temporary or Permanent Increase in Noise Levels

The proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

City of Costa Mesa Municipal Code Section 13-279(b) exempts construction activities from the City's noise level standards provided that they take place between the hours of 7:00 a.m. and 7:00 p.m. on Mondays through Fridays and between the hours of 9:00 a.m. and 6:00 p.m. on Saturdays. Construction activities are not exempt from the Municipal Code at any time on Sundays or federal holidays. Since, the Municipal Code does not provide any limits to the noise levels that may be created from construction activities that occur during the allowable times for construction, the FTA construction noise thresholds shown above in Table F have been utilized that limit noise impacts to 80 dBA Leq during the daytime.

For construction activities that occur outside of the exempt times, construction noise is limited to the noise standards provided in Section 13-280(a) of the Municipal Code that limits noise levels to 55 dBA between 7:00 a.m. and 11:00 p.m. and 50 dBA between 11:00 p.m. and 7:00 a.m. at the exterior of any residential home. In addition, Section 13-282(a) of the Municipal Code requires that the noise level at the exterior of schools do not exceed the noise standards detailed in Section 13-280(a), while the school is in use.

The operational noise impacts would be limited to construction equipment noise sources associated with well sampling and redevelopment activities. Since well sampling and redevelopment activities are essentially construction projects, the construction noise standards described above have been utilized for operational activities as well.

Monitoring Well Construction Noise Impacts

The project applicant has segmented the monitoring well construction activities into four phases, which have been analyzed separately below.

Phase 1: Noise Panel and Protective Fencing Installation / Utility Clearance

Phase 1 construction activities would include installation of the temporary noise barrier, protective fencing, and utility clearance of the well site. Construction activities for Phase 1 will be limited to during

the allowable construction times detailed in Section 13-279(b) of the Municipal Code. As such, only the daytime noise impacts were analyzed. The noise levels created during the Phase 1 activities are shown in Table M and the SoundPlan printouts are provided in Appendix C.

Table M – Phase 1 Noise Panel and Protective Fencing Installation/Utility Clearance Noise Levels

Receiver[1]	Description	Construction Noise Level[2] (dBA Leq)	Noise Standard[3] (dBA Leq)	Exceed Standard?
1	South Side of Building 5 at Pine Creek Village	56.2	80	No
2	South Side of Building 6 at Pine Creek Village	55.8	80	No
3	OCC Sports Field East of Well Site	63.8	80	No
4	Northwest Corner of Athletics Center Building	50.2	80	No

Notes:
[1] Receiver locations shown in Figure 6.
[2] The calculated construction noise level is based on implementation of Project Design Feature 1 (Installation of Sound Wall) prior to utility clearance activities.
[3] All construction activities during Phase 1 would adhere to the limitation in construction hours provided in Section 13-280(a) of the Municipal Code. The 80 dBA threshold was obtained from the FTA construction noise criteria provided above in Table F.
Source: SoundPlan Version 8.0.

Table M shows that Phase 1 construction activities would create noise levels as high as 63.8 dBA Leq at the sports field adjacent to the east side of the well site. Table M shows that none of the Receivers would exceed the FTA's daytime construction noise standard of 80 dBA Leq. Through adherence to the limitations of allowable construction times provided in Section 13-280(a) of the City's Municipal Code and implementation of the sound wall detailed in Project Design Feature 1, noise impacts from Phase 1 construction activities would be less than significant.

Phase 2: Monitor Well Drilling and Construction

Phase 2 construction activities would include drilling and construction of the monitoring well. The proposed monitoring well would be drilled by using flooded reverse circulation rotary drilling method. To reduce the risk of a borehole collapse during the drilling and well construction phase, a 24-hour operation of activities will be required. Since, some construction activities would occur outside of the times when construction noise is exempt as detailed in Section 13.279(b) of the Municipal Code, Phase 2 construction activities would be required to adhere to the daytime and nighttime exterior noise standards detailed in Section 13-280(a) of the Municipal Code. As such both the daytime and nighttime noise impacts were analyzed. The noise levels created during Phase 2 monitor well drilling and construction is shown in Table N and the SoundPlan printouts are provided in Appendix D. The calculated noise levels provided in Table N accounts for the sound attenuation from the sound wall that is detailed in Project Design Feature 1.

Table N – Phase 2 Well Drilling and Construction Noise Levels

Receiver[1]	Description	Daytime Construction Noise Levels (dBA Leq)			Nighttime Construction Noise Levels (dBA Leq)		
		Noise Level	Daytime Standard[2]	Exceed Standard?	Noise Level	Nighttime Standard[3]	Exceed Standard?
1	South Side of Building 5 at Pine Creek Village	49.5	55	No	49.5	50	No
2	South Side of Building 6 at Pine Creek Village	49.5	55	No	49.5	50	No
3	OCC Sports Field East of Well Site	60.5	--[4]	--	60.5	--[4]	--
4	Northwest Corner of Athletics Center Building	53.7	55	No	53.7	--[5]	--

Notes:
[1] Receiver locations shown in Figure 6.
[2] The Daytime (7:00 a.m. to 11:00 p.m.) standard is 55 dBA for the nearby residential as detailed in Section 13-280(a) of the Municipal Code.
[3] The Nighttime (11:00 p.m. to 7:00 a.m.) standard is 50 dBA as detailed in Section 13-280(a) of the Municipal Code.
[4] Since the sports field on the east side of the well site does not have lights, the field is not anticipated to be used during the hours when construction activity is not exempt (7:00 p.m. to 7:00 a.m.).
[5] The Athletics Building located to the south of the well site is not anticipated to be used during the nighttime hours of 11:00 p.m. to 7:00 a.m..
Source: SoundPlan Version 8.0.

Table N shows that the Phase 2 well drilling and construction activities would create noise levels as high as 49.5 dBA Leq at the homes to the north of the well site and as high as 53.7 dBA at the nearest school building to the south. Table N shows that both residential receivers would be within the daytime noise standard of 55 dBA and the nighttime noise standard of 50 dBA as detailed in Section 13-280(a) of the Municipal Code. Although the sports field on the east side of the well site would exceed the daytime and nighttime noise standards and the nearest school building would exceed the nighttime noise standard, Section 13-282(a) of the Municipal Code states that the noise standard in Section 13-280(a) of the Municipal Code is only required to be met while the school is in use. Since the sports field on the east side does not have lights, it is not anticipated to be used during the hours when construction is not exempt of 7:00 p.m. to 7:00 a.m. and the nearest school building is not anticipated to be used while the nighttime noise standard is applicable of 11:00 p.m. to 7:00 a.m.. As such, no exceedance in noise standards are anticipated to occur at the receivers located on school grounds. Therefore, with implementation of Project Design Feature 1, noise impacts from Phase 2 well drilling and construction activities would be less than significant.

Phase 3: Monitor Well Development

Phase 3 construction activities would include the mechanical and pumping development for each of the five well casings. Construction activities for Phase 3 will be limited to during the allowable construction times detailed in Section 13-279(b) of the Municipal Code. As such, only the daytime noise impacts were analyzed. The noise levels created during Phase 3, monitor well development is shown in Table O and the SoundPlan printouts are provided in Appendix E. The calculated noise levels provided in Table O accounts for the sound attenuation from the sound wall that is detailed in Project Design Feature 1.

Table O – Phase 3 Monitor Well Development Noise Levels

Receiver[1]	Description	Construction Noise Level[2] (dBA Leq)	Noise Standard[3] (dBA Leq)	Exceed Standard?
1	South Side of Building 5 at Pine Creek Village	46.8	80	No
2	South Side of Building 6 at Pine Creek Village	46.5	80	No
3	OCC Sports Field East of Well Site	53.9	80	No
4	Northwest Corner of Athletics Center Building	46.8	80	No

Notes:
[1] Receiver locations shown in Figure 6.
[2] The calculated construction noise level is based on implementation of Project Design Feature 1 (Installation of Sound Wall) prior to utility clearance activities.
[3] All construction activities during Phase 1 would adhere to the limitation in construction hours provided in Section 13-280(a) of the Municipal Code. The 80 dBA threshold was obtained from the FTA construction noise criteria provided above in Table F.
Source: SoundPlan Version 8.0.

Table O shows that Phase 3 construction activities would create noise levels as high as 53.9 dBA Leq at the sports field adjacent to the east side of the well site. Table O shows that none of the Receivers would exceed the FTA's daytime construction noise standard of 80 dBA Leq. Through adherence to the limitations of allowable construction times provided in Section 13-280(a) of the City's Municipal Code and implementation of the sound wall detailed in Project Design Feature 1, noise impacts from Phase 3 construction activities would be less than significant.

Phase 4: Site Cleanup and Traffic-Rated Vault Installation

Phase 4 involves site cleanup and installation of the below ground traffic-rated well vault. Construction activities for Phase 4 will be limited to during the allowable construction times detailed in Section 13-279(b) of the Municipal Code. As such, only the daytime noise impacts were analyzed. The noise levels created during Phase 4, monitor well development is shown in Table P and the SoundPlan printouts are provided in Appendix F.

Table P – Phase 4 Site Cleanup and Protective Vault Installation Noise Levels

Receiver[1]	Description	Construction Noise Level (dBA Leq)	Noise Standard[2] (dBA Leq)	Exceed Standard?
1	South Side of Building 5 at Pine Creek Village	48.2	80	No
2	South Side of Building 6 at Pine Creek Village	50.1	80	No
3	OCC Sports Field East of Well Site	65.1	80	No
4	Northwest Corner of Athletics Center Building	46.0	80	No

Notes:
[1] Receiver locations shown in Figure 6.
[2] All construction activities during Phase 1 would adhere to the limitation in construction hours provided in Section 13-280(a) of the Municipal Code. The 80 dBA threshold was obtained from the FTA construction noise criteria provided above in Table F.
Source: SoundPlan Version 8.0.

Table P shows that Phase 4 construction activities would create noise levels as high as 65.1 dBA Leq at the sports field adjacent to the east side of the well site. Table P shows that none of the Receivers would exceed the FTA's daytime construction noise standard of 80 dBA Leq. Through adherence to the limitations of allowable construction times provided in Section 13-280(a) of the City's Municipal Code, noise impacts from Phase 4 construction activities would be less than significant.

Monitoring Well Operational Noise Impacts

In general, operation of the proposed monitoring well would be passive as there would be no permanent equipment installed in the well. OCWD staff would collect groundwater samples and record water levels on a semi-annual basis. In total, the 5-casing monitoring well would be visited by OCWD staff up to two times a year. Every three to five years OCWD would conduct maintenance activities to redevelop the well. A typical monitoring well redevelopment process would be completed in one day. The noise impacts created by the monitoring well sampling and redevelopment activities have been analyzed separately below.

Monitoring Well Sampling

The operational monitor well sampling activities will be limited to during the allowable construction times detailed in Section 13-279(b) of the Municipal Code. As such, only the daytime noise impacts were analyzed. The noise levels created during the monitor well sampling activities are shown in Table Q and the SoundPlan printouts are provided in Appendix G.

Table Q – Operational Monitor Well Sampling Activities Noise Levels

Receiver[1]	Description	Noise Level (dBA Leq)	Noise Standard[2] (dBA Leq)	Exceed Standard?
1	South Side of Building 5 at Pine Creek Village	39.3	80	No
2	South Side of Building 6 at Pine Creek Village	40.1	80	No
3	OCC Sports Field East of Well Site	56.5	80	No
4	Northwest Corner of Athletics Center Building	39.8	80	No

Notes:
[1] Receiver locations shown in Figure 6.
[2] All construction activities during Phase 1 would adhere to the limitation in construction hours provided in Section 13-280(a) of the Municipal Code. The 80 dBA threshold was obtained from the FTA construction noise criteria provided above in Table F.
Source: SoundPlan Version 8.0.

Table P shows that monitor well sampling activities would create noise levels as high as 56.5 dBA Leq at the sports field adjacent to the east side of the well site. Table P shows that none of the Receivers would exceed the FTA's daytime construction noise standard of 80 dBA Leq. Through adherence to the limitations of allowable construction times provided in Section 13-280(a) of the City's Municipal Code, noise impacts from the operational monitoring well sampling activities would be less than significant.

Monitor Well Redevelopment

The operational monitor well redevelopment activities will be limited to during the allowable construction times detailed in Section 13-279(b) of the Municipal Code. As such, only the daytime noise impacts were analyzed. The noise levels created during the monitor well redevelopment activities are shown in Table R and the SoundPlan printouts are provided in Appendix H.

Table R – Operational Monitor Well Redevelopment Activities Noise Levels

Receiver[1]	Description	Noise Level (dBA Leq)	Noise Standard[2] (dBA Leq)	Exceed Standard?
1	South Side of Building 5 at Pine Creek Village	56.3	80	No
2	South Side of Building 6 at Pine Creek Village	57.6	80	No
3	OCC Sports Field East of Well Site	72.0	80	No
4	Northwest Corner of Athletics Center Building	52.0	80	No

Notes:
[1] Receiver locations shown in Figure 6.

[2] All construction activities during Phase 1 would adhere to the limitation in construction hours provided in Section 13-280(a) of the Municipal Code. The 80 dBA threshold was obtained from the FTA construction noise criteria provided above in Table F.
Source: SoundPlan Version 8.0.

Table R shows that monitor well redevelopment activities would create noise levels as high as 72.0 dBA Leq at the sports field adjacent to the east side of the well site. Table R shows that none of the Receivers would exceed the FTA's daytime construction noise standard of 80 dBA Leq. Through adherence to the limitations of allowable construction times provided in Section 13-280(a) of the City's Municipal Code, noise impacts from the operational monitoring well redevelopment activities would be less than significant.

Level of Significance

Less than significant.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. Vibration impacts from construction and operational activities associated with the proposed project would be a function of the vibration generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The construction and operational activities and anticipated equipment to be utilized have been described above in Sections 1.4 and 1.5, respectively. The nearest offsite sensitive receptors to the project site consist of people at the OCC athletic fields that are located adjacent to the east side of the proposed well site, however vibration impacts are not typically felt on sports fields since vibration impacts are normally only felt by persons that are sitting or lying down. As such, the nearest vibration-sensitive receptors are the multi-family residential uses located as near as 390 feet to the north.

Since Neither the City's Municipal Code nor the General Plan provide a quantifiable vibration threshold, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

Table L above in Section 6.2 provides a list of construction equipment that are known sources of vibration. Of the equipment listed in Table L above, a loaded truck is the piece of equipment that would be utilized by the proposed project with the highest vibration level, at 0.076 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest vibration-sensitive offsite receptor (390 feet) would be 0.004 inch per second PPV. The vibration level at the nearest vibration-sensitive offsite receptor is below the 0.25 inch per second PPV threshold detailed above. Therefore, a less than significant vibration impact is anticipated from construction and operation of the proposed project.

Level of Significance

Less than significant impact.

7.4 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport to the proposed project site is John Wayne Airport, which is located as near as 2.2 miles southeast of Well M43R. The proposed project consists of the development and operation of a monitoring well, which will typically be a passive operation that would not require anyone onsite and would not introduce new sensitive receptors to the project site. No aircraft noise impacts would occur.

Level of Significance

No impact.

8.0 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, June, 2004

City of Costa Mesa, *2015-2035 General Plan,* June 2016.

City of Costa Mesa, *Costa Mesa Municipal Code,* July 2018.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* May 2006.

Harris, Cyril M., *Noise Control in Buildings*, 1994.

Kinsler, Lawrence E., *Fundamentals of Acoustics 4th Edition,* 2000.

U.S. Department of Transportation, *Highway Traffic Noise: Analysis and Abatement Guidance,* December 2011.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide,* January, 2006.

Vista Environmental, *Air Quality and Greenhouse Gas Emissions Impact Analysis Monitoring Well OCWD-M43R at Orange Coast College Project,* November 14, 2018.

Vista Environmental, *Noise Abatement Plan Mid-Basin Monitoring Well SAR-11*, August 11, 2011.

APPENDIX A

Study Area Photo Index

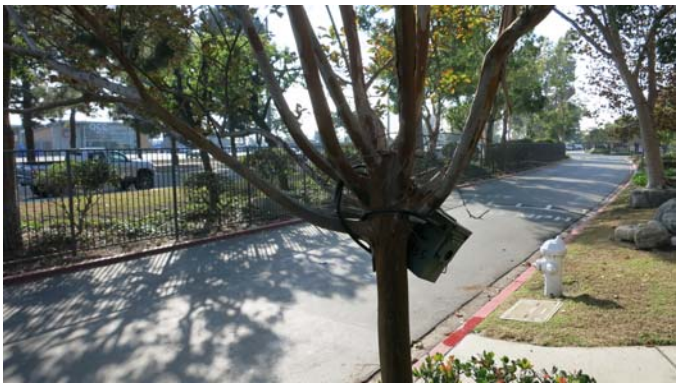
Noise Measurement Site A - looking north

Noise Measurement Site A - looking northeast

Noise Measurement Site A - looking east

Noise Measurement Site A - looking southeast

Noise Measurement Site A - looking south



Noise Measurement Site A - looking southwest

Noise Measurement Site A - looking west

Noise Measurement Site A - looking northwest

Noise Measurement Site B - looking north

Noise Measurement Site B - looking northeast

Noise Measurement Site B - looking east

Noise Measurement Site B - looking southeast

Noise Measurement Site B - looking south

Noise Measurement Site B - looking southwest

Noise Measurement Site B - looking west

Noise Measurement Site B - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Site A - On Tree in Front of Bldg 6 at Pine Creek Village

Date	Time=11/07/18	1:42:00 PM			
Sampling	Time=3	Weighting=A			
Record	Num= 29200	Weighting=Slow	CNEL(24hr)=	61.9	
Leq	59.5 SEL	Value=109.3	Ldn(24hr)=	61.5	
MAX	89.5	Min Leq1hr =	44.4	2:39 AM	
MIN	39.7	Max Leq1hr =	68.6	12:52 PM	

Site B - On Fence on East Side of Well Site

Date	Time=11/07/18	1:52:00 PM			
Sampling	Time=3	Freq Weighting=A			
Record	Num= 29200	Weighting=Slow	CNEL(24hr)=	58.5	
Leq	55.8 SEL	Value=105.4	Ldn(24hr)=	58.1	
MAX	82.8	Min Leq1hr =	40.7	1:46 AM	
MIN	36	Max Leq1hr =	62.2	3:02 PM	

Site A - On Tree in Front of Bldg 6 at Pine Creek Village

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
54.2	13:42:00		54.2	54.2
55.8	13:42:03		55.8	55.8
53.5	13:42:06		53.5	53.5
56.1	13:42:09		56.1	56.1
62.5	13:42:12		62.5	62.5
59	13:42:15		59	59
62.4	13:42:18		62.4	62.4
59.9	13:42:21		59.9	59.9
61.8	13:42:24		61.8	61.8
62	13:42:27		62	62
56.7	13:42:30		56.7	56.7
63.3	13:42:33		63.3	63.3
62.6	13:42:36		62.6	62.6
64.6	13:42:39		64.6	64.6
57.6	13:42:42		57.6	57.6
63.2	13:42:45		63.2	63.2
57.1	13:42:48		57.1	57.1
59.5	13:42:51		59.5	59.5
54.8	13:42:54		54.8	54.8
55.3	13:42:57		55.3	55.3
60.5	13:43:00		60.5	60.5
52.2	13:43:03		52.2	52.2
55.6	13:43:06		55.6	55.6
63.5	13:43:09		63.5	63.5
64.1	13:43:12		64.1	64.1
62.7	13:43:15		62.7	62.7
61.6	13:43:18		61.6	61.6
61.2	13:43:21		61.2	61.2
62.2	13:43:24		62.2	62.2
56.9	13:43:27		56.9	56.9
62.7	13:43:30		62.7	62.7
63.6	13:43:33		63.6	63.6
61.9	13:43:36		61.9	61.9
61.6	13:43:39		61.6	61.6
58.3	13:43:42		58.3	58.3
65.4	13:43:45		65.4	65.4
59.4	13:43:48		59.4	59.4
56.2	13:43:51		56.2	56.2
61.5	13:43:54		61.5	61.5
64.4	13:43:57		64.4	64.4
64.8	13:44:00		64.8	64.8
63.9	13:44:03		63.9	63.9
65.7	13:44:06		65.7	65.7
62.4	13:44:09		62.4	62.4
55.2	13:44:12		55.2	55.2
61.2	13:44:15		61.2	61.2
62.9	13:44:18		62.9	62.9
57.2	13:44:21		57.2	57.2
57.9	13:44:24		57.9	57.9
64.7	13:44:27		64.7	64.7
61.9	13:44:30		61.9	61.9
69	13:44:33		69	69
62.3	13:44:36		62.3	62.3
58.1	13:44:39		58.1	58.1
58.3	13:44:42		58.3	58.3
61.4	13:44:45		61.4	61.4
60.7	13:44:48		60.7	60.7
63.2	13:44:51		63.2	63.2
60.2	13:44:54		60.2	60.2
61.4	13:44:57		61.4	61.4
61.8	13:45:00		61.8	61.8
65.7	13:45:03		65.7	65.7
64.8	13:45:06		64.8	64.8
65.8	13:45:09		65.8	65.8
66.4	13:45:12		66.4	66.4
62.7	13:45:15		62.7	62.7
60.7	13:45:18		60.7	60.7
67.4	13:45:21		67.4	67.4
61.4	13:45:24		61.4	61.4
61.5	13:45:27		61.5	61.5
59.5	13:45:30		59.5	59.5
58.4	13:45:33		58.4	58.4
57	13:45:36		57	57
55.8	13:45:39		55.8	55.8
56.5	13:45:42		56.5	56.5
57	13:45:45		57	57
53.4	13:45:48		53.4	53.4

Site B - On Fence on East Side of Well Site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
64.8	13:52:00		64.8	64.8
62.9	13:52:03		62.9	62.9
59.2	13:52:06		59.2	59.2
64.2	13:52:09		64.2	64.2
55.6	13:52:12		55.6	55.6
58.2	13:52:15		58.2	58.2
60.1	13:52:18		60.1	60.1
62.4	13:52:21		62.4	62.4
60.6	13:52:24		60.6	60.6
57.9	13:52:27		57.9	57.9
61.8	13:52:30		61.8	61.8
66.6	13:52:33		66.6	66.6
66.6	13:52:36		66.6	66.6
61.9	13:52:39		61.9	61.9
61.4	13:52:42		61.4	61.4
62.2	13:52:45		62.2	62.2
67.9	13:52:48		67.9	67.9
57	13:52:51		57	57
59.1	13:52:54		59.1	59.1
58.4	13:52:57		58.4	58.4
61.1	13:53:00		61.1	61.1
58.3	13:53:03		58.3	58.3
57.4	13:53:06		57.4	57.4
58.9	13:53:09		58.9	58.9
59.8	13:53:12		59.8	59.8
55.2	13:53:15		55.2	55.2
60.9	13:53:18		60.9	60.9
57.3	13:53:21		57.3	57.3
58	13:53:24		58	58
61.1	13:53:27		61.1	61.1
58.3	13:53:30		58.3	58.3
56.7	13:53:33		56.7	56.7
59.7	13:53:36		59.7	59.7
57.8	13:53:39		57.8	57.8
56.9	13:53:42		56.9	56.9
58.6	13:53:45		58.6	58.6
66.8	13:53:48		66.8	66.8
63.2	13:53:51		63.2	63.2
62.1	13:53:54		62.1	62.1
64.7	13:53:57		64.7	64.7
55.9	13:54:00		55.9	55.9
64.7	13:54:03		64.7	64.7
62.2	13:54:06		62.2	62.2
59.5	13:54:09		59.5	59.5
66.4	13:54:12		66.4	66.4
67.2	13:54:15		67.2	67.2
64.6	13:54:18		64.6	64.6
68.9	13:54:21		68.9	68.9
62.3	13:54:24		62.3	62.3
69.1	13:54:27		69.1	69.1
57.4	13:54:30		57.4	57.4
58	13:54:33		58	58
62.3	13:54:36		62.3	62.3
59	13:54:39		59	59
68.3	13:54:42		68.3	68.3
61.1	13:54:45		61.1	61.1
59.8	13:54:48		59.8	59.8
61.8	13:54:51		61.8	61.8
55.9	13:54:54		55.9	55.9
55	13:54:57		55	55
56.6	13:55:00		56.6	56.6
55.9	13:55:03		55.9	55.9
54.5	13:55:06		54.5	54.5
53.2	13:55:09		53.2	53.2
53.3	13:55:12		53.3	53.3
54.1	13:55:15		54.1	54.1
52.4	13:55:18		52.4	52.4
54	13:55:21		54	54
54.3	13:55:24		54.3	54.3
54.8	13:55:27		54.8	54.8
56.9	13:55:30		56.9	56.9
56.6	13:55:33		56.6	56.6
56	13:55:36		56	56
61.9	13:55:39		61.9	61.9
56	13:55:42		56	56
55	13:55:45		55	55
54.9	13:55:48		54.9	54.9

Site A - On Tree in Front of Bldg 6 at Pine Creek Village					Site B - On Fence on East Side of Well Site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
56.5	13:45:51		56.5	56.5	55.1	13:55:51		55.1	55.1
57.9	13:45:54		57.9	57.9	56.1	13:55:54		56.1	56.1
57.7	13:45:57		57.7	57.7	56.5	13:55:57		56.5	56.5
58.3	13:46:00		58.3	58.3	56.4	13:56:00		56.4	56.4
60.6	13:46:03		60.6	60.6	57.4	13:56:03		57.4	57.4
61.5	13:46:06		61.5	61.5	58	13:56:06		58	58
61.2	13:46:09		61.2	61.2	57.3	13:56:09		57.3	57.3
60.2	13:46:12		60.2	60.2	59	13:56:12		59	59
57.5	13:46:15		57.5	57.5	57.4	13:56:15		57.4	57.4
57.2	13:46:18		57.2	57.2	54.8	13:56:18		54.8	54.8
57.7	13:46:21		57.7	57.7	54.7	13:56:21		54.7	54.7
58.4	13:46:24		58.4	58.4	55.3	13:56:24		55.3	55.3
58.9	13:46:27		58.9	58.9	54.6	13:56:27		54.6	54.6
56.2	13:46:30		56.2	56.2	53.5	13:56:30		53.5	53.5
55.8	13:46:33		55.8	55.8	53.8	13:56:33		53.8	53.8
56.1	13:46:36		56.1	56.1	54.8	13:56:36		54.8	54.8
56.2	13:46:39		56.2	56.2	57	13:56:39		57	57
55.8	13:46:42		55.8	55.8	54.3	13:56:42		54.3	54.3
53	13:46:45		53	53	54.7	13:56:45		54.7	54.7
52.7	13:46:48		52.7	52.7	58.1	13:56:48		58.1	58.1
53.9	13:46:51		53.9	53.9	54.8	13:56:51		54.8	54.8
54.1	13:46:54		54.1	54.1	61	13:56:54		61	61
53.9	13:46:57		53.9	53.9	59	13:56:57		59	59
52.2	13:47:00		52.2	52.2	55	13:57:00		55	55
57.2	13:47:03		57.2	57.2	54.1	13:57:03		54.1	54.1
56	13:47:06		56	56	54.5	13:57:06		54.5	54.5
59.4	13:47:09		59.4	59.4	52.9	13:57:09		52.9	52.9
62	13:47:12		62	62	52.3	13:57:12		52.3	52.3
60	13:47:15		60	60	52.8	13:57:15		52.8	52.8
63	13:47:18		63	63	52.8	13:57:18		52.8	52.8
61.9	13:47:21		61.9	61.9	56	13:57:21		56	56
62.2	13:47:24		62.2	62.2	58.5	13:57:24		58.5	58.5
60.2	13:47:27		60.2	60.2	54.1	13:57:27		54.1	54.1
57.6	13:47:30		57.6	57.6	62.8	13:57:30		62.8	62.8
54.7	13:47:33		54.7	54.7	64	13:57:33		64	64
60.1	13:47:36		60.1	60.1	63	13:57:36		63	63
62.6	13:47:39		62.6	62.6	59	13:57:39		59	59
54.3	13:47:42		54.3	54.3	59.3	13:57:42		59.3	59.3
52.8	13:47:45		52.8	52.8	57.6	13:57:45		57.6	57.6
59.2	13:47:48		59.2	59.2	58.4	13:57:48		58.4	58.4
60.8	13:47:51		60.8	60.8	58	13:57:51		58	58
58.9	13:47:54		58.9	58.9	59.7	13:57:54		59.7	59.7
57.9	13:47:57		57.9	57.9	60	13:57:57		60	60
60.6	13:48:00		60.6	60.6	56.8	13:58:00		56.8	56.8
61.8	13:48:03		61.8	61.8	56.8	13:58:03		56.8	56.8
59.3	13:48:06		59.3	59.3	55.6	13:58:06		55.6	55.6
59.1	13:48:09		59.1	59.1	56.3	13:58:09		56.3	56.3
62.3	13:48:12		62.3	62.3	58.4	13:58:12		58.4	58.4
60.7	13:48:15		60.7	60.7	59.6	13:58:15		59.6	59.6
61.4	13:48:18		61.4	61.4	61.7	13:58:18		61.7	61.7
64.8	13:48:21		64.8	64.8	56.7	13:58:21		56.7	56.7
63.5	13:48:24		63.5	63.5	55.7	13:58:24		55.7	55.7
57.5	13:48:27		57.5	57.5	56.6	13:58:27		56.6	56.6
59.6	13:48:30		59.6	59.6	57.6	13:58:30		57.6	57.6
58.5	13:48:33		58.5	58.5	56.2	13:58:33		56.2	56.2
56.6	13:48:36		56.6	56.6	56	13:58:36		56	56
54.3	13:48:39		54.3	54.3	56.8	13:58:39		56.8	56.8
56.2	13:48:42		56.2	56.2	58.1	13:58:42		58.1	58.1
57.7	13:48:45		57.7	57.7	57.9	13:58:45		57.9	57.9
57.9	13:48:48		57.9	57.9	59.5	13:58:48		59.5	59.5
55.8	13:48:51		55.8	55.8	61.1	13:58:51		61.1	61.1
55.8	13:48:54		55.8	55.8	64.9	13:58:54		64.9	64.9
58.4	13:48:57		58.4	58.4	58.9	13:58:57		58.9	58.9
59.3	13:49:00		59.3	59.3	58.8	13:59:00		58.8	58.8
59.5	13:49:03		59.5	59.5	60.9	13:59:03		60.9	60.9
62	13:49:06		62	62	59.7	13:59:06		59.7	59.7
61.9	13:49:09		61.9	61.9	59.3	13:59:09		59.3	59.3
62.2	13:49:12		62.2	62.2	58.5	13:59:12		58.5	58.5
59.5	13:49:15		59.5	59.5	58.8	13:59:15		58.8	58.8
59.2	13:49:18		59.2	59.2	61.8	13:59:18		61.8	61.8
57.3	13:49:21		57.3	57.3	61.4	13:59:21		61.4	61.4
59.4	13:49:24		59.4	59.4	63.4	13:59:24		63.4	63.4
62.3	13:49:27		62.3	62.3	59.1	13:59:27		59.1	59.1
62.8	13:49:30		62.8	62.8	56.6	13:59:30		56.6	56.6
59.1	13:49:33		59.1	59.1	56.7	13:59:33		56.7	56.7
59.4	13:49:36		59.4	59.4	57.9	13:59:36		57.9	57.9
58.4	13:49:39		58.4	58.4	62.5	13:59:39		62.5	62.5
56.6	13:49:42		56.6	56.6	65.2	13:59:42		65.2	65.2
58	13:49:45		58	58	64.6	13:59:45		64.6	64.6
60.2	13:49:48		60.2	60.2	63.3	13:59:48		63.3	63.3
57.4	13:49:51		57.4	57.4	66.6	13:59:51		66.6	66.6
56.6	13:49:54		56.6	56.6	61.8	13:59:54		61.8	61.8
57	13:49:57		57	57	63.3	13:59:57		63.3	63.3
57	13:50:00		57	57	62.8	14:00:00		62.8	62.8
57.7	13:50:03		57.7	57.7	61.4	14:00:03		61.4	61.4
55.8	13:50:06		55.8	55.8	61.6	14:00:06		61.6	61.6
57.8	13:50:09		57.8	57.8	60.9	14:00:09		60.9	60.9
60.1	13:50:12		60.1	60.1	59	14:00:12		59	59
59.8	13:50:15		59.8	59.8	54	14:00:15		54	54

Site A - On Tree in Front of Bldg 6 at Pine Creek Village					Site B - On Fence on East Side of Well Site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
60.6	13:50:18		60.6	60.6	56	14:00:18		56	56
59.4	13:50:21		59.4	59.4	56.1	14:00:21		56.1	56.1
56.2	13:50:24		56.2	56.2	55.3	14:00:24		55.3	55.3
54.7	13:50:27		54.7	54.7	55.9	14:00:27		55.9	55.9
55.5	13:50:30		55.5	55.5	56.5	14:00:30		56.5	56.5
58.4	13:50:33		58.4	58.4	55.2	14:00:33		55.2	55.2
58.8	13:50:36		58.8	58.8	55.8	14:00:36		55.8	55.8
57.2	13:50:39		57.2	57.2	57.2	14:00:39		57.2	57.2
57.2	13:50:42		57.2	57.2	56.3	14:00:42		56.3	56.3
55.1	13:50:45		55.1	55.1	59.2	14:00:45		59.2	59.2
56	13:50:48		56	56	57.1	14:00:48		57.1	57.1
59.6	13:50:51		59.6	59.6	61.5	14:00:51		61.5	61.5
63.2	13:50:54		63.2	63.2	63.6	14:00:54		63.6	63.6
61.5	13:50:57		61.5	61.5	61.5	14:00:57		61.5	61.5
58.1	13:51:00		58.1	58.1	53.8	14:01:00		53.8	53.8
57.8	13:51:03		57.8	57.8	57.3	14:01:03		57.3	57.3
63.1	13:51:06		63.1	63.1	57.9	14:01:06		57.9	57.9
66.3	13:51:09		66.3	66.3	60.8	14:01:09		60.8	60.8
61.5	13:51:12		61.5	61.5	60.1	14:01:12		60.1	60.1
61	13:51:15		61	61	58.3	14:01:15		58.3	58.3
60.6	13:51:18		60.6	60.6	60.6	14:01:18		60.6	60.6
61.9	13:51:21		61.9	61.9	61.4	14:01:21		61.4	61.4
61.5	13:51:24		61.5	61.5	65.2	14:01:24		65.2	65.2
59.5	13:51:27		59.5	59.5	63.9	14:01:27		63.9	63.9
58.6	13:51:30		58.6	58.6	61.5	14:01:30		61.5	61.5
58.6	13:51:33		58.6	58.6	59.7	14:01:33		59.7	59.7
60.3	13:51:36		60.3	60.3	63.4	14:01:36		63.4	63.4
59.7	13:51:39		59.7	59.7	61	14:01:39		61	61
60	13:51:42		60	60	59.7	14:01:42		59.7	59.7
58.6	13:51:45		58.6	58.6	60.2	14:01:45		60.2	60.2
64.4	13:51:48		64.4	64.4	58.1	14:01:48		58.1	58.1
58.4	13:51:51		58.4	58.4	56.5	14:01:51		56.5	56.5
57.3	13:51:54		57.3	57.3	55.7	14:01:54		55.7	55.7
57.6	13:51:57		57.6	57.6	58.4	14:01:57		58.4	58.4
60.2	13:52:00		60.2	60.2	57	14:02:00		57	57
59.7	13:52:03		59.7	59.7	56.8	14:02:03		56.8	56.8
57	13:52:06		57	57	57.2	14:02:06		57.2	57.2
55.3	13:52:09		55.3	55.3	60.9	14:02:09		60.9	60.9
55.6	13:52:12		55.6	55.6	56.3	14:02:12		56.3	56.3
56.7	13:52:15		56.7	56.7	57.8	14:02:15		57.8	57.8
61.9	13:52:18		61.9	61.9	63.5	14:02:18		63.5	63.5
69	13:52:21		69	69	61.2	14:02:21		61.2	61.2
72.5	13:52:24		72.5	72.5	58.4	14:02:24		58.4	58.4
66.9	13:52:27		66.9	66.9	56.3	14:02:27		56.3	56.3
66.3	13:52:30		66.3	66.3	54.9	14:02:30		54.9	54.9
72.9	13:52:33		72.9	72.9	55	14:02:33		55	55
62	13:52:36		62	62	54.6	14:02:36		54.6	54.6
59.5	13:52:39		59.5	59.5	53.9	14:02:39		53.9	53.9
58.6	13:52:42		58.6	58.6	53.6	14:02:42		53.6	53.6
59.1	13:52:45		59.1	59.1	55.5	14:02:45		55.5	55.5
61.1	13:52:48		61.1	61.1	55.6	14:02:48		55.6	55.6
61.5	13:52:51		61.5	61.5	57.7	14:02:51		57.7	57.7
62	13:52:54		62	62	57.4	14:02:54		57.4	57.4
62.8	13:52:57		62.8	62.8	55.6	14:02:57		55.6	55.6
62	13:53:00		62	62	57.4	14:03:00		57.4	57.4
59.7	13:53:03		59.7	59.7	58	14:03:03		58	58
57.6	13:53:06		57.6	57.6	56.6	14:03:06		56.6	56.6
58.1	13:53:09		58.1	58.1	57.4	14:03:09		57.4	57.4
61	13:53:12		61	61	54.9	14:03:12		54.9	54.9
58.3	13:53:15		58.3	58.3	60.5	14:03:15		60.5	60.5
56.4	13:53:18		56.4	56.4	58.4	14:03:18		58.4	58.4
59.1	13:53:21		59.1	59.1	58.4	14:03:21		58.4	58.4
57.6	13:53:24		57.6	57.6	58.3	14:03:24		58.3	58.3
52.5	13:53:27		52.5	52.5	59.1	14:03:27		59.1	59.1
52.1	13:53:30		52.1	52.1	57.3	14:03:30		57.3	57.3
56.1	13:53:33		56.1	56.1	55.6	14:03:33		55.6	55.6
57.3	13:53:36		57.3	57.3	55.1	14:03:36		55.1	55.1
58.6	13:53:39		58.6	58.6	55.6	14:03:39		55.6	55.6
61.1	13:53:42		61.1	61.1	56.2	14:03:42		56.2	56.2
58.1	13:53:45		58.1	58.1	55.9	14:03:45		55.9	55.9
54.7	13:53:48		54.7	54.7	56.4	14:03:48		56.4	56.4
53	13:53:51		53	53	56.2	14:03:51		56.2	56.2
51.7	13:53:54		51.7	51.7	57.4	14:03:54		57.4	57.4
52.6	13:53:57		52.6	52.6	56.8	14:03:57		56.8	56.8
55.1	13:54:00		55.1	55.1	58.3	14:04:00		58.3	58.3
53.2	13:54:03		53.2	53.2	58.1	14:04:03		58.1	58.1
57.3	13:54:06		57.3	57.3	55.7	14:04:06		55.7	55.7
56.6	13:54:09		56.6	56.6	58.4	14:04:09		58.4	58.4
53.6	13:54:12		53.6	53.6	56.9	14:04:12		56.9	56.9
59	13:54:15		59	59	59.8	14:04:15		59.8	59.8
59.4	13:54:18		59.4	59.4	57.3	14:04:18		57.3	57.3
58.8	13:54:21		58.8	58.8	56	14:04:21		56	56
58	13:54:24		58	58	55.5	14:04:24		55.5	55.5
60.5	13:54:27		60.5	60.5	55	14:04:27		55	55
59	13:54:30		59	59	55.3	14:04:30		55.3	55.3
56.2	13:54:33		56.2	56.2	53.4	14:04:33		53.4	53.4
57.6	13:54:36		57.6	57.6	54.5	14:04:36		54.5	54.5
57.6	13:54:39		57.6	57.6	53.8	14:04:39		53.8	53.8
57.4	13:54:42		57.4	57.4	54.1	14:04:42		54.1	54.1

Site A - On Tree in Front of Bldg 6 at Pine Creek Village					Site B - On Fence on East Side of Well Site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
57.4	13:54:45		57.4	57.4	55.1	14:04:45		55.1	55.1
60.2	13:54:48		60.2	60.2	55.7	14:04:48		55.7	55.7
59.7	13:54:51		59.7	59.7	56.2	14:04:51		56.2	56.2
59.5	13:54:54		59.5	59.5	56.6	14:04:54		56.6	56.6
60.2	13:54:57		60.2	60.2	57.7	14:04:57		57.7	57.7
58.9	13:55:00		58.9	58.9	59.5	14:05:00		59.5	59.5
59.2	13:55:03		59.2	59.2	59	14:05:03		59	59
56.7	13:55:06		56.7	56.7	63.8	14:05:06		63.8	63.8
54.9	13:55:09		54.9	54.9	60.4	14:05:09		60.4	60.4
54.9	13:55:12		54.9	54.9	59.2	14:05:12		59.2	59.2
61.1	13:55:15		61.1	61.1	53.9	14:05:15		53.9	53.9
61.3	13:55:18		61.3	61.3	53.2	14:05:18		53.2	53.2
60.8	13:55:21		60.8	60.8	54	14:05:21		54	54
58.7	13:55:24		58.7	58.7	53.8	14:05:24		53.8	53.8
60.3	13:55:27		60.3	60.3	54.7	14:05:27		54.7	54.7
57.5	13:55:30		57.5	57.5	57.1	14:05:30		57.1	57.1
54.3	13:55:33		54.3	54.3	55.2	14:05:33		55.2	55.2
56.2	13:55:36		56.2	56.2	54	14:05:36		54	54
54.5	13:55:39		54.5	54.5	54.7	14:05:39		54.7	54.7
51.8	13:55:42		51.8	51.8	53.9	14:05:42		53.9	53.9
50.5	13:55:45		50.5	50.5	56.1	14:05:45		56.1	56.1
51.3	13:55:48		51.3	51.3	58.4	14:05:48		58.4	58.4
58.6	13:55:51		58.6	58.6	59.9	14:05:51		59.9	59.9
56.5	13:55:54		56.5	56.5	58	14:05:54		58	58
51.5	13:55:57		51.5	51.5	56.3	14:05:57		56.3	56.3
50.2	13:56:00		50.2	50.2	71.6	14:06:00		71.6	71.6
49.5	13:56:03		49.5	49.5	58.2	14:06:03		58.2	58.2
50.4	13:56:06		50.4	50.4	54.7	14:06:06		54.7	54.7
57.6	13:56:09		57.6	57.6	71.5	14:06:09		71.5	71.5
59.8	13:56:12		59.8	59.8	58.1	14:06:12		58.1	58.1
60.8	13:56:15		60.8	60.8	62	14:06:15		62	62
59.2	13:56:18		59.2	59.2	67.6	14:06:18		67.6	67.6
59	13:56:21		59	59	57.4	14:06:21		57.4	57.4
57.8	13:56:24		57.8	57.8	60.4	14:06:24		60.4	60.4
56.8	13:56:27		56.8	56.8	56	14:06:27		56	56
57.9	13:56:30		57.9	57.9	53.2	14:06:30		53.2	53.2
58.8	13:56:33		58.8	58.8	53.2	14:06:33		53.2	53.2
56.9	13:56:36		56.9	56.9	53.6	14:06:36		53.6	53.6
55.8	13:56:39		55.8	55.8	55	14:06:39		55	55
55.8	13:56:42		55.8	55.8	55.9	14:06:42		55.9	55.9
57.8	13:56:45		57.8	57.8	58.1	14:06:45		58.1	58.1
58.2	13:56:48		58.2	58.2	56.8	14:06:48		56.8	56.8
59.6	13:56:51		59.6	59.6	55.2	14:06:51		55.2	55.2
60.1	13:56:54		60.1	60.1	56	14:06:54		56	56
54.6	13:56:57		54.6	54.6	58.7	14:06:57		58.7	58.7
51.8	13:57:00		51.8	51.8	59	14:07:00		59	59
54.6	13:57:03		54.6	54.6	59.1	14:07:03		59.1	59.1
64.6	13:57:06		64.6	64.6	61.9	14:07:06		61.9	61.9
56.3	13:57:09		56.3	56.3	61	14:07:09		61	61
60.7	13:57:12		60.7	60.7	56.4	14:07:12		56.4	56.4
59.9	13:57:15		59.9	59.9	55	14:07:15		55	55
59	13:57:18		59	59	55.1	14:07:18		55.1	55.1
60.1	13:57:21		60.1	60.1	55.3	14:07:21		55.3	55.3
60.1	13:57:24		60.1	60.1	55.3	14:07:24		55.3	55.3
55.8	13:57:27		55.8	55.8	55.3	14:07:27		55.3	55.3
51.4	13:57:30		51.4	51.4	53.4	14:07:30		53.4	53.4
51.5	13:57:33		51.5	51.5	54.2	14:07:33		54.2	54.2
52	13:57:36		52	52	54.2	14:07:36		54.2	54.2
49.8	13:57:39		49.8	49.8	53.2	14:07:39		53.2	53.2
50	13:57:42		50	50	54.9	14:07:42		54.9	54.9
49.9	13:57:45		49.9	49.9	55.7	14:07:45		55.7	55.7
51.5	13:57:48		51.5	51.5	57.3	14:07:48		57.3	57.3
50.7	13:57:51		50.7	50.7	55.9	14:07:51		55.9	55.9
52.9	13:57:54		52.9	52.9	57.2	14:07:54		57.2	57.2
54.9	13:57:57		54.9	54.9	55.7	14:07:57		55.7	55.7
53.9	13:58:00		53.9	53.9	54.9	14:08:00		54.9	54.9
55.8	13:58:03		55.8	55.8	54.2	14:08:03		54.2	54.2
55.8	13:58:06		55.8	55.8	55.4	14:08:06		55.4	55.4
59.2	13:58:09		59.2	59.2	54.4	14:08:09		54.4	54.4
61	13:58:12		61	61	53.7	14:08:12		53.7	53.7
61.8	13:58:15		61.8	61.8	53	14:08:15		53	53
62.3	13:58:18		62.3	62.3	53.1	14:08:18		53.1	53.1
62.5	13:58:21		62.5	62.5	53.8	14:08:21		53.8	53.8
61.8	13:58:24		61.8	61.8	54.3	14:08:24		54.3	54.3
60	13:58:27		60	60	55.9	14:08:27		55.9	55.9
58.9	13:58:30		58.9	58.9	54.4	14:08:30		54.4	54.4
55.3	13:58:33		55.3	55.3	56.2	14:08:33		56.2	56.2
53	13:58:36		53	53	58.4	14:08:36		58.4	58.4
53.8	13:58:39		53.8	53.8	55.9	14:08:39		55.9	55.9
56.6	13:58:42		56.6	56.6	58.4	14:08:42		58.4	58.4
58.3	13:58:45		58.3	58.3	60	14:08:45		60	60
55.2	13:58:48		55.2	55.2	59.6	14:08:48		59.6	59.6
53.1	13:58:51		53.1	53.1	58	14:08:51		58	58
55.8	13:58:54		55.8	55.8	57	14:08:54		57	57
62.4	13:58:57		62.4	62.4	56	14:08:57		56	56
60.8	13:59:00		60.8	60.8	56	14:09:00		56	56
59.3	13:59:03		59.3	59.3	55.6	14:09:03		55.6	55.6
53.7	13:59:06		53.7	53.7	58	14:09:06		58	58
52.4	13:59:09		52.4	52.4	57.3	14:09:09		57.3	57.3

Site A - On Tree in Front of Bldg 6 at Pine Creek Village					Site B - On Fence on East Side of Well Site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
58.9	13:59:12		58.9	58.9	55.6	14:09:12		55.6	55.6
58.1	13:59:15		58.1	58.1	58.9	14:09:15		58.9	58.9
61.2	13:59:18		61.2	61.2	54.5	14:09:18		54.5	54.5
62.1	13:59:21		62.1	62.1	55.2	14:09:21		55.2	55.2
57.8	13:59:24		57.8	57.8	55.2	14:09:24		55.2	55.2
58.8	13:59:27		58.8	58.8	53.4	14:09:27		53.4	53.4
58.3	13:59:30		58.3	58.3	55.4	14:09:30		55.4	55.4
58.1	13:59:33		58.1	58.1	54.2	14:09:33		54.2	54.2
58.3	13:59:36		58.3	58.3	55.6	14:09:36		55.6	55.6
57.6	13:59:39		57.6	57.6	55.8	14:09:39		55.8	55.8
56.4	13:59:42		56.4	56.4	55.1	14:09:42		55.1	55.1
58	13:59:45		58	58	57.5	14:09:45		57.5	57.5
58.1	13:59:48		58.1	58.1	57.1	14:09:48		57.1	57.1
58.5	13:59:51		58.5	58.5	58.7	14:09:51		58.7	58.7
56.2	13:59:54		56.2	56.2	60.1	14:09:54		60.1	60.1
58	13:59:57		58	58	57.3	14:09:57		57.3	57.3
61.5	14:00:00		61.5	61.5	56.2	14:10:00		56.2	56.2
59.8	14:00:03		59.8	59.8	55.8	14:10:03		55.8	55.8
59.7	14:00:06		59.7	59.7	53.4	14:10:06		53.4	53.4
59.6	14:00:09		59.6	59.6	54.2	14:10:09		54.2	54.2
62.6	14:00:12		62.6	62.6	53.1	14:10:12		53.1	53.1
63.1	14:00:15		63.1	63.1	55.2	14:10:15		55.2	55.2
62.7	14:00:18		62.7	62.7	54.2	14:10:18		54.2	54.2
63.5	14:00:21		63.5	63.5	54.2	14:10:21		54.2	54.2
61.9	14:00:24		61.9	61.9	55	14:10:24		55	55
59.6	14:00:27		59.6	59.6	55	14:10:27		55	55
58.2	14:00:30		58.2	58.2	55	14:10:30		55	55
60.5	14:00:33		60.5	60.5	57.4	14:10:33		57.4	57.4
58.7	14:00:36		58.7	58.7	59	14:10:36		59	59
59.9	14:00:39		59.9	59.9	56.4	14:10:39		56.4	56.4
55.3	14:00:42		55.3	55.3	56.1	14:10:42		56.1	56.1
55.5	14:00:45		55.5	55.5	55.2	14:10:45		55.2	55.2
57.9	14:00:48		57.9	57.9	57.7	14:10:48		57.7	57.7
57.6	14:00:51		57.6	57.6	56.3	14:10:51		56.3	56.3
60	14:00:54		60	60	54.6	14:10:54		54.6	54.6
55.5	14:00:57		55.5	55.5	54.1	14:10:57		54.1	54.1
53.1	14:01:00		53.1	53.1	54.3	14:11:00		54.3	54.3
53.2	14:01:03		53.2	53.2	56.3	14:11:03		56.3	56.3
56.1	14:01:06		56.1	56.1	54.8	14:11:06		54.8	54.8
56.5	14:01:09		56.5	56.5	55.4	14:11:09		55.4	55.4
55.7	14:01:12		55.7	55.7	58.7	14:11:12		58.7	58.7
57.5	14:01:15		57.5	57.5	56.4	14:11:15		56.4	56.4
56	14:01:18		56	56	63	14:11:18		63	63
54.4	14:01:21		54.4	54.4	59.2	14:11:21		59.2	59.2
54.7	14:01:24		54.7	54.7	57.3	14:11:24		57.3	57.3
50.8	14:01:27		50.8	50.8	55.3	14:11:27		55.3	55.3
51.9	14:01:30		51.9	51.9	56.8	14:11:30		56.8	56.8
54.4	14:01:33		54.4	54.4	56.3	14:11:33		56.3	56.3
60.3	14:01:36		60.3	60.3	57.4	14:11:36		57.4	57.4
61.4	14:01:39		61.4	61.4	59.5	14:11:39		59.5	59.5
60.5	14:01:42		60.5	60.5	57	14:11:42		57	57
59.4	14:01:45		59.4	59.4	56.1	14:11:45		56.1	56.1
61.6	14:01:48		61.6	61.6	60.5	14:11:48		60.5	60.5
65.1	14:01:51		65.1	65.1	60.8	14:11:51		60.8	60.8
66.7	14:01:54		66.7	66.7	59.8	14:11:54		59.8	59.8
60.2	14:01:57		60.2	60.2	62	14:11:57		62	62
56.7	14:02:00		56.7	56.7	59.9	14:12:00		59.9	59.9
60.2	14:02:03		60.2	60.2	58.2	14:12:03		58.2	58.2
60.2	14:02:06		60.2	60.2	56.6	14:12:06		56.6	56.6
61.4	14:02:09		61.4	61.4	55.7	14:12:09		55.7	55.7
62.7	14:02:12		62.7	62.7	55.3	14:12:12		55.3	55.3
62.4	14:02:15		62.4	62.4	56.8	14:12:15		56.8	56.8
61.2	14:02:18		61.2	61.2	56.4	14:12:18		56.4	56.4
60.6	14:02:21		60.6	60.6	55.2	14:12:21		55.2	55.2
58.8	14:02:24		58.8	58.8	59.2	14:12:24		59.2	59.2
59.8	14:02:27		59.8	59.8	58.6	14:12:27		58.6	58.6
56.6	14:02:30		56.6	56.6	58	14:12:30		58	58
57.8	14:02:33		57.8	57.8	58.5	14:12:33		58.5	58.5
58.2	14:02:36		58.2	58.2	58.3	14:12:36		58.3	58.3
60.8	14:02:39		60.8	60.8	58.5	14:12:39		58.5	58.5
57.4	14:02:42		57.4	57.4	57.6	14:12:42		57.6	57.6
60.9	14:02:45		60.9	60.9	58.7	14:12:45		58.7	58.7
72.5	14:02:48		72.5	72.5	58.6	14:12:48		58.6	58.6
68.4	14:02:51		68.4	68.4	59.7	14:12:51		59.7	59.7
61.8	14:02:54		61.8	61.8	58.3	14:12:54		58.3	58.3
55.5	14:02:57		55.5	55.5	59	14:12:57		59	59
53.7	14:03:00		53.7	53.7	56.5	14:13:00		56.5	56.5
51	14:03:03		51	51	56	14:13:03		56	56
51.5	14:03:06		51.5	51.5	55.5	14:13:06		55.5	55.5
56.3	14:03:09		56.3	56.3	59.5	14:13:09		59.5	59.5
57.2	14:03:12		57.2	57.2	55.1	14:13:12		55.1	55.1
56.7	14:03:15		56.7	56.7	54.8	14:13:15		54.8	54.8
59.4	14:03:18		59.4	59.4	54.8	14:13:18		54.8	54.8
59.2	14:03:21		59.2	59.2	57	14:13:21		57	57
61.1	14:03:24		61.1	61.1	54.8	14:13:24		54.8	54.8
55.9	14:03:27		55.9	55.9	54.6	14:13:27		54.6	54.6
59.3	14:03:30		59.3	59.3	54.4	14:13:30		54.4	54.4
62.7	14:03:33		62.7	62.7	53.9	14:13:33		53.9	53.9
58.4	14:03:36		58.4	58.4	59.4	14:13:36		59.4	59.4

Site A - On Tree in Front of Bldg 6 at Pine Creek Village					Site B - On Fence on East Side of Well Site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
55	14:03:39		55	55	55.8	14:13:39		55.8	55.8
54.1	14:03:42		54.1	54.1	57.1	14:13:42		57.1	57.1
55.7	14:03:45		55.7	55.7	54.8	14:13:45		54.8	54.8
58.3	14:03:48		58.3	58.3	54.2	14:13:48		54.2	54.2
58.9	14:03:51		58.9	58.9	55.4	14:13:51		55.4	55.4
58.4	14:03:54		58.4	58.4	55	14:13:54		55	55
57.3	14:03:57		57.3	57.3	54	14:13:57		54	54
53.5	14:04:00		53.5	53.5	54.6	14:14:00		54.6	54.6
52.8	14:04:03		52.8	52.8	55.7	14:14:03		55.7	55.7
53.4	14:04:06		53.4	53.4	55.1	14:14:06		55.1	55.1
55	14:04:09		55	55	55.3	14:14:09		55.3	55.3
59.3	14:04:12		59.3	59.3	55.1	14:14:12		55.1	55.1
60.5	14:04:15		60.5	60.5	55.4	14:14:15		55.4	55.4
60.5	14:04:18		60.5	60.5	58.8	14:14:18		58.8	58.8
60	14:04:21		60	60	58.1	14:14:21		58.1	58.1
59.6	14:04:24		59.6	59.6	58.2	14:14:24		58.2	58.2
65.2	14:04:27		65.2	65.2	55.4	14:14:27		55.4	55.4
59.9	14:04:30		59.9	59.9	56.8	14:14:30		56.8	56.8
56.6	14:04:33		56.6	56.6	57.5	14:14:33		57.5	57.5
56.3	14:04:36		56.3	56.3	56.8	14:14:36		56.8	56.8
63.6	14:04:39		63.6	63.6	57.4	14:14:39		57.4	57.4
63.2	14:04:42		63.2	63.2	57.7	14:14:42		57.7	57.7
60.6	14:04:45		60.6	60.6	56.8	14:14:45		56.8	56.8
59.2	14:04:48		59.2	59.2	57.2	14:14:48		57.2	57.2
60	14:04:51		60	60	56.6	14:14:51		56.6	56.6
57.1	14:04:54		57.1	57.1	55.1	14:14:54		55.1	55.1
56.8	14:04:57		56.8	56.8	55.8	14:14:57		55.8	55.8
54.1	14:05:00		54.1	54.1	56.9	14:15:00		56.9	56.9
55.9	14:05:03		55.9	55.9	57	14:15:03		57	57
52.1	14:05:06		52.1	52.1	55.5	14:15:06		55.5	55.5
54.8	14:05:09		54.8	54.8	56.6	14:15:09		56.6	56.6
53	14:05:12		53	53	60.2	14:15:12		60.2	60.2
57.9	14:05:15		57.9	57.9	55.5	14:15:15		55.5	55.5
62.2	14:05:18		62.2	62.2	57	14:15:18		57	57
60.4	14:05:21		60.4	60.4	60.5	14:15:21		60.5	60.5
59.4	14:05:24		59.4	59.4	67.6	14:15:24		67.6	67.6
60.1	14:05:27		60.1	60.1	68.3	14:15:27		68.3	68.3
59.6	14:05:30		59.6	59.6	62.2	14:15:30		62.2	62.2
63.1	14:05:33		63.1	63.1	59.4	14:15:33		59.4	59.4
62.8	14:05:36		62.8	62.8	57.6	14:15:36		57.6	57.6
59.3	14:05:39		59.3	59.3	58.1	14:15:39		58.1	58.1
54.8	14:05:42		54.8	54.8	57.2	14:15:42		57.2	57.2
53.9	14:05:45		53.9	53.9	58.8	14:15:45		58.8	58.8
55.2	14:05:48		55.2	55.2	57.1	14:15:48		57.1	57.1
56.1	14:05:51		56.1	56.1	57	14:15:51		57	57
56.2	14:05:54		56.2	56.2	56.8	14:15:54		56.8	56.8
60.4	14:05:57		60.4	60.4	58.9	14:15:57		58.9	58.9
59.6	14:06:00		59.6	59.6	57.8	14:16:00		57.8	57.8
55.2	14:06:03		55.2	55.2	56.5	14:16:03		56.5	56.5
54.6	14:06:06		54.6	54.6	56.7	14:16:06		56.7	56.7
57.8	14:06:09		57.8	57.8	59.9	14:16:09		59.9	59.9
60.8	14:06:12		60.8	60.8	58	14:16:12		58	58
58.8	14:06:15		58.8	58.8	58	14:16:15		58	58
60.1	14:06:18		60.1	60.1	57.5	14:16:18		57.5	57.5
60.5	14:06:21		60.5	60.5	57.7	14:16:21		57.7	57.7
60	14:06:24		60	60	60.8	14:16:24		60.8	60.8
60.5	14:06:27		60.5	60.5	60.5	14:16:27		60.5	60.5
61	14:06:30		61	61	60.6	14:16:30		60.6	60.6
54.9	14:06:33		54.9	54.9	58.2	14:16:33		58.2	58.2
58.1	14:06:36		58.1	58.1	57.4	14:16:36		57.4	57.4
60.1	14:06:39		60.1	60.1	55.9	14:16:39		55.9	55.9
57.5	14:06:42		57.5	57.5	57.2	14:16:42		57.2	57.2
66.8	14:06:45		66.8	66.8	56.5	14:16:45		56.5	56.5
59.2	14:06:48		59.2	59.2	56.5	14:16:48		56.5	56.5
56.5	14:06:51		56.5	56.5	57.1	14:16:51		57.1	57.1
54.9	14:06:54		54.9	54.9	59	14:16:54		59	59
53	14:06:57		53	53	57.6	14:16:57		57.6	57.6
51.7	14:07:00		51.7	51.7	58.3	14:17:00		58.3	58.3
51.2	14:07:03		51.2	51.2	58.4	14:17:03		58.4	58.4
56.4	14:07:06		56.4	56.4	59.5	14:17:06		59.5	59.5
58.5	14:07:09		58.5	58.5	59.6	14:17:09		59.6	59.6
57.3	14:07:12		57.3	57.3	58.1	14:17:12		58.1	58.1
59.3	14:07:15		59.3	59.3	56.3	14:17:15		56.3	56.3
59.2	14:07:18		59.2	59.2	59.3	14:17:18		59.3	59.3
59.3	14:07:21		59.3	59.3	61.1	14:17:21		61.1	61.1
62.4	14:07:24		62.4	62.4	60.7	14:17:24		60.7	60.7
61.6	14:07:27		61.6	61.6	56.9	14:17:27		56.9	56.9
61.1	14:07:30		61.1	61.1	56.4	14:17:30		56.4	56.4
60.6	14:07:33		60.6	60.6	58.2	14:17:33		58.2	58.2
59	14:07:36		59	59	56.6	14:17:36		56.6	56.6
57.5	14:07:39		57.5	57.5	56.6	14:17:39		56.6	56.6
55.3	14:07:42		55.3	55.3	56.8	14:17:42		56.8	56.8
53.8	14:07:45		53.8	53.8	56.1	14:17:45		56.1	56.1
55.8	14:07:48		55.8	55.8	55.6	14:17:48		55.6	55.6
59	14:07:51		59	59	56.6	14:17:51		56.6	56.6
55.3	14:07:54		55.3	55.3	57.4	14:17:54		57.4	57.4
57.1	14:07:57		57.1	57.1	57.6	14:17:57		57.6	57.6
57.7	14:08:00		57.7	57.7	58.1	14:18:00		58.1	58.1
54.1	14:08:03		54.1	54.1	58.1	14:18:03		58.1	58.1
55.4	14:08:06		55.4	55.4	59.9	14:18:06		59.9	59.9
57.7	14:08:09		57.7	57.7	58.3	14:18:09		58.3	58.3
60.6	14:08:12		60.6	60.6	58.8	14:18:12		58.8	58.8
60.9	14:08:15		60.9	60.9	56.8	14:18:15		56.8	56.8
57.8	14:08:18		57.8	57.8	56.3	14:18:18		56.3	56.3
57	14:08:21		57	57	55.8	14:18:21		55.8	55.8

Site A - On Tree in Front of Bldg 6 at Pine Creek Village					Site B - On Fence on East Side of Well Site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
59.8	14:08:24		59.8	59.8	55.2	14:18:24		55.2	55.2
57.3	14:08:27		57.3	57.3	55.7	14:18:27		55.7	55.7
54.3	14:08:30		54.3	54.3	55.8	14:18:30		55.8	55.8
51.5	14:08:33		51.5	51.5	57.3	14:18:33		57.3	57.3
54.7	14:08:36		54.7	54.7	58	14:18:36		58	58
52.2	14:08:39		52.2	52.2	56.6	14:18:39		56.6	56.6
53.7	14:08:42		53.7	53.7	56.8	14:18:42		56.8	56.8
56.3	14:08:45		56.3	56.3	56.6	14:18:45		56.6	56.6
54.9	14:08:48		54.9	54.9	55.8	14:18:48		55.8	55.8
53.8	14:08:51		53.8	53.8	54.6	14:18:51		54.6	54.6
54.1	14:08:54		54.1	54.1	55.5	14:18:54		55.5	55.5
53.4	14:08:57		53.4	53.4	56.9	14:18:57		56.9	56.9
54.6	14:09:00		54.6	54.6	55.4	14:19:00		55.4	55.4
56.8	14:09:03		56.8	56.8	55.5	14:19:03		55.5	55.5
59.4	14:09:06		59.4	59.4	56.3	14:19:06		56.3	56.3
59.6	14:09:09		59.6	59.6	55.8	14:19:09		55.8	55.8
60.7	14:09:12		60.7	60.7	56.8	14:19:12		56.8	56.8
62.2	14:09:15		62.2	62.2	55.2	14:19:15		55.2	55.2
60.2	14:09:18		60.2	60.2	54.3	14:19:18		54.3	54.3
59	14:09:21		59	59	55.4	14:19:21		55.4	55.4
61.1	14:09:24		61.1	61.1	57.3	14:19:24		57.3	57.3
60.2	14:09:27		60.2	60.2	56.7	14:19:27		56.7	56.7
62.7	14:09:30		62.7	62.7	55.1	14:19:30		55.1	55.1
62	14:09:33		62	62	56.1	14:19:33		56.1	56.1
61.4	14:09:36		61.4	61.4	57.3	14:19:36		57.3	57.3
56.6	14:09:39		56.6	56.6	57.1	14:19:39		57.1	57.1
56.9	14:09:42		56.9	56.9	59	14:19:42		59	59
55.8	14:09:45		55.8	55.8	58.9	14:19:45		58.9	58.9
54.6	14:09:48		54.6	54.6	60.8	14:19:48		60.8	60.8
52.9	14:09:51		52.9	52.9	58.6	14:19:51		58.6	58.6
51.5	14:09:54		51.5	51.5	58.2	14:19:54		58.2	58.2
51.6	14:09:57		51.6	51.6	56.9	14:19:57		56.9	56.9
52.1	14:10:00		52.1	52.1	55.9	14:20:00		55.9	55.9
58.1	14:10:03		58.1	58.1	55.4	14:20:03		55.4	55.4
59.2	14:10:06		59.2	59.2	57.4	14:20:06		57.4	57.4
57.6	14:10:09		57.6	57.6	57.4	14:20:09		57.4	57.4
58.7	14:10:12		58.7	58.7	58	14:20:12		58	58
61.4	14:10:15		61.4	61.4	57.8	14:20:15		57.8	57.8
60.8	14:10:18		60.8	60.8	57.3	14:20:18		57.3	57.3
57.2	14:10:21		57.2	57.2	56.7	14:20:21		56.7	56.7
56.4	14:10:24		56.4	56.4	57.2	14:20:24		57.2	57.2
59.8	14:10:27		59.8	59.8	55.7	14:20:27		55.7	55.7
59.3	14:10:30		59.3	59.3	56.6	14:20:30		56.6	56.6
60.3	14:10:33		60.3	60.3	55.7	14:20:33		55.7	55.7
60.6	14:10:36		60.6	60.6	56.3	14:20:36		56.3	56.3
69.4	14:10:39		69.4	69.4	57.1	14:20:39		57.1	57.1
73.3	14:10:42		73.3	73.3	57.8	14:20:42		57.8	57.8
68.2	14:10:45		68.2	68.2	56.9	14:20:45		56.9	56.9
66	14:10:48		66	66	55	14:20:48		55	55
60.1	14:10:51		60.1	60.1	55.4	14:20:51		55.4	55.4
57.6	14:10:54		57.6	57.6	56	14:20:54		56	56
57.4	14:10:57		57.4	57.4	55.7	14:20:57		55.7	55.7
59.2	14:11:00		59.2	59.2	55.4	14:21:00		55.4	55.4
67.1	14:11:03		67.1	67.1	55.4	14:21:03		55.4	55.4
62.8	14:11:06		62.8	62.8	56.1	14:21:06		56.1	56.1
59.1	14:11:09		59.1	59.1	56.1	14:21:09		56.1	56.1
59.6	14:11:12		59.6	59.6	55.3	14:21:12		55.3	55.3
62.5	14:11:15		62.5	62.5	56.7	14:21:15		56.7	56.7
60.2	14:11:18		60.2	60.2	57.1	14:21:18		57.1	57.1
59.2	14:11:21		59.2	59.2	57.9	14:21:21		57.9	57.9
58.8	14:11:24		58.8	58.8	56.8	14:21:24		56.8	56.8
59.3	14:11:27		59.3	59.3	57	14:21:27		57	57
62	14:11:30		62	62	57.4	14:21:30		57.4	57.4
60	14:11:33		60	60	65	14:21:33		65	65
56.8	14:11:36		56.8	56.8	61.1	14:21:36		61.1	61.1
53.7	14:11:39		53.7	53.7	58.9	14:21:39		58.9	58.9
55	14:11:42		55	55	60.6	14:21:42		60.6	60.6
56.3	14:11:45		56.3	56.3	59.6	14:21:45		59.6	59.6
59.5	14:11:48		59.5	59.5	59.4	14:21:48		59.4	59.4
59.3	14:11:51		59.3	59.3	63.4	14:21:51		63.4	63.4
57.6	14:11:54		57.6	57.6	67.1	14:21:54		67.1	67.1
53.9	14:11:57		53.9	53.9	61.8	14:21:57		61.8	61.8
55.2	14:12:00	60.9	55.2	55.2	57.9	14:22:00	59.1	57.9	57.9
59.2	14:12:03	60.9	59.2	59.2	56.9	14:22:03	59.1	56.9	56.9
60.2	14:12:06	60.9	60.2	60.2	58.1	14:22:06	59.0	58.1	58.1
60.9	14:12:09	60.9	60.9	60.9	57.3	14:22:09	59.0	57.3	57.3
59.9	14:12:12	60.9	59.9	59.9	56.5	14:22:12	59.0	56.5	56.5
60.1	14:12:15	60.9	60.1	60.1	62	14:22:15	59.0	62	62
58.6	14:12:18	60.9	58.6	58.6	61.1	14:22:18	59.0	61.1	61.1
61.6	14:12:21	60.9	61.6	61.6	56	14:22:21	59.0	56	56
62.2	14:12:24	60.9	62.2	62.2	55.7	14:22:24	59.0	55.7	55.7
62.6	14:12:27	60.9	62.6	62.6	57	14:22:27	59.0	57	57
57.5	14:12:30	60.9	57.5	57.5	58.2	14:22:30	59.0	58.2	58.2
53.9	14:12:33	60.9	53.9	53.9	56.3	14:22:33	59.0	56.3	56.3
54.2	14:12:36	60.9	54.2	54.2	56.6	14:22:36	59.0	56.6	56.6
56.5	14:12:39	60.9	56.5	56.5	56.2	14:22:39	59.0	56.2	56.2
54.9	14:12:42	60.8	54.9	54.9	57.1	14:22:42	59.0	57.1	57.1
52.5	14:12:45	60.8	52.5	52.5	57.1	14:22:45	59.0	57.1	57.1
55.1	14:12:48	60.8	55.1	55.1	59.9	14:22:48	59.0	59.9	59.9
57	14:12:51	60.8	57	57	64.5	14:22:51	59.0	64.5	64.5
56.8	14:12:54	60.8	56.8	56.8	61.1	14:22:54	59.0	61.1	61.1
57.8	14:12:57	60.8	57.8	57.8	59.1	14:22:57	59.0	59.1	59.1
58.5	14:13:00	60.8	58.5	58.5	63.8	14:23:00	59.0	63.8	63.8
58.3	14:13:03	60.8	58.3	58.3	59.4	14:23:03	59.0	59.4	59.4
57.7	14:13:06	60.8	57.7	57.7	56.5	14:23:06	59.0	56.5	56.5
56.5	14:13:09	60.8	56.5	56.5	57.3	14:23:09	59.0	57.3	57.3
56.6	14:13:12	60.8	56.6	56.6	56.5	14:23:12	59.0	56.5	56.5
58.6	14:13:15	60.8	58.6	58.6	61.5	14:23:15	59.0	61.5	61.5
61.7	14:13:18	60.8	61.7	61.7	56.2	14:23:18	59.0	56.2	56.2
61	14:13:21	60.8	61	61	61.1	14:23:21	59.0	61.1	61.1
60	14:13:24	60.8	60	60	58.5	14:23:24	59.0	58.5	58.5
56.9	14:13:27	60.8	56.9	56.9	59.7	14:23:27	59.0	59.7	59.7
58.3	14:13:30	60.8	58.3	58.3	59.1	14:23:30	59.0	59.1	59.1

APPENDIX C

SoundPlan Model Phase 1 Construction Noise Calculations

Name	Floor	X m	Y m	Z m	LeqD dB(A)	LeqN dB(A)	LeqE dB(A)	CNEL dB(A)
1 - MFR	G	11415461.1	3726600.4	1.5	56.2			53.2
2 - MFR	G	11415506.9	3726599.1	1.5	55.8			52.8
3 - Sports Field	G	11415525.7	3726477.3	1.5	63.8			60.8
4 - Nearest School Building	G	11415530.8	3726375.2	1.5	50.2			47.2

Monitoring Well OCWD-M43R at OCC
Octave spectra of the sources in dB(A) - Phase 1 - Noise Panel and Utility Clearance with Sound Wall

Name	Source type	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	KO-Wall dB(A)	Day histogram	Spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	
Support Truck	Point		96.0	96.0	0.0	0.0	0	7 am - 5 pm	Truck: loading	63.0	73.0	80.0	86.0	89.0	90.0	90.0	88.0	
Vacuum Rig	Point		117.0	117.0	0.0	0.0	0	7 am - 5 pm	Extracting equipment: compressed air				117.0					

APPENDIX D

SoundPlan Model Phase 2 Construction Noise Calculations

Monitoring Well OCWD-M43R at OCC
Assessed receiver levels - Phase 2 - Well

Name	Floor	X m	Y m	Z m	LeqD dB(A)	LeqN dB(A)	LeqE dB(A)	CNEL dB(A)
1 - MFR	G	11415461.1	3726600.4	1.5	49.5	49.5	49.5	56.2
2 - MFR	G	11415506.9	3726599.1	1.5	49.5	49.5	49.5	56.2
3 - Sports Field	G	11415525.7	3726477.3	1.5	60.5	60.5	60.5	67.1
4 - Nearest School Building	G	11415530.8	3726375.2	1.5	53.7	53.7	53.7	60.3

Monitoring Well OCWD-M43R at OCC
Octave spectra of the sources in dB(A) - Phase 2 - Well Drilling/Construction With Sound Wall

Name	Source type	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	KO-Wall dB(A)	Day histogram	Spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)	
Drill Rig	Point		112.0	112.0	0.0	0.0		0	100%/24h	Drill Rig (Challenger) - Vista	84.6	89.3	97.5	105.6	108.5	105.8	97.8	87.1	72.4	
Forklift	Point		95.0	95.0	0.0	0.0		0	100%/24h	Forklift diesel average work	76.6	80.6	84.6	87.6	90.6	88.6	83.6	78.6		
Mud System	Point		101.0	101.0	0.0	0.0		0	100%/24h	Mud Tank With Shaker (MI Swaco) - Vista	90.1	91.2	92.2	97.6	93.6	83.6	79.7	73.9	59.2	

APPENDIX E

SoundPlan Model Phase 3 Construction Noise Calculations

Monitoring Well OCWD-M43R at OCC
Assessed receiver levels - Phase 3 - Well Development

Name	Floor	X m	Y m	Z m	LeqD dB(A)	LeqN dB(A)	LeqE dB(A)	CNEL dB(A)	
1 - MFR	G	11415461.1	3726600.4	1.5	46.8			43.8	
2 - MFR	G	11415506.9	3726599.1	1.5	46.5			43.5	
3 - Sports Field	G	11415525.7	3726477.3	1.5	53.9			50.9	
4 - Nearest School Building	G	11415530.8	3726375.2	1.5	46.8			43.8	

Monitoring Well OCWD-M43R at OCC
Octave spectra of the sources in dB(A) - Phase 3 - Well Development With Sound Wall

Name	Source type	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	KO-Wall dB(A)	Day histogram	Spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)	
Air Compressor	Point		109.0	109.0	0.0	0.0		0	7 am - 5 pm	Compr: 10 - 30 cbm/min, sound-muffled				109.0						
Generator	Point		92.0	92.0	0.0	0.0		0	7 am - 5 pm	Ingersoll Rand G25 Generator - Vista	82.0	89.8	82.8	79.9	78.8	79.2	72.6	65.8	51.7	
Pump Rig	Point		104.0	104.0	0.0	0.0		0	7 am - 5 pm	C6.41 Diesel water pump	82.8	85.9	87.4	95.8	100.0	99.2	92.0	82.9		

APPENDIX F

SoundPlan Model Phase 4 Construction Noise Calculations

Name	Floor	X m	Y m	Z m	LeqD dB(A)	LeqN dB(A)	LeqE dB(A)	CNEL dB(A)
1 - MFR	G	11415461.1	3726600.4	1.5	48.2			45.2
2 - MFR	G	11415506.9	3726599.1	1.5	50.1			47.1
3 - Sports Field	G	11415525.7	3726477.3	1.5	65.1			62.1
4 - Nearest School Building	G	11415530.8	3726375.2	1.5	46.0			43.0

Monitoring Well OCWD-M43R at OCC
Octave spectra of the sources in dB(A) - Phase 4 - Site Cleanup and Vault Installation

Name	Source type	R'w	L'w	Lw	KI	KT	LwMax	KO-Wall	Day histogram	Spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
		dB	dB(A)	dB(A)	dB	dB	dB(A)	dB(A)			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	
Delivery Truck	Point		96.0	96.0	0.0	0.0		0	7 am - 5 pm	Truck: loading	63.0	73.0	80.0	86.0	89.0	90.0	90.0	88.0	
Forklift	Point		100.0	100.0	0.0	0.0		0	7 am - 3 pm	Forklift diesel average work	81.6	85.6	89.6	92.6	95.6	93.6	88.6	83.6	

APPENDIX G

SoundPlan Model Operational Well Sampling Noise Calculations

Monitoring Well OCWD-M43R at OCC
Assessed receiver levels - Operational - Well Sampling

Name	Floor	X m	Y m	Z m	LeqD dB(A)	LeqN dB(A)	LeqE dB(A)	CNEL dB(A)
1 - MFR	G	11415461.1	3726600.4	1.5	39.3			36.3
2 - MFR	G	11415506.9	3726599.1	1.5	40.1			37.1
3 - Sports Field	G	11415525.7	3726477.3	1.5	56.5			53.5
4 - Nearest School Building	G	11415530.8	3726375.2	1.5	39.8			36.8

Monitoring Well OCWD-M43R at OCC
Octave spectra of the sources in dB(A) - Operational - Well Sampling

Name	Source type	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	KO-Wall dB(A)	Day histogram	Spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)	
Generator	Point		92.0	92.0	0.0	0.0		0	7 am - 5 pm	Ingersoll Rand G25 Generator - Vista	82.0	89.8	82.8	79.9	78.8	79.2	72.6	65.8	51.7	

APPENDIX H

SoundPlan Model Operational Well Redevelopment Noise Calculations

Monitoring Well OCWD-M43R at OCC
Assessed receiver levels - Operational - Well

Name	Floor	X m	Y m	Z m	LeqD dB(A)	LeqN dB(A)	LeqE dB(A)	CNEL dB(A)
1 - MFR	G	11415461.1	3726600.4	1.5	56.3			53.3
2 - MFR	G	11415506.9	3726599.1	1.5	57.6			54.6
3 - Sports Field	G	11415525.7	3726477.3	1.5	72.0			69.0
4 - Nearest School Building	G	11415530.8	3726375.2	1.5	52.0			49.0

Monitoring Well OCWD-M43R at OCC
Octave spectra of the sources in dB(A) - Operational - Well Redevelopment

Name	Source type	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	KO-Wall dB(A)	Day histogram	Spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	
Air Compressor	Point		109.0	109.0	0.0	0.0		0	7 am - 5 pm	Compr: 10 - 30 cbm/min, sound-muffled				109.0					
Pump Rig	Point		104.0	104.0	0.0	0.0		0	7 am - 5 pm	C6.41 Diesel water pump	82.8	85.9	87.4	95.8	100.0	99.2	92.0	82.9	
Utility Truck	Point		96.0	96.0	0.0	0.0		0	7 am - 5 pm	Truck: loading	63.0	73.0	80.0	86.0	89.0	90.0	90.0	88.0	