4.11 Noise and Vibration

This section addresses the potential noise and vibration impacts of the proposed E&B Oil Development Project, including the development and ongoing operation of the oil drilling and production facility, the truck routes and construction of oil and gas pipelines that would extend out from Hermosa Beach into the cities of Redondo Beach and Torrance and the relocation of the City Yard. It describes the existing noise and vibration environment, identifies significance criteria for noise and vibration impact, assesses the likely impacts of the Project in the context of those criteria and identifies feasible mitigation measures.

4.11.1 Environmental Setting

4.11.1.1 Characteristics of Noise

Sound is most commonly experienced by people as pressure waves passing through the air. These rapid fluctuations in air pressure are processed by the human auditory system to produce the sensation of sound. Noise is defined as unwanted sound that may be disturbing or annoying. The character of noise is defined by its loudness and its pitch and also by the way the noise varies with time.

Loudness and Sound Level

Human perception of loudness is logarithmic rather than linear: On the logarithmic scale, an increase of 10 dB in sound level represents a perceived doubling of loudness. Conversely, a decrease of 10 dB in sound level is perceived as being half as loud. For this reason, sound level is usually measured on a logarithmic decibel (dB) scale, which is calculated from the ratio of the sound pressure to a reference pressure level. The reference pressure for sound in the air is 20 microPascals (μPa), which is represented as zero on the decibel scale. This value is used because it approximates the lowest pressure level detectable by a healthy human ear.

Decibel noise levels from two or more sources add logarithmically and not in the more familiar arithmetic way. For example, two similar sources with a noise level of 50 dBA combine to produce a total noise level of 53 dBA; three similar sources with a noise level of 50 dBA would result in a total noise level of 55 dBA.

Pitch and Frequency

The rate at which sound pressure changes occur is called the frequency of the sound. Frequency is usually measured as the number of oscillations per second or Hertz (Hz). Frequencies that can be heard by a healthy human ear span the range from 20 Hz to 20,000 Hz. Towards the lower end of this range are low-pitched sounds, including those that might be described as “rumble” or “boom”. Towards the higher end of the range are high-pitched sounds such as “screech” or “hiss”.

Pure Tones

Noise in which a single frequency stands out, is said to contain a "pure tone." Sources that produce pure tones are often described as being "tonal" and tend to be more noticeable, and potentially more annoying, to humans than sources that do not contain pure tones. In assessing the subjective impact of tonal noise, it is common practice to take this increased annoyance into account by adding a 5 dBA penalty to the measured noise level.

A-Weighting, dBA

Humans are more sensitive to some sound frequencies than others. It is therefore common practice to apply an audio filter to measured sound levels, to approximate the response of the human ear. This filter is called the A-weighting filter, which emphasizes sounds between 500 and 5,000 Hz and attenuates the frequencies outside of that range. The resulting measure is the A-weighted decibel, or dBA, which is used almost universally in the assessment of noise impact on humans. Table 4.11.1 shows typical noise levels that might be found in both outdoor and indoor environments.

Table 4.11-1 Common Environmental Noise Levels

Outdoor Environment	Noise Level (dBA)	Indoor Environment
	120	
Jet fly-over at 1,000 feet		
	110	Rock concert
Pile driver at 100 feet	100	
		Night club with live music
	90	
Large truck passby at 50 feet		
	80	Noisy restaurant
Gas lawn mower at 50 feet		
	70	Vacuum cleaner at 10 feet
Commercial/Urban area daytime		Normal speech at 5 feet
	60	
Suburban daytime		Active office environment
	50	
Urban area nighttime		Quiet office environment
	40	
Suburban nighttime		Library
Quiet rural areas	30	Quiet bedroom at night
Wilderness area	20	
		Quiet recording studio
	10	
Threshold of human hearing	0	Threshold of human hearing

Time-Varying Noise Descriptors

Some sources, such as air-conditioning equipment, produce continuous noise with a steady level that does not change with time. Other sources may be transient in nature, such as a train or aircraft passing-by. Between these two extremes are constant sources that vary gradually with time, such as distant freeway traffic, and intermittent sources that vary rapidly with time, such as traffic on a surface street. A location may receive noise contributions from a number of sources that fall into some or all of these categories, resulting in a complex time-varying noise environment. For this reason, meaningful measurement and analysis of environmental noise usually requires time-dependent noise descriptors.

The equivalent sound level, or L_{eq} , is a sound energy average, calculated over a stated time period. 1-hour, A-weighted L_{eq} values are used commonly in environmental noise assessments.

The Day-Night noise level, or L_{dn}, is an A-weighted sound energy average calculated over 24-hours, with a 10 dBA weighting added to sound levels between the hours of 10:00 pm and 7:00 am to reflect the increased annoyance of noise at night. The Community Noise Equivalent Level, or CNEL, is similar to the L_{dn}, but with an additional 5 dBA weighting applied to sound levels during the evening hours of 7:00 pm to 10:00 pm.

Time-varying noise environments may also be expressed in terms of the noise level that is exceeded for certain percentages of the total measurement time. These statistical noise levels are denoted L_N, where "L" is the noise level exceeded for "N" percent of the time. For example, the L_{50} is the noise level exceeded for 50 percent of the measurement time and the L_{25} is the noise level exceeded for 25 percent of the measurement time. For a one-hour measurement period, the L_{50} would be the noise level exceeded for a total of 30 minutes in that hour and the L_{25} would be the noise level exceeded for a total of 15 minutes. The maximum and minimum sound levels measured over a stated period are denoted by L_{max} and L_{min} respectively.

Sound Propagation

Noise levels produced by a source reduce with increased distance, depending on a number of factors discussed below:

Geometric Spreading

Sound from a single small source, which is referred to as a "point source" spreads outwards as a series of spherical waves. The sound level of a point source reduces at a rate of 6 dBA for each doubling of distance. A busy highway does not behave as a simple point source; the movement of vehicles on a highway approximates a "line source", in which the sound waves spread out in a cylindrical pattern. The sound level of a line source reduces at a rate of 3 dBA for each doubling of distance.

Ground Effects

The path between the noise source and the receptor is often very close to the ground. This introduces two additional mechanisms by which sound is attenuated as it radiates from the source, in addition to the geometric spreading losses described above.

First is ground absorption, due to imperfect reflection of the sound waves by the ground surface. The amount of absorption depends on the nature of the ground surface. For an acoustically "hard" site, such as a parking lot or smooth body of water, very little attenuation due to ground absorption will occur. On a site with acoustically "soft" ground surfaces, such as tilled soil, grass or scattered bushes and trees, there may be an appreciable amount of attenuation due to ground absorption. High frequency sounds are generally attenuated more than low frequencies by ground absorption.

Second is the destructive interference between the direct sound wave and the sound wave reflected off the ground surface. This phenomenon, often called the "ground effect" is generally limited to the frequency range of 200 – 600 Hz.

Barriers and Shielding

A solid barrier placed between the source and the receptor can significantly reduce the noise level at the receptor. The amount of attenuation provided by "shielding" the noise source in this way depends on the size and location of the barrier and the frequency content of the noise produced by the source. To be effective, a sound barrier must generally be at least large enough, in both height and width dimensions, to block sightlines between the noise source and the receptor. Barriers located very close to either the source or receptor, provide the most effective noise reduction.

A wide barrier which is just high enough to block the line-of-sight to the noise source will reduce noise levels by approximately 5 dBA. A higher barrier will increase the amount of attenuation. A barrier is more effective at attenuating the high frequencies, since low frequencies can diffract more easily around the perimeter of the barrier.

Permanent or temporary barriers may be purpose-built to attenuate noise transfer between source and receptor. Natural terrain, such as hills or berms, and man-made structures, such as buildings can also perform well as noise barriers, even though this is not their primary function.

Human Response to Noise

It is widely accepted that a change of 3 dBA is considered just noticeable to most people, while a change of 5 dBA is generally acknowledged to be the point at which most people would consider a significant increase or decrease in noise level to have occurred.

Noise Mitigation

Since industry-related noise can often impact sensitive receptors, many mitigation methods are available to reduce this type of noise including: walls, temporary and permanent acoustical barriers, engine exhaust silencers, acoustical equipment enclosures, sound-absorbing blankets and panels, and sound-dampening flooring and siding materials. The acoustical performance of materials and products designed to control noise, and therefore the criteria used to specify mitigation, is often described using one or more of the metrics summarized in Table 4.11-2:

Sound Power Level

The sound energy produced or radiated by a source (e.g., an engine, power tool, appliance etc.) may be expressed as the Sound Power Level, or L_w, which is expressed in decibels and varies with frequency. Overall Sound Power Level is often conveyed as an A-weighted value in dBA.

Table 4.11-2 Noise Control Metrics

Term	Abbreviation	Description
Transmission Loss	TL	The ability of a material, product or assembly to reduce the amount of sound transmitted through it. TL varies with frequency, with high frequencies generally being attenuated more readily than low frequencies.
Sound Transmission Class	STC	A weighted average of TL values over the frequency range 125 Hz - 4,000 Hz. STC is widely used as a convenient single-number way of conveying the ability of a material or product to reduce sound passing through it.
Insertion Loss	IL	The net effect of introducing certain sound mitigation measures. IL varies with frequency, with high frequencies generally being attenuated more readily than low frequencies. The acoustical performance of exhaust silencers and noise barriers is often expressed in terms of their IL.
Absorption Coefficient	α	The ability of a material or assembly to absorb sound incident upon it. Absorption coefficient varies with frequency and depending on factors such as the thickness, porosity and density of the materials involved. Acoustical panels and blankets designed to absorb sound are often made up of a soft acoustical "core" covered or wrapped in a protective layer of vinyl, woven fabric or perforated metal.
Noise Reduction Coefficient	NRC	A convenient single-number way of expressing sound absorption. NRC is the average of the Absorption Coefficient in the 250, 500, 2,000 and 4,000 Hz frequency bands.

4.11.1.2 Characteristics of Vibration

Vibration is acoustic energy transmitted as pressure waves through a solid medium, such as soil or concrete. Like noise, the rate at which pressure changes occur is called the frequency of the vibration, measured in Hz. Vibration may be the form of a single pulse of acoustical energy, a series of pulses, or a continuous oscillating motion.

Ground-Borne Vibration

The way that vibration is transmitted through the ground depends on the soil type, the presence of rock formations or man-made features and the topography between the vibration source and the receptor location. These factors vary considerably from site to site and make accurate

prediction of vibration levels at receptors distant from the source extremely difficult (often impossible) in practice.

As a general rule, vibration waves tend to dissipate and reduce in magnitude with distance from the source. Also, the high frequency vibrations are generally attenuated rapidly as they travel through the ground, so that the vibration received at locations distant from the source tends to be dominated by low-frequency vibration. The frequencies of ground-borne vibration most perceptible to humans are in the range from less than 1 Hz to 100 Hz.

When ground-borne vibration arrives at a building, there is usually an initial ground-to-foundation coupling loss. However, once the vibration energy is in the building structure it can be amplified by the resonance of the walls and floors. Occupants can perceive vibration as motion of the building elements (particularly floors) and also rattling of lightweight components, such as windows, shutters or items on shelves. Vibrating building surfaces can also radiate noise, typically heard as a low-frequency rumbling known as ground-borne noise. At very high levels, low-frequency vibration can cause damage to buildings.

Vibration Levels

Vibration may be defined in terms of the displacement, velocity or acceleration of the particles in the medium material. In environmental assessments, where human response is the primary concern, velocity is commonly used as the descriptor of vibration level, expressed in inches per second (in/s). The amplitude of vibration can be expressed in terms of the wave peaks or as an average, called the root mean square (rms). The rms level is generally used to assess the effect of vibration on humans. Vibration levels for typical sources of ground-borne vibration are shown in Table 4.11-3 below.

Table 4.11-3 Typical Levels of Ground-Borne Vibration

Source	Typical Velocity at 50-feet (in/s, rms)	Human or Building Response
Blasting from construction projects	0.1000	Minor cosmetic damage to fragile buildings
Bulldozers and other heavy tracked construction equipment.	0.0447	Workplace annoyance; difficulty with vibration-sensitive tasks.
Commuter rail, upper range	0.0178	
Rapid transit rail, upper range	0.0100	Distinctly Perceptible Residential annoyance for infrequent events
Commuter rail, typical range	0.0056	
Bus or truck over bump	0.0040	Barely perceptible. Residential annoyance for frequent events
Rapid transit rail, typical range	0.0032	
Bus or truck typical	0.0020	Approximate threshold of perception
Background vibration	0.0003	None

Source: Adapted from Transit Noise and Vibration Impact Assessment (FTA 2006)

4.11.1.3 Project Area - Existing Noise and Vibration Environment

For the purposes of noise and vibration impact analysis, the Project area can be divided into three main components:

- The vicinity of the Project Site itself - centered on the proposed oil drilling and production facility at 555 6th Street, Hermosa Beach.
- The areas adjacent to the truck and pipeline routes - which would extend out from the Project Site across the city of Hermosa Beach and into the cities of Redondo Beach and Torrance.
- The vicinity of the site proposed for the relocated City Yard, just to the south of 11th Place and Hermosa Beach City Hall.

Vicinity of the Project Site

The Project Site is the current location of the City Yard at the intersection of Valley Drive and 6th Street. The site is bounded on its north, west and south sides by light manufacturing uses and on its east side by the Veterans Parkway greenbelt space. Beyond these immediate adjacencies, the land uses are predominantly residential, with the exception of South Park to the south. The topography of this area is such that the residential uses on Loma Drive and 8th Street are elevated above the Project Site, with clear sightlines between many of the homes and the existing City Yard. The noise and vibration sources in the area include traffic flows on the local streets (8th Street, Valley Drive and Ardmore Avenue are particularly significant), noise from the light industrial uses on 6th Street, Cypress Avenue, City Yard activity and associated vehicle movements.

Truck and Pipeline Routes

The proposed truck and pipeline construction routes include Valley Drive and Prospect Avenue in the City of Hermosa Beach, Herondo Street, Anita Street and 190th Street in the City of Redondo Beach and 109th Street in the City of Torrance. Since these are major thoroughfares, the steady flow of street traffic is the predominant source of existing noise and vibration along the truck and pipeline routes. The uses flanking these routes are largely residential, with some commercial properties - generally situated at the major street intersections in Redondo Beach and Torrance. Hermosa View School is located on Prospect Avenue and a large commercial plant nursery facility runs along the south side of Anita Street190th Street in Redondo Beach. Street traffic is the predominant source of existing noise and vibration in these areas.

Relocated City Yard

The proposed site for the relocated City Yard is bounded by 11th Place and City Hall to the north, Valley Drive and Veterans Parkway to the east and residential uses on 11th and Cypress Streets to the south and west. Further west, beyond Veterans Parkway and Ardmore Avenue are more residential uses, the Hermosa Beach Community Center and Library. Noise and vibration sources in the area include traffic flows on Valley Drive, Ardmore Avenue and Pier Avenue, as well as vehicle movements associated with the City Hall and Police Department parking lots. Occasional noise contributions are made by the maintenance facility for the Police Department vehicles which is located nearby. The public parking lot near the intersection of 11th Street and Valley Drive is another source of vehicle noise.

Baseline Noise Monitoring

The existing noise environment in the Project area was established by long-term monitoring using unmanned data acquisition systems to continuously measure and log noise levels. Measurement locations were selected for their proximity to sensitive uses as well as potential future exposure to noise impacts associated with the Project.

Project Site

Establishing an accurate and representative noise baseline for the area around the proposed oil drilling and production facility was considered critical to the impact analysis for the Project. And because of the unique nature of this neighborhood, it was important to capture both weekday (Monday through Friday) and weekend (Saturday and Sunday) noise conditions. For these reasons noise levels at each of six selected locations around the Project Site were monitored for a continuous period of seven days. The noise monitoring occurred during August and September, 2013, with a break in measurements over the Labor Day holiday weekend (August 31 - September 2) to avoid gathering non-representative data.

The locations around the Project Site selected for long term noise monitoring are shown in Figure 4.11-1; figure 4.11-2 shows a typical noise monitor installation. The results of these measurements are presented as seven-day noise histograms in the Appendix and are summarized in Tables 4.11-4 and 4.11-5.

Figure 4.11-1 Noise Monitoring Locations around the Project Site

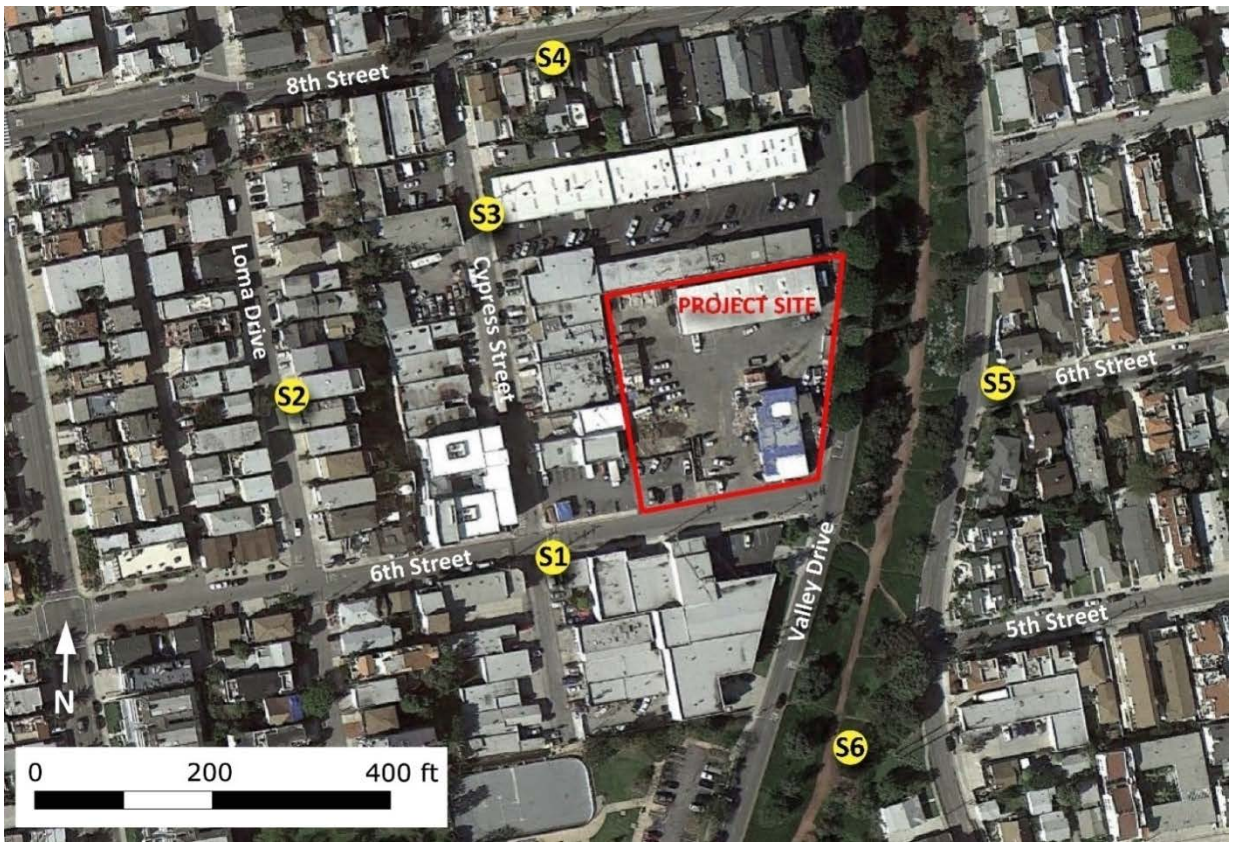


Figure 4.11-2 Typical Noise Monitor Installation

Table 4.11-4 Summary of Existing Ambient L_{eq} Noise Levels Around the Project Site

Monitoring Location		Monday - Friday				Saturday & Sunday			
		Lowest Hourly L_{eq} (dBA)		Overall Average L_{eq} (dBA)		Lowest Hourly L_{eq} (dBA)		Overall Average L_{eq} (dBA)	
		Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am
S1	6th Street & Cypress	55.7	38.1	61.2	53.0	53.1	37.7	58.0	52.2
S2	634 Loma Dr.	49.7	40.0	55.8	48.8	47.6	39.9	51.5	47.0
S3	730 Cypress St.	50.4	38.0	58.9	48.5	47.5	37.6	53.0	48.0
S4	526 8th Street	61.7	45.6	63.6	58.5	60.3	48.3	63.3	58.3
S5	600 6th Street	57.3	38.3	60.6	54.2	52.7	42.4	57.6	50.8
S6	Veterans Parkway	51.3	35.6	56.4	47.8	50.2	40.7	52.1	46.5

Table 4.11-5 Summary of Existing Ambient L_{50} Noise Levels Around the Project Site

Monitoring Location		Lowest Hourly L_{50} (dBA)			
		Monday - Friday		Saturday & Sunday	
		Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am
S1	6th Street & Cypress	46.1	37.2	41.5	37.4
S2	634 Loma Dr.	45.5	39.5	41.1	37.3
S3	730 Cypress St.	46.0	35.2	43.6	35.5
S4	526 8th Street	54.6	34.5	49.2	39.8
S5	600 6th Street	51.0	37.0	41.4	33.6
S6	Veterans Parkway	49.2	33.7	46.6	38.5

The results of additional statistical analysis are presented in Table 4.11-6. The statistical noise descriptors used in the analysis correspond to the time-dependent noise limits in the Hermosa Beach Oil Code (see section 4.11.2).

Table 4.11-6 Existing Ambient Noise Levels Around the Project Site - Additional Statistics

Monitoring Location		Lowest Hourly L_{25} (dBA)		Lowest Hourly $L_{8.3}$ (dBA)		Lowest Hourly $L_{1.7}$ (dBA)		Lowest Hourly L_{max} (dBA)	
		Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am
S1	6th Street & Cypress	43.5	38.0	52.5	38.8	61.8	39.5	73.7	42.3
S2	634 Loma Dr.	43.1	37.8	48.0	38.8	57.1	40.3	67.6	45.9
S3	730 Cypress St.	45.5	36.4	49.6	38.0	54.8	40.8	65.5	46.1
S4	526 8th Street	57.3	36.2	65.0	40.2	68.9	47.0	74.7	68.2
S5	600 6th Street	46.9	34.9	57.1	39.3	63.9	41.6	70.1	50.2
S6	Veterans Parkway	50.1	34.5	53.5	35.7	56.5	38.8	62.3	54.1

Note: L25, L8.3 and L1.7 correspond to 15, 5 and 1 minute, respectively.

Truck and Pipeline Routes

Extensive noise monitoring along the truck and pipeline routes was performed by the Applicant's noise consultant (Behrens & Associates) during August 2012. The gathered data was originally presented in a noise impact study report dated November 9, 2012, which was attached to the Project application as Appendix J. The data from the 2012 study has been used as the baseline for the noise impact analysis for the truck and pipeline routes presented in this section, but not before it had been verified for accuracy and to ensure that no significant change had occurred since the time of the noise monitoring. Verification was achieved by repeating the noise monitoring at two of the locations used in the 2012 study between July 30 and August 1, 2013. The locations selected for the verification noise monitoring were: 531 Herondo Street (Redondo Beach) and 5410 W. 190th Street (Torrance). Agreement between the two sets of data was found to be good, as shown in Table 4.11-7.

Table 4.11-7 Comparison of Noise Monitoring Results from the Truck and Pipeline Routes

Monitoring Location	Daytime (7am-10pm) L_{eq} (dBA)			CNEL		
	2012 Result	2013 Result	Delta/ Change	2012 Result	2013 Result	Delta/ Change
531 Herondo Street	66.5	66.0	- 0.5	67.8	68.7	- 0.9
5410 W. 190th Street	70.6	71.7	+ 1.1	73.9	73.3	+ 0.6

Figures 4.11-4, 5, 6 and 7 show the noise monitoring locations used for the 2012 study along the truck and pipeline routes and Table 4.11-8 provides a summary of the measurement results, which have been used in the analysis presented in this section.

City Yard Relocation Site

Baseline noise monitoring was performed around the proposed site for the City Yard relocation during September and October 2013. A total of eight monitoring locations were selected for this task, which are shown in Figure 4.11-8. Noise levels were monitored continuously for a period of one week at each location, to capture both weekday and weekend conditions. Results of the monitoring are presented as seven-day noise histograms in the Appendix and are summarized in Table 4.11-9.

During the period of noise monitoring, there was significant noise from a construction site at 533 11th Street, which elevated noise levels at measurement locations Y3, Y5 and Y6 between the hours of 8AM and 4PM on weekdays. Since this construction activity could be considered atypical, weekday daytime noise level averages at the affected locations have been recalculated, excluding the hours of construction. The results of this analysis are presented in Table 4.11-10.

Figure 4.11-4 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study)

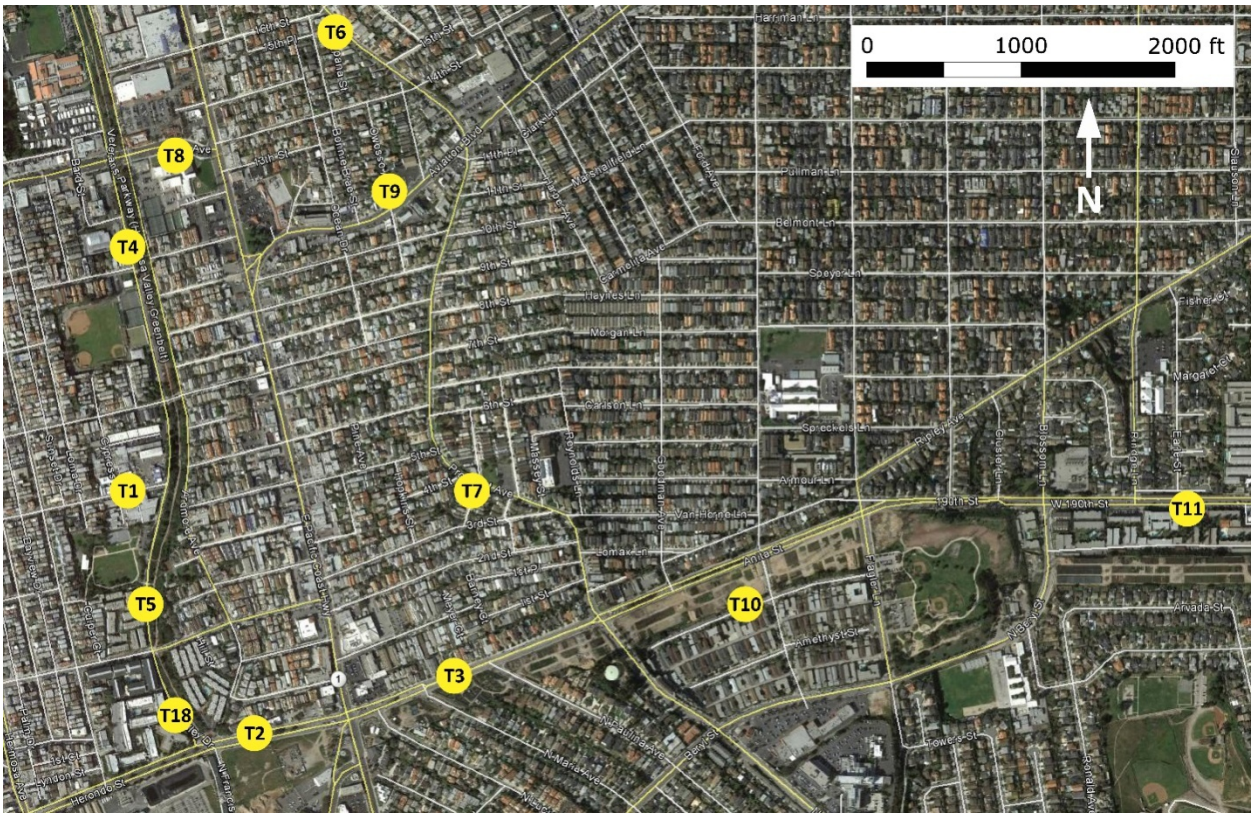


Figure 4.11-5 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study)

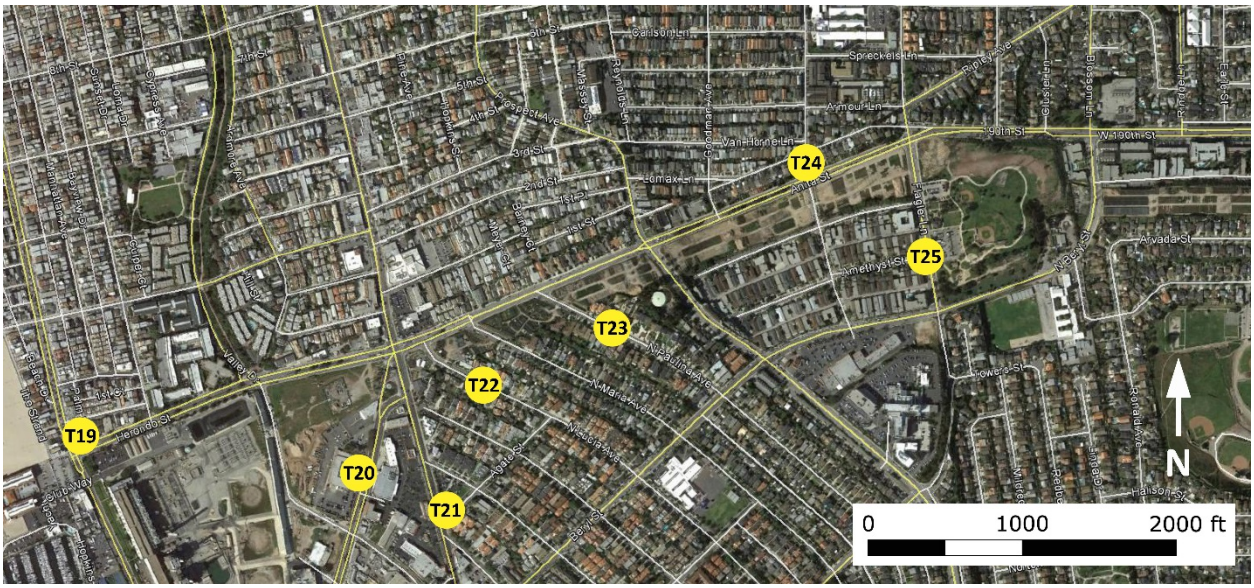


Figure 4.11-6 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study)

Figure 4.11-7 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study)

Table 4.11-8 Truck and Pipeline Route Ambient Noise Measurement Summary*

Behrens Location Number	Address	City	Daytime (7am - 10pm) Leq (dBA)	CNEL (dBA)	20-minute Daytime Leq (dBA)
T1	6th Street & Cypress Street	Hermosa Beach	59.9	61.4	-
T2	531 Herondo Street	Redondo Beach	66.5	68.7	-
T3	426 Anita Street	Redondo Beach	73.2	75.5	-
T4	1107 Valley Drive	Hermosa Beach	63.4	65.1	-
T5	201 Valley Drive	Hermosa Beach	63.5	64.0	-
T6	1556 Prospect Avenue	Hermosa Beach	63.3	63.7	-
T7	404 Gentry Street	Hermosa Beach	64.4	65.1	-
T8	752 Pier Avenue	Hermosa Beach	73.1	75.8	-
T9	1213 Owosso Avenue	Hermosa Beach	63.4	66.2	-
T10	1228 Agate Street	Redondo Beach	57.7	60.1	-
T11	5410 W. 190th Street	Torrance	70.6	73.3	-
T12	4777 W. 191st Street	Torrance	64.9	67.2	-
T13	4713 Towers Street	Torrance	69.7	73.4	-
T14	4305 W. 190th Street	Torrance	73.0	75.6	-
T15	4100 W. 185th Street	Torrance	69.6	70.7	-
T16	3625 W. 190th Street	Torrance	75.3	77.6	-
T17	18721 Crenshaw Blvd	Torrance	69.7	73.4	-
T18	415 Herondo Street	Hermosa Beach	-	-	57.3
T19	2 Hermosa Avenue	Hermosa Beach	-	-	65.7
T20	1231 N. Catalina Avenue	Redondo Beach	-	-	64.9
T21	408 Agate Street	Redondo Beach	-	-	61.9
T22	817 N. Lucia Street	Redondo Beach	-	-	54.0
T23	817 N. Paulina Avenue	Redondo Beach	-	-	54.9
T24	801 Anita Street	Redondo Beach	-	-	58.4
T25	1327 Amethyst Street	Redondo Beach	-	-	61.5
T26	5210 Arvada Street	Torrance	-	-	51.9

Source: Reproduced from Behrens & Associates Noise Impact Study dated November 9, 2012 in the Applicants Application. Some locations were monitored for 24 hour periods, some (T18-T26) were measured for only 20 minutes.

Figure 4.11-8 Noise Monitoring Locations around the City Yard Relocation Site

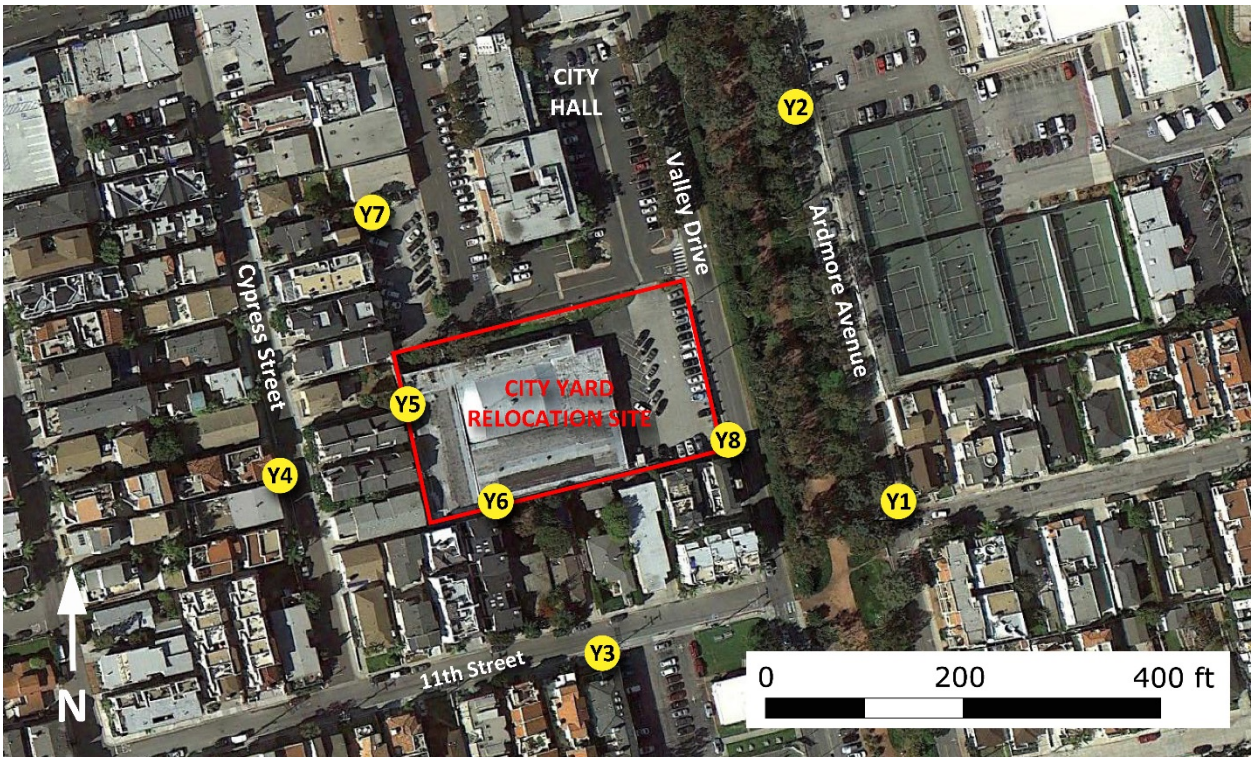


Table 4.11-9 Summary of Existing Ambient Noise Levels around the City Yard Relocation Site

Monitoring Location		Monday - Friday				Saturday & Sunday			
		Average L_{eq} (dBA)		Average L_{50} (dBA)		Average L_{eq} (dBA)		Average L_{50} (dBA)	
		Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am
Y1	Ardmore Ave & 11th Street	63.8	57.7	58.3	45.9	63.3	55.2	56.2	45.2
Y2	Ardmore Ave at the Library	63.0	58.6	58.4	48.4	61.7	56.3	55.9	47.7
Y3	546 11th Street	65.4	52.1	58.2	44.8	56.4	51.0	49.7	45.4
Y4	1141 Cypress St	60.8	47.9	49.3	41.5	56.6	46.9	46.2	43.0
Y5	Roof of Storage Facility (west)	57.7	46.6	48.8	43.3	54.6	44.3	44.7	42.1
Y6	Roof of Storage Facility (south)	60.9	47.3	50.7	44.0	52.1	45.3	45.2	42.2
Y7	City Hall Parking Lot	53.3	48.7	48.7	45.8	50.2	47.8	47.0	45.6
Y8	1107 Valley Drive	63.5	57.5	58.8	47.3	64.8	56.3	56.4	46.4

Table 4.11-10 Recalculated Daytime Ambient Noise Levels around the City Yard Relocation Site

Monitoring Location		Monday - Friday	
		Average L_{eq} (dBA), 4pm - 7pm	Average L_{50} (dBA), 4pm - 7pm
Y3	546 11th Street	59.6	53.3
Y5	Roof of Storage Facility (west)	48.1	45.1
Y6	Roof of Storage Facility (south)	48.9	46.0

Baseline Vibration Measurements

Baseline vibration levels were determined by direct measurement of ground vibration at all of the same locations selected for the 2013 baseline noise measurements around the proposed oil production site and potential City Yard relocation site, except locations Y5 and Y6 - which were on the roof of an existing structure and therefore not relevant to the vibration study. Vibration levels were measured over a 20-minute period in each case.

Maximum and average baseline vibration values recorded during each 20-minute sample are shown in Table 4.11-11.

Table 4.11-11 Baseline Vibration Levels (2013)

Location Number	Maximum Velocity (in/sec, RMS)	Average Velocity (in/sec, RMS)	Location Number	Maximum Velocity (in/sec, RMS)	Average Velocity (in/sec, RMS)
S1	0.0023	0.0002	Y1	0.0018	0.0002
S2	0.0015	0.0002	Y2	0.0015	0.0002
S3	0.0017	0.0002	Y3	0.0011	0.0001
S4	0.0013	0.0002	Y4	0.0027	0.0002
S5	0.0013	0.0001	Y7	0.0012	0.0002
S6	0.0008	0.0001	Y8	0.0017	0.0002

Baseline vibration measurements were also made during 2012 by the Applicant's consultant Behrens & Associates, including measurements at locations along the proposed truck/pipe routes associated with the Project. The results of the 2012 measurements - which have been converted from peak particle velocity (PPV) to approximate root-mean-squared (RMS) velocity values, assuming a crest factor of 4 - are shown in Table 4.11-12. A crest factor is the ratio of the peak value and the RMS value.

Table 4.11-12 Baseline Vibration Levels (2012)

Location Number	Maximum Velocity* (in/sec, RMS)	Location Number	Maximum Velocity* (in/sec, RMS)	Location Number	Maximum Velocity* (in/sec, RMS
T1	0.0005	T8	0.0035	T15	0.0033
T2	0.0023	T9	0.0018	T16	0.0020
T3	0.0038	T10	0.0015	T17	0.0040
T4	0.0005	T11	0.0038	T18	0.0018
T5	0.0015	T12	0.0015	T26	0.0015
T6	0.0010	T13	0.0010		
T7	0.0018	T14	0.0020		

Measured maximum PPV converted to approximate RMS value by applying a crest factor of four. 20-minute sample.

4.11.2 Regulatory Setting

4.11.2.1 City of Hermosa Beach Noise Standards

Hermosa Beach Municipal Code

There are no quantitative noise standards in the City of Hermosa Beach Municipal Code. However, Chapter 8.24 of the Code does include certain qualitative noise regulations and restrictions on the allowable timing of noisy activity that are generally applicable to the Project, as follows:

8.24. 030 Prohibited Noises - General Standard.

Unless otherwise permitted in this Chapter, no person shall make, permit to be made or cause to suffer any noises, sounds or vibrations that in view of the totality of the circumstances are so loud, prolonged and harsh as to be physically annoying to reasonable persons of ordinary sensitivity and to cause or contribute to the unreasonable discomfort of any persons within the vicinity. When considering whether a noise, sound or vibration is unreasonable within the meaning of this section, the following factors shall be taken into consideration:

- The volume and intensity of the noise, particularly as it is experienced within a residence or place of business;
- Whether the noise is prolonged and continuous;
- How the noise contrasts with the ambient noise level;
- The proximity of the noise source to residential and commercial uses;
- The time of day; and

- The anticipated duration of the noise.

8.24. 040 Specific Prohibited Noises.

Notwithstanding any other provisions of this chapter, the following acts and the causing or permitting thereof, are declared and deemed to be in violation of this chapter:

(c) **Engines, motors and mechanical devices near residential district.** The sustained, continuous or repeated operation or use between the hours of 10:00 p.m. and 8:00 a.m. of any motor or engine or the repair, modification, reconstruction, testing or operation of any automobile, motorcycle, machine, contrivance, or mechanical device or other contrivance or facility unless such motor, engine, automobile, motorcycle, machine or mechanical device is enclosed within a sound insulated structure so as to prevent noise and sound from being plainly audible at the property line of the property from which the sound is emanating.

Loading and unloading. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of 10:00 p.m. and 8:00 a.m. in such a manner as to cause noise disturbance, except for solid waste collection by a franchised collector.

Non-emergency signaling devices. Sounding or permitting the sounding of any electronically amplified signal from any bell, chime, siren, whistle or similar device, intended primarily for non-emergency purposes, from any place between the hours of 10:00 p.m. and 8:00 a.m., and in no event for more than ten (10) consecutive seconds in any hourly period outside those hours.

Emergency signaling devices.

1. The intentional sounding, or permitting the sounding, outdoors, of any emergency signaling device including fire, burglar, civil defense alarm, siren, whistle or similar emergency signaling device, provided, however that testing of an emergency signaling device is permitted between the hours of 10:00 a.m. and 8:00 p.m. Any such testing shall use only the minimum cycle test time. In no case shall such test time exceed sixty (60) seconds. Testing of the emergency signaling system shall not occur more than once in each calendar month.
2. Sounding or permitting the sounding of any exterior burglar or fire alarm unless such alarm is terminated within fifteen (15) minutes of activation.
3. Sounding or permitting the sounding of any motor vehicle alarm unless such alarm is terminated within five (5) minutes of activation.
4. Sounding or permitting the sounding of any motor vehicle alarm more than three times of any duration in any twenty-four (24) hour period.

8.24. 050 Construction.

(a) **Permissible hours of construction.**

All construction shall be conducted between the hours of 8:00 a.m. and 6:00 p.m., Monday through Friday (except national holidays), and 9:00 a.m. and 5:00 p.m. Saturdays. Construction activity is prohibited at all other hours and on Sundays and national holidays. For purposes of this section, "construction" or "construction activity" shall include site preparation, demolition, grading, excavation, and the erection, improvement, remodeling or repair of structures, including operation of equipment or machinery and the delivery of materials associated with those activities.

Hermosa Beach General Plan

The Noise Element of the City of Hermosa Beach General Plan sets the following noise limits (all of which are assumed to be in dBA) for various land use zones:

NOISE TOLERANCE STANDARDS

City policy should be geared to the following maximum ambient noise levels:

R-1	45 or below (also schools, hospitals, nurseries and rest homes)
R-2	50 or below (also parks and playgrounds)
R-3	55 or below
C-1	55 or below
C-2/C-3	60 or below
M	65 or below

Maximum traffic noise should be restricted in residential areas to no more than 5 dBA above the ambient standard levels. In commercial and manufacturing areas, no more than 10 dBA above ambient standards. Every effort to keep mean dBA considerably below this should be made.

Hermosa Beach Oil Code

Article VI of the City of Hermosa Beach Oil Code (established by Ordinance No. 85-803 and added to the Municipal Code as Chapter 21A) defines noise level standards for oil drilling and redrilling operations as follows:

Sec. 21A-6.2 NOISE LEVEL STANDARDS

(a) No person, either as owner, agent, or operator, shall conduct any drilling, or redrilling operation at any well in any manner as to create any noise which causes the exterior noise level when measured at the property line of any single or multiple-family dwelling unit, guest room, commercial building, school, hospital, church, or public library to exceed the noise level standards set forth in table below (Table 1 in the code). The exterior noise level shall be continuously monitored to ensure conformance to the noise level standards. The costs of such monitoring shall be borne by the operator conducting such operation.

Cumulative Number of Minutes In Any One-Hour Time Period	Noise Level Standards, dBA	
	Daytime (8 am to 7 pm)	Nighttime (7 pm to 8 am)
30	50	45
15	55	50
5	60	55
1	65	60
0	70	65

No person, either as owner, agent, or operator, shall conduct any drilling, or redrilling operation at any time at any well in any manner so as to create any noise which causes a noise level in excess of those limits provided by the Hermosa Beach Municipal Code.

If the existing ambient noise level, exclusive of existing drilling activity, at the nearest adjacent dwelling unit, guest room, commercial building, school, hospital, church or public library property line to the requested oil drilling site does not exceed the permitted nighttime noise levels in [Table 1] for any period, then the following regulations shall apply:

1. The only activity permitted between the hours of seven p.m. and eight a.m. will be "on-bottom" drilling, with single joint connections. None of the following will be done during the hours of 7 p.m. and 8 a.m.:
    a. Hammering on pipe;
    b. Racking of pipe;
    c. Acceleration and deceleration of engines or motors;
    d. Use of drilling assembly rotational speeds that could cause more noise than necessary and could reasonably be reduced by use of slower rotational speed;
    e. Picking up or laying down drill pipe, casing, tubing or rods into or out of the drill hole.
2. If the measured ambient noise level exceeds that permissible within any of the first four noise limit categories in [Table 1] above, the allowable noise exposure standard shall be increased in five-decibel increments in each affected category as appropriate to encompass or reflect the 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 equal the maximum ambient noise level.
3. If the difference between the noise levels with noise source operating and not operating is four decibels or greater, then the noise measurement of the alleged source can be considered valid with a correction applied to account for the contribution of the ambient noise. The correction is to be applied in accordance with the data shown in e table below (Table 2 in the code).

BACKGROUND NOISE CORRECTION	
Difference Between Total Noise and Background Noise Alone (Decibels)	**Amount to be Subtracted from Total Noise Measurement (Decibels)**
4.0 - 4.5	2.0
4.5 - 6.0	1.5
6.0 - 8.0	1.0
8.0 - 10.0	0.5

The noise monitoring results show that the lowest hourly noise levels at residential properties near the Project Site are all below the limits in the Oil Code, so that no adjustment is required to the Oil Code limits at these locations.

The Hermosa Beach Oil Code also requires that all derricks and drilling machines that produce noise be enclosed in acoustical blankets, as follows:

Sec. 21A-6.3 ACOUSTICAL BLANKETS

(a) No person, either as owner, agent or operator, shall conduct any drilling machines on any well unless all derricks and all drilling machines which produce noise and which are used in connection with said drilling or redrilling operations are enclosed with soundproofing material as provided in subsection B of this section.

When sound proofing is required by the provisions of subsection A of this section, such soundproofing shall comply with accepted A.P.I. standards and shall be subject to fire department regulations. All doors and similar openings shall be kept closed during drilling operations, except for ingress and egress and necessary logging and well completion operations. Alternate methods of soundproofing may be used, provided that such alternative has been approved by the director and chief of the fire department. The director and chief of the fire department may approve any such alternative if they find that the proposed material and method is equal to the soundproofing ability and fire resistive qualities to the aforesaid specifications. Either may require the submission of evidence to substantiate any claims that may be made regarding the use of such alternative."

Los Angeles County Code - Vibration Standards

The City of Hermosa Beach currently has no regulations that limit vibration. Vibration is, however, covered by Chapter 12.08 of the County of Los Angeles Code, as follows:

12.08.560 Vibration

Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.

The County Code allows an exemption for oil well drilling and redrilling performed in compliance with the conditions of permits issued by the County. However, since permits for the Project would be issued by the City of Hermosa Beach and not the County, the Project would not qualify for this exemption and the vibration limits in the County Code would still apply.

4.11.2.2 City of Redondo Beach Noise Standards

Redondo Beach Municipal Code

Title 4, Chapter 24 of the Redondo Beach Municipal Code regulates noise and vibration in the City of Redondo Beach. Exterior and interior noise standards are defined as follows:

ARTICLE 3 – EXTERIOR NOISE LIMITS

4-24.301 Maximum permissible sound levels by land use categories.

The noise standards for the various categories of land use districts identified shall be the higher of either the presumed or actual measured ambient and shall apply to all such property within a designated category as follows:

Receiving Land Use District Category	Time Period	Presumed Ambient Level (dBA)
Low Density Residential R-1-A, R-1, R-2, P-D-R, P-U-D Overlay	10:00 p.m. to 7:00 a.m.	45
	7:00 a.m. to 10:00 p.m.	50
Medium Density Residential R-3, R4, P-D-R, P-U-D Overlay	10:00 p.m. to 7:00 a.m.	50
	7:00 a.m. to 10:00 p.m.	55
High Density Residential R-5, R-6, P-D-R, P-U-D Overlay, C-I	10:00 p.m. to 7:00 a.m.	55
	7:00 a.m. to 10:00 p.m.	60
Commercial NSC, CSC, GC, P-D-C	10:00 p.m. to 7:00 a.m.	60
	7:00 a.m. to 10:00 p.m.	65
Industrial P-D-I	10:00 p.m. to 7:00 a.m.	60
	7:00 a.m. to 10:00 p.m.	65
Industrial P-I	10:00 p.m. to 7:00 a.m.	70
	7:00 a.m. to 10:00 p.m.	70

As indicated above, the presumed ambient levels in the Planned Development Residential (P-D-R) and the Planned Unit Development (P-U-D) Overlay land use districts are categorized so as to be consistent with the actual density of the development. The presumed ambient levels for the Planned Development (P-D) and the Civic Center (C-C) land use districts shall be consistent with those established for the lowest adjacent land use district.

(a) Correction for time characteristics. No person shall operate, or cause to be operated, any source of sound at any location within the City or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level when measured on any other property to exceed:

(1) The noise standard of the receiving land use district for a cumulative period of more than thirty (30) minutes in any hour; or

(2) The noise standard of the receiving land use district plus five (5) dB for a cumulative period of more than fifteen (15) minutes in any hour; or

(3) The noise standard of the receiving land use district plus ten (10) dB for a cumulative period of more than five (5) minutes in any hour; or

(4) The noise standard of the receiving land use district plus fifteen (15) dB for a cumulative period of more than one minute in any hour; or

(5) The noise standard of the receiving land use district plus twenty (20) dB for any period of time.

(b) Levels exceeding the noise limit categories. If the measured ambient level exceeds that permissible as set forth in subsections (1), (2), (3), and (4) of subsection (a) of this section, the allowable noise exposure standard shall be increased in five (5) dB increments as appropriate to encompass or reflect such ambient noise level. In the event the ambient noise level exceeds the noise level set forth in subsection (5) of subsection (a) of this section, the maximum allowable noise level shall be increased to reflect the maximum ambient noise level.

(c) Correction for location of noise source. If the measurement location is on a boundary between two (2) different land use district categories, the noise level limit applicable to the lower land use district category, plus five (5) dB shall apply.

(d) Correction for ambient noise levels when alleged offending sources cannot be shut down. If possible, the ambient noise shall be measured at the same location along the property line utilized in subsection (a) of this section with the alleged offending noise source inoperative. If for any reason the alleged offending noise source cannot be shut down, then the ambient noise shall be estimated by performing a measurement in the same general area of the source, but at a sufficient distance such that the offending noise from the source is inaudible. If the difference between the noise levels with the noise source operating and not operating, with the utilization of either of the above-described methods of measurement, is six (6) dB or greater, then the noise measurement of the alleged source can be considered valid.

(e) Correction for character of sound. In the event the alleged offensive noise contains a steady audible tone, such as a whine, screech, or hum, or is a repetitive noise, such as hammering or riveting, the standard limits set forth in this section shall be reduced by five (5) dB.

ARTICLE 4 – INTERIOR NOISE STANDARDS

4-24.401 Maximum permissible interior dwelling sound levels.

The following noise standards for various categories of land use presented as follows, unless otherwise specifically indicated, shall apply to all such structures within a designated land use district category with the windows in their normal seasonal configuration:

Receiving Land Use Category	Time Interval	Allowable Interior Noise Level (dBA)
Residential	10:00 p.m. to 7:00 a.m.	40
	7:00 a.m. to 10:00 p.m.	45
School	7:00 a.m. to 10:00 p.m.	45
Hospital and designated quiet areas	Any time	40

(a) Correction for time characteristics. No person shall operate, or cause to be operated, any source of sound at any location within the City or allow the creation of any noise which causes the noise level, when measured inside the receiving structure, to exceed:

(1) The noise standard for that land use district category as specified for a cumulative period of more than five (5) minutes in any hour; or

(2) The noise standard plus five (5) dB for a cumulative period of more than one minute in any hour; or

(3) The noise standard plus ten (10) dB for any period of time. (§ 1, Ord. 2183 c.s., eff. August 11, 1976)"

The Code contains the following specific regulations for construction noise:

4-24.503 Construction noise.

(a) All construction activity shall be prohibited, except between hours of 7:00 a.m. and 6:00 p.m. on Monday, Tuesday, Wednesday, Thursday, and Friday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday. No construction activity shall be permitted on Sunday, or the days on which the holidays designated as Memorial Day, the Fourth of July, Labor Day, Thanksgiving Day, Christmas Day, and New Year's Day are observed.

(b) In the case of an emergency, the Building Officer may issue a permit for construction activity for periods during which construction activity is prohibited by subsection (a) of this section. Such permit shall be issued for only the period of the emergency. Where feasible, the Building Officer shall notify the residential occupants within 300 feet of any emergency construction activity of the issuance of any permit authorized by this subsection.

(c) If the Building Officer should determine that the peace, comfort, and tranquility of the occupants of residential property will not be impaired because of the location or nature of the construction activity, the Building Officer may issue a permit for construction activity for periods during which construction activity is prohibited by subsection (a) of this section.

(d) For purposes of this section, "construction activity" shall mean the erection, excavation, demolition, alteration, or repair of any building.

(e) Exemption. This section shall not be applicable to minor repairs or routine maintenance of residential dwelling units. (§ 1, Ord. 2183 c.s., eff. August 11, 1976, as amended by § 2, Ord. 2535 c.s., eff. April 13, 1989, and § 1, Ord. 2608 c.s., eff. January 3, 1991)

Vibration is regulated by the Code as follows:

4-24.504 Vibration.

The operation or permitting the operation of any device which creates vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property, or at 150 feet (forty-six (46) meters) from the source if on a public space or public right-of-way, shall be prohibited. For the purposes of this section, "vibration perception threshold" shall mean the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or the visual observation of moving objects. The perception threshold shall be presumed to be .001 "g's" in the frequency range from zero to thirty (30) Hz and .003 "g's" in the frequency range between thirty (30) and 100 Hz.

Redondo Beach General Plan

The Noise Element of the Redondo Beach General Plan includes the City's objectives and policies for controlling noise impacts on the community. The following policy would apply to noise from the pipeline and trucking routes associated with the Project that pass through Redondo Beach:

Section 10.3.4

Prohibit the development of new industrial, commercial, or related land uses or the expansion of existing land uses when it can be demonstrated that such new or expanded land uses would be directly responsible for causing overall (ambient) noise levels to exceed an Ldn of 65 dB (A) exterior upon areas containing housing, schools, healthcare facilities, or other "noise-sensitive" land uses (as determined by the City of Redondo Beach).

4.11.2.3 City of Torrance Noise Standards

Torrance Municipal Code

Noise in the City of Torrance is regulated by Division 4, Chapter 6 of the Municipal Code. Since that component of the Project occurring in the city will be Pipeline construction, Article 3 of the noise regulations is particularly relevant:

ARTICLE 3 – CONSTRUCTION

SECTION 46.3.1. CONSTRUCTION OF BUILDINGS AND PROJECTS.

(a) It shall be unlawful for any person within the City of Torrance to operate power construction tools, equipment, or engage in the performance of any outside construction or repair work on buildings, structures, or projects in or adjacent to a residential area involving the creation of noise beyond 50 decibels (dB) as measured at property lines, except between the hours of 7:30 A.M. to 6:00 P.M. Monday through Friday and 9:00 A.M. to 5:00 P.M. on Saturdays. Construction shall be prohibited on Sundays and

Holidays observed by City Hall. An exception exists between the hours of 10:00 A.M. to 4:00 P.M. for homeowners that reside at the property.

(b) The Community Development Director may allow expanded hours and days of construction if unusual circumstances and conditions exist. Such requests must be made in writing and must receive approval by the Director prior to any expansion of the hour and day restrictions listed above.

(c) Every construction project requiring Planning Commission review or considered to be a significant remodel as defined by Section 231.1.2, shall be required to post an information board along the front property line that displays the property owner's name and contact number, contractor's name and contact number, a copy of TMC Section 46.3.1, a list of any special conditions, and the Code Enforcement phone number where violations can be reported.

(d) Properties zoned as commercial, industrial or within an established redevelopment District, are exempted from the above day and hour restrictions if a minimum buffer of 300 feet is maintained from the subject property's property line to the closest residential property. The Community Development Director, may, however, revoke such exemption for a particular project if the noise level exceeds 50 decibels (dB) at the property line of a residential property beyond the 300 linear foot buffer.

(e) Heavy construction equipment such as pile drivers, mechanical shovels, derricks, hoists, pneumatic hammers, compressors or similar devices shall not be operated at any time, within or adjacent to a residential area, without first obtaining from the Community Development Director permission to do so. Such request for permission shall include a list and type of equipment to be used, the requested hours and locations of its use, and the applicant shall be required to show that the selection of equipment and construction techniques has been based on minimization of noise within the limitations of such equipment as is commercially available or combinations of such equipment and auxiliary sound barriers. Such permission to operate heavy construction equipment will be revoked if operation of such equipment is not in accordance to approval.

General noise regulations (from which motor vehicles are exempt) are provided in Article 7:

ARTICLE 7 – GENERAL NOISE REGULATIONS

SECTION 46.7.1. GENERAL NOISE REGULATIONS.

Notwithstanding any other provision of this Chapter and in addition thereto, it shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any loud, unnecessary or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.

SECTION 46.7.2. NOISE LIMITS.

To provide for methodical enforcement and to give reasonable notice of the performance standards to be met, the foregoing intent is expressed in the following numerical standards. For purposes of this Chapter, the City is divided into regions. Region 1 includes the

predominantly industrial areas in and around the refineries and industrial uses on the western edge of the City. ƒ Region 2 includes the area in and around the airport and includes the commercial and industrial uses south of Lomita Boulevard and north of Pacific Coast Highway. ƒ Region 3 encompasses the residential neighborhoods south of Pacific Coast Highway and west of Hawthorne Boulevard ƒ Region 4 includes the remainder of the City.

(a) Noise Limits on Residential Land. It shall be unlawful for any person within the City of Torrance (wherever located) to produce noise in excess of the following levels as received on residential land owned or occupied by another person within the designated regions. In addition to the noise limits stated herein, the noise limits set forth in Sec. 46.7.2.b) shall also be complied with.

(1) For noise receivers located on residential land, for measurement positions five hundred (500) feet or more distant from the boundaries of Regions 1 and 2, the following limits apply:

REGION (in which noise receiver is located)	NOISE LEVEL, dB	
	Day	Night
3	50	45
4	55	50

(2) For noise receivers located on residential land, for positions within five hundred (500) feet from the boundary of Region 1 or 2, the following limits apply: Five (5) dB above the limits set forth in Section 46.7.2.a) 1 above, or 5 dB above the ambient noise level, whichever is the lower number.

(b) Noise Limits at Industrial and Commercial Boundaries:

(1) Noise Sources in Region 1: It shall be unlawful for any person in Region 1 to produce noise levels at the boundary of Region 1 in excess of 70 dB during the day or 65 dB during the night.

(2) Noise Sources in Region 2: It shall be unlawful for any person in Region 2 to produce noise levels at the boundary of Region 2 in excess of 60 dB during the day or 55 dB during the night.

(3) Noise Sources in All Remaining Industrial Use Land: It shall be unlawful for any person on industrial use land outside Region 1 and 2 to produce noise levels at his own property boundary in excess of 60 dB during the day or 55 dB during the night.

(4) Noise Sources on All Land Use for Commercial Purposes: It shall be unlawful for any person on land used for commercial purposes to produce noise levels at his own property boundary in excess of 60 dB during the day or 55 dB during the night.

In addition to the noise limits set forth herein (Sec. 46.7.2.b), the noise limits set forth in Sec. 46.7.2. (a) shall also be complied with.

(c) Corrections to the Noise Limits: The numerical limits given in Sec. 46.7.2. (a) and (b) shall be adjusted by addition of the following corrections where appropriate.

Noise Conditions		Correction to the Limits, decibels
1.	Noise contains a steady, audible tone, such as a whine, screech or hum	-5
2.	Noise is a repetitive impulsive noise, such as hammering or riveting	-5
3.	If the noise is not continuous, one of the following corrections to the limits shall be applied:	
	a) Noise occurs less than 5 hours per day or less than 1 hour per night	+5
	b) Noise occurs less than 90 minutes per day or less than 20 minutes per night	+10
	c) Noise occurs less than 30 minutes per day or less than 6 minutes per night	+15
4.	Noise occurs on Sunday morning (between 12:01 A.M. and 12:01 P.M. Sunday)	-5

Section 91.32.4 addresses vibrations in limited manufacturing districts, stating "No equipment, machinery or facility shall be operated so as to generate vibration which is perceptible at or beyond the property line, without the aid of instruments to a person of normal sensibilities".

City of Torrance General Plan

The noise control provisions of the Torrance Municipal Code are reiterated in the Noise Element (Chapter 5) of the City of Torrance General Plan. The General Plan also includes maximum noise level guidelines for land-use compatibility, which are not applicable to the Project.

4.11.3 Significance Criteria

The significance criteria used in this EIR are based on Appendix G of the CEQA Guidelines (section X), which presents the following key questions relative to noise impacts.

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
- A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

These questions from the CEQA Guidelines are further enhanced for analysis specific to the Proposed Project through the application of locally adopted standards and criteria described in the previous section. Based on these enhanced significance thresholds, the potential noise effects for each phase are discussed below.

4.11.3.1 Oil Production Site

A significant noise impact would occur if:

- Operational activity results in noise levels in excess of the limits established by the Hermosa Beach Municipal Code and the Hermosa Beach Oil Code (see section 4.11.2).
- Construction activities at the Project Site occur outside of the hours allowed by the Hermosa Beach Municipal Code (see section 4.11.2).
- Operations, drilling or redrilling results in an increase of more than 3 dBA in the lowest hourly ambient equivalent noise levels (L_{eq}) at residential uses.
- Operations, drilling or redrilling results in an increase of more than 5 dBA in the lowest hourly ambient equivalent noise levels (L_{eq}) at sensitive non-residential uses (school or greenbelt).
- Operations, drilling or redrilling produce noise that includes pure tones when measured at a neighboring property.
- Construction activities result in an increase of more than 5 dBA in the daily ambient equivalent noise level (L_{eq}) measured over the period 8:00AM - 7:00PM.

A significant vibration impact would occur if:

- Construction or operational activity causes vibration levels at the property line of any neighboring use to exceed 0.01 inches/second over the frequency range 1 - 100 Hz.

4.11.3.2 Pipeline Construction and Trucking Routes

A significant noise impact would occur if:

- Pipeline construction activity associated with the Project results in noise levels in excess of the limits established by local codes and regulations of the cities through which the Pipeline passes (see section 4.11.2).
- Pipeline construction activities occur outside of the hours allowed by the Municipal Codes of the cities through which the Pipeline passes (see section 4.11.2).
- Pipeline construction activities result in an increase of more than 5 dBA in the equivalent noise level (L_{eq}) measured over the entire daytime period.
- Traffic associated with the Project results in an increase in the Community Noise Equivalent Level (CNEL) of more than 3 dB.
- Traffic associated with the Project that passes through the city of Redondo Beach results in a Day-Night average noise level (L_{dn}) of more than 65 dB.

A significant vibration impact would occur if:

- Project-related construction or traffic along the Pipeline/truck routes results in vibration levels at the property line of any neighboring use to exceed 0.01 inches/second over the frequency range 1- 100 Hz.

4.11.3.3 Relocated City Yard

A significant noise impact would occur if:

- Construction activities result in an increase of more than 5 dBA in the average daily ambient equivalent noise level (L_{eq}) measured over the period 8:00AM - 7:00PM.
- Operation of the yard results in an increase of more than 3 dBA in the daily average ambient equivalent noise level (L_{eq}) measured over the period 8:00AM - 7:00PM.

A significant vibration impact would occur if:

- Construction or operational activity causes vibration levels at the property line of any neighboring use to exceed 0.01 inches/second over the frequency range 1 - 100 Hz.

4.11.3.4 Significance Criteria Rationale

Noise Impacts of the Oil Production Facility

The significance criteria for operations (including drilling and redrilling) at the Project Site are based on A-weighted minimum hourly average equivalent noise levels (L_{eq}, dBA). The intent is to provide a relatively simple, easily understood description of the noise environment that does not require complex analysis to measure or enforce. The minimum hourly L_{eq} is selected as the baseline, because the operation of the proposed facility would be continuous, 24-hours a day, seven days a week. Project noise levels contributing a 3 to 5 dBA increase over the baseline noise level were selected as significance criteria. These levels are derived from typical human response to changes in noise level. A change of 3 dBA is generally acknowledged as the point at which most people would begin to perceive an increase or decrease in noise level; a change of 5 dBA is generally considered to be the point at which most people would perceive a significant increase or decrease in noise level. The lower value was selected for residential locations with nighttime occupancy (nighttime usually produces the lowest hourly, A-weighted equivalent noise level), whereas the higher value was used for areas that generally do not have nighttime occupancy.

Pure tones are sounds in which a single frequency stands out, like a hum or a buzz. Pure tones can be considerably more annoying than sounds that do not contain pure tones at the same dBA level, and therefore the impacts of pure tones have been specifically addressed herein. A pure tone shall be deemed to exist if the one-third octave band sound-pressure level in the band with the tone exceeds the arithmetic average of the sound-pressure levels of the two contiguous one-third octave bands by 5 dB for center frequencies of 500 Hertz and above, and by 8 dB for center frequencies between 160 and 400 Hertz, and by 15 dB for center frequencies less than or equal to 125 Hertz.

Construction Noise

Construction noise is generally accepted as a necessary part of construction activities, which are allowed by the Hermosa Beach Municipal Code (section 8.24.050) if the construction activities are limited to daytime, weekday and Saturday hours only. The cities of Redondo Beach and Torrance regulate construction in a similar time-limited way, without specific noise limits. However, in order to ensure that daytime noise levels do not produce noise levels that are "physically annoying to reasonable persons of ordinary sensitivity and ... cause or contribute to the unreasonable discomfort of any persons within the vicinity" (as per the Hermosa Beach Municipal Code section 8.24.030), the significance criteria for construction noise impacts limit noise from Project-related construction (including the Pipelines and relocated City Yard, as well as the oil production facility itself), based on the daily equivalent noise level - i.e. the equivalent noise level (L_{eq}) measured over the entire day. By limiting the total amount of noise generated during the day to a specific increase over the baseline, the impacts could be classified as not annoying and would not contribute to discomfort.

The significance criteria for construction noise are less stringent than the significance criteria for operational noise from the Project, because noise from the construction phases of the Project would be intermittent and temporary whereas noise from the operation of the production facility would be constant and long-term.

Traffic Noise

It is conventional to assess the noise impact of changes in traffic flow noise in terms of a 24-hour noise average such as CNEL or L_{dn}. CNEL is marginally more stringent than L_{dn}, because it includes a 5 dB penalty for the evening hours (which L_{dn} does not) and has therefore been selected as the default metric for assessing traffic noise impact associated with the Project. A 3 dB increase in the CNEL is selected as the threshold of significance because a 3dB change is generally acknowledged as the point at which most people would begin to perceive an increase or decrease in noise level.

For those truck routes that pass through the City of Redondo Beach, an additional significance criterion of 65 dB, L_{dn} is applied - consistent with the traffic noise policy prescribed by the Redondo Beach General Plan.

Noise Impacts of the Relocated City Yard

Unlike the proposed oil production facility, the operation of the relocated City Yard would be limited to the daytime, with activities occurring predominantly Monday through Friday. The City Yard would not operate at night and it is expected that weekend operations would be limited to a few hours on Saturdays - consistent with the schedule at the existing yard. Also unlike oil production operations, noise from the City Yard is sporadic and varies from hour to hour.

For these reasons, the significance criterion for noise impact from the City Yard is based on equivalent noise levels measured over the entire daytime, rather than the minimum hourly L_{eq}.

It should also be noted that the significance criterion for weekend operations is more stringent than it is for operations on Monday - Friday due to the lower baseline noise levels in the area during weekends and the criteria being based on an increase over baseline.

Vibration

Since the City of Hermosa Beach General Plan and Municipal Code do not address vibration, the significance criteria for Project-related vibration impacts in the city has been based on the County of Los Angeles Code has been used, which defines a "perception threshold" vibration limit of 0.01 inches per second over the frequency range 1 - 100 Hz. The same rationale has been applied to Project-related vibration impacts in the City of Torrance.

The Redondo Beach Municipal Code, which requires that vibration be limited to "the threshold of perception", which is defined in terms of acceleration ("g's") rather than velocity (inches per second). Nonetheless, the 0.01 inches per second limit is applied as the significance threshold for Project-related vibration sources (Pipeline construction) that would occur in the City of Redondo Beach because:

- Although the metrics are different, the intent of the vibration limits in the Los Angeles County Code and the Redondo Beach Municipal Code is the same - to describe the threshold of human perception.
- Applying the 0.01 inches per second (1 - 100 Hz) significance criterion to all three cities affected by the Project is consistent and avoids unnecessarily complication in the presentation of the vibration analysis.

4.11.4 Project Impacts and Mitigation Measures

Impacts are assessed associated with noise, at the Proposed Oil Project Site and along the Pipeline and traffic routes, and vibration.

4.11.4.1 Proposed Oil Project Noise Impacts & Mitigation

The noise impacts of the Project have been predicted by creating computer modeling using SoundPLAN 7.3 software.

The SoundPLAN software allows the environment around the Project to be modeled in three dimensions, based on terrain contours and ground surface characteristics. The physical characteristics of buildings and other structures that will serve as barriers to (or reflectors of) noise have been imported directly into the model from records provided by the Planning Department at the City of Hermosa Beach, ensuring that footprint and height dimensions are the most accurate available. The various noise sources associated with each phase of the Project have been input to the model, with calibration checks to verify that received noise levels are accurate. The software then uses all of this information to calculate noise contours and single-point-receiver noise levels, assuming a light downwind in all directions.

Project Phase 1 - Site Preparation

According to the Project Application, the Phase 1 of the Project has an estimated duration of 23 weeks, during which time various site preparation work would occur at the oil production site including:

- Relocation of existing overhead utilities along Valley Drive and at the intersection of 6th Street and Valley Drive underground.
- Construction of redesigned intersection at 6th Street and Valley Drive.
- Demolition of the existing buildings on the site.
- Demolition of existing concrete paving, asphalt, fencing and walls.
- Construction of new retaining walls at west and south property lines.
- Rough grading.
- Excavation and construction of the well cellar.
- Construction of a new chain-link fence.
- Installation of electrical services.
- Landscaping.
- Erection of a 32-foot high sound attenuation wall.

According to equipment usage data made available by the Applicant, together with published noise level data for the various activities and equipment associated with the proposed site preparation work, the noisiest portion of the demolition stage is expected to be the removal of concrete paving, fencing and walls, estimated to last up to 7 weeks. By a similar assessment, the noisiest part of the construction work in Phase 1 has been determined to be the pumping of concrete for the new well cellar; the noisiest stage of this construction work would occur when a concrete truck and concrete pump are in use simultaneously, estimated to last up to 2 weeks.

These two specific stages of the site preparation work have therefore been modeled as representing the worst-case demolition and construction noise scenarios during Phase 1, using information about the type and usage of equipment during each provided by the applicant's consultant. Table 4.11-13 summarizes the equipment noise and usage data input to the noise prediction models for Phase 1. Note that the demolition and concrete pumping portion of Phase 1 would last for a combined 9 weeks of the Phase 1 twenty-three week period. The other periods of Phase 1 would generate less noise and therefore have lower noise levels than these predicted in this analysis.

Table 4.11-13 Phase 1 Noise Models - Equipment Usage and Noise Level Data

Work Stage	Equipment	Sound Power Level (dBA)	Quantity in Model	Usage Factor[1] (%)
Phase 1 Demolition *Removal of concrete paving, fencing and walls.*	Concrete Buster	121.8	1	10
	Loader	110.7	1	40
	Truck	115.8	1	40
Phase 1 Construction *Pumping of concrete for the well cellar.*	Concrete Pump	113.8	1	20
	Concrete Truck	116.8	1	40

[1] The percentage of time the equipment is expected to operate during each day of the modeled scenario.

The applicant proposes the following noise reduction design features measures for Phase 1:

- A 16-foot high temporary acoustical barrier, with a minimum Sound Transmission Class (STC) rating of 25 erected around the perimeter of the site.
- Demolition and construction activities at the Project Site limited to between 8am and 6pm Monday - Friday, 9am - 5pm on Saturdays. No demolition or construction activities on Sundays or Federal holidays.
- All demolition and construction equipment will be regularly serviced and maintained in proper working order, so as not to create excessive noise. Any non-compliant equipment will be immediately removed from service. Equipment maintenance work will be subject to the same time restrictions as the other demolition and construction activities.
- All mechanical equipment, including mobile equipment, will be switched off when not in use.
- All personnel working on the Project Site will receive Employee Noise Awareness training, to ensure familiarity with all noise control procedures and the importance of strict compliance.
- Horns, whistles or other loud devices will not be used.
- Yelling will be avoided. All personnel communications - outside of emergencies - will be made via walkie-talkies or other electronic communication devices.
- No radios or other loudspeaker devices will be allowed on the site.

In addition, the Applicant would be bound by the following construction noise control measures required by the 1993 Conditional Use Permit:

- All truck and equipment deliveries will be limited to the hours of 9am to 3pm, Monday through Friday.
- Operation of earthmoving equipment will be limited to the hours 8am - 6pm.

Figures 4.11-9 and 4.11-10 show the predicted noise contour maps for the worst-case demolition and construction scenarios during Phase 1, with all of the Applicant's noise control proposals in-place. The contour values are overall average Equivalent Noise Levels (Leq) and the receiver height for these two figures is 5-feet, which represents approximate ear height for a person standing on the ground. Figures 4.11-11 and 4.11-12 show the noise contours for the same two scenarios with a receiver height of 20-feet - which approximates the height of a second or third-story window or deck. These contours are relevant to the residential uses in the neighborhood, which are typically two- or three-story structures.

Tables 4.11-14 and 4.11-15 compare baseline (existing) noise levels at those receptors closest to the proposed oil production site with the predicted demolition and construction noise levels associated with Phase 1 of the Project, with the Applicant's proposed mitigation measures. The baseline is the average daytime noise level measured on a Saturday - since this day of the week will represent the worst-case noise impact as the baseline noise levels are lower on the weekend than the weekday.

Impact #	Impact Description	Phase	Residual Impact
NV.1	Demolition and construction machinery would increase noise levels.	Phase 1	Class I Significant and Unavoidable

As the tables show, the predicted noise impact of demolition and construction activities in Phase 1 of the Project is significant at many of the neighboring sensitive uses. The most significant impacts occur during the construction phase, when Project-related noise is expected to result in an increase in daytime noise levels of as much as 12.7 dBA at the homes to the northwest and west of the site.

Table 4.11-14 Phase 1 - Predicted Demolition Noise Impact

Location	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Daytime Noise Level (dBA)	Significant?
		Baseline	Prediction for Phase 1 Demolition	Phase 1 Demolition + Baseline		
Residential Uses North of Site on 8th Street	5	62.8	63.5	66.2	3.4	NO
	20	62.8	65.6	67.4	4.6	NO
Residential Uses Northwest of Site on Cypress Street	5	54.1	59.8	60.8	6.7	YES
	20	54.1	66.3	66.6	12.5	YES
Residential Uses East of Site on Ardmore Avenue	5	58.8	59.8	62.3	3.5	NO
	20	58.8	63.9	65.1	6.3	YES
Residential Uses West of Site on Loma Drive	5	52.4	64.0	64.3	11.9	YES
	20	52.4	65.4	65.6	13.2	YES
Veterans Parkway (Center)	5	52.7	58.6	59.6	6.9	YES

Table 4.11-15 Phase 1 - Predicted Construction Noise Impact

Location	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Daytime Noise Level (dBA)	Significant?
		Baseline	Prediction for Phase 1 Con-struction	Phase 1 Con-struction + Baseline		
Residential Uses North of Site on 8th Street	5	62.8	63.7	66.3	3.5	NO
	20	62.8	65.3	67.2	4.4	NO
Residential Uses Northwest of Site on Cypress Street	5	54.1	58.3	59.7	5.6	YES
	20	54.1	66.1	66.4	12.3	YES
Residential Uses East of Site on Ardmore Avenue	5	58.8	58.4	61.6	2.8	NO
	20	58.8	63.1	64.5	5.7	YES
Residential Uses West of Site on Loma Drive	5	52.4	61.7	62.2	9.8	YES
	20	52.4	64.9	65.1	12.7	YES
Veterans Parkway (Center)	5	52.7	55.1	57.1	4.4	NO

Mitigation Measures

NV-1a Increase the height of the noise barriers on the west and north sides of the site to 35-feet and upgrade the sound insulation performance of the barrier material from STC-25 to STC-32.

NV-1b Increase the height of the noise barriers on the south and east sides of the site to 22-feet. The sound insulation performance of the barrier material in these locations may remain at STC-25.

NV-1c The gates on the east and south sides of the site shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides.

NV-1d All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.

Figures 4.11-11 through 4.11-15 show predicted demolition and construction noise contours for Phase 1, with these mitigations in place. Tables 4.11-16 and 4.11-17 show how the additional mitigation measures reduce noise impact around the site during Phase 1.

Residual Impacts

The noise impacts of construction would be less than significant with mitigation. The noise impact of demolition equipment in Phase 1 would remain **significant and unavoidable (Class I)**.

Figure 4.11-9 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION for a Receiver Height of 5-ft

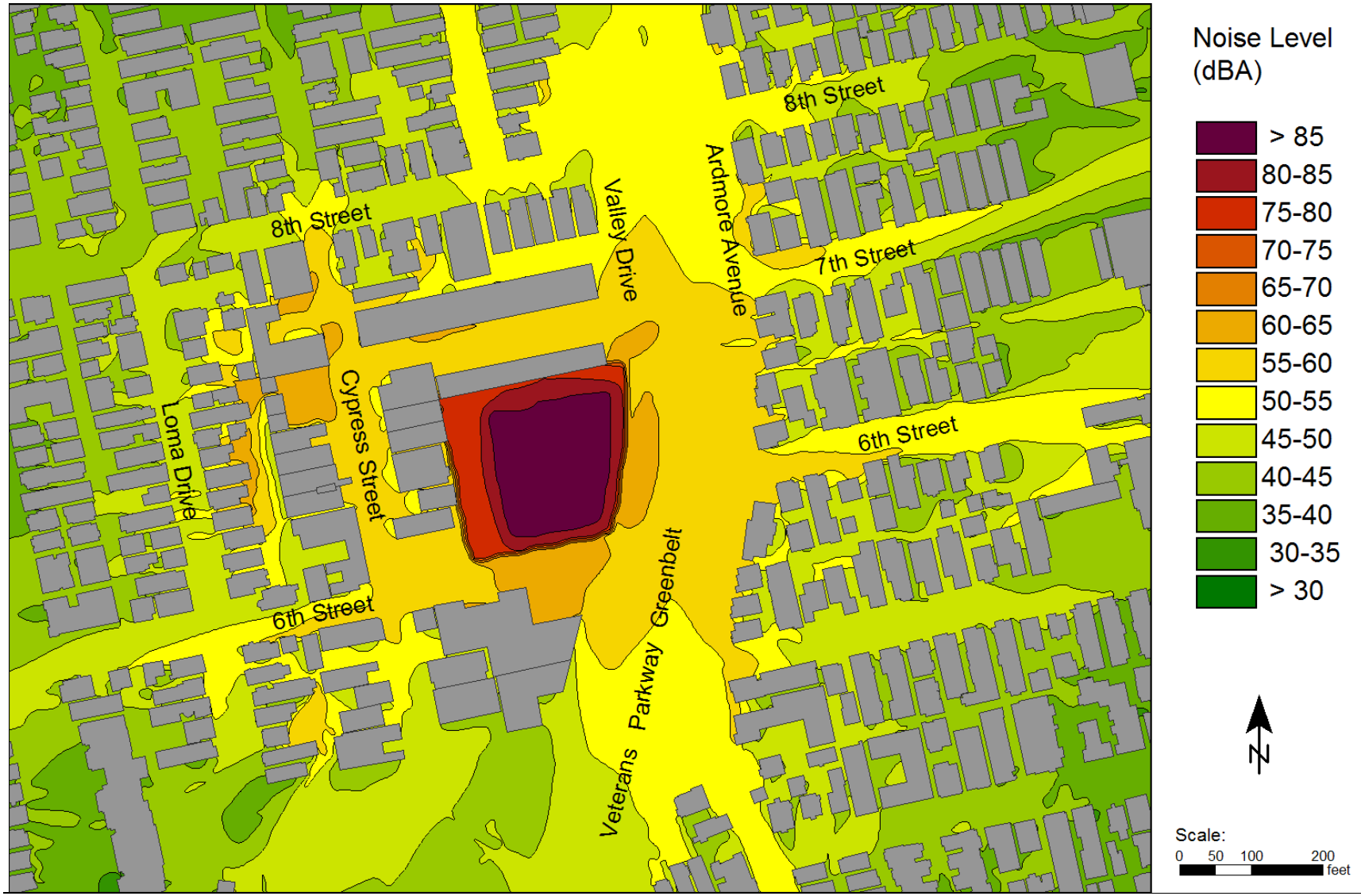


Figure 4.11-10 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION for a Receiver Height of 5-ft

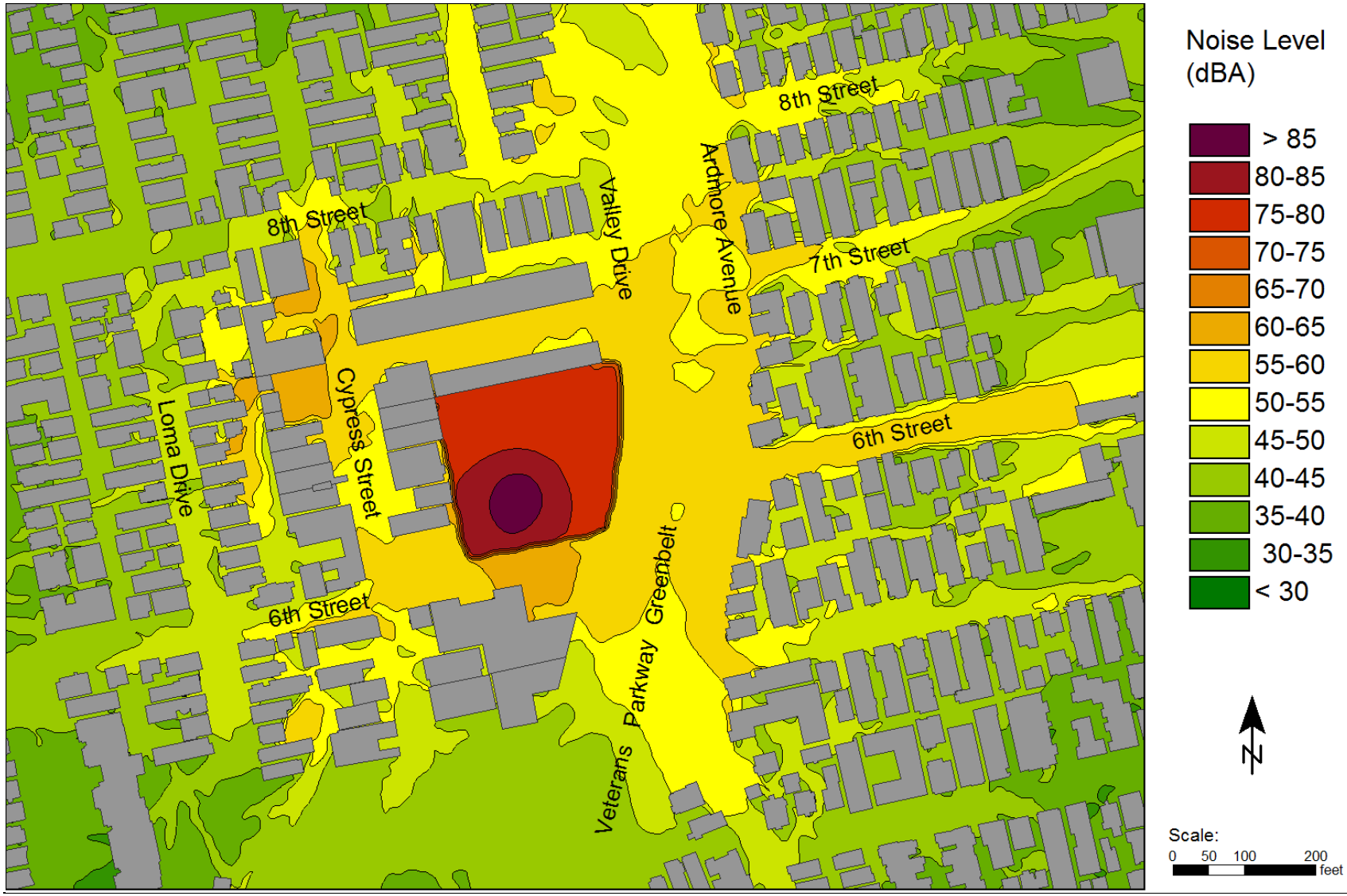


Figure 4.11-11 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION for a Receiver Height of 20-ft

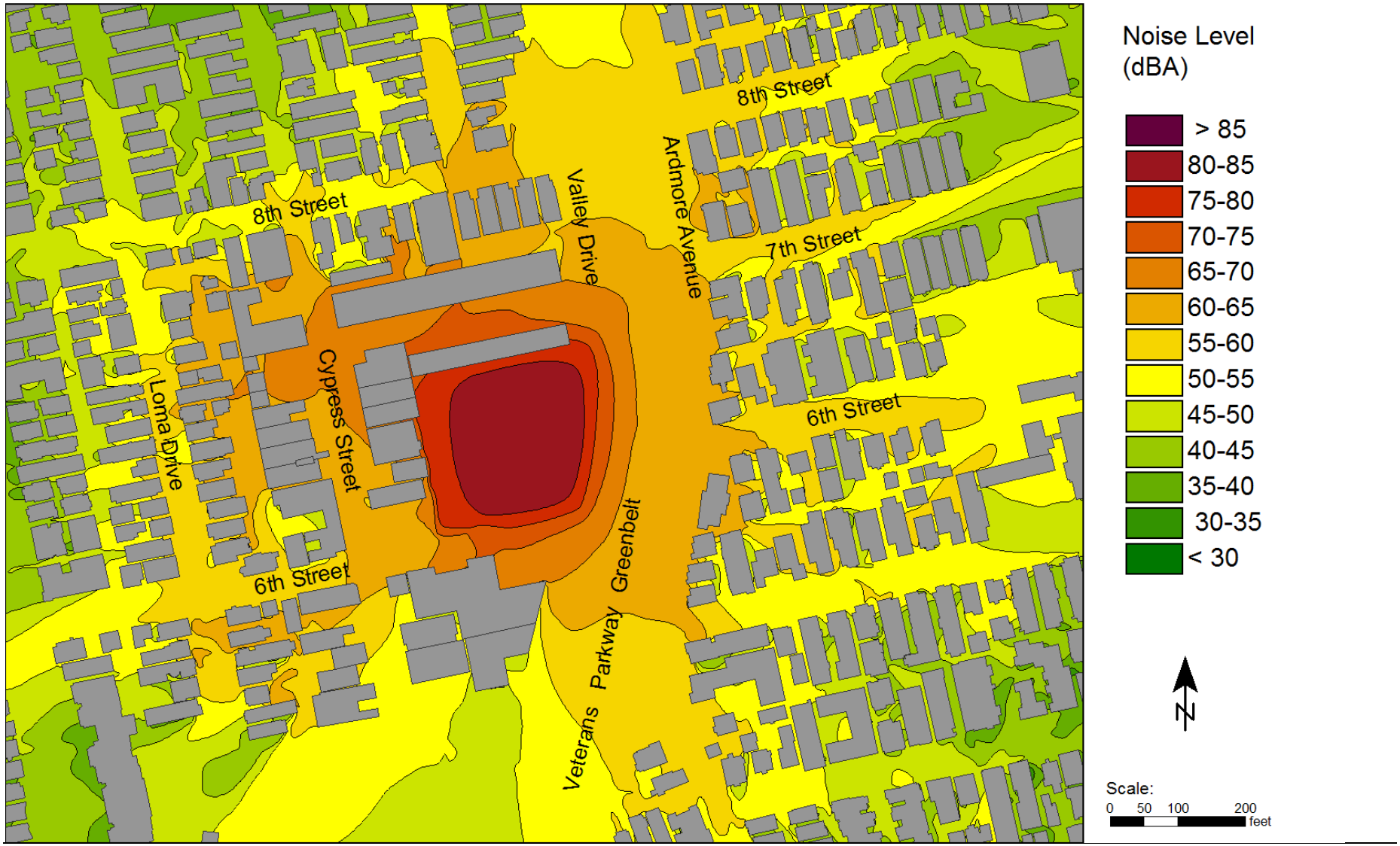


Figure 4.11-12 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION for Receiver Height of 20-ft

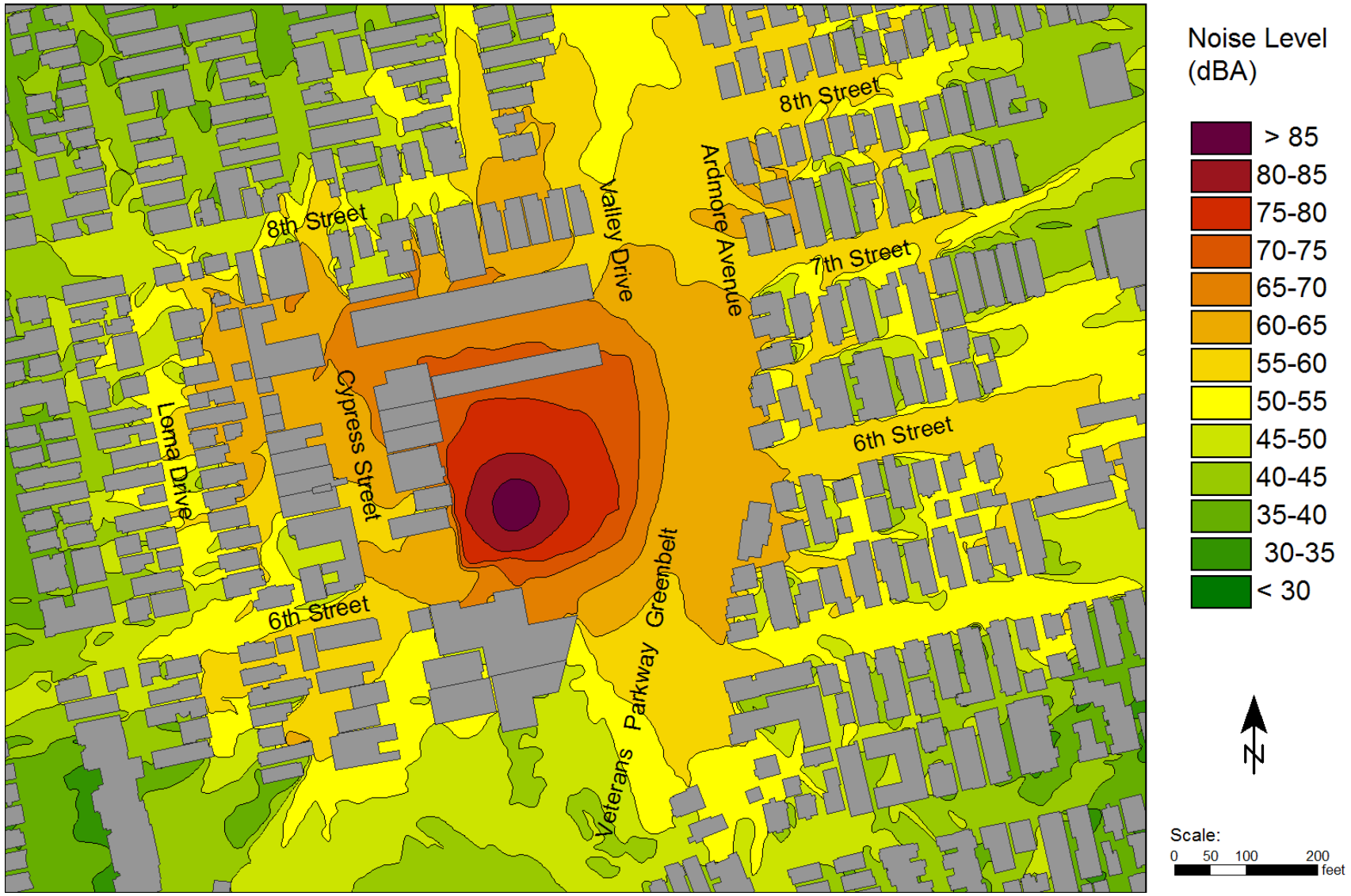


Table 4.11-16 Phase 1 - Predicted Demolition Noise Impact with Additional Mitigation

Location	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Daytime Noise Level (dBA)	Significant?
		Baseline	Prediction for Phase 1 Demolition	Phase 1 Demolition + Baseline		
Residential Uses North of Site on 8th Street	5	62.8	56.5	63.7	0.9	NO
	20	62.8	57.3	63.9	1.1	NO
Residential Uses Northwest of Site on Cypress Street	5	54.1	53.5	56.8	2.7	NO
	20	54.1	57.9	59.4	5.3	YES
Residential Uses East of Site on Ardmore Avenue	5	58.8	57.2	61.1	2.3	NO
	20	58.8	61.1	63.1	4.3	NO
Residential Uses West of Site on Loma Drive	5	52.4	57.5	58.7	6.3	YES
	20	52.4	56.5	57.9	5.5	YES
Veterans Parkway (Center)	5	52.7	56.5	58.0	5.3	YES

Table 4.11-17 Phase 1 - Predicted Construction Noise Impact with Additional Mitigation

Location	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Daytime Noise Level (dBA)	Significant?
		Baseline	Prediction for Phase 1 Con-struction	Phase 1 Con-struction + Baseline		
Residential Uses North of Site on 8th Street	5	62.8	54.4	63.4	0.6	NO
	20	62.8	56.4	63.7	0.9	NO
Residential Uses Northwest of Site on Cypress Street	5	54.1	51.7	56.1	2.0	NO
	20	54.1	56.3	58.3	4.2	NO
Residential Uses East of Site on Ardmore Avenue	5	58.8	54.8	60.3	1.5	NO
	20	58.8	59.2	62.0	3.2	NO
Residential Uses West of Site on Loma Dr	5	52.4	54.5	56.6	4.2	NO
	20	52.4	54.0	56.3	3.9	NO
Veterans Parkway (Center)	5	52.7	52.8	55.8	3.1	NO

Figure 4.11-13 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION with Mitigation for a Receiver Height of 5-ft

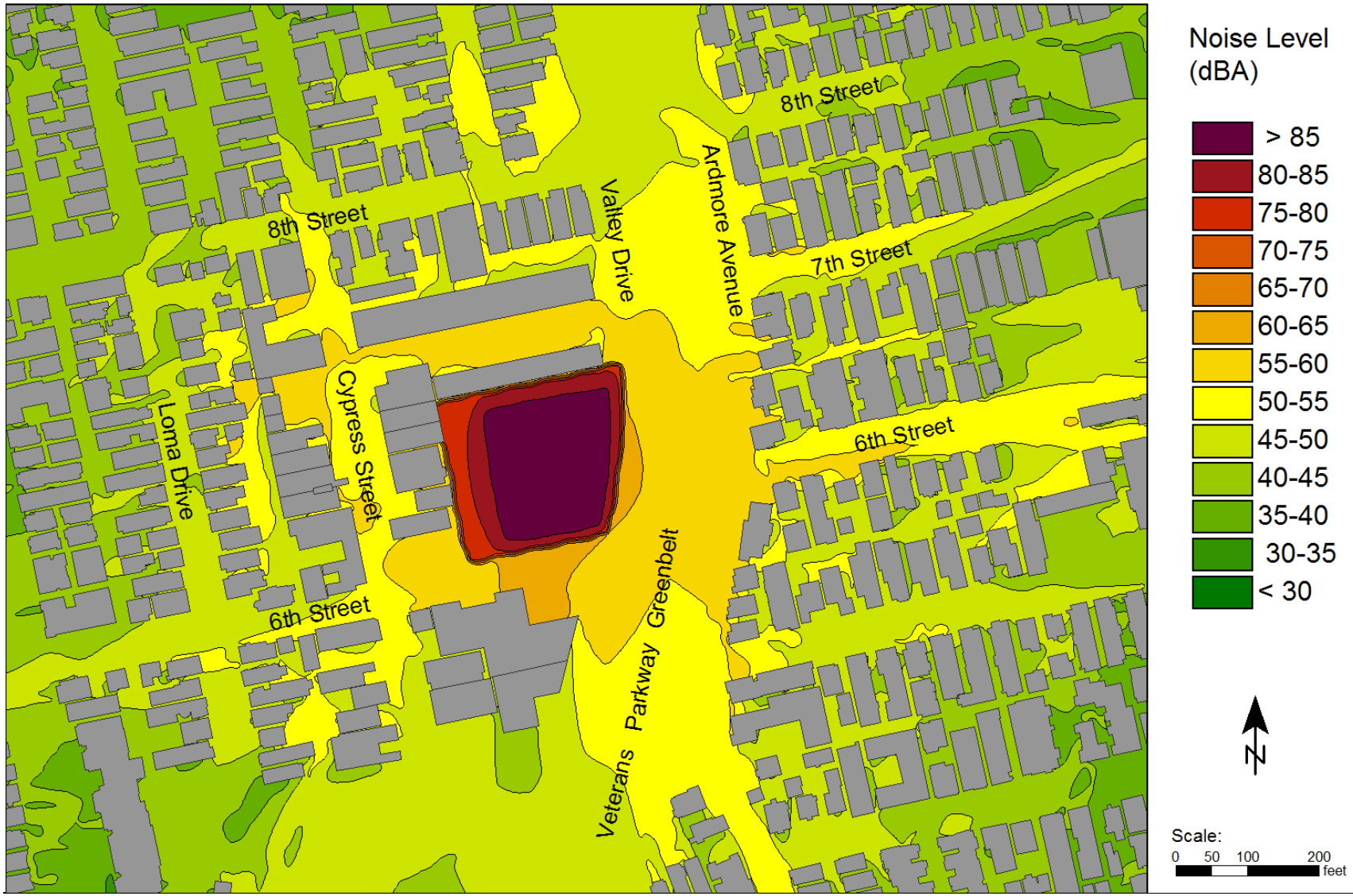


Figure 4.11-14 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 5-ft

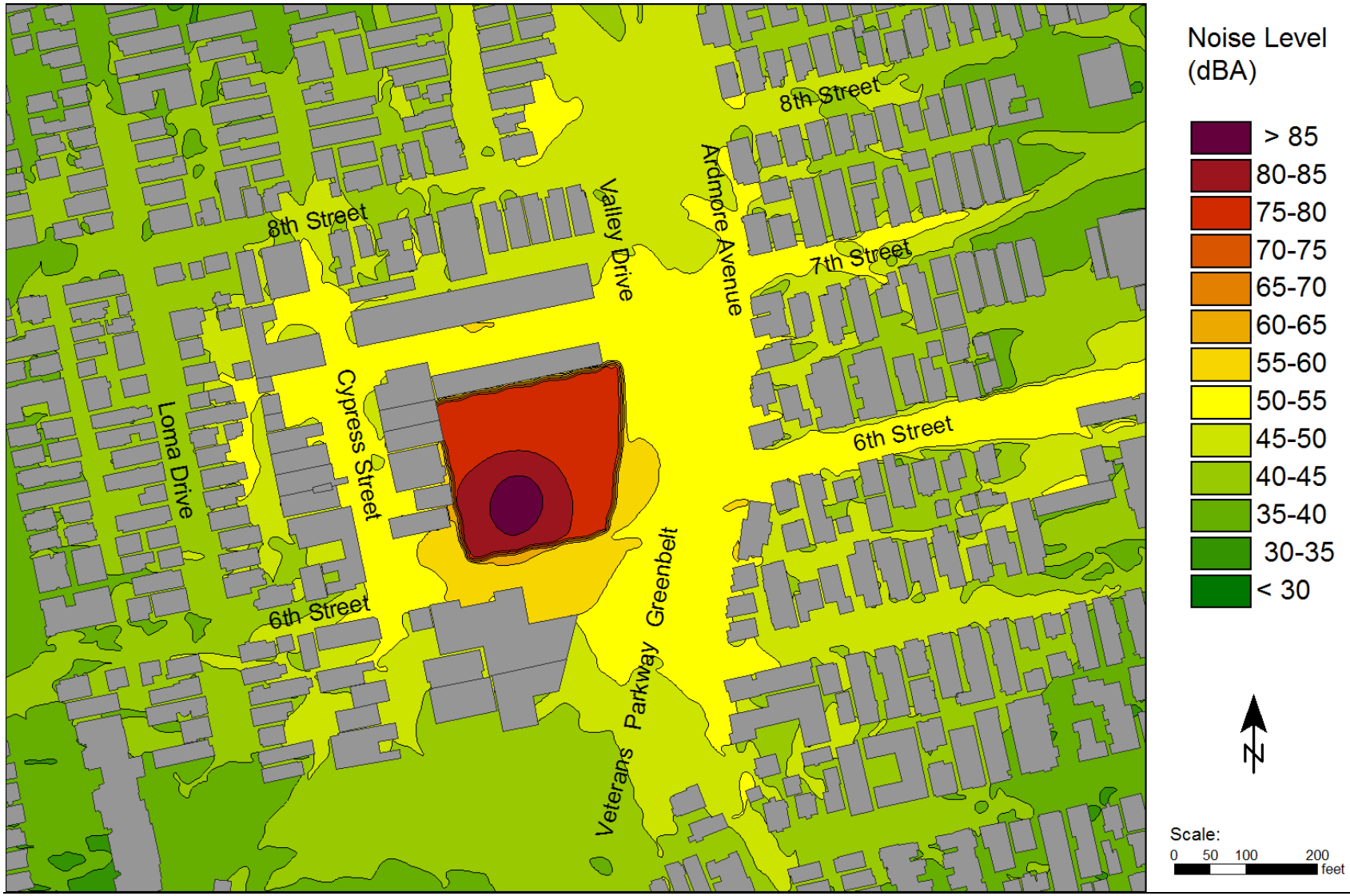


Figure 4.11-15 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION with Mitigation for a Receiver Height of 20-ft

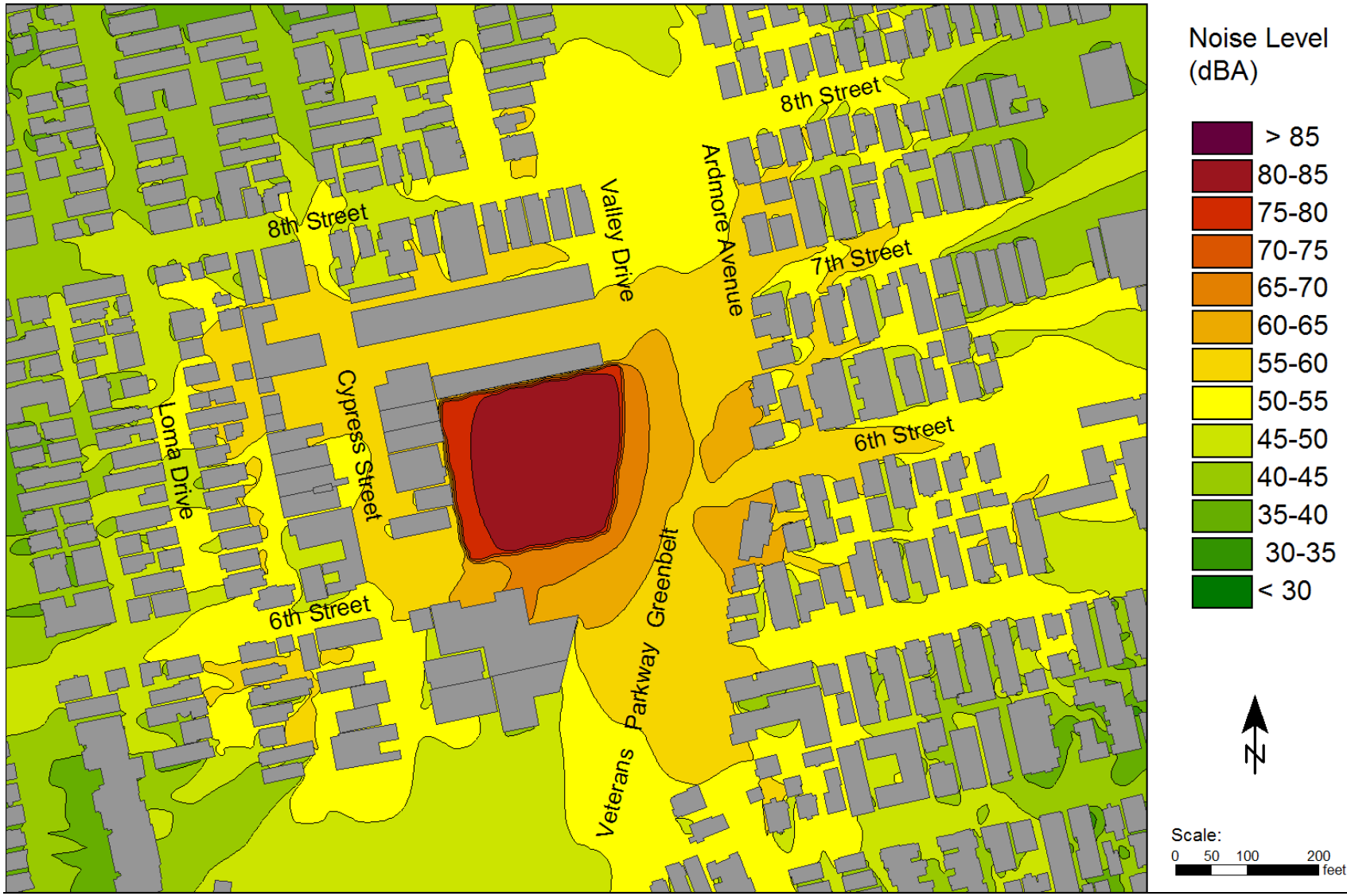


Figure 4.11-16 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 20-ft

Project Phase 2 - Drilling and Testing

Phase 2 of the Proposed Project has an estimated duration of 12 months, during which time the potential productivity and economic viability of the site would be evaluated by the drilling of test wells. Three test wells would be drilled together with one water injection well. Test production equipment would also be in use during this phase, testing the wells at a rate of approximately 800 barrels per day. According to the Applicant's schedule, the test drilling and test production activities would occur simultaneously for approximately 2 months. During this time, drilling and test production equipment would operate 24-hours per day. After the overlap period, the test production activity only would continue for approximately 7 months, with equipment operating continuously 24-hours per day. The drilling would occur for 4 months.

Data used in the noise modeling of the drilling activities in this phase is based on:

- Field measurements made by Behrens and Associates of the noise produced by an Ensign 533 electric top drive drilling rig operating on a site near Bakersfield. According to the application, this rig is similar to the drilling equipment proposed for Phase 2 of the Project.
- Field measurements made by Arup Acoustics at the Whittier oilfield of various intermittent pipe-handling noises associated with drilling.

The test production equipment noise model has been based on noise measurements made by Behrens and Associates at PXP's Murphy site in Los Angeles. According to the application, the production equipment in use at the Murphy site is similar to that proposed for this phase of the Project. Table 4.11-18 summarizes the equipment types and source noise levels used in the noise analysis of Phase 2.

Impact #	Impact Description	Phase	Residual Impact
NV.2	Drilling + Production activities would increase noise levels.	Phase 2	Class I Significant and Unavoidable

The Applicant proposes the following noise reduction design features for Phase 2:

- A 32-foot high acoustical barrier, with a minimum STC rating of 32 will be erected around the perimeter of the Project Site during all drilling activities.
- The air inlets of the hydraulic power unit will be fitted with silencers providing the following minimum insertion loss performance:

Octave Band Center Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Insertion Loss (dB)	4	8	18	31	38	38	31	18

- An acoustical shroud will be provided on three sides of the drill rig mast to reduce top drive noise emissions.
- Mud pumps to be completely enclosed by acoustical barriers, with a minimum STC-25 rating.

- An 8-foot high acoustical barrier, with a minimum STC rating of 25 will be installed around the shaker tables.
- The implementation of a "Drilling Quiet Mode Plan", as described in the appendices to the Application. The plan includes both engineering and administrative measures designed to reduce noise disturbance during the nighttime hours (from 7 pm to 8 am).
- Each well pump will be fitted with an acoustical enclosure to limit the radiated sound power level to 83 dBA.
- Noise emissions from each of the produced oil pumps, produced water pumps, water booster pumps and variable frequency drive (VFD) cabinets will be attenuated in such a way as to limit the radiated sound power level to 77 dBA.
- Noise emissions from the water injection pump will be attenuated in such a way as to limit its radiated sound power level to 83 dBA.
- Noise emissions from the vapor recovery compressor will be attenuated in such a way as to limit its radiated sound power level to 83 dBA.
- Noise emissions from the cooler for the vapor recovery compressor will be attenuated in such a way as to limit its radiated sound power level to 85 dBA.

Table 4.11-18 Phase 2 Noise Models - Equipment Usage and Noise Level Data

Work Stage	Equipment	Sound Power Level[1] (dBA)	Quantity in Model	Usage Factor[2] (%)
Phase 2 Test Drilling *Three test wells and one water injection well.*	Hydraulic Power Unit	110.7	1	100
	Mud Pump	105.4	2	100
	Drill Rig Top Drive	93.3	1	100
	Shaker	75.3	3	100
	Metal on Metal Noise	131.7	1	0.1
Phase 2 Test Production *At a rate of 800 barrels per day.*	Well Pumps	97.7	3	100
	Produced Oil Pumps	77.7	1	100
	Produced Water Pumps	86.7	1	100
	Loading Pumps	86.7	1	100
	Water Booster Pumps	86.7	1	100
	Water Injection Pumps	96.8	1	100
	Vapor Recovery Compressor	93.6	1	100
	Vapor Recovery Unit Cooler	90.2	1	100
	Variable Frequency Drive	83.3	3	100

[1] Source level, not including noise control design features, where proposed.
[2] The percentage of time the equipment is expected to operate during each 24-hour period.

In addition, the Applicant would be bound by the following drilling and production equipment noise control measures required by the 1993 Conditional Use Permit:

- Heavy/large reciprocating equipment shall be mounted on vibration isolators.
- Pumping units shall be maintained to eliminate noise from worn parts.
- Tripping will be restricted to daylight hours only.
- Loudspeaker paging systems will be prohibited.
- Well workover rigs or any other rig that is used shall be operated only between the hours of 8:00am and 6:00pm during daytime weekday hours only, excluding holidays, except in an emergency as defined in the CUP and reported to the City in accordance with the notification requirement. The exhaust and intake of the diesel engine (if used on workover rig) shall be muffled to reduce noise to an acceptable limit. The operator shall use whatever means necessary, including but not limited to enclosing the diesel engine and rig in acoustic blankets or housing.
- All oil maintenance equipment, vehicles and non-electrical motors shall be equipped with manufacturer-approved mufflers or housed in a sound-proofing device.
- Noise monitoring shall be conducted under the supervision of an independent certified acoustical engineer paid for by the permittee. Reports shall be submitted to the Planning Director within three working days after the completion of each phase of the monitoring. The monitoring shall include:
    - Pre-drilling phase monitoring. Prior to the start of the drilling phase, noise measurements shall be obtained during the operation of the specific drilling rig which has been selected and the measurements shall be related to those experienced at the nearest residential boundaries to the drilling site. In addition, the noise control measures which have been (or will be) applied to the rig as needed for compliance with the City of Hermosa Beach noise ordinances shall be identified.
    - Start of drilling. Noise measurements shall be obtained during the nighttime hours (10:00pm to 7:00am) for at least six hours on each of three nights within the five day period from the start of the drilling phase. Monitoring is to occur at the nearest residential boundary to the actual drilling operation.
    - During the drilling phase. Noise monitoring shall occur during a six-hour period between the hours of 10:00pm and 7:00am at least once each month during the drilling phase of the Project. The noise level data obtained shall be compared to the City of Hermosa Beach Noise Ordinance standards by the Planning Department. Where an exceedence of the standards is identified. Noise control measures shall be required.
    - Production phase. Noise measurements shall be obtained during a six-hour period between the hours of 10:00pm and 7:00am at least once each year during the production and completion phase.

Figures 4.11-17 and 4.11-18 show predicted noise contours for the drilling-plus-test production stage of Phase 2, for receiver heights of 5-feet and 20-feet above the ground, respectively. These predictions include all of the noise reduction design features proposed by the Applicant for this phase of the Project.

Figure 4.11-17 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION for a Receiver Height of 5-ft

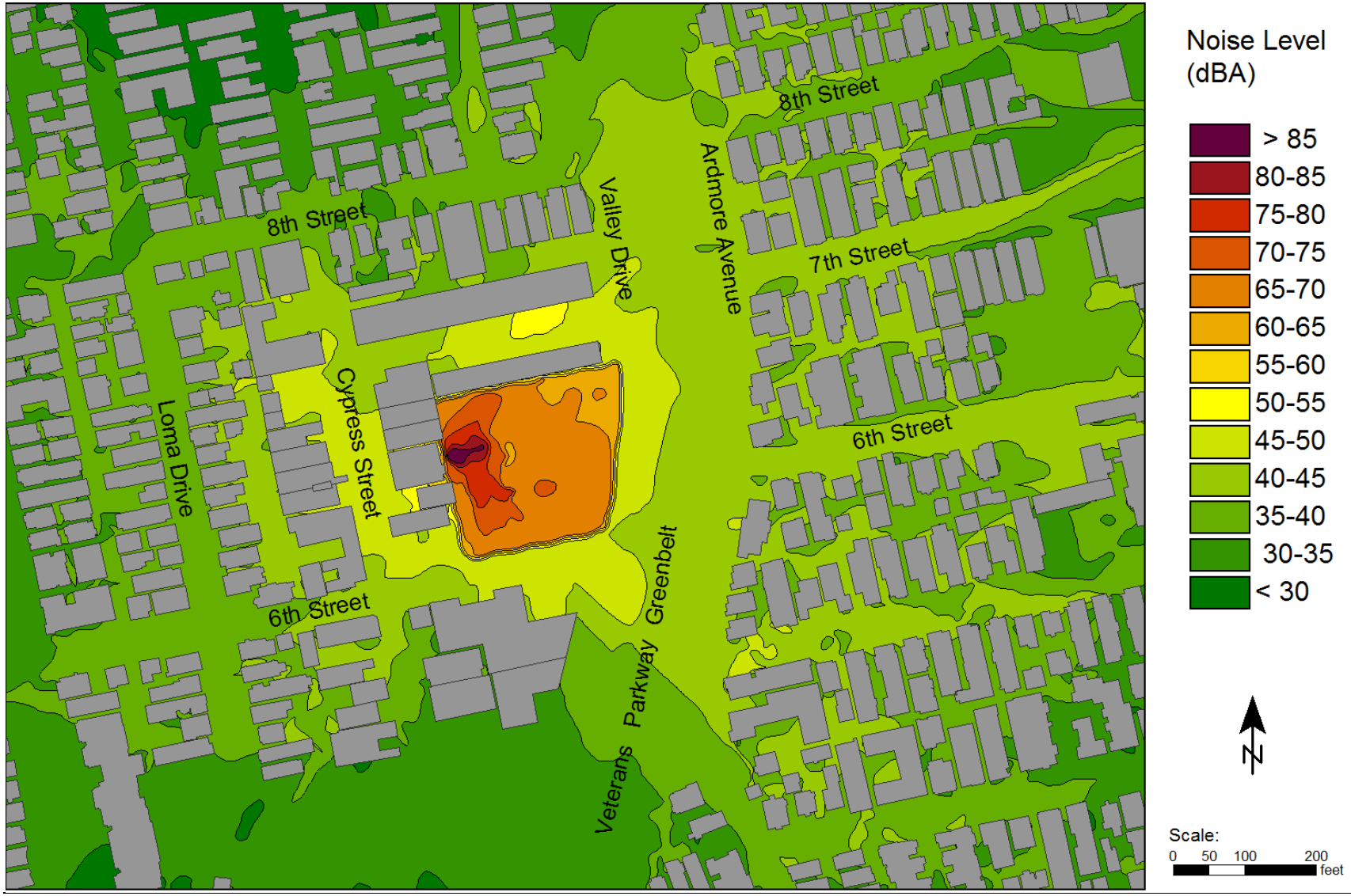


Figure 4.11-18 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION for a Receiver Height of 20-ft

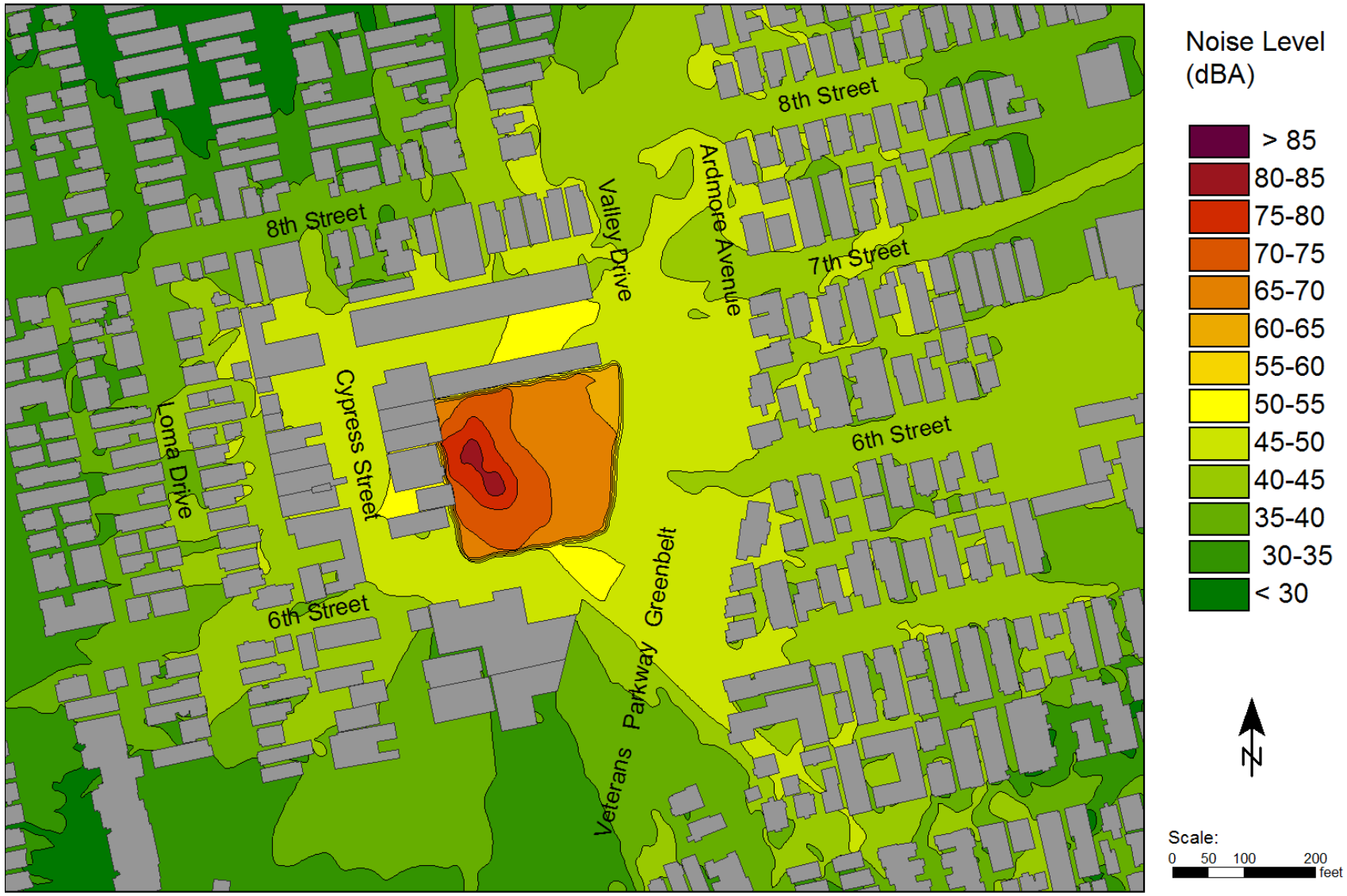


Table 4.11-19 shows how predicted drilling-plus-production noise levels in Phase 2 would impact noise levels at the nearby receivers during the quietest hours of the night. Table 4.11-20 compares predicted drilling-plus-production noise levels with the 45 dBA noise limit required by the Hermosa Beach Oil Code.

Table 4.11-19 Phase 2 - Predicted Drilling & Test Production Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Drilling + Test Production	Drilling + Test Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	44.6	48.1	2.5	NO
	20	45.6	49.1	50.7	5.1	YES
Residential Uses Northwest of Site on Cypress Street	5	37.6	41.3	42.8	5.2	YES
	20	37.6	47.0	47.5	9.9	YES
Residential Uses East of Site on Ardmore Avenue	5	38.3	45.2	46.0	7.7	YES
	20	38.3	47.9	48.4	10.1	YES
Residential Uses West of Site on Loma Drive	5	39.9	44.5	45.8	5.9	YES
	20	39.9	45.2	46.3	6.4	YES
Veterans Parkway (Center)	5	35.6	44.8	45.3	9.7	YES

Table 4.11-20 Phase 2 - Compliance with the Hermosa Beach Oil Code

Location	Receiver Height (ft)	Predicted Drilling + Test Production Noise Level (dBA)	Complies with 45 dBA Limit?
Residential Uses North of the Site on 8th Street	5	44.6	YES
	20	49.1	NO
Residential Uses Northwest of the Site on Cypress Street	5	41.3	YES
	20	47.0	NO
Residential Uses East of the Site on Ardmore Avenue	5	45.2	NO
	20	47.9	NO
Residential Uses West of the Site on Loma Drive	5	44.5	YES
	20	45.2	NO
Veterans Parkway (Center)	5	44.8	YES

Table 4.11-21 Phase 2 - Predicted Test Production (Only) Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Drilling + Test Production	Drilling + Test Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	35.6	46.0	0.4	NO
	20	45.6	36.5	46.1	0.5	NO
Residential Uses Northwest of Site on Cypress Street	5	37.6	31.9	38.6	1.0	NO
	20	37.6	36.9	40.3	2.7	NO
Residential Uses East of Site on Ardmore Avenue	5	38.3	31.9	39.2	0.9	NO
	20	38.3	34.0	39.7	1.4	NO
Residential Uses West of Site on Loma Drive	5	39.9	34.6	41.0	1.1	NO
	20	39.9	35.1	41.1	1.2	NO
Veterans Parkway (Center)	5	35.6	32.2	37.2	1.6	NO

As the figures and tables show, predicted noise impacts during the production-only portion of Phase 2 are less than significant.

Figures 4.11-19 and 4.11-20 show predicted noise contours for the test production (only) stage of Phase 2, for receiver heights of 5-feet and 20-feet above the ground, respectively. These predictions include all of the noise reduction design features proposed by the Applicant for this phase of the Project. The predicted noise impacts on the surrounding uses during this part of Phase 2 are summarized in Table 4.11-21.

Predicted noise impacts during the Phase 2 drilling and production stage are significant on all sides of the site and in many cases also exceed the 45 dBA limit prescribed by the Hermosa Beach Oil Code. Since the Applicant's proposals for Phase 2 already include extensive noise control measures, there is little additional scope for reducing noise emissions during the drilling and production stage. However, the additional mitigation would be feasible.

Figure 4.11-19 Phase 2 - Leq Noise Contours during TEST PRODUCTION (ONLY) for a Receiver Height of 5-ft

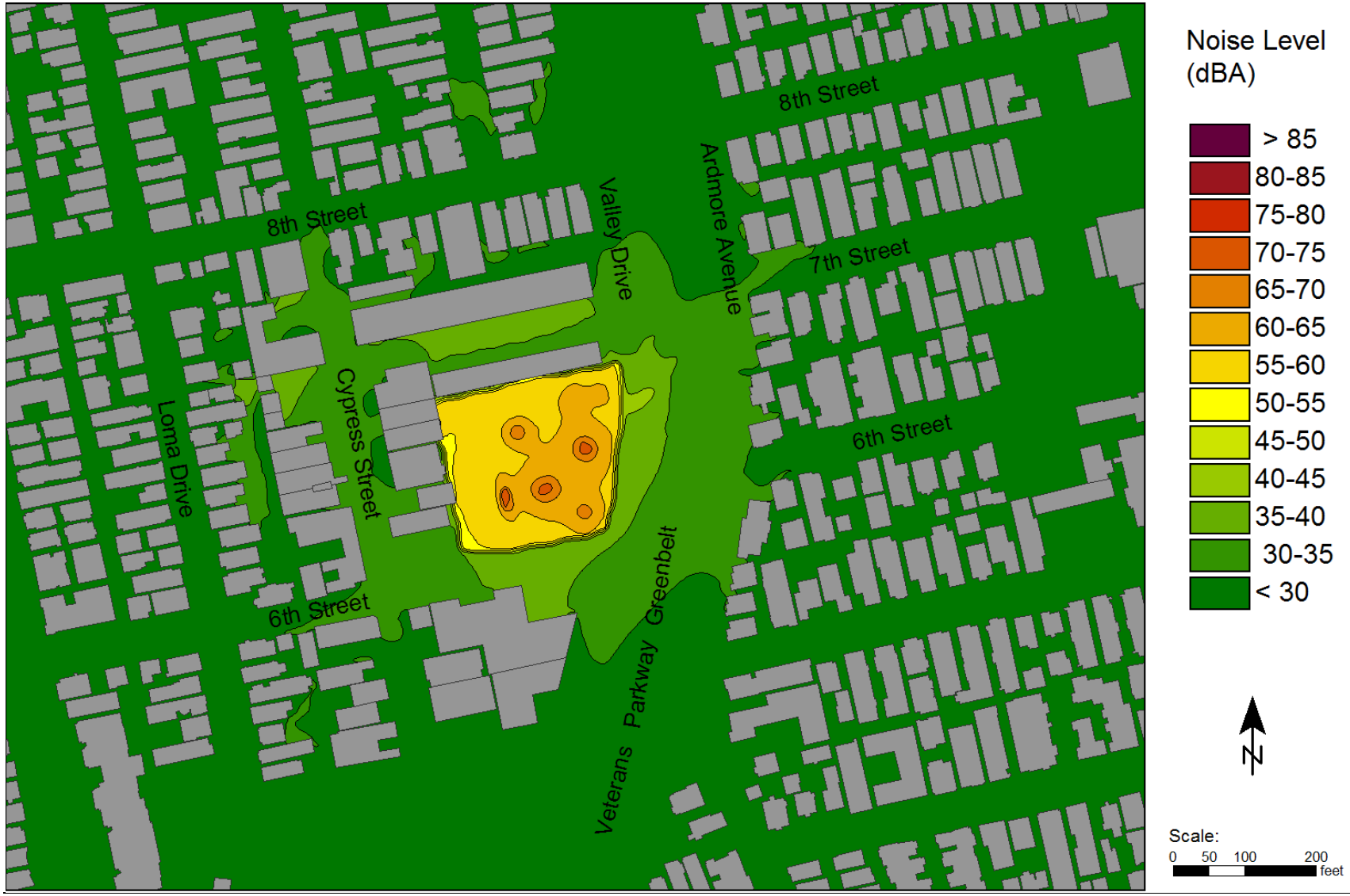


Figure 4.11-20 Phase 2 - Leq Noise Contours during TEST PRODUCTION (ONLY) for a Receiver Height of 20-ft

Mitigation Measures

NV-2a Increase the height of the noise barriers on all sides of the site from 32-feet to 35-feet (35-feet is the maximum height allowed). Minimum sound insulation performance of the barrier material should be STC-32.

NV-2b The gates on the east and south sides of the site shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-32. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides.

NV-2c All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.

NV-2d Install pads on the V-door and other appropriate areas, timbers and pads on the drill deck, pads between drill and casing pipe while in storage and pad and timbers at the boards on the mast to reduce metal-on-metal noise.

Residual Impacts

Figures 4.11-21, 4.11-22 and Table 4.11-22 show predicted noise levels during the drilling and production stage of Phase 2 with mitigation - in addition to all of the noise control design features already proposed by the Applicant.

Table 4.11-22 Phase 2 - Predicted Drilling & Test Production Noise Impact with Mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Drilling + Test Production	Drilling + Test Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	43.7	47.8	2.2	NO
	20	45.6	48.0	50.0	4.4	YES
Residential Uses Northwest of Site on Cypress Street	5	37.6	41.1	42.7	5.1	YES
	20	37.6	45.1	45.8	8.2	YES
Residential Uses East of Site on Ardmore Avenue	5	38.3	44.6	45.5	7.2	YES
	20	38.3	47.0	47.5	9.2	YES
Residential Uses West of Site on Loma Drive	5	39.9	43.9	45.4	5.5	YES
	20	39.9	44.4	45.7	5.8	YES
Veterans Parkway (Center)	5	35.6	43.7	44.3	8.7	YES

Table 4.11-23 compares mitigated noise levels during the drilling-and-production stage of Phase 2 with the requirements of the Hermosa Beach Oil Code.

Table 4.11-23 Phase 2 - Compliance with the Hermosa Beach Oil Code (with Mitigation)

Location	Receiver Height (ft)	Predicted Drilling + Test Production Noise Level (dBA)	Complies with 45 dBA Limit?
Residential Uses North of the Site on 8th Street	5	43.7	YES
	20	48.0	NO
Residential Uses Northwest of the Site on Cypress Street	5	41.1	YES
	20	45.1	NO
Residential Uses East of the Site on Ardmore Avenue	5	44.6	YES
	20	47.0	NO
Residential Uses West of the Site on Loma Drive	5	43.9	YES
	20	44.4	YES
Veterans Parkway (Center)	5	43.7	YES

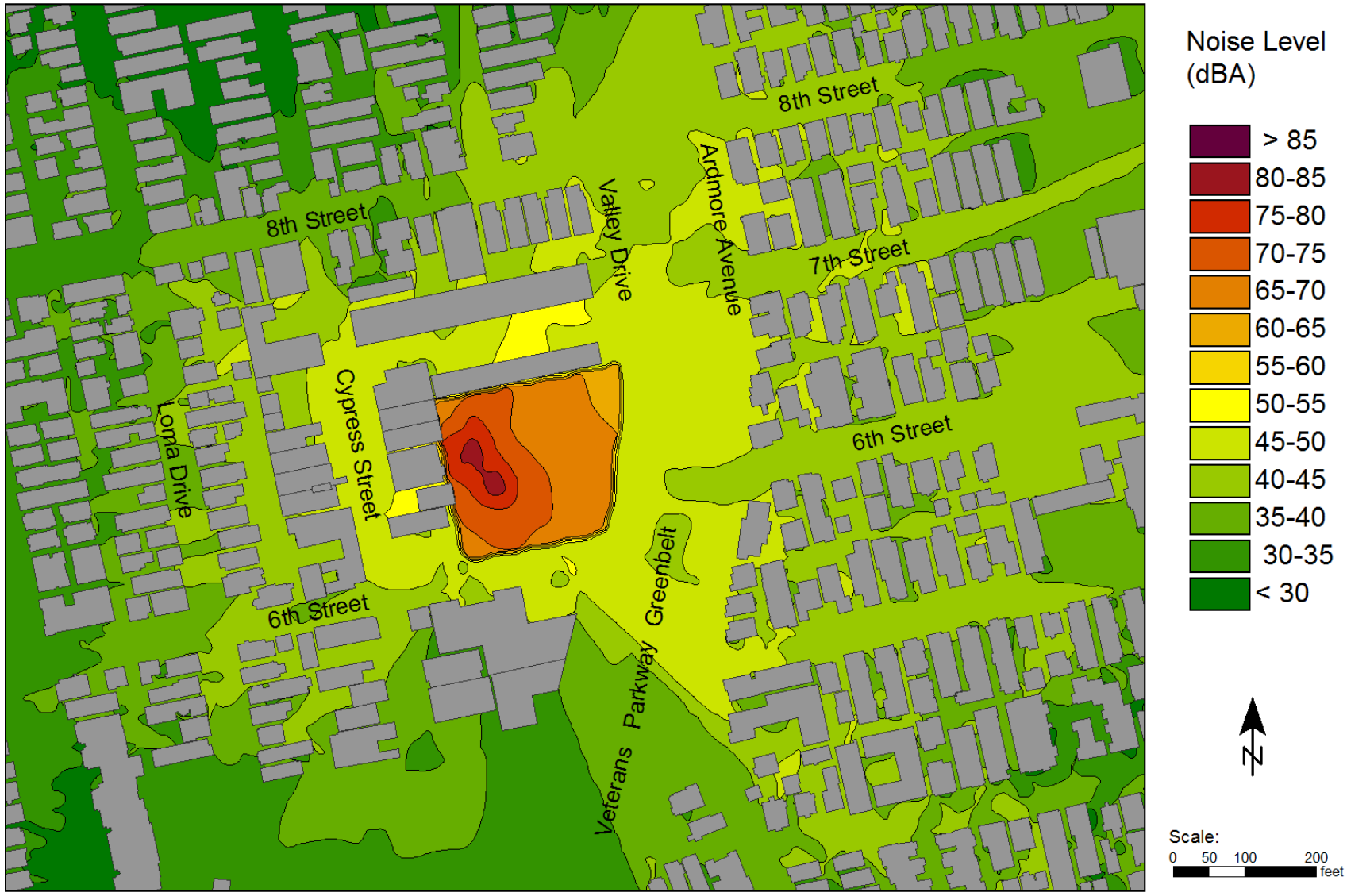
As the figures and tables show, while the additional mitigation does reduce noise impact on the surrounding sensitive uses, it is still significant in almost all cases. The 20-foot receivers are predicted to experience the worst noise impact, because their elevated position reduces the effectiveness of the noise barrier around the site and the shielding provided by existing buildings.

For receivers to the north and west, the most significant contributions to the noise impact on receptors to the north are from the top drive, mud pumps and metal-on-metal contact (the latter is anticipated from time to time and therefore included in the noise model, even in the mitigated scenario). For receivers to the west, the most significant contributions are from the mud pumps and metal-on-metal contact. The top drive is a little less significant here because of the topography of the site.

The predicted noise impacts during the production-only portion of Phase 2 are less than significant. However, the noise impact of drilling-plus-production activities in Phase 2 would remain **significant and unavoidable (Class I)**.

Figure 4.11-21 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION with Mitigation for a Receiver Height of 5-ft

Figure 4.11-22 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION with Mitigation for a Receiver Height of 20-ft



Comparison with the Applicant's Noise Impact Study

The noise impact analysis for Phase 2 presented here differs from Noise Impact Study (November 2012) prepared by the Applicant's acoustical consultant, Behrens & Associates - which concluded that noise impacts during the drilling-plus-production stage of Phase 2 would be less than significant. There are several reasons for this:

- This analysis has compared the noise impact of the drilling-plus-production stage of Phase 2 with both the requirements of the Hermosa Beach Oil Code and the existing baseline noise level, which was determined to be the noise level during the quietest hour of the night, based on noise monitoring over a full week (including weekends). By contrast, the Behrens & Associates study considered only the noise standard in the Hermosa Beach Oil Code, without considering Project noise levels against baseline levels.
- The analysis presented here considers Project noise levels at a height of 20-feet above ground; this approach is necessary to reflect noise impact on the many two- and three-story residential uses around the Project Site. Elevated receivers will often experience higher levels of noise than those on the ground, because of reduced shielding effects from walls and other buildings. The Behrens & Associates study only considered receivers at a height of 5-feet above the ground.
- The SoundPLAN model used for this analysis was set to include both first and second order sound reflections, which was considered important to accurately describe the way noise would propagate through a neighborhood characterized by relatively tall and narrow buildings located quite close together. The Behrens & Associates study was based on first order sound reflections only, an approach which tends to yield lower noise level predictions.

Project Phase 3 - Project Site Construction

Construction activities at the Project Site during Phase 3 are scheduled to last for 14 months. The noisiest portion of the work is expected to occur during an eight-week period when the construction of five steel tanks and installation of mechanical and electrical equipment occurs simultaneously. This part of the site construction has therefore been modeled as representing the worst-case noise scenario during Phase 3, using information about the type and usage of equipment during each provided by the applicant's consultant, which is summarized in Table 4.11-24.

For the site construction in Phase 3, the Applicant proposes the same noise reduction measures described above for Phase 1. This part of the Project will also comply with the noise control measures required by the 1993 Conditional Use Permit.

As part of Phase 3, a 16-foot high permanent masonry wall is proposed around the perimeter of the site. Before the masonry wall is built a 16-foot high temporary sound attenuation barrier with a minimum STC rating of 25 will be in-place at the perimeter of the Project Site; this approach is intended to ensure that no site construction work is carried out in Phase 3 without a perimeter noise barrier being in place. In addition, the Applicant proposes the use of temporary portable noise barriers, a minimum of 8-feet high, which will be positioned around the concrete truck engine, welders and crane engine when these items are in use.

Figure 4.11-23 shows noise contours for the modeled site construction scenario during Phase 3 for a receiver height of 5-feet. Figure 4.11-24 shows noise contours for the same scenario for a receiver height of 20-feet. Table 4.11-25 summarizes the highest predicted noise levels for the receivers closest to the Project Site. These predictions include all of the noise reduction features proposed by the Applicant for Phase 3 as well as the noise control measures required under the 1993 Conditional Use Permit.

Table 4.11-24 Phase 3 Site Construction Noise Model - Equipment Usage and Noise Level Data

Work Stage	Equipment	Sound Power Level (dBA)	Quantity in Model	Usage Factor[1] (%)
Construction of steel tanks and installation of mechanical and electrical equipment (8-weeks).	Crane	114.7	1	40
	Welders	112.1	3	40
	Forklifts	111.8	2	25
	Manlifts	107.7	2	10
	Backhoe	116.8	1	20
	Concrete Truck	116.8	1	10
	Truck	115.8	1	10

[1] The percentage of time the equipment is expected to operate during each day of the modeled scenario.

Table 4.11-25 Phase 3 - Predicted Site Construction Noise Impact

Location	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Prediction for Phase 3 Con-struction	Phase 3 Con-struction + Baseline		
Residential Uses North of Site on 8th Street	5	62.8	62.0	65.4	2.6	NO
	20	62.8	67.4	68.7	5.9	YES
Residential Uses Northwest of Site on Cypress Street	5	54.1	59.4	60.5	6.4	YES
	20	54.1	65.9	66.2	12.1	YES
Residential Uses East of Site on Ardmore Avenue	5	58.8	58.4	61.6	2.8	NO
	20	58.8	62.4	64.0	5.2	YES
Residential Uses West of Site on Loma Drive	5	52.4	63.5	63.8	11.4	YES
	20	52.4	65.5	65.7	13.3	YES
Veterans Parkway (Center)	5	52.7	58.5	59.5	6.8	YES

Figure 4.11-23 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION for a Receiver Height of 5-ft

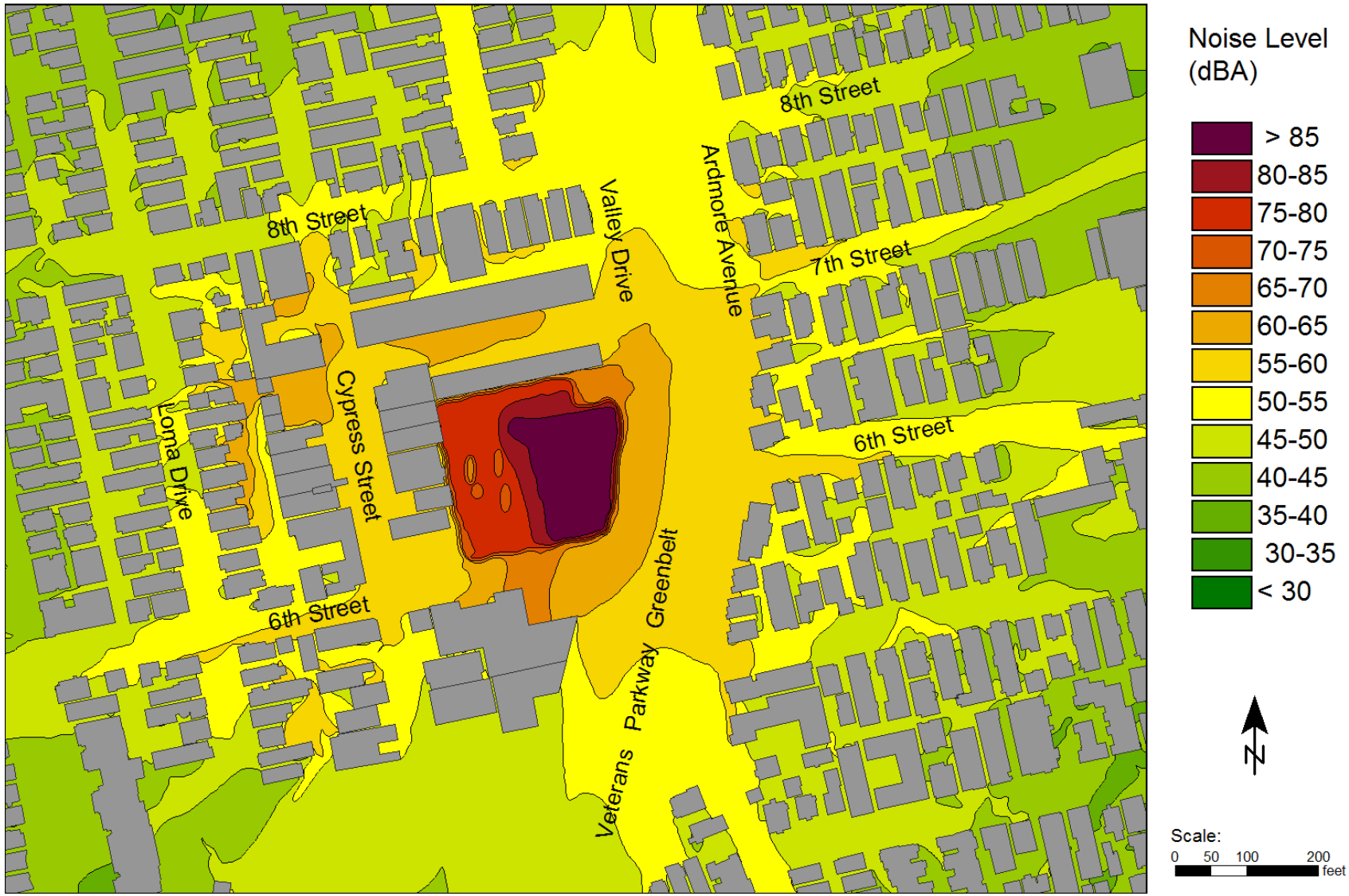
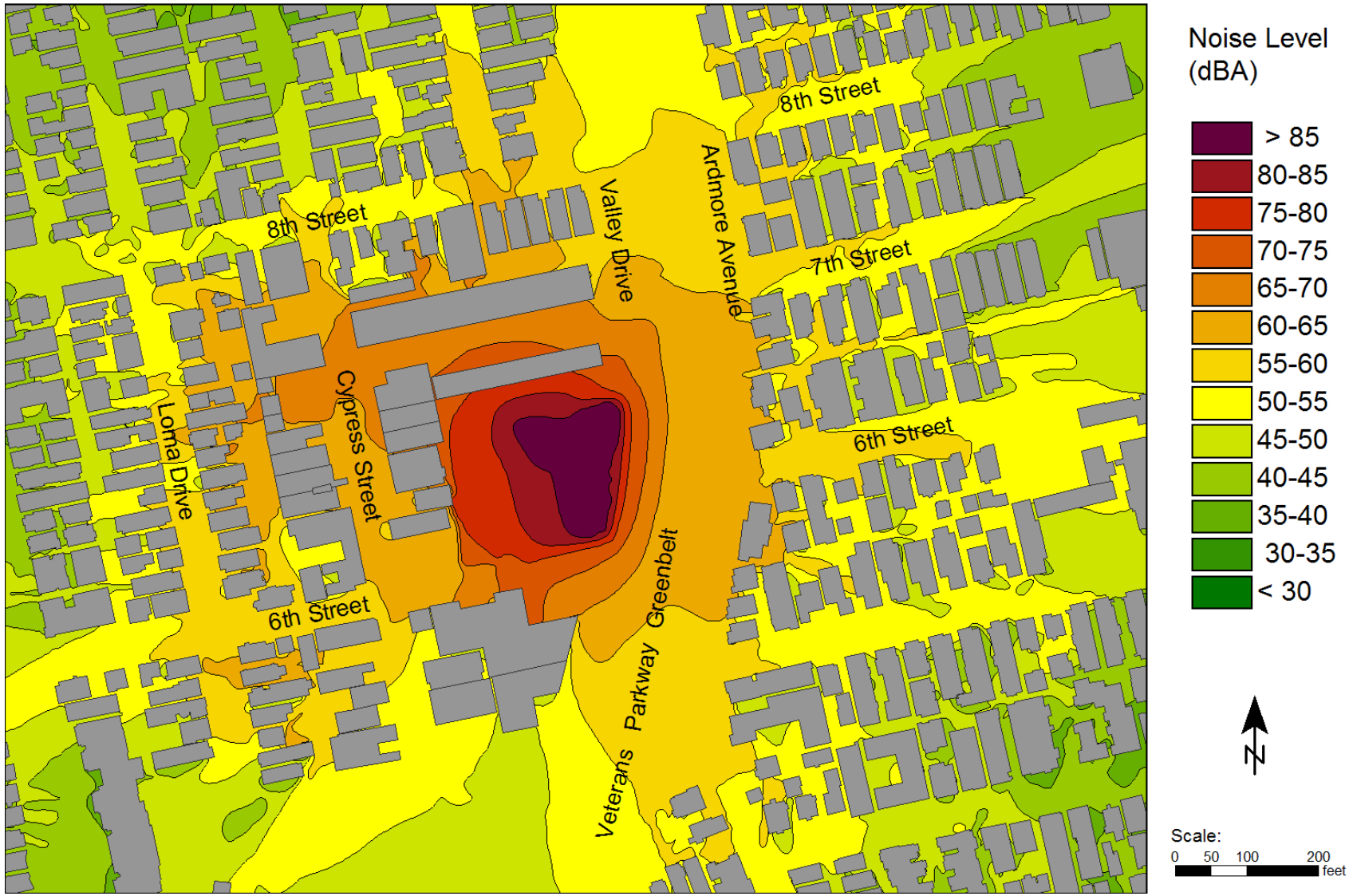


Figure 4.11-24 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION for a Receiver Height of 20-ft



Impact #	Impact Description	Phase	Residual Impact
NV.3	Site construction machinery would result in a substantial increase in ambient noise levels.	Phase 3	Class I Significant and Unavoidable

As Table 4.11-25 shows, predicted noise impacts during Phase 3 construction are significant on the north, east and west sides of the site - with the greatest impacts shown at the upper floors of the residences on Cypress Street and Loma Drive.

Mitigation Measures

NV-3a Provide continuous, 35-foot high noise barriers along the west and north sides of the site. Minimum sound insulation performance of the barrier material should be STC-32.

NV-3b Provide continuous 25-foot high noise barriers along the east and south sides of the site. Minimum sound insulation performance of the barrier material shall be STC-25. The gates on the east and south sides of the site should be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides.

NV-3c All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.

Figures 4.11-25 and 26 show predicted construction noise contours for Phase 3 with all of the additional noise mitigation measures listed above in place (in addition to the mitigations already proposed by the Applicant). Table 4.11-26 summarizes the highest predicted noise levels for receivers closest to the Project Site in this additional-mitigation scenario.

Residual Impacts

The noise impact of site construction equipment in Phase 3 would remain significant at the residences on Loma Drive and Cypress Street, even after mitigation (Class I). Since it is not possible to provide a sound barrier higher than 35-feet on the western side of the site due to municipal code height limitations, this noise impact cannot be further mitigated and is **significant and unavoidable (Class I).**

Table 4.11-26 Phase 3 - Predicted Site Construction Noise Impact with Additional Mitigation

Location	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Prediction for Phase 3 Construction	Phase 3 Construction + Baseline		
Residential Uses North of Site on 8th Street	5	62.8	57.1	63.8	1.0	NO
	20	62.8	58.9	64.3	1.5	NO
Residential Uses Northwest of Site on Cypress Street	5	54.1	55.1	57.6	3.5	NO
	20	54.1	57.9	59.4	5.3	YES
Residential Uses East of Site on Ardmore Avenue	5	58.8	55.6	60.5	1.7	NO
	20	58.8	58.4	61.6	2.8	NO
Residential Uses West of Site on Loma Drive	5	52.4	57.8	58.9	6.5	YES
	20	52.4	57.4	58.6	6.2	YES
Veterans Parkway (Center)	5	52.7	56.1	57.7	5.0	NO

Project Phase 3 - Pipeline Construction

During this stage of Phase 3, new Pipelines would be constructed to convey produced oil and gas from the Project Site to purchasers offsite. The Pipelines would pass through the cities of Hermosa Beach, Redondo Beach and Torrance. Construction of the Pipelines is scheduled to take 17 weeks.

The Hermosa Beach portion of the pipe construction would extend south from the Project Site along Valley Drive to Herondo Street. The section of the Valley Drive work expected to cause the most noise impact would occur between South Park and 2nd Street and this has been selected for assessment as representing the worst-case scenario for the pipeline construction in Hermosa Beach.

The Redondo Beach portion of the pipeline construction would extend northwest from the eastern end of Herondo Street and along Anita Street to the western end of 190th Street. There are three possible alignments for this portion of the pipeline: westbound side of Anita Street, Eastbound side of Anita Street and the Southern California Edison corridor to the south of Anita Street. Each of these possible alignments is overlooked by residential uses on the north and south sides. The section of the Anita Street pipeline between N. Paulina Avenue and Prospect Avenue and the three alignment alternatives associated with this section have been selected for assessment as representing the worst-case scenarios for the pipeline construction in Redondo Beach.

The Torrance portion of the pipeline construction would run in an east-west direction, parallel to 190th Street. There are three possible alignments for this portion of the pipeline: extend northwest from the eastern end of Herondo Street and along Anita Street to the western end of 190th Street. There are three possible alignments for this portion of the pipeline: westbound side of 190th Street, eastbound side of 190th Street and the Southern California Edison corridor to the south of 191st Street. Each of these possible alignments is overlooked by residential uses to the north and/or south sides. The section of the Torrance pipeline between Inglewood Avenue and Firmona Avenue and all three alignment alternatives associated with this section have been

selected for assessment as representing the worst-case scenarios for the pipeline construction in Torrance.

Table 4.11-27 summarizes the equipment quantities and usage factors (based on information provided by the Applicant's consultant) as well as sound power level data from published reference sources which have been the inputs to the Phase 3 pipeline construction noise model.

The Applicant proposes the following noise control design features for the pipeline construction portion of Phase 3:

- Temporary noise reduction barriers, minimum 12-feet high, located on either side of the pavers and trenchers in such a way as the block the line-of-sight between the equipment and the nearest sensitive receiver. The barriers will have an STC rating of at least 25 and will be moved alongside the equipment as the work progresses.
- Pipeline construction will be limited to daylight hours between 8:00am and 3:00pm, Monday through Friday in the City of Hermosa Beach and 9:00am to 3:00pm Monday through Friday in the cities of Redondo Beach and Torrance. There will be no pipeline construction work on Saturdays, Sundays or holidays.

Figure 4.11-25 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION with Mitigation for a Receiver Height of 5-ft

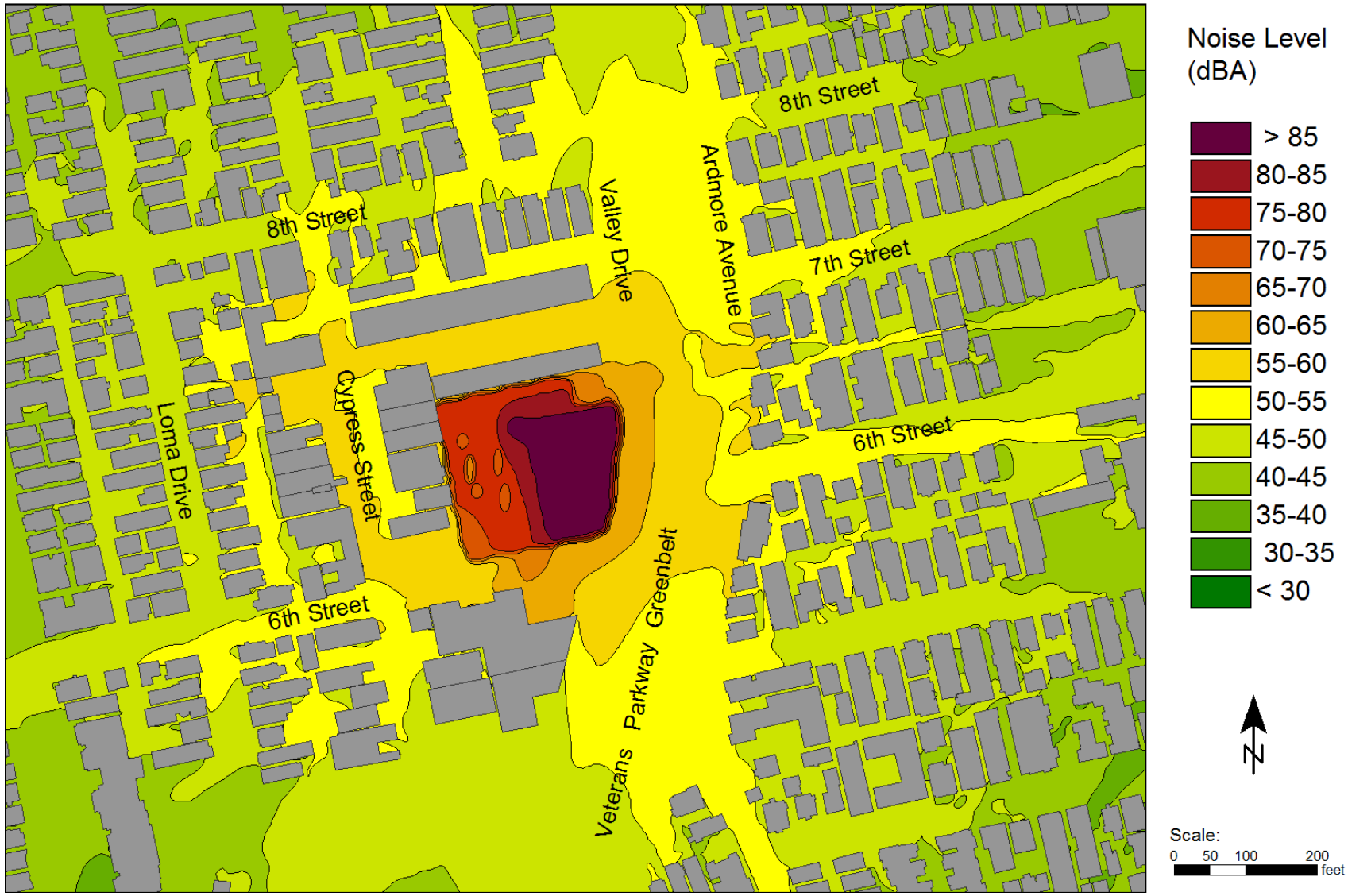


Figure 4.11-26 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION with Mitigation for a Receiver Height of 20-ft

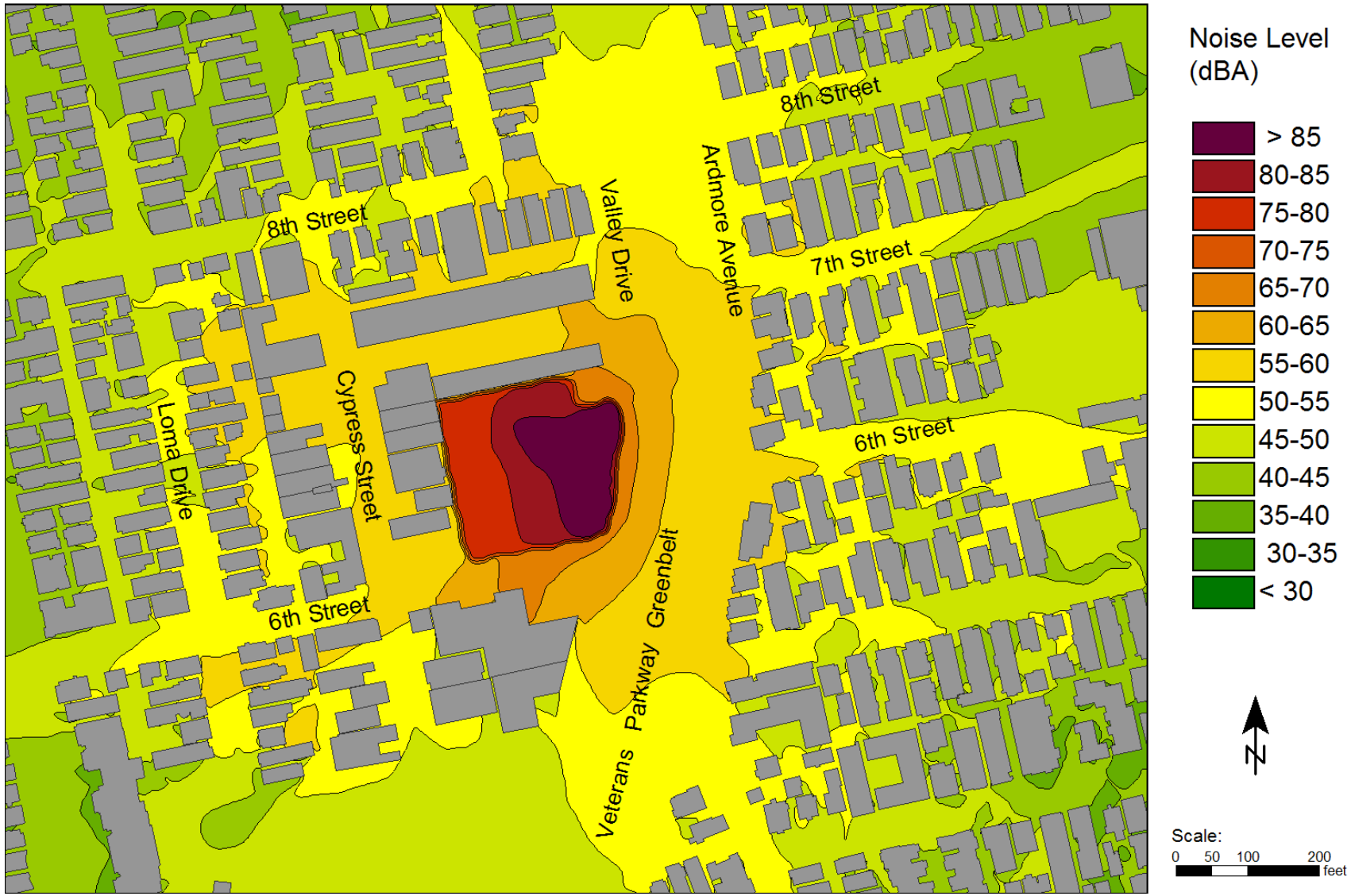


Table 4.11-27 Phase 3 Pipeline Construction Noise Models Equipment Usage and Noise Level Data

Pipeline Location	Equipment	Sound Power Level[1] (dBA)	Quantity in Model	Usage Factor[2] (%)
Valley Drive *City of Hermosa Beach*	Pipe Fitter Truck	111.7	1	16
	Sideboom Truck	116.7	1	16
	Trencher	113.3	1	50
	Backhoe	116.8	1	40
	Water Truck	111.7	1	16
	Dump Trucks	115.0	2	40
	Flatbed Truck	111.7	1	16
	Paver	116.8	1	50
	Concrete Truck	116.8	1	40
Anita Street/ Edison Corridor *City of Redondo Beach* 190th Street/ Edison Corridor *City of Torrance*	Pipe Fitter Trucks	111.7	2	16
	Sideboom Trucks	116.7	2	16
	Trenchers	113.3	2	50
	Backhoes	116.8	2	40
	Water Truck	111.7	1	16
	Dump Trucks	115.0	4	40
	Flatbed Trucks	111.7	2	16
	Paver	116.8	1	50
	Concrete Truck	116.8	1	40

[1] Source level, not including attenuation measures, where proposed.
[2] The percentage of time the equipment is expected to operate during each 24-hour period.

Figures 4.11-27 through 4.11-37 show predicted noise contours for each of the modeled pipeline construction location/alignment scenarios. Table 4.11-28 summarizes the highest predicted noise levels at the nearby receivers in each case.

Impact #	Impact Description	Phase	Residual Impact
NV.4	Pipeline construction machinery would result in a substantial increase in ambient noise levels.	Phase 3	Class I Significant and Unavoidable

As Table 4.11-28 shows, considerable increases in daily noise level are predicted as a result of the pipeline construction work in Phase 3, indicating clearly significant noise impact in all cases. Due to the nature of the work, further options for mitigation of pipeline construction noise (beyond the measures already proposed by the Applicant and included in the noise model) are

expected to be very limited - and it would therefore not be possible in practice to reduce noise impact on nearby sensitive receivers to less than significant levels at any portion of the Pipeline route.

Mitigation Measures
None.

Residual Impact
Impacts would be **significant and unavoidable (Class I)**.

Project Phase 4 - Development and Operations

Phase 4 of the Project includes both drilling and production activities on the site, which will overlap. The noise analysis assessed noise levels during drilling and production and during production only (no drilling). Each of these scenarios is discussed below.

Phase 4 Drilling and Production

It is proposed to drill 27 oil and gas wells and three water injection wells in this phase over a 30-month period, with drilling equipment operating 24-hours a day during this time. The drilling equipment the Applicant proposes to use is the same as that in Phase 2 and all of the Phase 2 noise reduction measures would also be applied in this phase, including the 32-foot high sound attenuation barrier.

The proposed production operations are projected to yield approximately 8,000 barrels of crude oil per day and 2.5 million cubic feet of gas, as per Section 2, Project Description. The production would occur concurrently with the drilling activity during the first 30 months of Phase 4. Once the drilling stage is complete, the 32-foot high noise barrier would be removed (leaving only the 16-foot high masonry wall constructed in Phase 3) and production activity would continue 24-hours a day for the remainder of the life of the Project.

Table 4.11-29 summarizes the information about types and quantities of drilling and production equipment in Phase 4, made available by the Applicant's consultant. The table also shows overall sound power levels of the equipment - based on field measurements at similar oil production facilities as well as manufacturers' data and other published sources.

Figure 4.11-27 Phase 3 - Leq Noise Contours during Pipeline Construction Valley Drive Scenario, Receiver Height of 5-feet

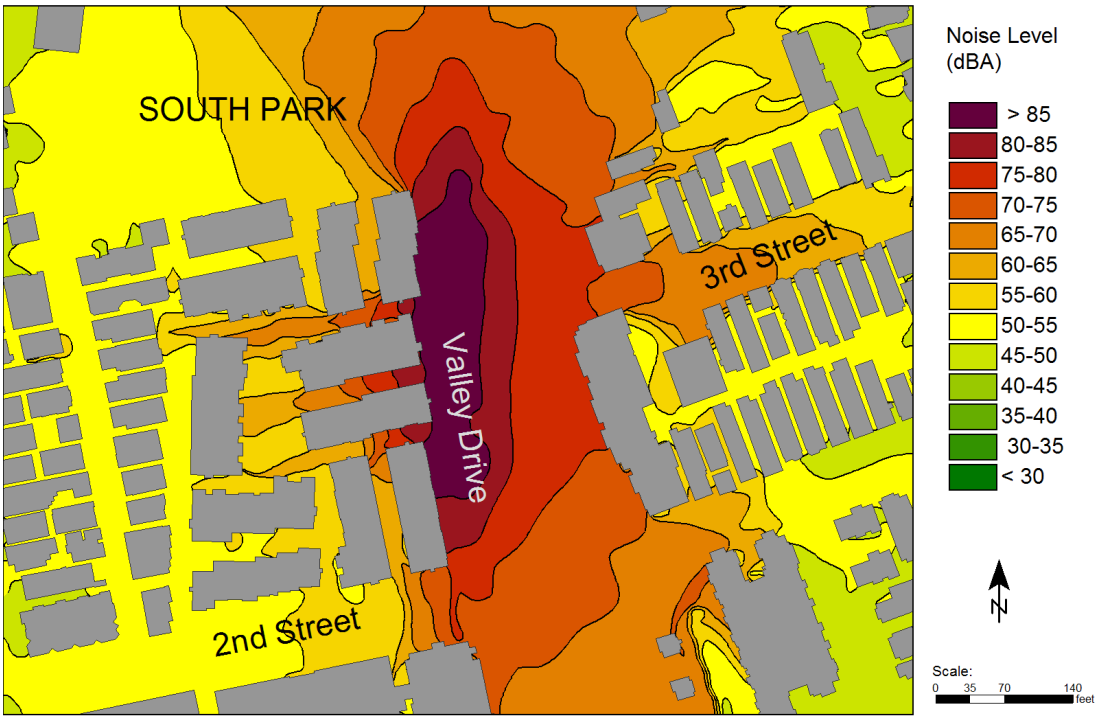


Figure 4.11-28 Phase 3 - Leq Noise Contours during Pipeline Construction Valley Drive Scenario, Receiver Height of 20-feet

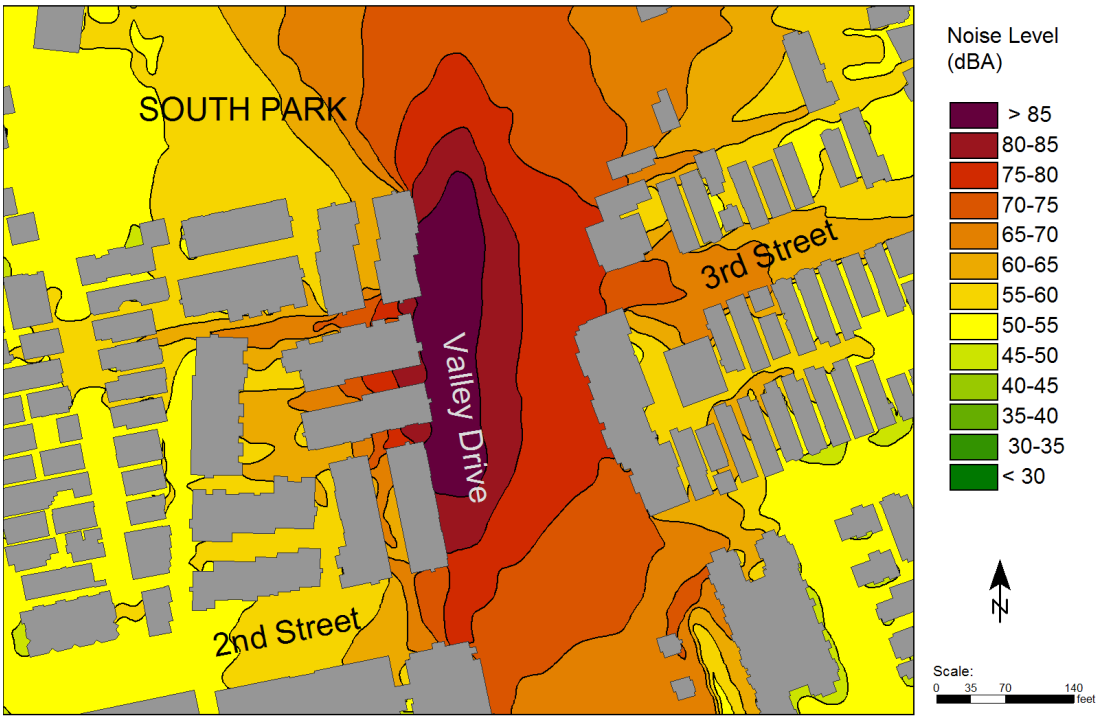


Figure 4.11-29 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Westbound Scenario, Receiver Height of 5-feet

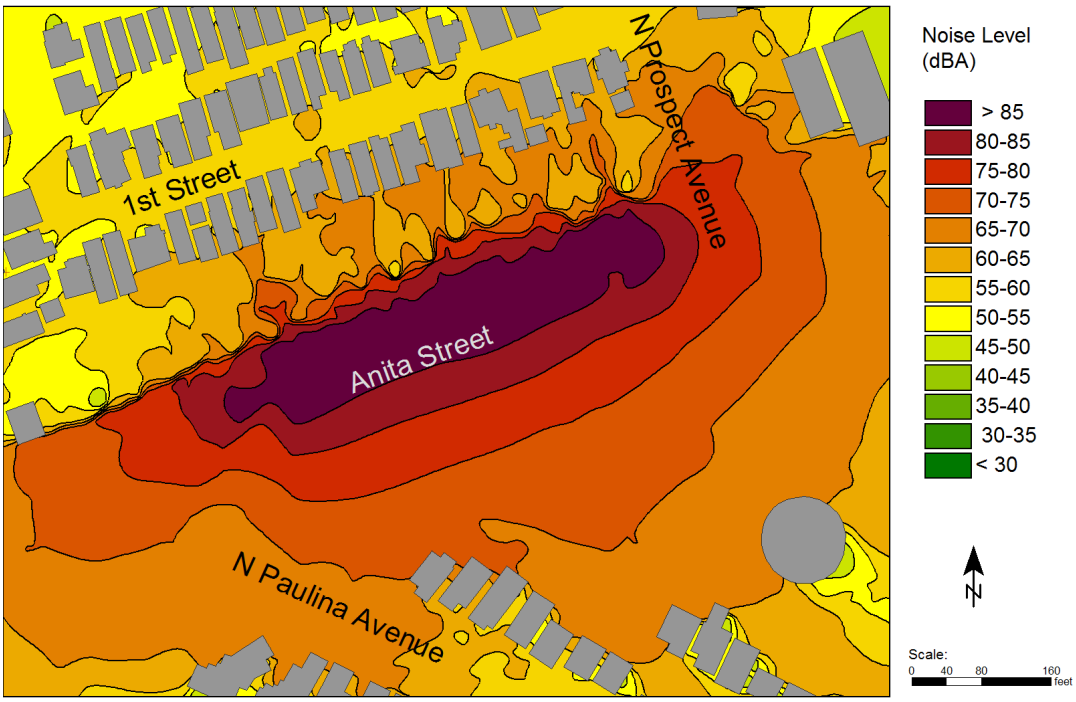


Figure 4.11-30 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Westbound Scenario, Receiver Height of 20-feet

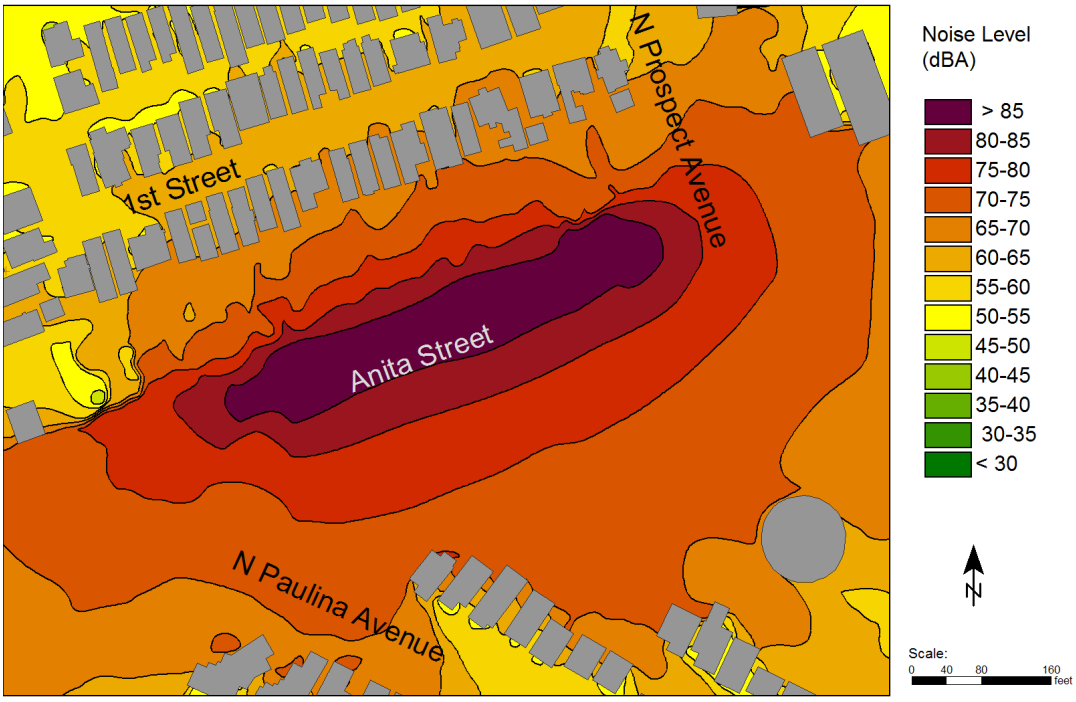


Figure 4.11-31 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Eastbound Scenario, Receiver Height of 5-feet

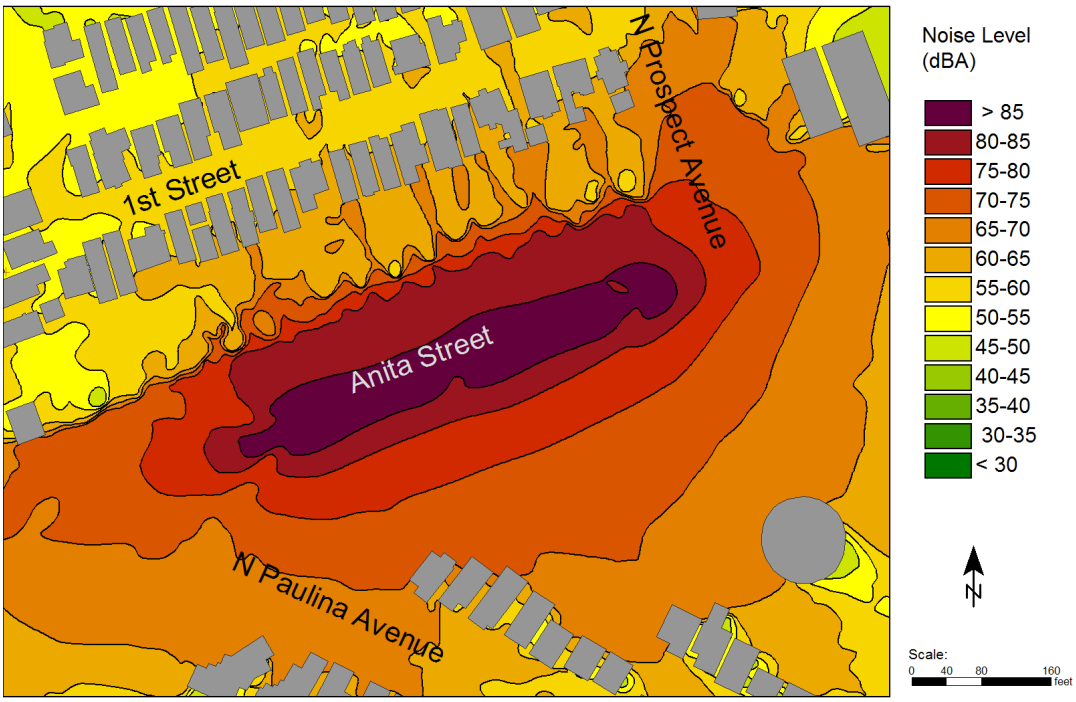


Figure 4.11-32 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Eastbound Scenario, Receiver Height of 20-feet

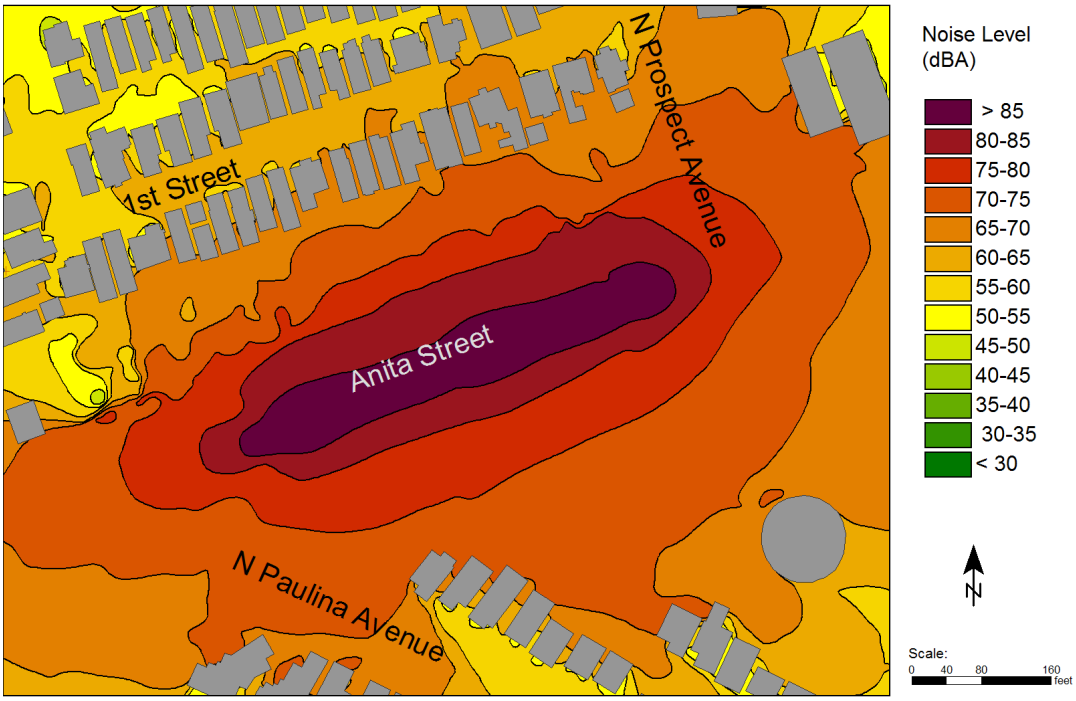


Figure 4.11-33 Phase 3 - Leq Noise Contours during Pipeline Construction Redondo Beach Edison Corridor Scenario, Receiver Height of 5-feet

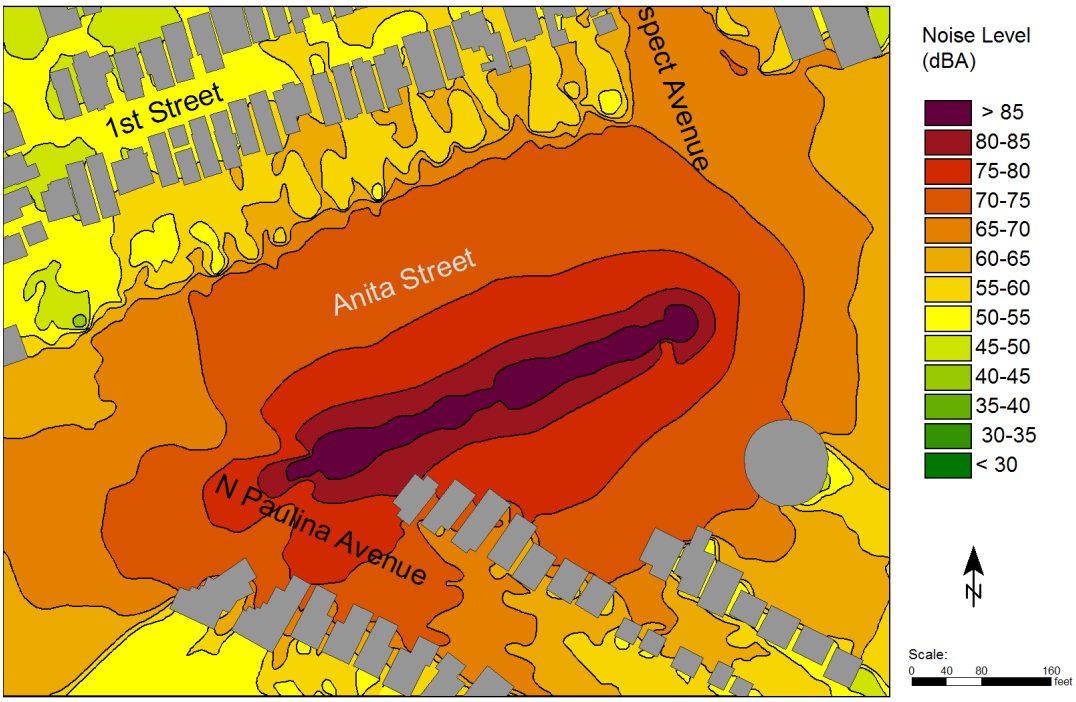


Figure 4.11-34 Phase 3 - Leq Noise Contours during Pipeline Construction Redondo Beach Edison Corridor Scenario, Receiver Height of 20-feet

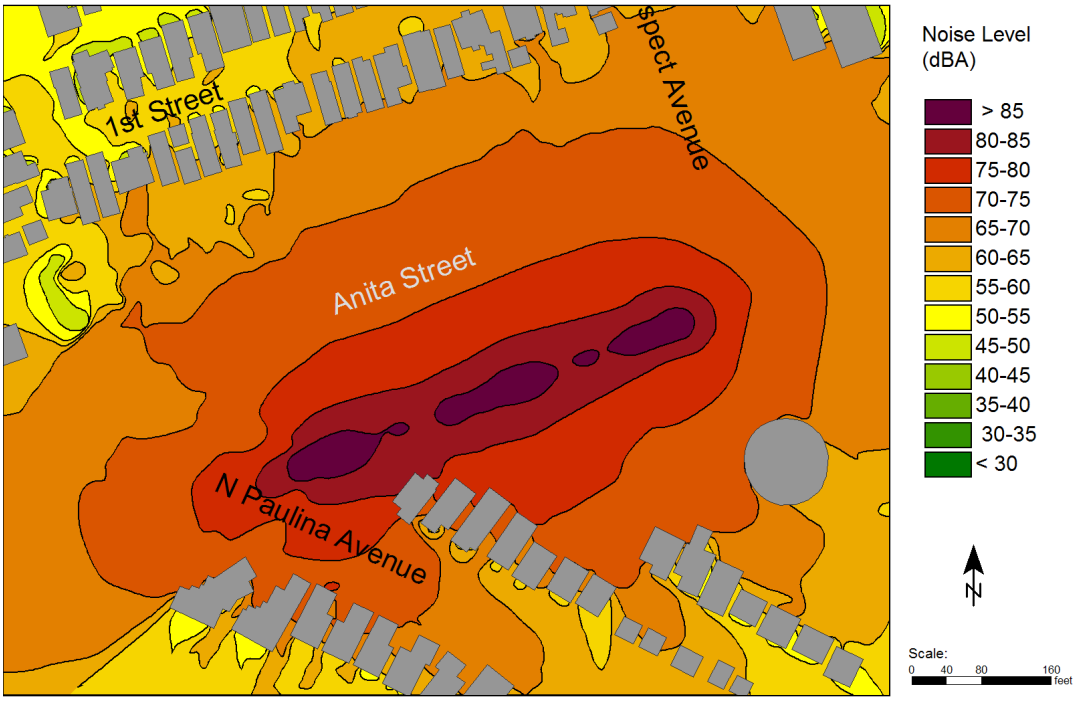


Figure 4.11-35 Phase 3 - Leq Noise Contours during Pipeline Construction 190th Street Westbound Scenario, Receiver Height of 5-feet

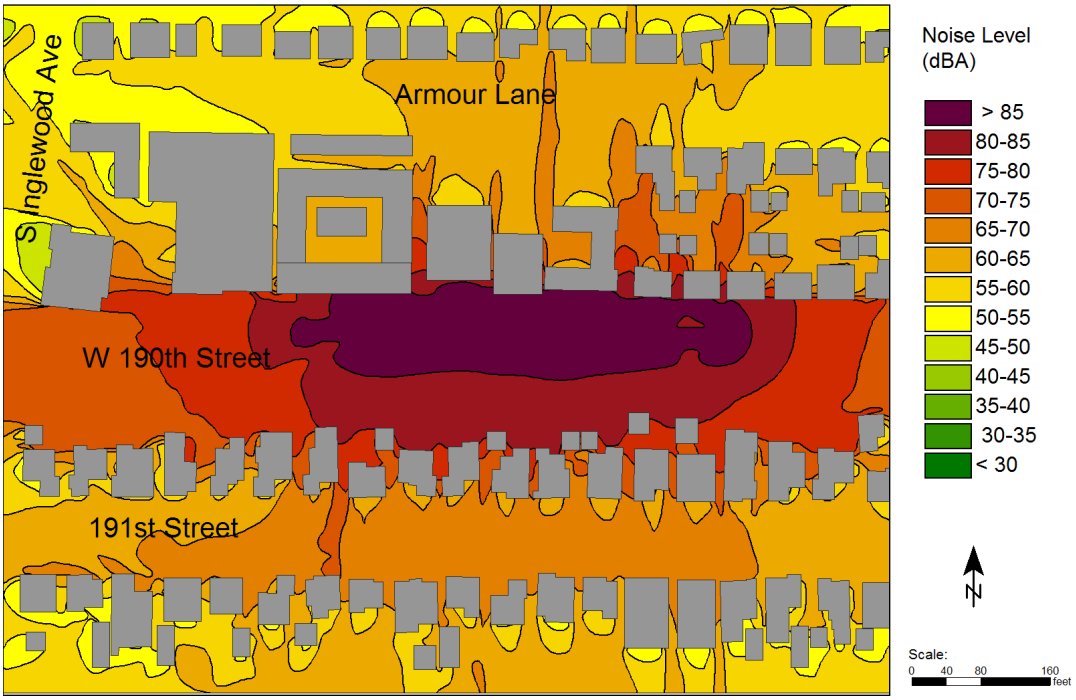


Figure 4.11-36 Phase 3 - Leq Noise Contours during Pipeline Construction 190th Street Eastbound Scenario, Receiver Height of 5-feet

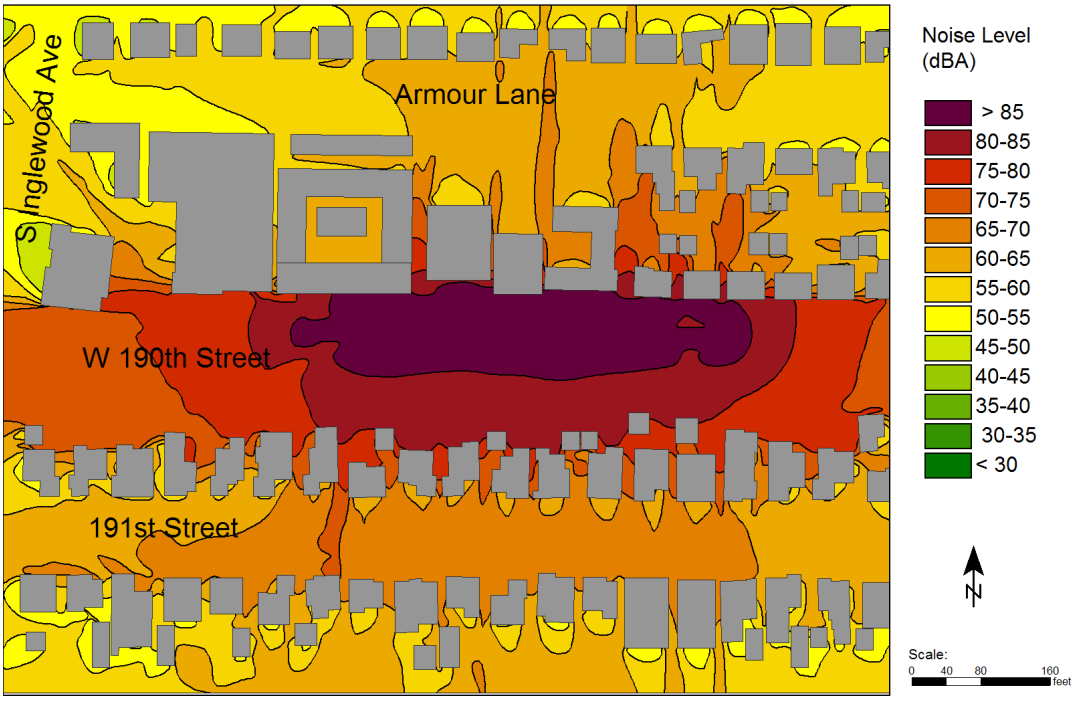


Figure 4.11-37 Phase 3 - Leq Noise Contours during Pipeline Construction Torrance Edison Corridor Scenario, Receiver Height of 5-feet

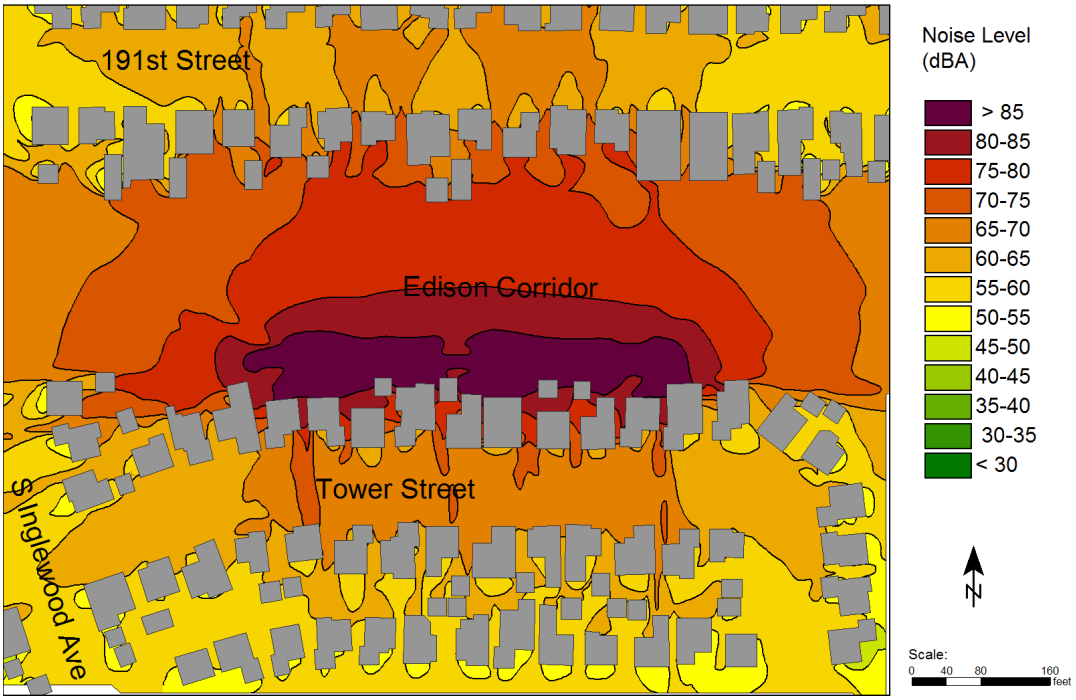


Table 4.11-28 Phase 3 - Predicted Pipeline Construction Noise Impact

Scenario / Alignment	Most Impacted Receiver	Receiver Height (ft)	Average Daytime Noise Level (Leq, dBA)			Increase in Daytime Noise Level (dBA)	Significant?
			Baseline	Prediction for Phase 3 Pipeline Construction	Phase 3 Pipeline Construction + Baseline		
Valley Drive Between South Park & Second Street	Residential Uses West of Valley Drive	5	63.5	88.1	88.1	24.6	YES
		20	63.5	87.7	87.7	24.2	YES
Anita Street Westbound Side Between Paulina Ave & Prospect Ave	Residential Uses North of Anita Street	5	58.4	89.6	89.6	31.2	YES
		20	58.4	88.9	88.9	30.5	YES
Anita Street Eastbound Side Between Paulina Ave & Prospect Ave	Residential Uses North of Anita Street	5	58.4	83.0	83.0	24.6	YES
		20	58.4	82.3	82.3	23.9	YES
Southern California Edison Corridor Between Paulina Ave & Prospect Ave	Residential Uses North of Paulina Ave	5	54.9	80.5	80.5	25.6	YES
		20	54.9	79.6	79.6	24.7	YES
190th Street Westbound Side Between Inglewood & Fermona Avenues	Residential Uses North of 190th Street	5	64.9	86.8	86.8	21.9	YES
190th Street Eastbound Side Between Inglewood & Fermona Avenues	Residential Uses South of 190th Street	5	64.9	86.2	86.2	21.3	YES
Southern California Edison Corridor Between Inglewood & Fermona Avenues	Residential Uses North if Tower Street	5	69.7	88.4	88.5	18.8	YES

The Applicant proposes the following noise mitigation measures in Phase 4:

- Each well pump will be housed in a sound-attenuating enclosure, sufficient to limit its radiated sound power level to 73 dBA.
- The amine cooler will be fitted with sound attenuating devices sufficient to limit its radiated sound power level to 82 dBA.
- The amine cooler will be located no higher than 10-feet above ground level in the containment area.
- Each variable frequency drive cabinets will provide sufficient sound attenuation to limit radiated sound power level of the variable frequency drives to 63 dBA.
- Acoustically-rated enclosures will be provided for the compressor motors, sufficient to limit the radiated sound power level of the motors to 81 dBA.
- The compressor fans will be fitted with silencers and otherwise acoustically treated to limit the radiated fan sound power level to 75 dBA.
- The produced oil pumps, produced water pumps, water booster pumps, DEA charge pumps and regenerator reflux pumps will be acoustically treated in such a way as to limit the radiated sound power level of each piece of equipment to 67 dBA.
- The shipping pumps will be acoustically treated in such a way as to limit their radiated sound power level to 73 dBA.
- The water injection pumps will be acoustically treated in such a way as to limit their radiated sound power level to 83 dBA.
- The vapor recovery compressors will be acoustically treated in such a way as to limit their radiated sound power level to 67 dBA.
- The cooler for the vapor recovery compressors will be acoustically treated in such a way as to limit its radiated sound power level to 85 dBA.
- The glycol regenerator will be acoustically treated in such a way as to limit its radiated sound power level to 73 dBA.
- The micro-turbines will be housed in acoustically-rated enclosures, sufficient to limit the sound power level radiated by the equipment to 67 dBA.
- The micro-turbine exhausts will be fitted with mufflers to limit the sound power level at the exhaust outlet to 73 dBA.

The Applicant would also be bound by the noise control requirements of the 1993 Conditional Use Permit, specifically:

- All pumps will be maintained to minimize noise from worn parts.
- All oil maintenance equipment, vehicles and non-electrical motors will be equipped with manufacturer-approved mufflers or housed in a sound-proofing device.
- Noise monitoring will be performed at least once each year for a six-hour period between the hours of 10pm and 7am.

Table 4.11-29 Phase 4 Noise Model - Equipment Usage and Noise Level Data

Work Stage	Equipment	Sound Power Level[1] (dBA)	Quantity in Model	Usage Factor[2] (%)
Phase 4 Drilling *30 month scheduled duration.*	Hydraulic Power Unit	110.7	1	100
	Mud Pump	105.4	2	100
	Drill Rig Top Drive	93.3	1	100
	Shaker	75.3	3	100
	Metal on Metal Noise	131.7	1	0.1
Phase 4 Production *At a rate of 800 barrels per day.*	Well Pumps	97.7	30	100
	Produced Oil Pump	77.7	1	100
	Produced Water Pump	86.7	1	100
	Shipping Pump	92.8	1	100
	Water Booster Pump	86.7	1	100
	Water Injection Pumps	102.8	2	100
	Vapor Recovery Compressor	88.6	1	100
	Vapor Recovery Unit Cooler	90.2	1	100
	1st Stage Compressor	96.2	2	100
	2nd Stage Compressor	96.2	2	100
	Compressor Cooler	102.0	2	100
	Amine Cooler	102.1	1	100
	DEA Charge Pump	77.7	1	100
	Regenerator Reflux Pump	77.7	1	100
	Chiller	85.0	1	100
	Glycol Regenerator	92.4	1	100
	Micro-turbines (Inc. Exhaust)	92.9	5	100
	Variable Frequency Drives	83.3	30	100

[1] Source level, not including noise control design features, where proposed.
[2] The percentage of time the equipment is expected to operate during each 24-hour period.

Figures 4.11-38 and 4.11-39 show the predicted noise contours for the drilling-and-production stage of Phase 4, for receiver heights of 5-feet and 20-feet respectively. Table 4.11-30 shows how the predicted noise levels during the drilling-and-production stage of Phase 4 would impact noise levels at the nearby receivers during the quietest hours of the night. Table 4.11-31 compares predicted noise levels with the noise limit required by the Hermosa Beach Oil Code.

Table 4.11-30 Phase 4 - Predicted Drilling + Production Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Drilling + Production	Drilling + Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	44.1	47.9	2.3	NO
	20	45.6	48.5	50.3	4.7	YES
Residential Uses Northwest of Site on Cypress Street	5	37.6	40.2	42.1	4.5	YES
	20	37.6	45.5	46.2	8.6	YES
Residential Uses East of Site on Ardmore Avenue	5	38.3	45.9	46.6	8.3	YES
	20	38.3	49.7	50.0	11.7	YES
Residential Uses West of Site on Loma Drive	5	39.9	44.1	45.5	5.6	YES
	20	39.9	43.2	44.9	5.0	YES
Veterans Parkway (Center)	5	35.6	45.0	45.5	9.9	YES

Table 4.11-31 Phase 4 - Compliance with the Hermosa Beach Oil Code

Location	Receiver Height (ft)	Predicted Drilling + Production Noise Level (dBA)	Complies with 45 dBA Limit?
Residential Uses North of the Site on 8th Street	5	44.1	YES
	20	48.5	NO
Residential Uses Northwest of the Site on Cypress Street	5	40.2	YES
	20	45.5	NO
Residential Uses East of the Site on Ardmore Avenue	5	45.9	NO
	20	49.7	NO
Residential Uses West of the Site on Loma Drive	5	44.1	YES
	20	43.2	YES
Veterans Parkway (Center)	5	45.0	YES

Figure 4.11-38 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION for a Receiver Height of 5-ft

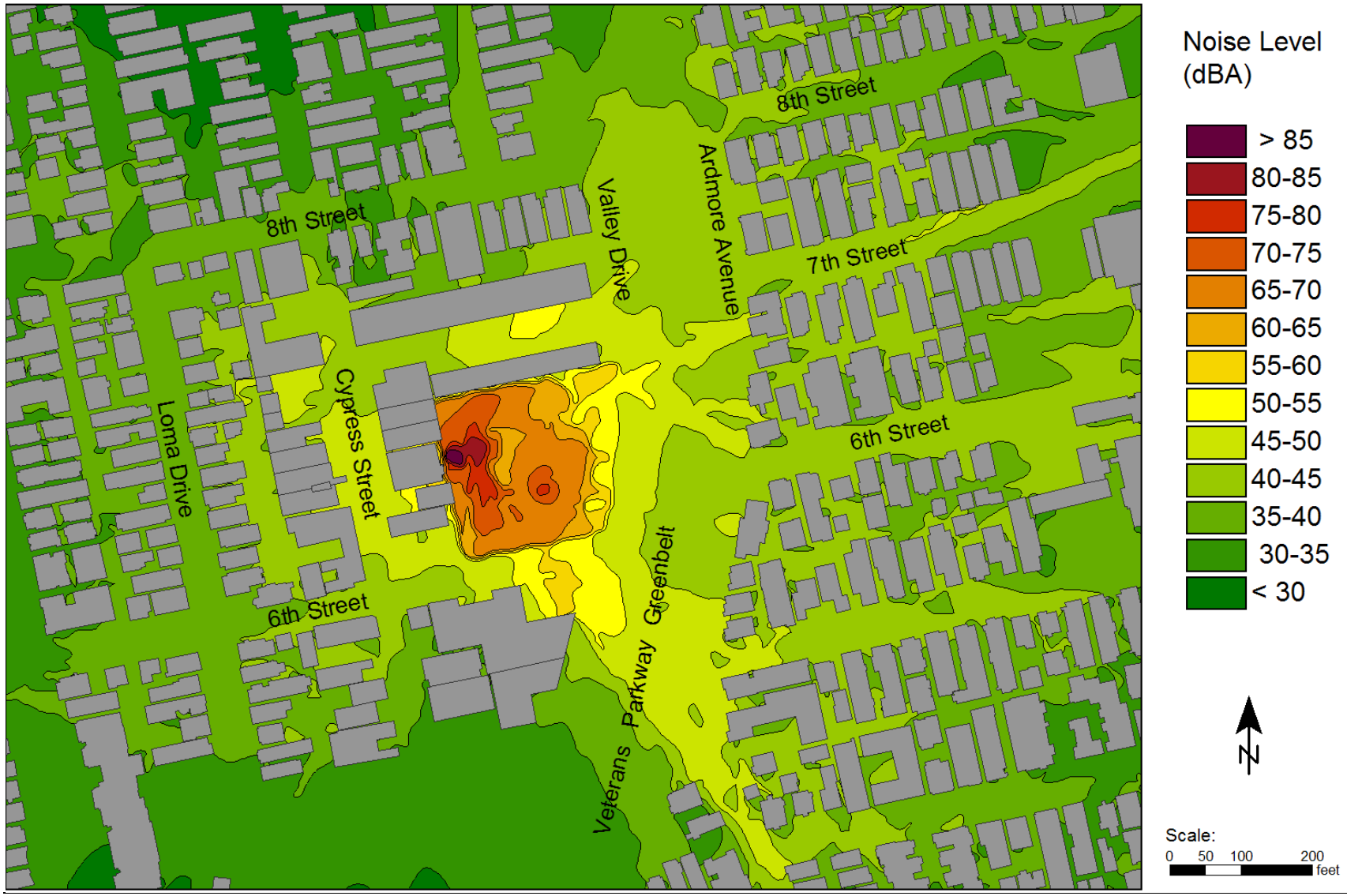
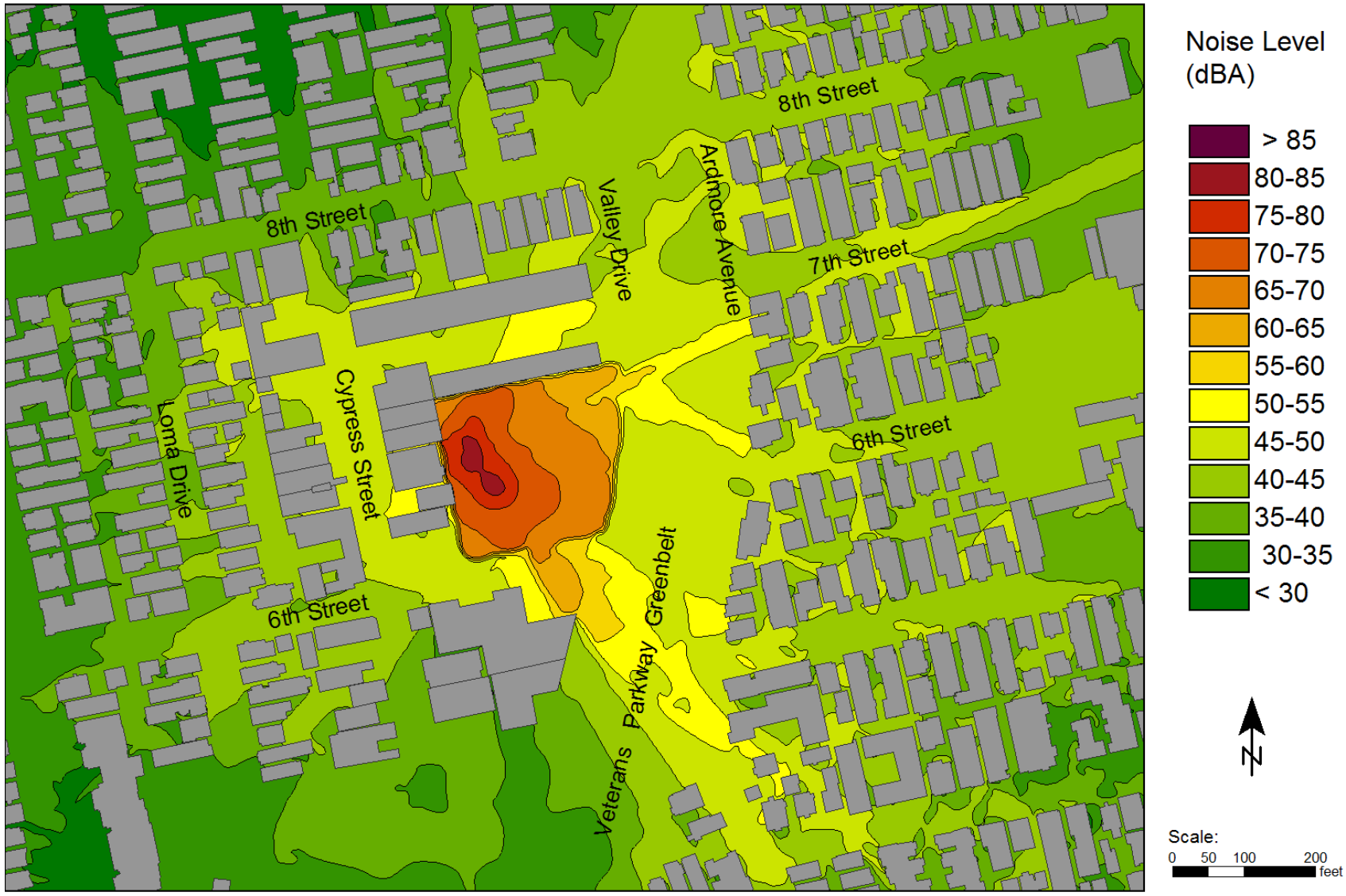


Figure 4.11-39 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION for a Receiver Height of 20-ft



Impact #	Impact Description	Phase	Residual Impact
NV.5	Drilling-plus-production activity on the site would result in a substantial increase in ambient noise levels.	Phase 4	Class I Significant and Unavoidable

As the preceding tables show, predicted noise levels during the drilling-and-production stage of Phase 4 are significant at almost all of the neighboring sensitive receivers. The most significantly impacted properties are expected to be the homes on Ardmore Avenue. Because the Applicant already proposes quite extensive noise controls for the drilling and production equipment, options for further mitigation are limited to increasing the height and extent of the noise reduction barrier around the perimeter as described below.

Mitigation Measures

NV-5a Provide a continuous, 35-foot high noise barrier around the entire perimeter of the site. Minimum sound insulation performance of the barrier material should be STC-32.

NV-5b Provide solid (no holes) plywood or sheet metal gates for the east and south designed to deliver a minimum STC of 32. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides. The intent is to maintain the acoustical integrity of the STC-32 noise barrier in all locations.

NV-5c All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.

NV-5d Install pads on the V-door and other appropriate areas, timbers and pads on the drill deck, pads between drill and casing pipe while in storage and pad and timbers at the boards on the mast to reduce metal-on-metal noise.

Figures 4.11-40 and 4.11-41 show the noise contours for this mitigated scenario and the slightly reduced noise impact on neighboring uses is summarized in Table 4.11-32. Table 4.11-33 compares the slightly mitigated predicted noise levels during the drilling-plus-production with the 45 dBA noise limit required by the Hermosa Beach Oil Code.

Residual Impacts

The noise impact of drilling-and-production activities in Phase 4 would remain significant, even after mitigation (Class I). Since it is not possible to provide a sound barrier higher than 35-feet on the western side of the site, this noise impact would be **significant and unavoidable (Class I).**

Figure 4.11-40 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION with Mitigation for a Receiver Height of 5-ft

Figure 4.11-41 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION with Mitigation for a Receiver Height of 20-ft

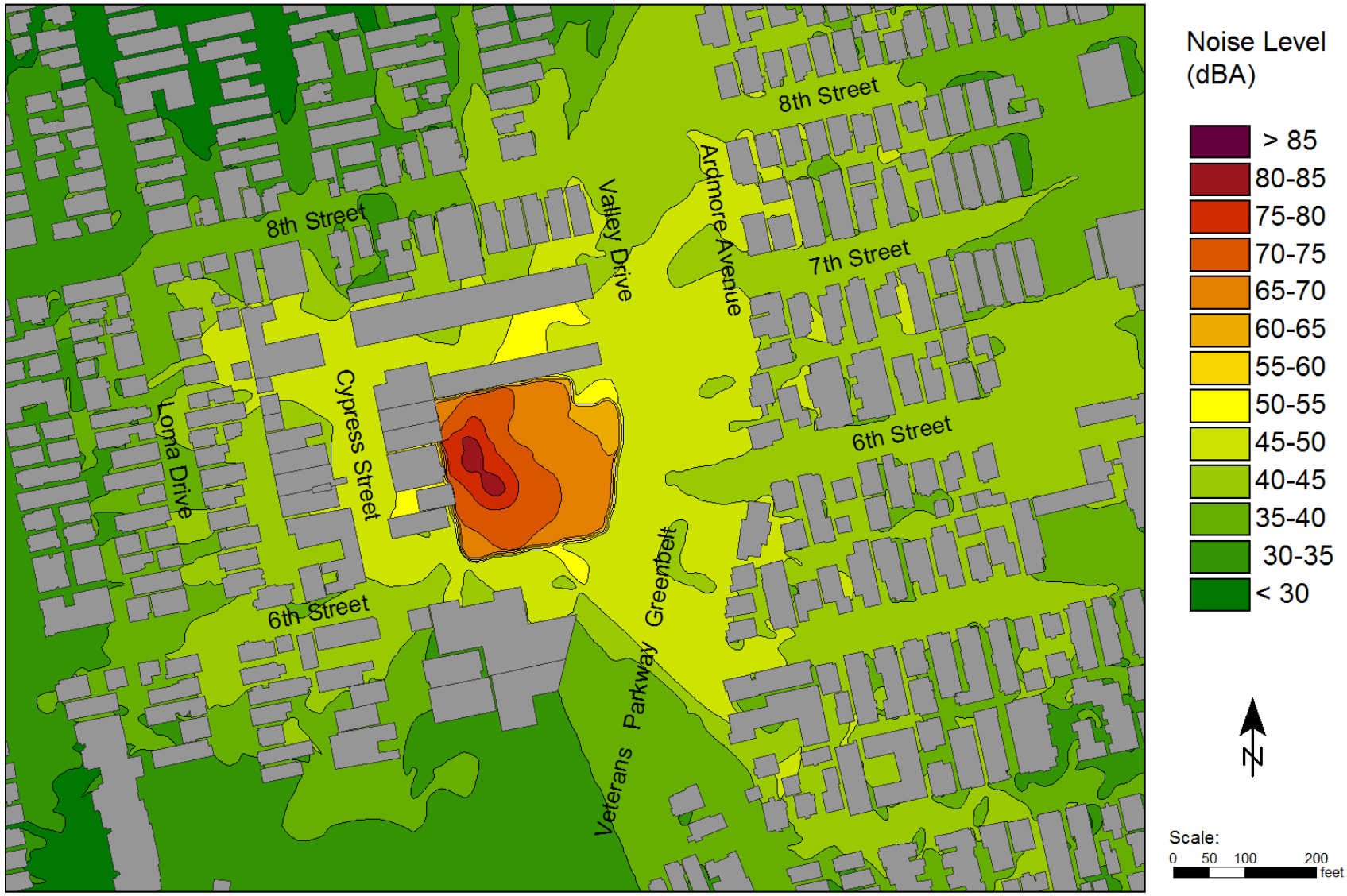


Table 4.11-32 Phase 4 - Predicted Drilling + Production Noise Impact with Mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant ?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Drilling + Production	Drilling + Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	43.8	47.8	2.2	NO
	20	45.6	47.7	49.8	4.2	YES
Residential Uses Northwest of Site on Cypress Street	5	37.6	39.5	41.7	4.1	YES
	20	37.6	44.2	45.1	7.5	YES
Residential Uses East of Site on Ardmore Avenue	5	38.3	45.0	45.8	7.5	YES
	20	38.3	47.1	47.6	9.3	YES
Residential Uses West of Site on Loma Drive	5	39.9	44.2	45.6	5.7	YES
	20	39.9	44.4	45.7	5.8	YES
Veterans Parkway (Center)	5	35.6	42.8	43.6	8.0	YES

Table 4.11-33 Phase 4 - Compliance with the Hermosa Beach Oil Code (with Mitigation)

Location	Receiver Height (ft)	Predicted Drilling + Production Noise Level (dBA)	Complies with 45 dBA Limit?
Residential Uses North of the Site on 8th Street	5	42.2	YES
	20	47.1	NO
Residential Uses Northwest of the Site on Cypress Street	5	37.4	YES
	20	40.4	YES
Residential Uses East of the Site on Ardmore Avenue	5	44.5	YES
	20	46.7	NO
Residential Uses West of the Site on Loma Drive	5	42.6	YES
	20	42.7	YES
Veterans Parkway (Center)	5	42.4	YES

Comparison with the Applicant's Noise Impact Study

As with Phase 2 the noise impact analysis presented above, noise impacts for Phase 4 differs from the Noise Impact Study (November 2012) prepared by the Applicant's acoustical consultant, Behrens & Associates - which concluded that noise impacts during the drilling-plus-production stage of Phase 4 would be less than significant. The reasons for this difference are the same as those described above in subsection 4.11.4.1 for Phase 2.

Phase 4 Production Only (No Drilling or Re-drilling Occurring)

The production would occur concurrently with the drilling activity during the first 30 months of Phase 4. Once the drilling stage is complete, the 32-foot high noise barrier would be removed

(leaving only the 16-foot high masonry wall constructed in Phase 3) and production activity would continue 24-hours a day for the remainder of the life of the Project. Re-drills would also occur occasionally. Noise impacts during redrilling would be the same as under the drilling scenario discussed above. This subsection discussed the period after drilling or when re-drilling is not occurring, with only production equipment operating.

Figures 4.11-42 and 4.11-43 show predicted noise contours for the production-only portion of Phase 4, for receiver heights of 5-feet and 20-feet respectively. Table 4.11-34 shows the predicted noise impact of the long-term production operations at the site on the sensitive receptors nearby.

Table 4.11-34 Phase 4 - Predicted Production (only) Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Production	Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	38.2	46.3	0.7	NO
	20	45.6	42.3	47.3	1.7	NO
Residential Uses Northwest of Site on Cypress Street	5	37.6	36.1	39.9	2.3	NO
	20	37.6	42.6	43.8	6.2	YES
Residential Uses East of Site on Ardmore Avenue	5	38.3	35.1	40.0	1.7	NO
	20	38.3	38.0	41.2	2.9	NO
Residential Uses West of Site on Loma Drive	5	39.9	37.2	41.8	1.9	NO
	20	39.9	39.2	42.6	2.7	NO
Veterans Parkway (Center)	5	35.6	34.1	37.9	2.3	NO

Figure 4.11-42 Phase 4 - Leq Noise Contours during Long Term PRODUCTION for a Receiver Height of 5-ft

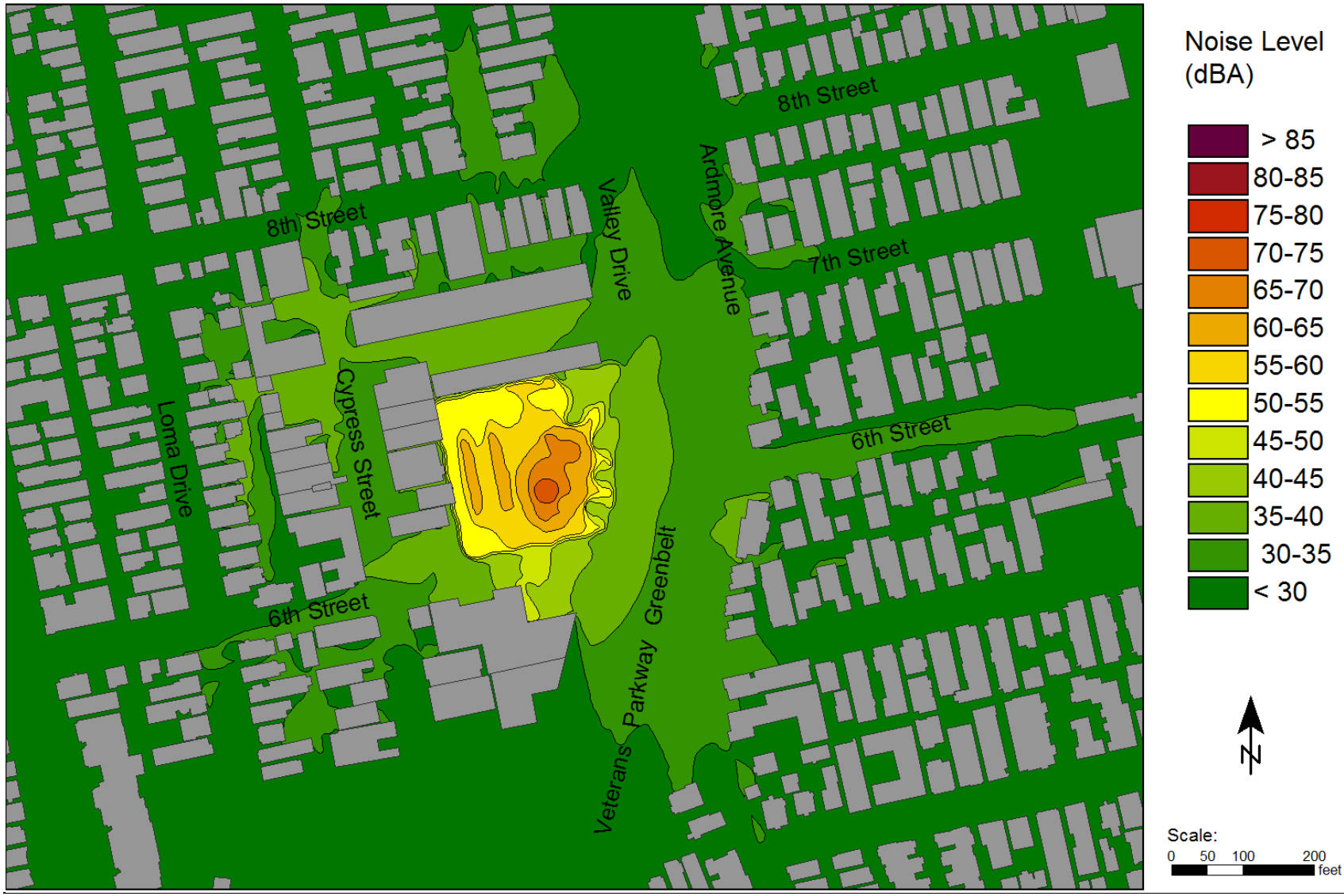


Figure 4.11-43 Phase 4 - Leq Noise Contours during Long Term PRODUCTION for a Receiver Height of 20-ft

Impact #	Impact Description	Phase	Residual Impact
NV.6	Long term production activity on the site would result in a substantial increase in ambient noise levels.	Phase 4	Class II Less Than Significant with Mitigation

Mitigation Measures

NV-6a Increase the height of the masonry walls on the north and west sides of the site to a minimum of 27-feet.

NV-6b Apply outdoor acoustical panels to all available surfaces of the north and west walls that face the production operations above a height of 10-feet above the ground. The purpose of the acoustical panels is to control reflection of production noise in the direction of the sensitive uses to the east and south. The acoustical panels shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.28, 0.68, 0.95, 0.86, 0.89, 0.72.

Figures 4.11-44 and 4.11-45 show the noise contours for this mitigated long-term production scenario and the reduced noise impact on neighboring uses is summarized in Table 4.11-35.

Table 4.11-35 Phase 4 - Predicted Production (only) Noise Impact with mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline (Lowest 1-hr Nighttime L_{eq})	Production	Production + Baseline		
Residential Uses North of Site on 8th Street	5	45.6	35.4	46.0	0.4	NO
	20	45.6	37.1	46.2	0.6	NO
Residential Uses Northwest of Site on Cypress Street	5	37.6	33.1	38.9	1.3	NO
	20	37.6	37.1	40.4	2.8	NO
Residential Uses East of Site on Ardmore Avenue	5	38.3	34.1	39.7	1.4	NO
	20	38.3	36.9	40.7	2.4	NO
Residential Uses West of Site on Loma Drive	5	39.9	33.7	40.8	0.9	NO
	20	39.9	35.0	41.1	1.2	NO
Veterans Parkway (Center)	5	35.6	33.3	37.6	2.0	NO

Residual Impacts

The noise impact of long term production activities in Phase 4 would be reduced to **less than significant with mitigation (Class II)**.

4.11.4.2 Traffic Noise Analysis

The noise impact of additional traffic generated by the Project will be most pronounced on Valley Drive between Pier Avenue and 6th Street and between 6th and Herondo Streets, because:

- Of all the street segments anticipated to be used by cars and trucks associated with the Project, these segments of Valley Drive have the lowest present-day volumes and will therefore experience the greatest percentage increase in traffic volume due to the Project.
- Since Valley Drive connects directly to the site, it will necessarily handle all inbound and outbound traffic; further from the site, the traffic will tend to disperse and be distributed between the various route options.
- There are noise-sensitive residential uses located directly adjacent to both segments of Valley Drive.

Traffic contribution on PCH, 190th or other main streets would be a lower percentage of the total roadway traffic than on Valley Drive and would therefore produce a lower change in noise level increases than the analysis below for Valley Drive.

For the purposes of the noise analysis, it has been assumed that all inbound traffic will access the site from the north (Valley Drive between Pier Avenue and 6th Street) and all outgoing traffic will leave the site towards the south (via Valley Drive between 6th and Herondo Streets). Traffic noise CNEL values for Valley Drive have been calculated at the closest residential properties to Valley Drive using the FHWA Traffic Noise Model module in SoundPLAN 7.3 software, using present day and future traffic volumes with as well as the estimated additional trips associated with each of the four phases of the Project.

This process has yielded the calculated increase in traffic noise CNEL values with and without each Project phase. Table 4.11-36 summarizes the input data and results of this analysis. As the Table shows, the expected increases in CNEL are no more than 0.1 dBA, which is less than significant.

Figure 4.11-44 Phase 4 - Leq Noise Contours during Long Term PRODUCTION with Mitigation for a Receiver Height of 5-ft

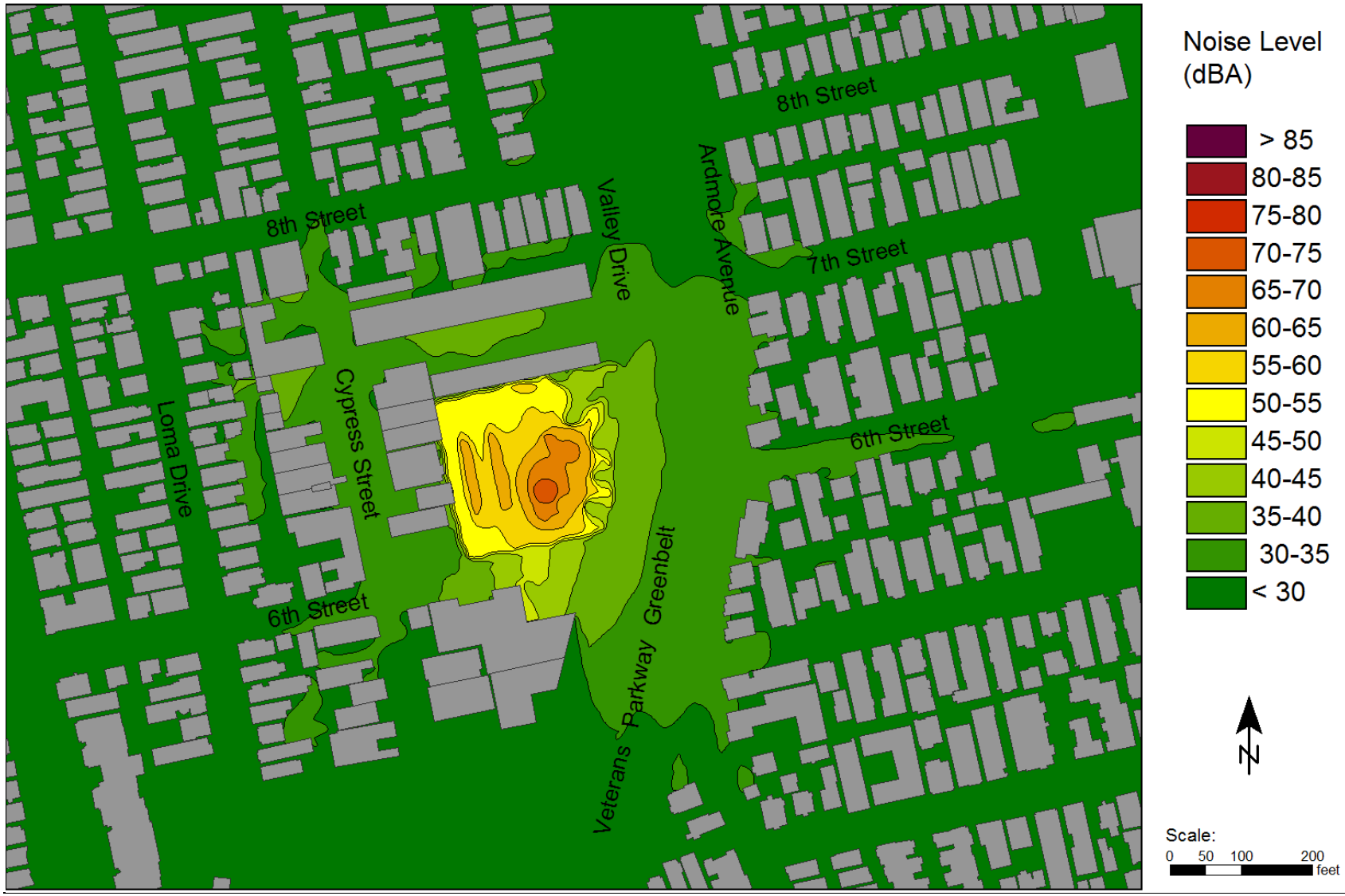


Figure 4.11-45 Phase 4 - Leq Noise Contours during Long Term PRODUCTION with Mitigation for a Receiver Height of 20-ft

Table 4.11-36 Calculated Traffic CNEL Noise Level Increases on Valley Drive

Project Phase	Vehicles		Pier Avenue to 6th Street	6th Street to Herondo Street
PHASE 1	Without Project	Total ADT Volume	4,709	4,021
		Medium Duty Trucks	85	72
		Heavy Duty Trucks	33	28
	With Project	Total ADT Volume	4,734	4,046
		Medium Duty Trucks	85	72
		Heavy Duty Trucks	48	43
	Predicted Increase in CNEL (dBA)		0.1	0.0
PHASE 2	Without Project	Total ADT Volume	4,758	4,063
		Medium Duty Trucks	86	72
		Heavy Duty Trucks	33	28
	With Project	Total ADT Volume	4,804	4,109
		Medium Duty Trucks	89	75
		Heavy Duty Trucks	51	46
	Predicted Increase in CNEL (dBA)		0.0	0.1
PHASE 3	Without Project	Total ADT Volume	4,758	4,063
		Medium Duty Trucks	86	72
		Heavy Duty Trucks	33	28
	With Project	Total ADT Volume	4,831	4,136
		Medium Duty Trucks	86	72
		Heavy Duty Trucks	51	46
	Predicted Increase in CNEL (dBA)		0.1	0.1
PHASE 4 Drilling & Operations	Without Project	Total ADT Volume	4,758	4,063
		Medium Duty Trucks	86	72
		Heavy Duty Trucks	33	28
	With Project	Total ADT Volume	4,806	4,111
		Medium Duty Trucks	90	76
		Heavy Duty Trucks	45	40
	Predicted Increase in CNEL (dBA)		0.0	0.1
PHASE 4 Operations	Without Project	Total ADT Volume	4,939	4,217
		Medium Duty Trucks	89	76
		Heavy Duty Trucks	36	30
	With Project	Total ADT Volume	4,952	4,230
		Medium Duty Trucks	90	77
		Heavy Duty Trucks	40	34
	Predicted Increase in CNEL (dBA)		0.0	0.0

4.11.4.3 Vibration Impact Analysis

Phases 1 & 3

Demolition and construction equipment in use on the site during Phases 1 and 3 of the Project would produce potentially significant levels of vibration at the property line. Table 4.11-37 lists the equipment the Applicant expects to be used during Phases 1 and 3, together with the anticipated levels of ground vibration each will produce.

As shown in Table 4.11-37, ground vibration levels are expected to be significant at the property line while many of the demolition and construction machines are in use. In the case of the vibratory roller and hydraulic concrete buster, the vibration levels will still be significant at a distance of 50-feet from the property line. This equipment would be used for a period of 3-15 days during Phase 1 and 3. At a distance of 10-feet from the property line, all of the listed pieces of equipment are expected to produce ground vibration levels that greatly exceed the 0.01 inches/second significance threshold for vibration. Since the listed items of equipment are a necessary part of Phases 1 and 3 and since the work will - at times - be occurring close to the property line. However, the land uses immediately adjacent to the Project Site are light manufacturing shops that have their own sources of vibration and are not considered sensitive to vibration from outside sources. The closest use nearby that would be sensitive to vibration is Studio 637, a recording studio on the west side of Cypress Street, which is 200-feet from Project Site. At this distance, ground vibration produced by the construction activities would be below the 0.01 inches/second threshold and would be less than significant.

Table 4.11-37 Demolition & Construction Equipment Ground Vibration Levels

Equipment	Vibration Level (in/sec, rms)		
	at 50-feet	at 25-feet	at 10-feet
Large Hydraulic Excavator	0.007	0.020*	0.078*
Backhoe	0.008	0.022*	0.088*
Auger	0.008	0.022*	0.088*
Large Bulldozer	0.008	0.022*	0.088*
Vibratory Roller	0.019*	0.053*	0.208*
Tamper	0.003	0.009	0.035*
Crane	0.003	0.008	0.031*
Trencher	0.005	0.014*	0.054*
Large Truck	0.007	0.019*	0.075*
Hydraulic Concrete Buster	0.021*	0.060*	0.237*

Source: Adapted from Transit Noise and Vibration Impact Assessment (FTA 2006), assuming a crest factor of 4.
* Asterisk indicates that ground vibration exceeds the 0.01 in/sec significance threshold.

Phases 2 & 4 Vibration

The drilling and production equipment associated with Phases 2 and 4 will produce lower levels of vibration than the demolition and construction used in Phases 1 and 3.

Maximum ground vibration levels of 0.006 inches/second (RMS) at a distance of 50-feet from a drilling rig have been measured at the PXP oilfield in Baldwin Hills. The rig being studied in Baldwin Hills was larger than that proposed for this Project and was powered by large diesel generators - which will not be needed for the Hermosa Beach site. However, a vibration level of 0.006 inches/second has been used as a conservative basis for the analysis in this case.

The Applicant's proposed layout for the site places the drill mast approximately 50-feet from the property line, but there are several pieces of associated equipment (such as mud and well pumps) that are closer to the property line than 50-feet, which introduces the possibility that ground vibration levels at the property line could approach, the 0.01 inches/second significance threshold. Also, there will likely be occasional pulses of vibration from pipe handling and similar intermittent activities that could be introduced to the ground, causing vibration levels at the property line to exceed 0.01 inches/second from time to time.

The land uses immediately adjacent to the Project Site are light manufacturing shops that have their own sources of vibration and are not considered sensitive to vibration from outside sources. The closest use nearby that would be sensitive to vibration is Studio 637, a recording studio on the west side of Cypress Street, which is 200-feet from the Project Site. At this distance, ground vibration produced by the drilling and production activities would be below the 0.01 inches/second threshold and would be less than significant.

Valve Box Options

The Proposed Project includes a number of different options for the location of the valve box for the tie-in to the crude oil system. Noise impacts could be realized if maintenance activities are required on the valve boxes or fluid noise occurs from components. Therefore, the greater separation distance the better from populated areas. The valve box options 2 and 4 provide the best separation distance.

Pipeline Route Options

The Proposed Project includes a number of different options for the pipeline route for tie-in to the crude oil system. Scenario 1 and Scenario 2 involve construction in the roadway, which would require additional construction activities, including asphalt laying, and potential recirculation of traffic during construction, which would generate more noise than Scenario 3, which would be installed within the mostly dirt SCE right-of-way. Scenario 3 would therefore be preferable.

4.11.4.4 Relocation of the City Yard

The proposal to relocate the City Yard to a new site adjacent to City Hall would involve demolition of the existing Hermosa Storage building and clearance of the site. A new facility would be built to replace the existing one and would include a circulation yard flanked by workshops, storage and a small office building. Two options are currently under consideration: a No Added Parking option that would retain the same number of parking spaces as are currently

available at Hermosa Storage; and a Parking Option, that would provide 97 additional subterranean parking spaces.

The noise impacts of the City Maintenance Yard relocation have been modeled using SoundPLAN 7.3 software. Three scenarios were studied: demolition phase, construction phase and operations. In each case, the anticipated worst-case noise sources were used as inputs to the model.

Comparison of the two Options

Construction Noise

Under the Parking Option, additional construction would be required to construct the underground parking level, thereby increasing the duration of construction noise impact compared to the No Added Parking option.

Operational Noise - Parking Structure

During operations, the Parking Option would introduce additional vehicle parking activity compared to the No Added Parking option and to present-day conditions. However, the increase in vehicle movements would be offset by the fact that the new parking structure would be sunken below grade and enclosed, shielding the closest sensitive uses from most of the parking structure noise. For residential receivers on 11th Street, parking activity associated with the Parking Option would not introduce any additional noise impacts compared to the No Added Parking option or to the present-day. A similar situation would exist for those residential receivers located immediately north of the new Yard site on Cypress Avenue.

Residential receivers located further north on Cypress Avenue would be exposed to noise radiating from the parking structure entrance/exit ramp, but the effect on time-averaged noise levels (such as hourly Leq) would be negligible due to the relatively low number of parking spaces and correspondingly low traffic volume. However, the noise of individual events in the parking structure such as - door slams, tire squeals, alarm activation etc. - would be apparent from time to time and would be most noticeable during the late evening and at night, when ambient noise levels are at their lowest.

Based on noise measurements made in existing parking structures (MGA 2008), maximum instantaneous noise levels of 50 dBA are estimated for the homes on Cypress Avenue that have direct line-of-sight to the parking structure entrance/exit. While audible, a maximum noise level of 50 dBA is considered less than significant in the context of the existing noise climate in this area. During the baseline noise surveys, instantaneous maximum noise levels in this location (monitoring location Y7 in Figure 4.11-8) were found to frequently exceed 50 dBA - even at night - due to existing noise sources such as vehicle movements on Cypress Avenue and Valley Drive.

Demolition & Construction

The demolition and construction schedule would span approximately 16 months. The noisiest portion of the demolition and site clearance work at the new City Maintenance Yard site is anticipated to be the break-up and removal of existing asphalt and concrete paving, concrete curbs and walls, and underground utilities. The equipment in use during this worst-case demolition stage would be the same as that in the demolition of the existing City Maintenance

Yard (see Table 4.11-13) and would last for an estimated 2 weeks. The noisiest stage of the construction work is expected to be the construction of foundations and slabs and would last for an estimated 2-4 weeks. Equipment types, noise levels and usage factors used in the noise model for the new City Maintenance Yard demolition and construction phases are shown in Table 4.11-38.

The following noise reducing design features have been included in the noise models for the construction and demolition work at the new City Maintenance Yard site:

- A typical 12-foot high plywood jobsite fence at the perimeter of the site.
- Demolition and construction activities limited to between 8am and 6pm Monday - Friday, 9am - 5pm on Saturdays. No demolition or construction activities on Sundays or Federal holidays. All consistent with the Hermosa Beach Municipal Code.
- All demolition and construction equipment will be regularly serviced and maintained in proper working order, so as not to create excessive noise. Any non-compliant equipment will be immediately removed from service. Equipment maintenance work will be subject to the same time restrictions as the other demolition and construction activities.
- All mechanical equipment, including mobile equipment, will be switched off when not in use.
- All personnel working on the Project Site will receive Employee Noise Awareness training, to ensure familiarity with all noise control procedures and the importance of strict compliance.

- Horns, whistles or other loud devices will not be used.
- Yelling will be avoided. All personnel communications - outside of emergencies - will be made via walkie-talkies or other electronic communication devices.
- No radios or other loudspeaker devices will be allowed on the site.

Table 4.11-38 City Maintenance Yard Relocation Demolition & Construction Equipment Usage and Noise Level Data

Work Stage	Equipment	Sound Power Level (dBA)	Quantity in Model	Usage Factor[1] (%)
Demolition *Removal of concrete & asphalt paving, walls and utilities.*	Concrete Buster	121.8	1	10
	Loader	110.7	1	40
	Truck	115.8	1	15
Construction *Concrete foundations and slabs.*	Compressor	112.8	2	50
	Concrete Pump	113.8	1	40
	Concrete Truck	116.8	1	40
	Concrete Vibrator	110.8	1	40
	Pump	110.8	2	50
	Pneumatic Drill	116.8	1	4
	Saw	109.8	1	12

[1] The percentage of time the equipment is expected to operate during each day of the modeled scenario.

Figures 4.11-46 and 4.11-47 show the predicted noise contour maps for the worst-case demolition and construction scenarios for the new City Maintenance Yard site. The contour values are daily average Equivalent Noise Levels (Leq) and the receiver height for these two figures is 5-feet. Figures 4.11-48 and 4.11-49 show the noise contours for the same two scenarios with a receiver height of 20-feet; the 20-foot noise contours are particularly relevant to the residential uses on 11th and Cypress Streets, which are predominantly two and three-story structures, as well as City Hall.

Tables 4.11-39 and 4.11-40 compare baseline (existing) noise levels at those receptors closest to the proposed City Maintenance Yard site with the predicted demolition and construction noise levels.

The baseline for City Hall is the average daytime noise level measured Monday - Friday. For all other receivers, the baseline is the average daytime noise level measured Monday - Saturday, to represent the worst-case noise impact (see Table 4.11-9).

Figure 4.11-46 Relocated City Maintenance Yard - Leq Noise Contours during DEMOLITON for a Receiver Height of 5-feet

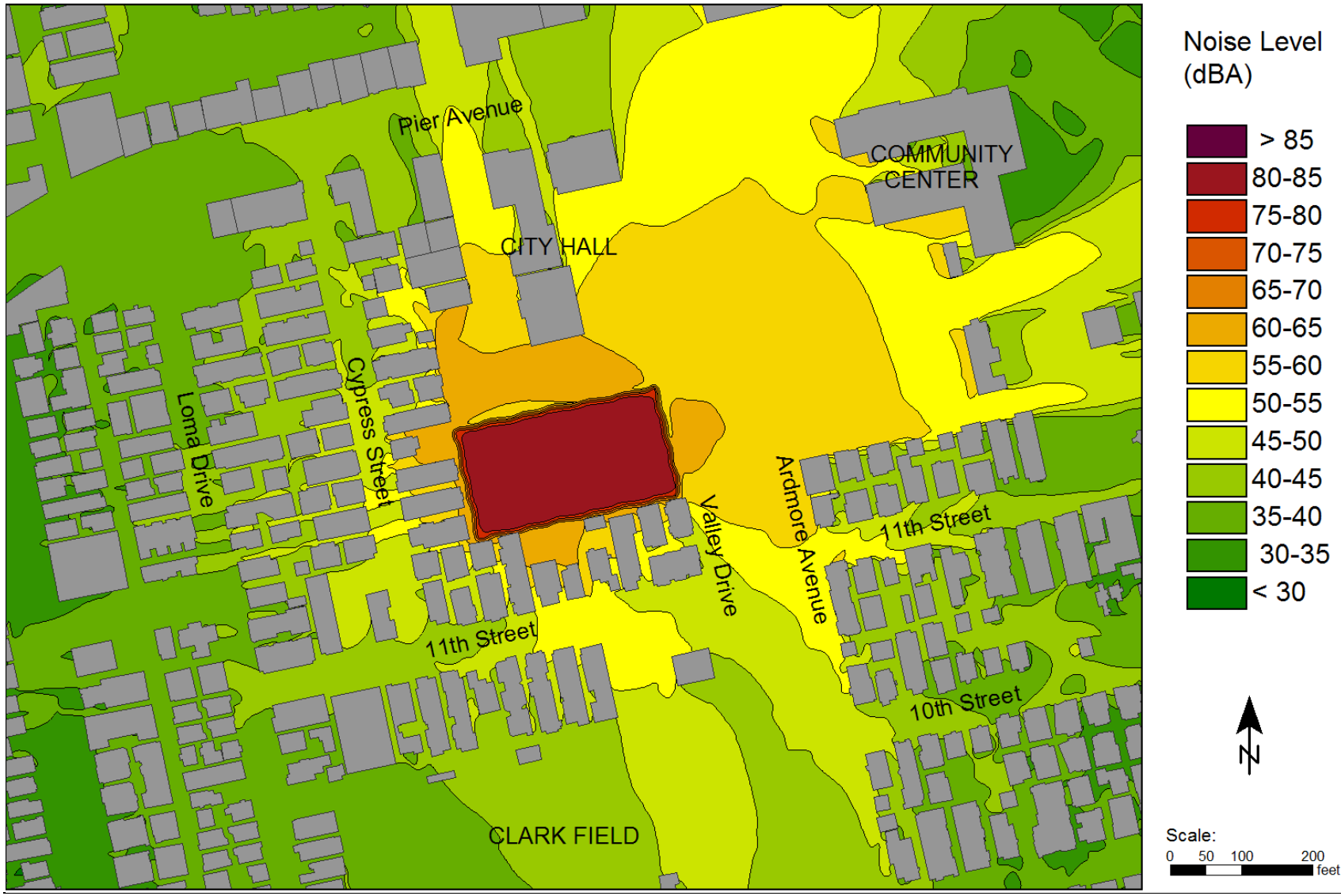


Figure 4.11-47 Relocated City Yard - Leq Noise Contours during CONSTRUCTION for a Receiver Height of 5-feet

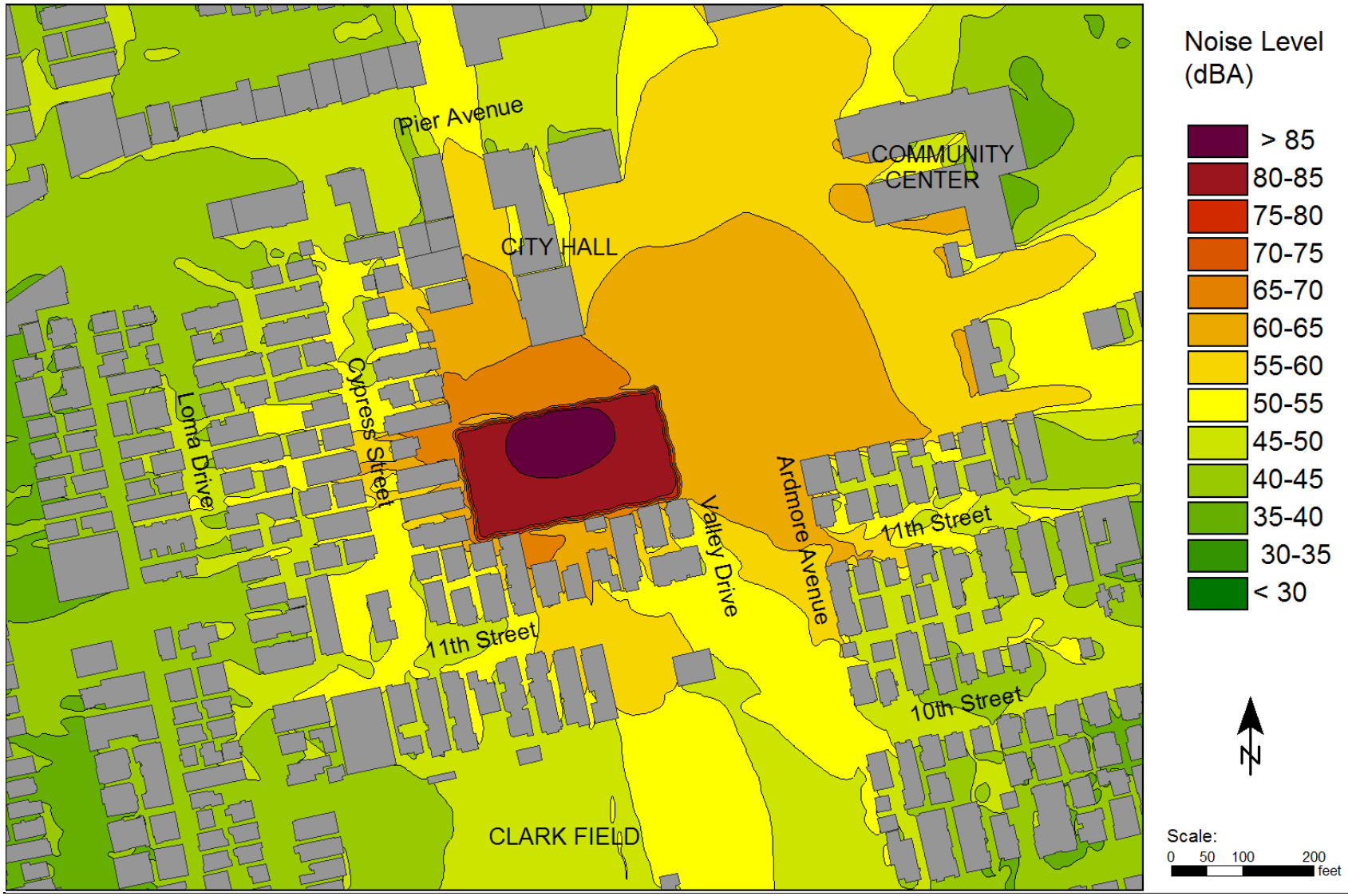


Figure 4.11-48 Relocated City Yard - Leq Noise Contours during DEMOLITON for a Receiver Height of 20-feet

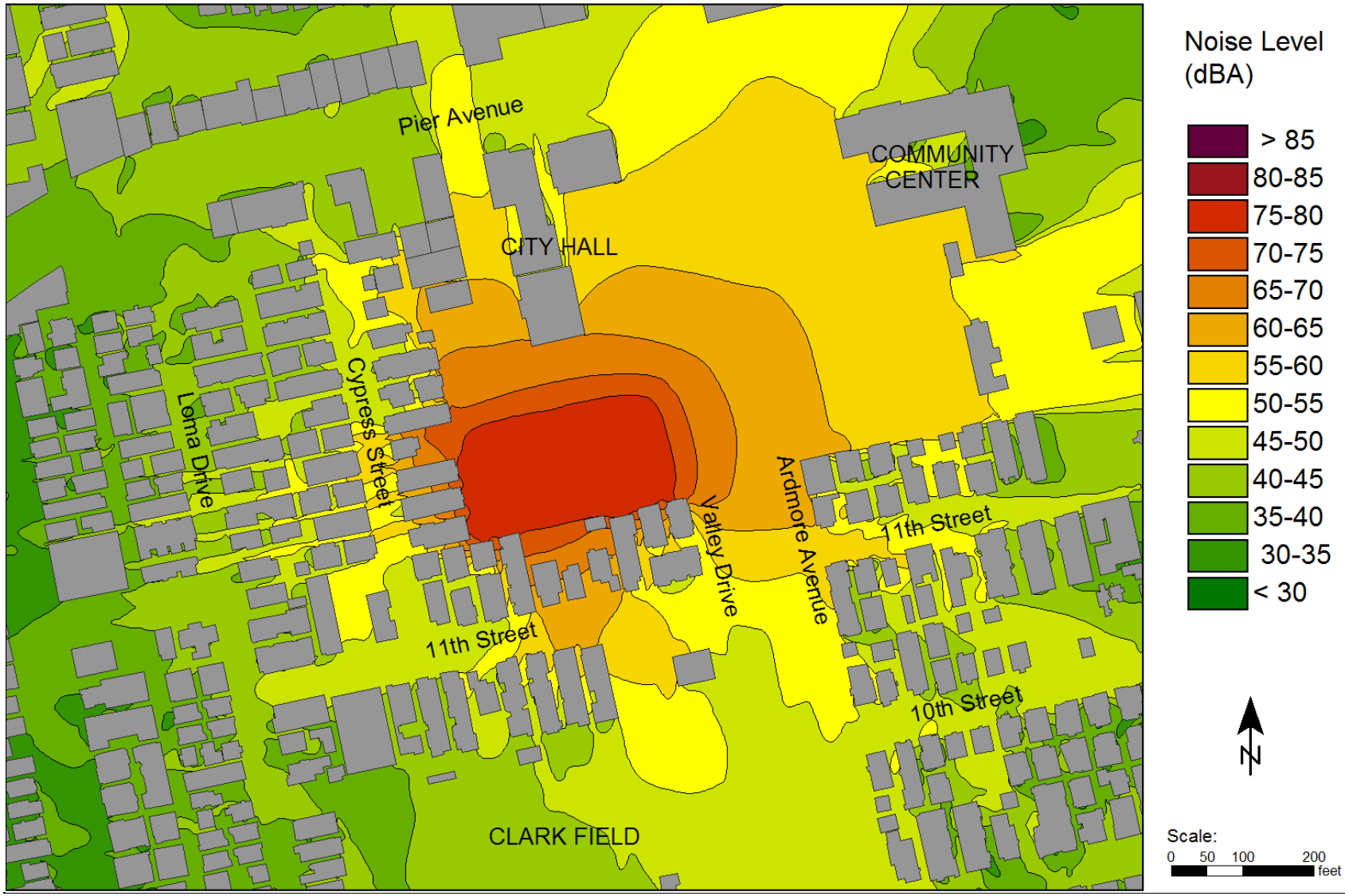


Figure 4.11-49 Relocated City Yard - Leq Noise Contours during CONSTRUCTION for a Receiver Height of 20-feet

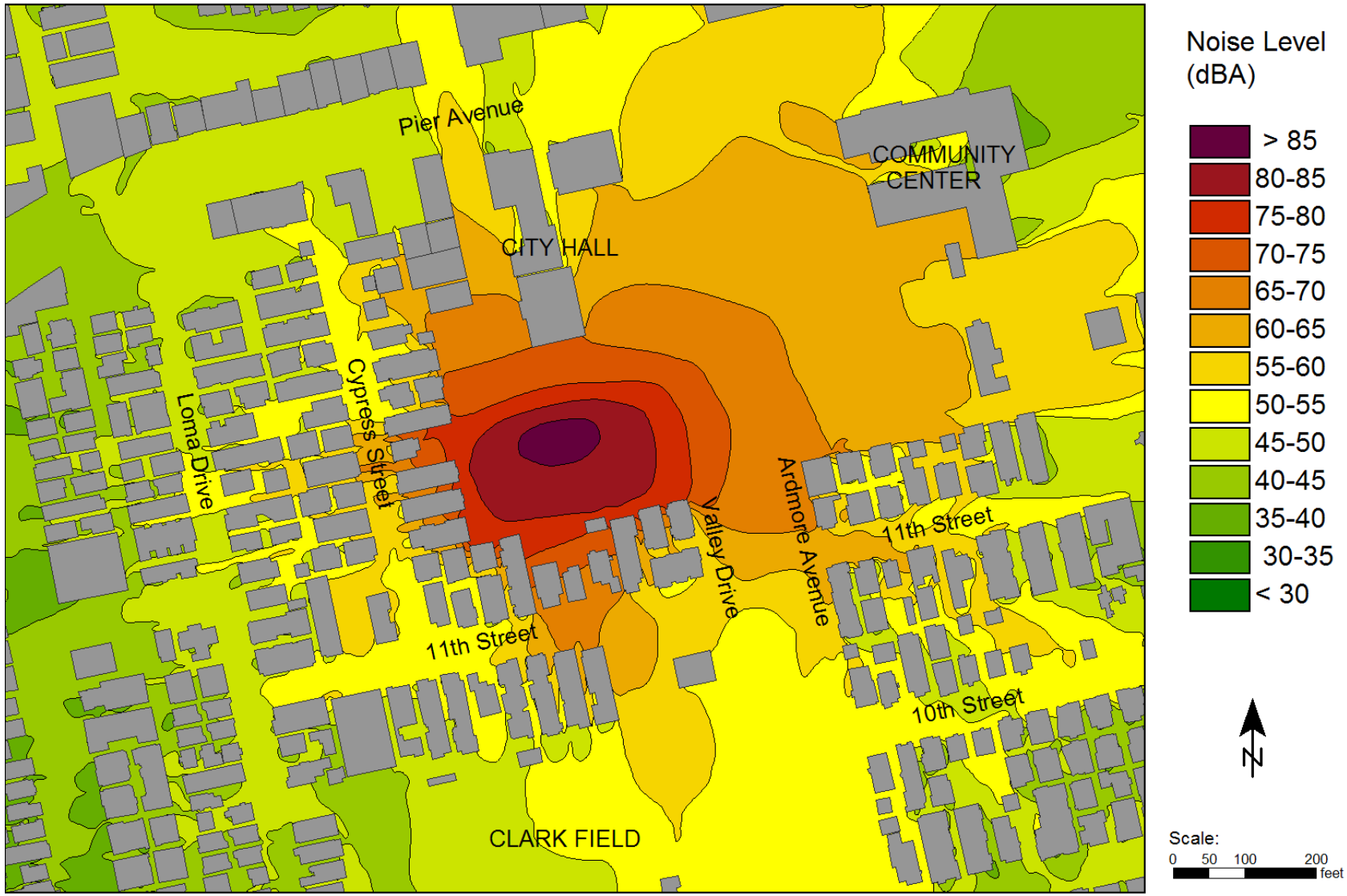


Table 4.11-39 Relocated City Yard - Predicted Demolition Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Demolition	Demolition + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	60.4	61.5	6.7	YES
	20	54.8	73.7	73.8	19.0	YES
Residential Uses South of the Site on 11th Street	5	53.9	60.8	61.6	7.7	YES
	20	53.9	73.8	73.8	19.9	YES
Residential Uses East of the Site on Ardmore Avenue	5	63.3	56.0	64.0	0.7	NO
	20	63.3	62.3	65.8	2.5	NO
Hermosa Beach Community Center	5	62.3	56.9	63.4	1.1	NO
	20	62.3	58.1	63.7	1.4	NO
Tennis Courts to the East of the Site	5	62.3	58.0	63.7	1.4	NO
City Hall	5	53.3	61.6	62.2	8.9	YES
	20	53.3	65.5	65.8	12.5	YES
Veterans Parkway (Center)	5	63.3	57.8	64.4	1.1	NO

Table 4.11-40 Relocated City Yard - Predicted Construction Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Construction	Construction + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	65.1	65.5	10.7	YES
	20	54.8	77.0	77.0	22.2	YES
Residential Uses South of the Site on 11th Street	5	53.9	64.4	64.8	10.9	YES
	20	53.9	77.3	77.3	23.4	YES
Residential Uses East of the Site on Ardmore Avenue	5	63.3	61.2	65.4	2.1	NO
	20	63.3	66.7	68.3	5.0	NO
Hermosa Beach Community Center	5	62.3	61.2	64.8	2.5	NO
	20	62.3	61.6	65.0	2.7	NO
Tennis Courts to the East of the Site	5	62.3	62.4	65.4	3.1	NO
City Hall	5	53.3	66.4	66.6	13.3	YES
	20	53.3	69.5	69.6	16.3	YES
Veterans Parkway (Center)	5	63.3	62.3	65.8	2.5	NO

As Tables 4.11-39 and 4.11-40 show, the predicted noise impact of demolition and construction activities on the new City Yard site is significant at many of the neighboring sensitive uses. The most significant impacts occur during the construction phase, when Project-related noise is expected to result in a substantial increase in daytime noise at the back of the homes on 11th and Cypress Streets which directly overlook the site, and also at City Hall.

Impact #	Impact Description	Phase	Residual Impact
NV.7	Demolition and construction equipment would increase noise levels.	Phase 3 Proposed City Maintenance Yard Project	Class I Significant and Unavoidable

Mitigation Measures

NV-7a Provide a continuous, 25-foot high noise control barrier along the north, west and south boundaries of the City Yard site. Minimum sound insulation performance of the barrier material should be STC-32.

NV-7b Provide a continuous, 16-foot high noise control barrier along the east boundary of the site. Minimum sound insulation performance of the barrier material shall be STC-25.

NV-7c Access to the site for construction shall be limited to a gate on the east side in order to maintain the integrity of the noise barrier on the north side. Gates shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides. The intent is to maintain the acoustical integrity of the STC-25 noise barrier.

NV-7d All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.

Residual Impacts

Figures 4.11-50 and 4.11-51 show the predicted noise contour maps for the worst-case demolition and construction scenarios with noise mitigation. The contour values are daily average Equivalent Noise Levels (Leq) and the receiver height for these two figures is 5-feet. Figures 4.11-52 and 4.11-53 show the noise contours for the same two scenarios with a receiver height of 20-feet. The noise impact of these mitigated demolition and construction scenarios on the neighboring properties is summarized in Tables 4.11-41 and 4.11-42.

As the figures and tables show, these mitigated scenarios reduce demolition and construction noise impact to less than significant levels for receivers east of the site, but at the residences on Cypress and 11th Streets and at City Hall, significant impact remains.

The noise impact of demolition and construction associated with the relocation of the City Yard would remain **significant and unavoidable (Class I).**

Table 4.11-41 Relocated City Yard - Predicted Demolition Noise Impact with Mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Demolition	Demolition + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	56.8	58.9	4.1	NO
	20	54.8	56.8	58.9	4.1	NO
Residential Uses South of the Site on 11th Street	5	53.9	58.3	59.6	5.7	YES
	20	53.9	58.1	59.5	5.6	YES
Residential Uses East of the Site on Ardmore Avenue	5	63.3	54.4	63.8	0.5	NO
	20	63.3	60.4	65.1	1.8	NO
Hermosa Beach Community Center	5	62.3	54.8	63.0	0.7	NO
	20	62.3	56.6	63.3	1.0	NO
Tennis Courts to the East of the Site	5	62.3	56.1	63.2	0.9	NO
City Hall	5	53.3	53.5	56.4	3.1	NO
	20	53.3	54.3	56.8	3.5	NO
Veterans Parkway (Center)	5	63.3	55.9	64.0	0.7	NO

Figure 4.11-50 Relocated City Yard - Leq Noise Contours during DEMOLITON with Mitigation for a Receiver Height of 5-feet

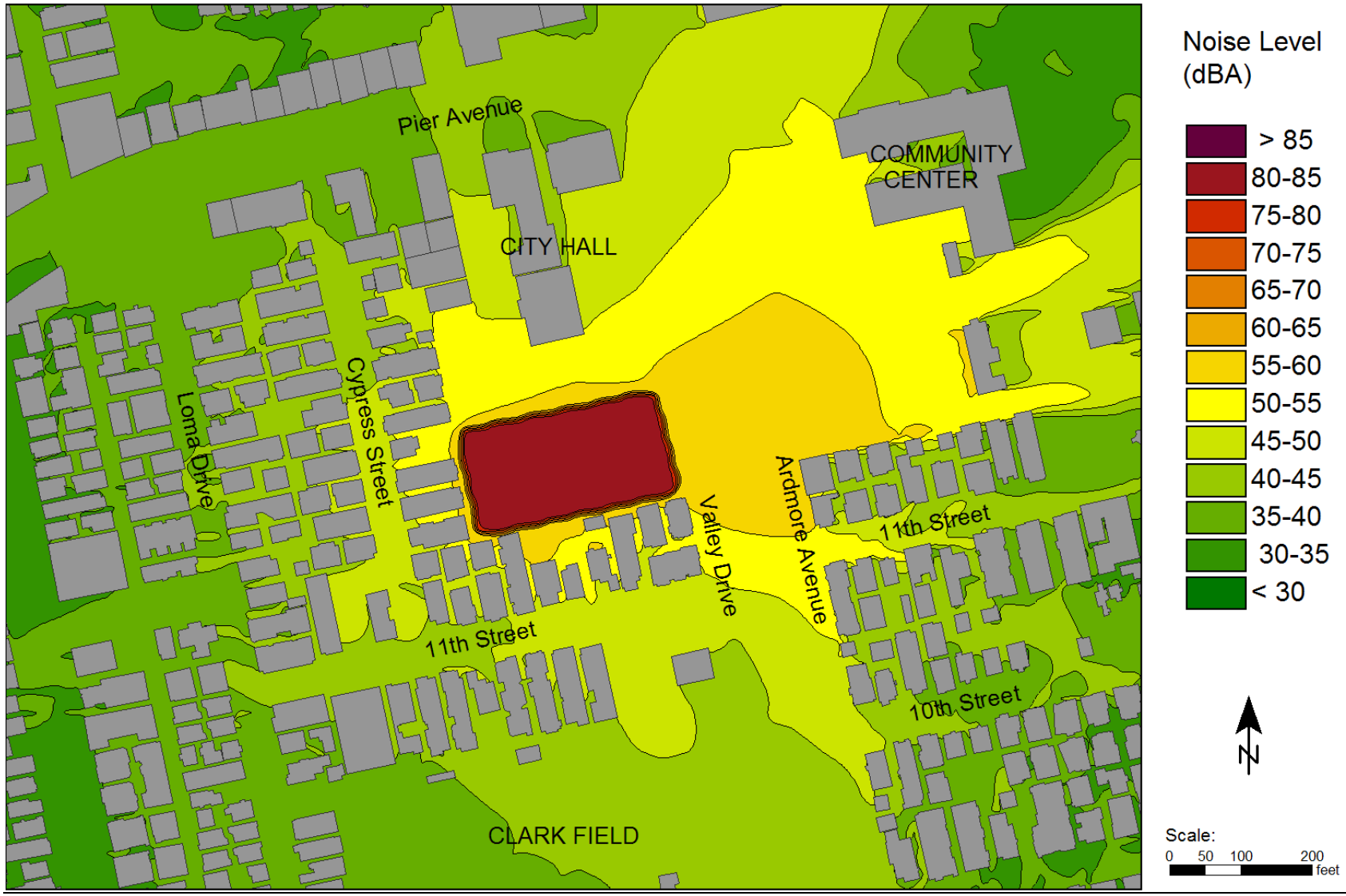


Figure 4.11-51 Relocated City Yard - Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 5-feet

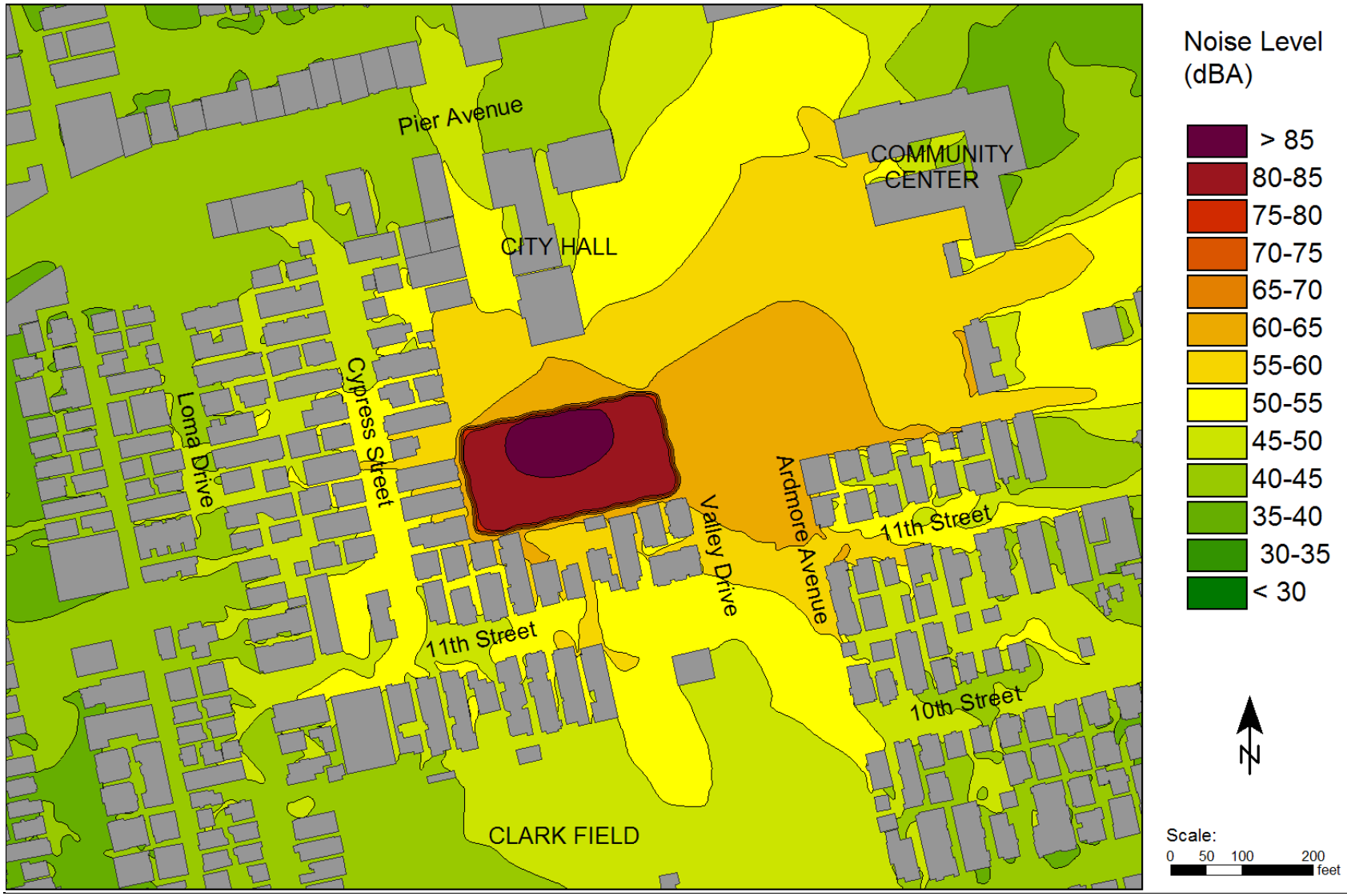


Figure 4.11-52 Relocated City Yard - Leq Noise Contours during DEMOLITON with Mitigation for a Receiver Height of 20-feet

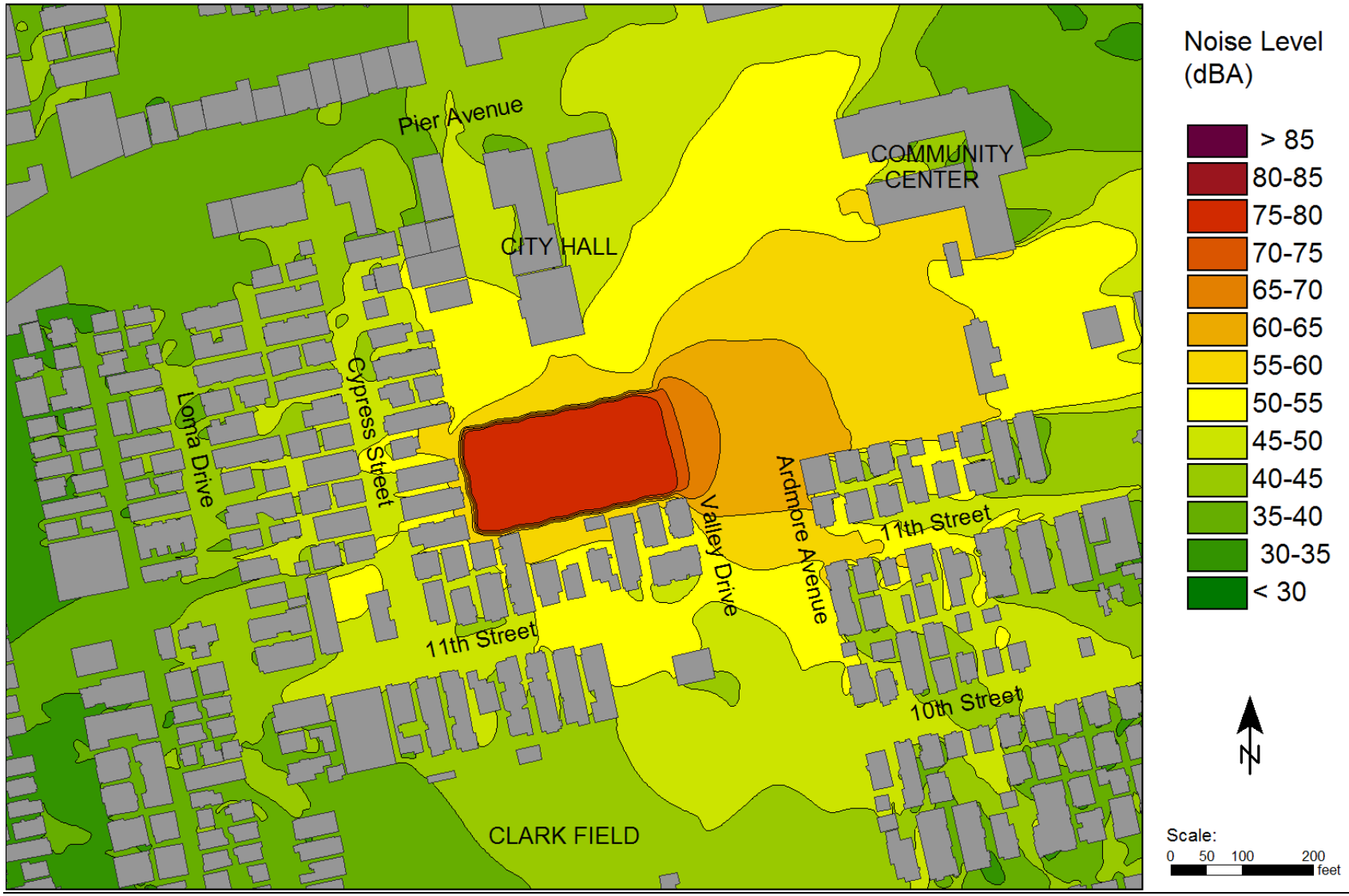


Figure 4.11-53 Relocated City Yard - Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 20-feet

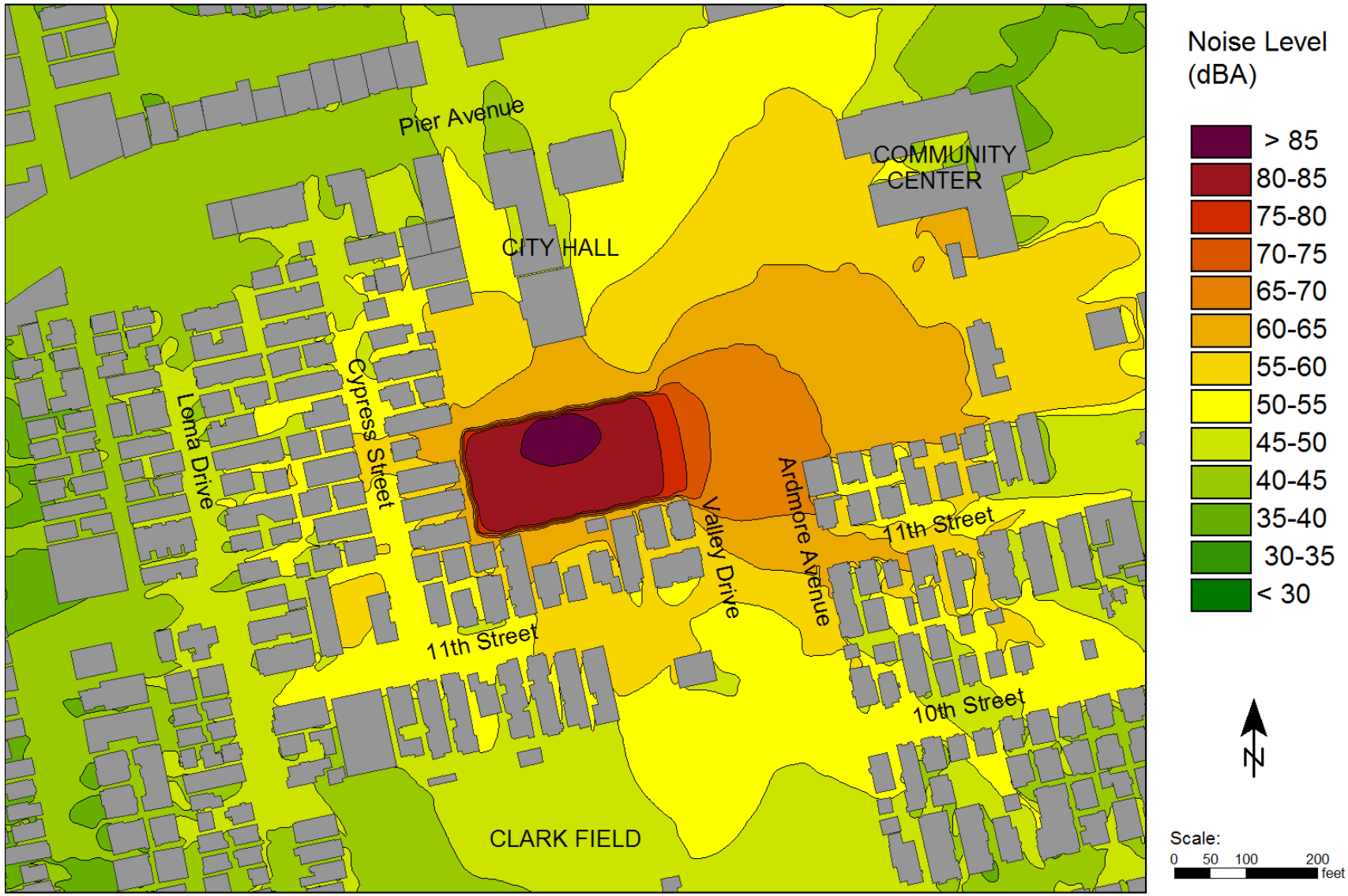


Table 4.11-42 Relocated City Yard - Predicted Construction Noise Impact With Additional Noise Mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Con-struction	Con-struction + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	60.1	61.2	6.4	YES
	20	54.8	60.4	61.5	6.7	YES
Residential Uses South of the Site on 11th Street	5	53.9	61.9	62.5	8.6	YES
	20	53.9	62.0	62.6	8.7	YES
Residential Uses East of the Site on Ardmore Avenue	5	63.3	59.7	64.9	1.6	NO
	20	63.3	65.1	67.3	4.0	NO
Hermosa Beach Community Center	5	62.3	59.9	64.3	2.0	NO
	20	62.3	60.0	64.3	2.0	NO
Tennis Courts to the East of the Site	5	62.3	60.8	64.6	2.3	NO
City Hall	5	53.3	59.4	60.4	7.1	YES
	20	53.3	59.9	60.8	7.5	YES
Veterans Parkway (Center)	5	63.3	60.8	65.2	1.9	NO

Operational Phase

Assessment of operational noise from the relocated City Yard has been based on noise measurements made at the existing facility during the month of December, 2013. 24-hour noise readings - both frequency spectra and overall dBA levels - were made at several locations in the yard, including the vehicle maintenance and building maintenance/wood shops and outside in the circulation/parking areas, trash drop off etc. These source readings were input to the SoundPLAN model, together with a three-dimensional representation of the future buildings on the new site based on the architectural drawings and renderings for the new facility (parking Option).

Figure 4.11-54 shows the predicted noise contour maps for the operation of the City Yard in its proposed new location. The contour values are daily average Equivalent Noise Levels (Leq) and the receiver height is 5-feet. Figure 4.11-55 shows the noise contours for the same scenario with a receiver height of 20-feet. The predicted noise contours assume a 6-foot high solid masonry wall - as indicated on the architectural drawings.

Table 4.11-43 summarizes the impact of the predicted City Yard operational noise levels at the most affected receivers in the vicinity. In each case, the baseline is the average weekday daytime (8AM - 7PM) L_{eq} noise level (see Table 4.11-9)..

Table 4.11-43 Relocated City Yard - Predicted Operational Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Operations	Operations + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	42.0	55.0	0.2	NO
	20	54.8	55.3	58.1	3.3	YES
Residential Uses South of the Site on 11th Street	5	53.9	33.8	53.9	0.0	NO
	20	53.9	45.9	54.5	0.6	NO
Residential Uses East of the Site on Ardmore Avenue	5	63.3	38.8	63.3	0.0	NO
	20	63.3	40.3	63.3	0.0	NO
Hermosa Beach Community Center	5	62.3	40.9	62.3	0.0	NO
	20	62.3	42.2	62.3	0.0	NO
Tennis Courts to the East of the Site	5	62.3	40.5	62.3	0.0	NO
City Hall	5	53.3	48.0	54.4	1.1	NO
	20	53.3	51.4	55.5	2.2	NO
Veterans Parkway (Center)	5	63.3	43.9	63.3	0.0	NO

Impact #	Impact Description	Phase	Residual Impact
NV.8	Operational noise from the relocated City Maintenance Yard would increase noise levels.	Phase 3 Proposed City Maintenance Yard Project	Class II Less Than Significant with Mitigation

Generally, the predicted increases in noise level are less than significant. However, at the upper stories of the residences located directly to the west of the site, the predicted increase in daytime noise levels is 3.3 dBA, which slightly exceeds the significance threshold.

Mitigation Measures

NV-8a Increase the height of the masonry wall on the west side of the Yard (the wall that spans between the office and shop building) from 6-feet to 12-feet.

NV-8b No noise-producing activity allowed in the City Yard before 8AM or after 7PM on weekdays and anytime on Saturdays and Sundays except during emergencies.

NV-8c For the Parking Option, there shall be no openings in the parking structure enclosure except for the vehicular entrance/exit opening on the north side. The entrance/exit should be located as far to the east as possible, to maximize its distance from the homes on Cypress Avenue. Garage exhaust fans shall be enclosed and fitted with duct silencers on the discharge and intake sides as necessary to limit noise emissions to less than significant levels at the nearby sensitive receivers.

Residual Impacts

Figures 4.11-55, 4.11-56 and Table 4.11-44 show how this mitigation would reduce the predicted noise impact on the residential properties to the west to less than significant levels. Impacts would be **less than significant with mitigation (Class II).**

Table 4.11-44 Relocated City Yard - Predicted Operational Noise Impact with Mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Operations	Operations + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	42.0	55.0	0.2	NO
	20	54.8	54.0	57.4	2.6	NO
Residential Uses South of the Site on 11th Street	5	53.9	33.9	53.9	0.0	NO
	20	53.9	46.0	54.6	0.7	NO
Residential Uses East of the Site on Ardmore Avenue	5	63.3	38.9	63.3	0.0	NO
	20	63.3	42.7	63.3	0.0	NO
Hermosa Beach Community Center	5	62.3	41.0	62.3	0.0	NO
	20	62.3	42.3	62.3	0.0	NO
Tennis Courts to the East of the Site	5	62.3	40.7	62.3	0.0	NO
City Hall	5	53.3	48.0	54.4	1.1	NO
	20	53.3	51.4	55.5	2.2	NO
Veterans Parkway (Center)	5	63.3	44.0	63.4	0.1	NO

Figure 4.11-54 Relocated City Yard - Leq Noise Contours during OPERATIONS For a Receiver Height of 5-feet

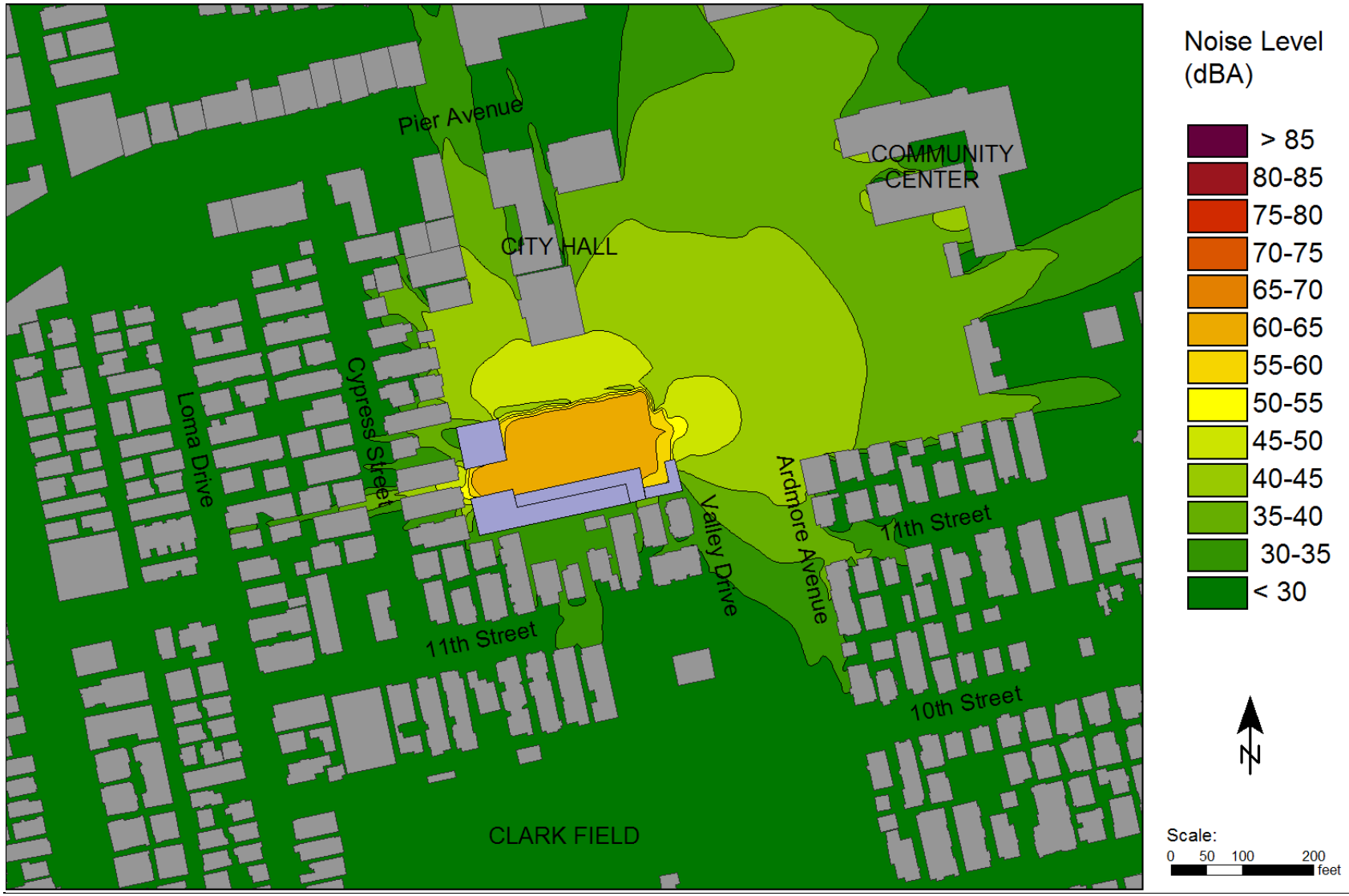


Figure 4.11-55 Relocated City Yard - Leq Noise Contours during OPERATIONS for a Receiver Height of 20-feet

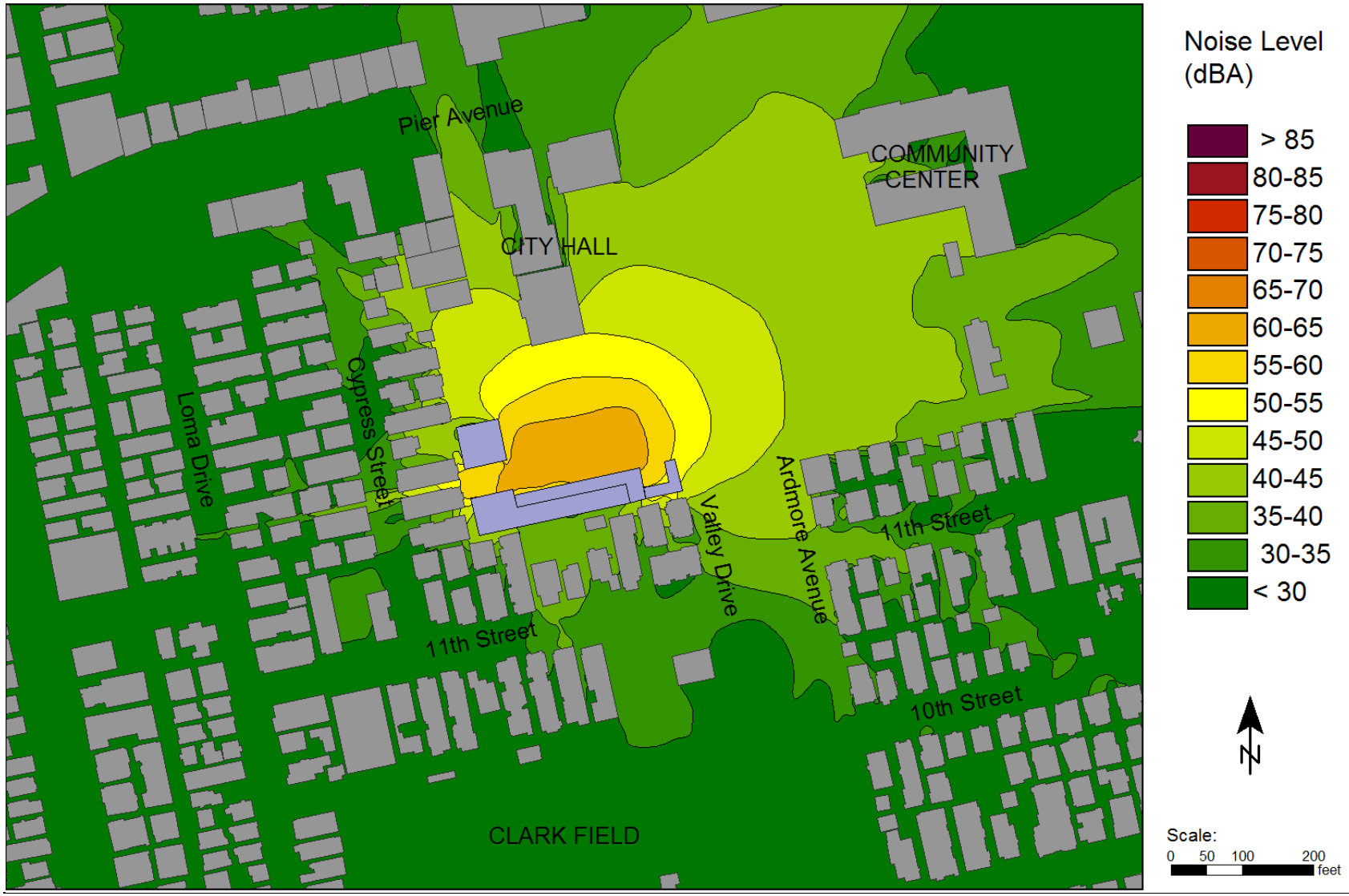
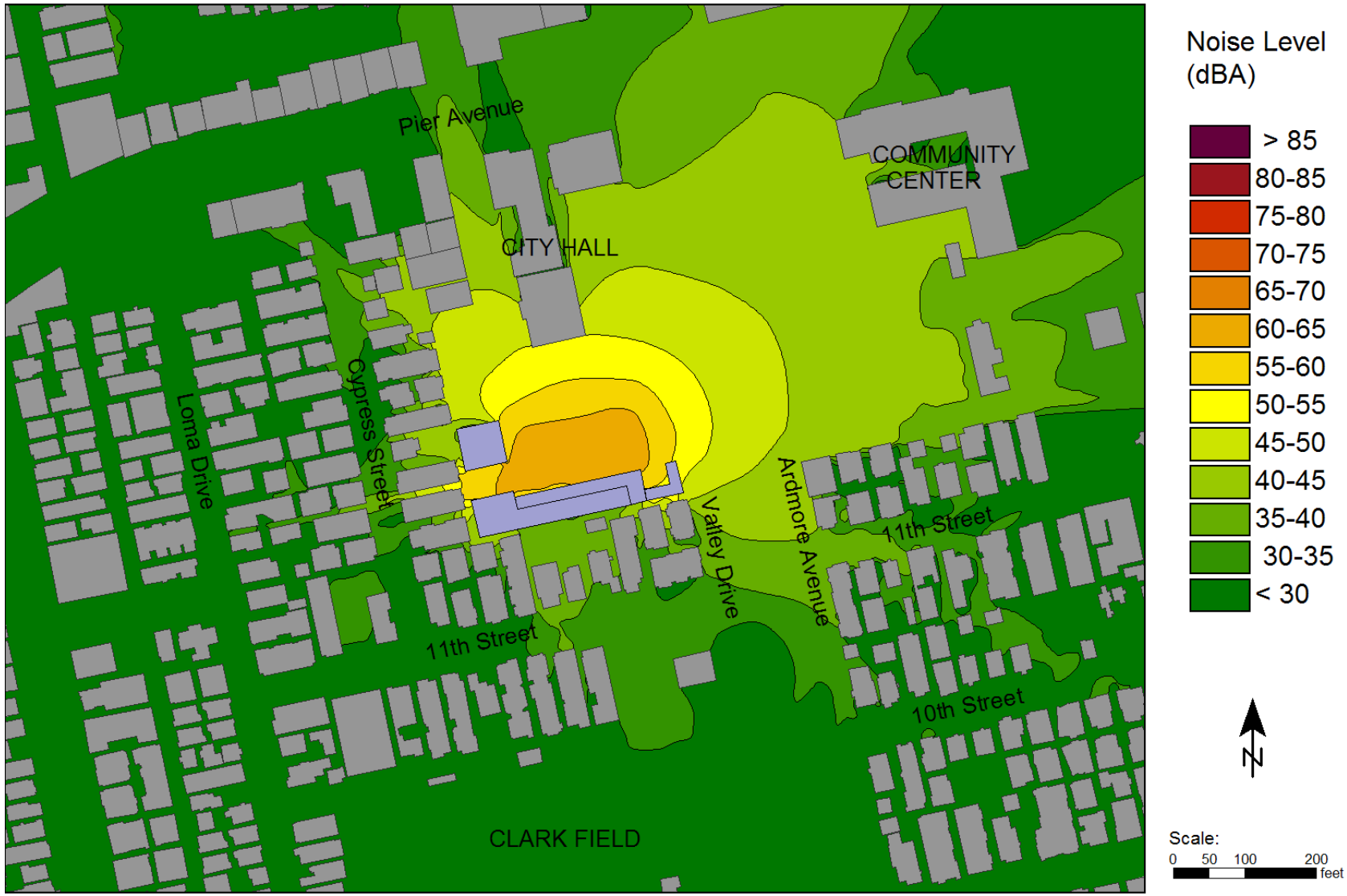


Figure 4.11-56 Relocated City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 5-feet

Figure 4.11-57 Relocated City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 20-feet



4.11.4.5 Temporary City Maintenance Yard

The permanent relocation of the City Yard would occur in Phase 3, however the Yard would need to be temporarily relocated prior to Phase 1 to allow demolition and construction work to begin at the Project Site. The temporary facility would be located immediately west and south of City Hall on what is now the City vehicle parking lot and access road (see Section 2 Project Description, Figure 2.20). Current proposals for the temporary facility include an 8-foot high concrete block wall around the Yard buildings and open areas.

Demolition & Construction

For residential receivers in the vicinity, the noise impacts during demolition and construction for the temporary facility will generally be of the same magnitude as those predicted for the permanent Yard, with the most affected residences being those located immediately west of the City Hall property on Cypress Street. For City Hall itself, demolition and construction noise impacts will be greater than those predicted for the permanent Yard, because of the immediate proximity of the temporary facility to City Hall.

Impact #	Impact Description	Phase	Residual Impact
NV.9	Demolition and construction equipment would increase noise levels.	Phase 1 Proposed City Maintenance yard Project temporary site	Class I Significant and Unavoidable

Mitigation Measures

NV-9a Provide a continuous, 25-foot high noise control barrier on the north, west and south sides of the site and along those parts of the site boundary adjacent to City Hall. Minimum sound insulation performance of the barrier material should be STC-32. If visual and light concerns preclude a 25-foot high noise control barrier close to City Hall - because of visual and light concerns - the noise barrier here should be as tall as possible.

NV-9b Provide a continuous, 16-foot high noise control barrier along the east boundary of the site. Minimum sound insulation performance of the barrier material should be STC-25.

NV-9c Access to the site for construction shall be limited to a gate on the east side in order to maintain the integrity of the noise barrier on the north side. Gates shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides. The intent is to maintain the acoustical integrity of the STC-25 noise barrier.

NV-9d All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.

Residual Impacts

As with the permanent Yard relocation, the noise impact of demolition and construction associated with the temporary facility would be significant at the nearby residential uses and at City Hall even after mitigation.

The noise impact of demolition and construction associated with the temporary relocation of the City Yard would remain **significant and unavoidable (Class I)**.

Temporary City Maintenance Yard Operations

Assessment of operational noise from the temporary City Yard has been based on the same noise data as that used for analysis of the permanent facility. This data has been input to the SoundPLAN model along with digital representations of the temporary buildings and yard areas.

Figures 4.11-58 and 4.11-59 show the predicted noise contour maps for operation of the temporary yard facility, as it is currently proposed for receiver heights of 5-feet and 20-feet above the ground respectively. These maps assume an 8-foot high wall punctuated by pedestrian and vehicle access gates, as shown in the conceptual plan.

Table 4.11-45 summarizes the impact of predicted temporary City Yard operational noise levels at the most affected receivers in the vicinity. In each case, the baseline is the average weekday daytime (8AM - 7PM) L_{eq} noise level (see Table 4.11-9).

Impact #	Impact Description	Phase	Residual Impact
NV.10	Operational noise from the temporary City Yard would increase noise levels.	Phase 1 Proposed City Maintenance yard Project temporary site	Class II Less Than Significant with Mitigation

Generally, the predicted increases in noise level are less than significant. However, at the upper stories of City Hall, the predicted increase in daytime noise levels is 5.8 dBA, which exceeds the significance threshold.

Table 4.11-45 Temporary City Yard - Predicted Operational Noise Impact

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Operations	Operations + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	41.2	55.0	0.2	NO
	20	54.8	53.4	57.2	2.4	NO
Residential Uses South of the Site on 11th Street	5	53.9	34.1	53.9	0.0	NO
	20	53.9	40.0	54.1	0.2	NO
Residential Uses East of the Site on Ardmore Avenue	5	63.3	34.1	63.3	0.0	NO
	20	63.3	37.0	63.3	0.0	NO
Hermosa Beach Community Center	5	62.3	33.5	62.3	0.0	NO
	20	62.3	34.2	62.3	0.0	NO
Tennis Courts to the East of the Site	5	62.3	35.4	62.3	0.0	NO
City Hall	5	53.3	49.3	54.8	1.5	NO
	20	53.3	57.8	59.1	5.8	YES
Veterans Parkway (Center)	5	63.3	36.7	63.3	0.0	NO

Mitigation Measures

NV-10a Increase the height of the concrete block Yard wall along the west and south sides of City Hall from 8-feet to 16-feet.

NV-10b Apply outdoor acoustical panels to the extended wall surfaces facing the Yard above a height of 8-feet above the ground. The purpose of the acoustical panels is to control reflection of operational noise in the direction of the sensitive uses to the west and south. The acoustical panels shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.28, 0.68, 0.95, 0.86, 0.89, 0.72.

NV-10c No noise-producing activity allowed in the temporary City Yard before 8 A.M. or after 7 P.M. on weekdays and anytime on Saturdays and Sundays except during emergencies.

Figures 4.11-60 and 4.11-61 show the predicted noise contour maps for operation of the temporary yard facility with mitigation measures NV-9a and 9b in place, for receiver heights of 5-feet and 20-feet above the ground respectively. Table 4.11-46 summarizes the noise impact of

predicted temporary City Maintenance Yard operations with mitigation at the most affected receivers in the vicinity.

Table 4.11-46 Temporary City Yard - Predicted Operational Noise Impact with Mitigation

Location	Receiver Height (ft)	Noise Level (Leq, dBA)			Increase in Noise Level (dBA)	Significant?
		Baseline	Operations	Operations + Baseline		
Residential Uses West of the Site on Cypress Street	5	54.8	41.1	55.0	0.2	NO
	20	54.8	53.2	57.1	2.3	YES
Residential Uses South of the Site on 11th Street	5	53.9	32.5	53.9	0.0	NO
	20	53.9	38.8	54.0	0.1	NO
Residential Uses East of the Site on Ardmore Avenue	5	63.3	32.2	63.3	0.0	NO
	20	63.3	35.1	63.3	0.0	NO
Hermosa Beach Community Center	5	62.3	32.0	62.3	0.0	NO
	20	62.3	32.7	62.3	0.0	NO
Tennis Courts to the East of the Site	5	62.3	33.6	62.3	0.0	NO
City Hall	5	53.3	41.6	53.6	0.3	NO
	20	53.3	52.0	55.7	2.4	NO
Veterans Parkway (Center)	5	63.3	34.8	63.3	0.0	NO

Residual Impacts

Figures 4.11-60, 4.11-61 and Table 4.11-46 show how this mitigation would reduce the predicted noise impact on the residential properties to the west to less than significant levels. Impacts would be **less than significant with mitigation (Class II).**

Figure 4.11-58 Temporary City Yard - Leq Noise Contours during OPERATIONS for a Receiver Height of 5-feet

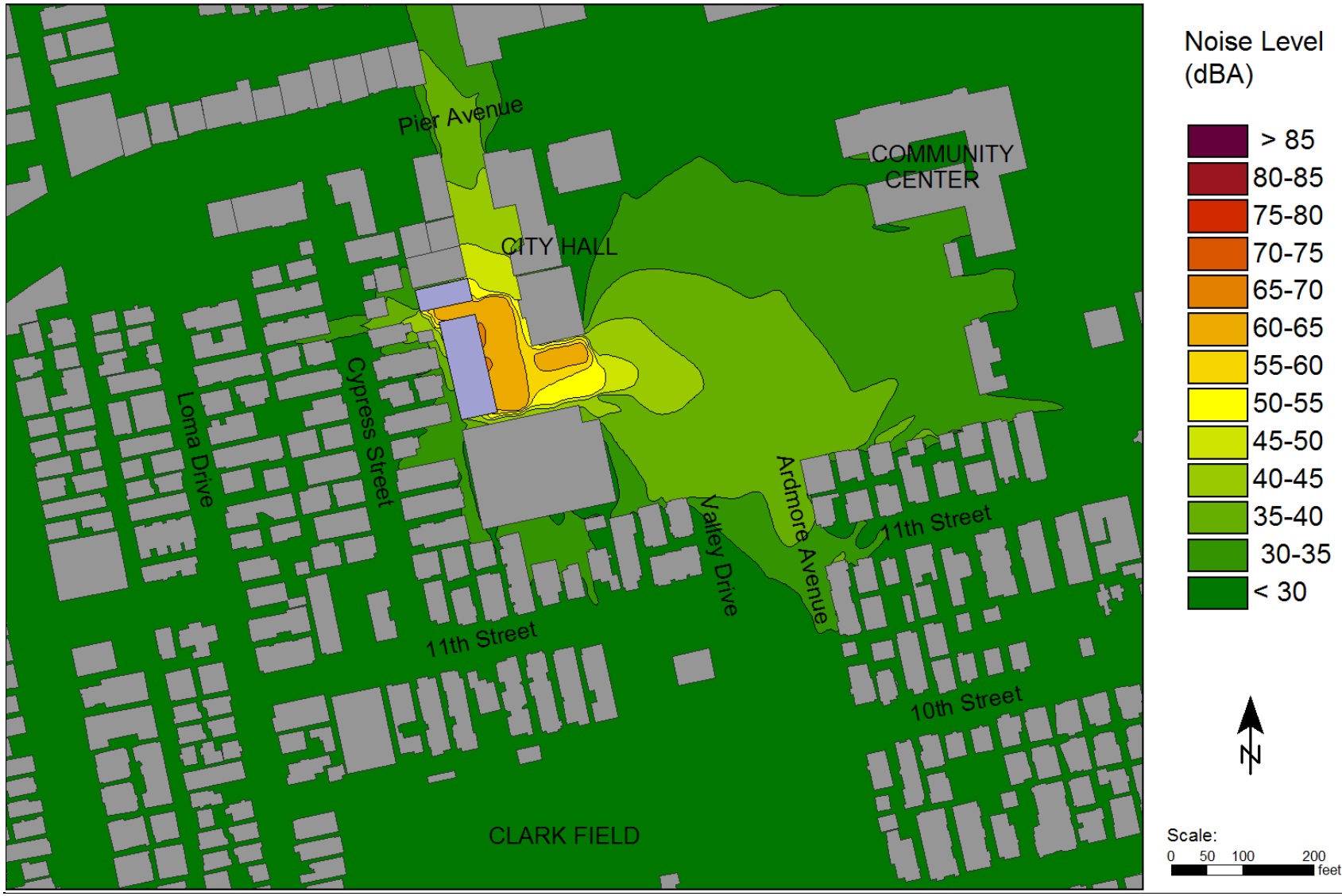


Figure 4.11-59 Temporary City Yard - Leq Noise Contours during OPERATIONS for a Receiver Height of 20-feet

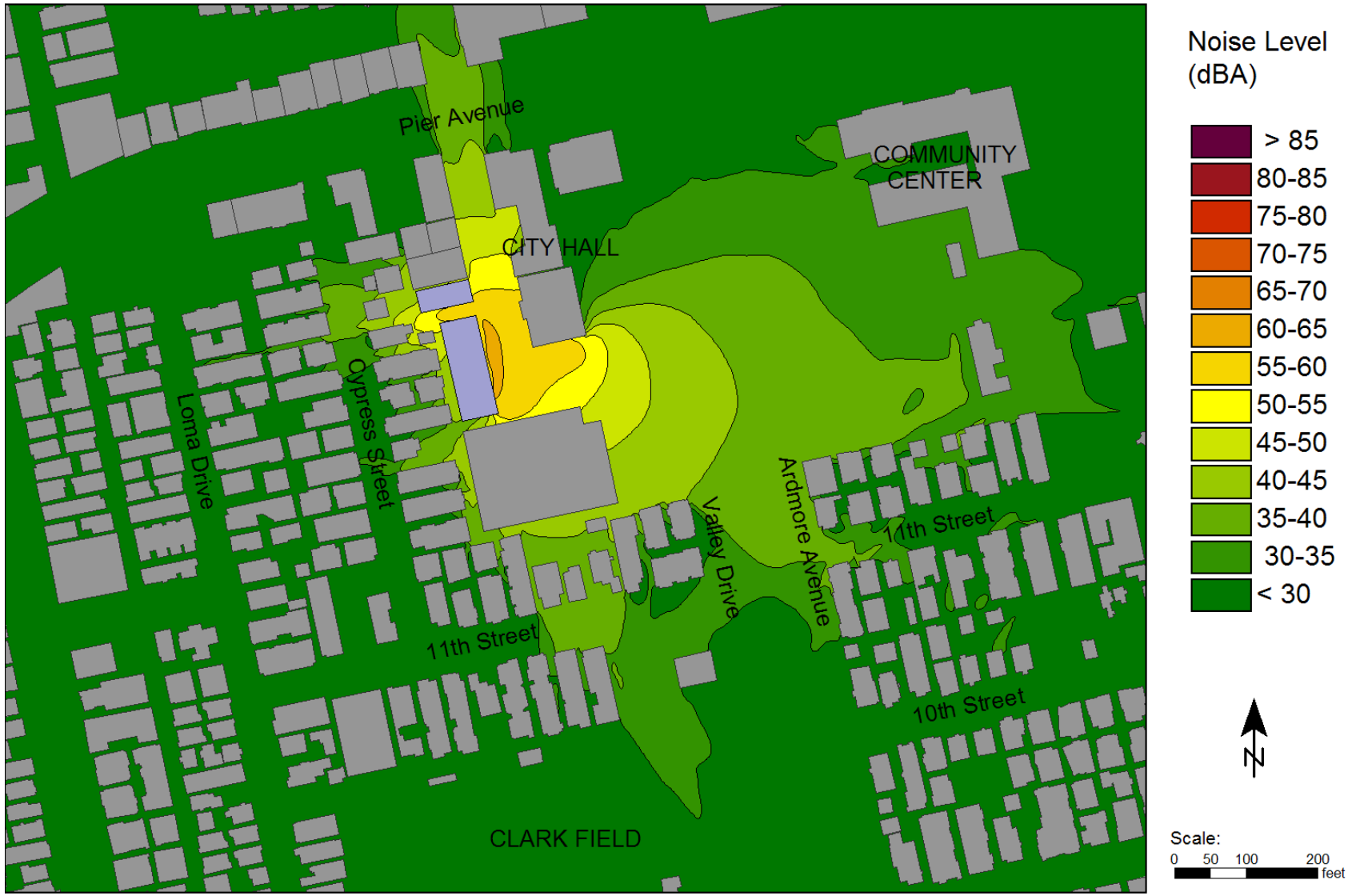


Figure 4.11-60 Temporary City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 5-feet

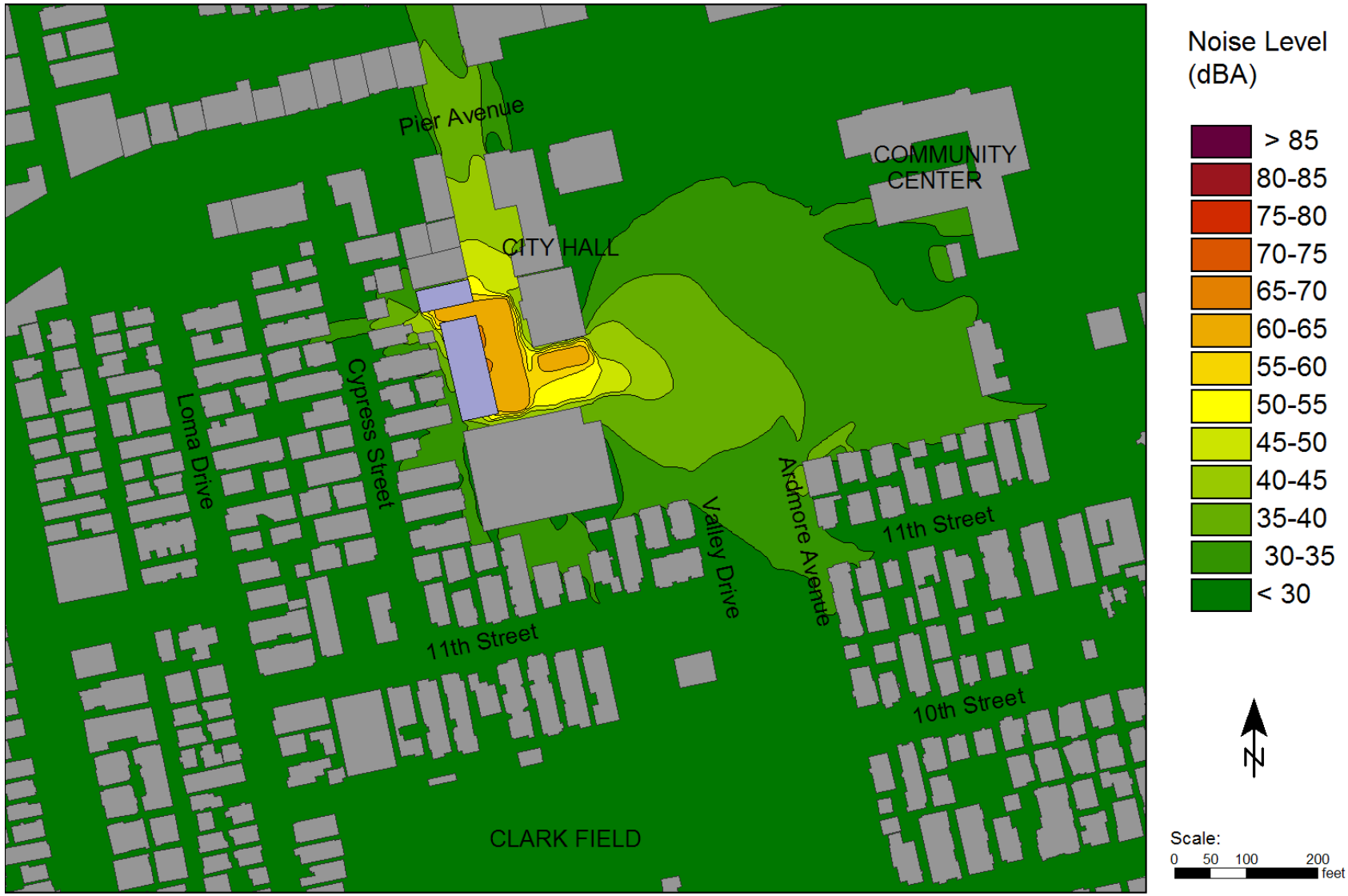
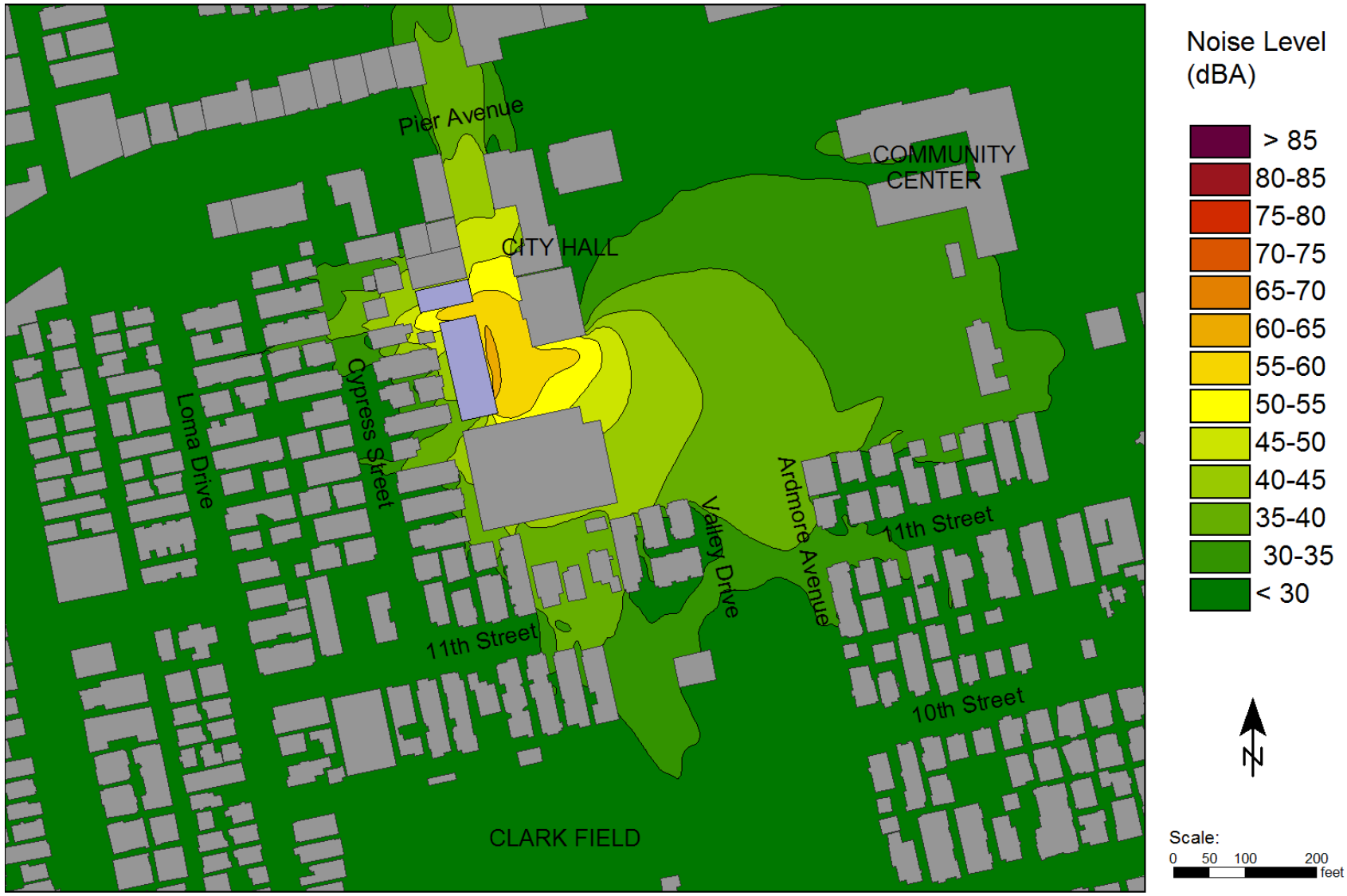


Figure 4.11-61 Temporary City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 20-feet



4.11.4.6 Proposed City Maintenance Yard Parking Options

Two options are currently under consideration: a No Added Parking option that would retain the same number of parking spaces as are currently available at Hermosa Storage; and a Parking Option, that would add 97 subterranean parking spaces. Under the Parking Option, additional construction would be required to construct the underground parking level, thereby increasing the duration of construction noise impact compared to the No Added Parking option. During operations, the Parking Option would introduce additional vehicle parking activity; however, as the parking structure would be sunken below grade and enclosed, noise levels would be less than significant. Otherwise, for operations, the two options would generate the same noise impacts. The noise study has been based on the Parking Option.

4.11.5 Other Issue Area Mitigation Measure Impacts

None of the other issue area mitigation measures would increase the peak noise levels. The mitigation measure installing a permanent wall (AE-1b) would reduce noise impacts during operational periods when no drilling rig is present. The permanent wall would also render mitigation measure NV-6a requiring a 27 foot wall no longer applicable. The other issue area mitigation measures would not result in additional impacts, and additional analysis or mitigation is not required.

4.11.6 Cumulative Impacts and Mitigation Measures

Localized noise impacts are generally restricted to an area within a few blocks from a Project Site. None of the residential cumulative projects would be constructed near enough to the Proposed Project area for noise impacts to overlap, so there would be no operational localized impacts associated with cumulative projects. Traffic levels generated by the other cumulative projects would also not contribute substantially to area traffic noise, and therefore cumulative traffic noise increases would be less than significant.

4.11.7 Mitigation Monitoring Plan

Proposed Oil Project Mitigation Measures				
Mitigation Measure	Requirements	Compliance Verification		
		Method	Timing	Responsible Party
NV-1a	Increase the height of the noise barriers on the west and north sides of the site to 35-feet and upgrade the sound insulation performance of the barrier material from STC-25 to STC-32.	Review of design documents and in-field inspections	Before Phase 1	City of Hermosa Beach
NV-1b	Increase the height of the noise barriers on the south and east sides of the site to 22-feet. The sound insulation performance of the barrier material in these locations may remain at STC-25.	Review of design documents and in-field inspections	Before Phase 1	City of Hermosa Beach
NV-1c	The gates on the east and south sides of the site shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides.	Review of design documents and in-field inspections	Before Phase 1	City of Hermosa Beach
NV-1d	All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.	Review of design documents and in-field inspections	Before Phase 1	City of Hermosa Beach
NV-2a	Increase the height of the noise barriers on all sides of the site from 32-feet to 35-feet (35-feet is the maximum height allowed). Minimum sound insulation performance of the barrier material should be STC-32.	Review of design documents and in-field inspections	Before Phase 2	City of Hermosa Beach
NV-2b	The gates on the east and south sides of the site shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-32. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides.	Review of design documents and in-field inspections	Before Phase 2	City of Hermosa Beach
NV-2c	All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.	Review of design documents and in-field inspections	Before Phase 2	City of Hermosa Beach
NV-2d	Install pads on the V-door and other appropriate areas, timbers and pads on the drill deck, pads between drill and casing pipe while in storage and pad and timbers at the boards on the mast to reduce metal-	Review of design documents and in-field inspections	Before Phase 2	City of Hermosa Beach

Proposed Oil Project Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	on-metal noise.			
NV-3a	Provide continuous, 35-foot high noise barriers along the west and north sides of the site. Minimum sound insulation performance of the barrier material should be STC-32.	Review of design documents and in-field inspections	Before Phase 3	City of Hermosa Beach
NV-3b	Provide continuous 25-foot high noise barriers along the east and south sides of the site. Minimum sound insulation performance of the barrier material shall be STC-25. The gates on the east and south sides of the site should be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides.	Review of design documents and in-field inspections	Before Phase 3	City of Hermosa Beach
NV-3c	All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.	Review of design documents and in-field inspections	Before Phase 3	City of Hermosa Beach
NV-5a	Provide a continuous, 35-foot high noise barrier around the entire perimeter of the site. Minimum sound insulation performance of the barrier material should be STC-32.	Review of design documents and in-field inspections	Before Phase 4	City of Hermosa Beach
NV-5b	Provide solid (no holes) plywood or sheet metal gates for the east and south designed to deliver a minimum STC of 32. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides. The intent is to maintain the acoustical integrity of the STC-32 noise barrier in all locations.	Review of design documents and in-field inspections	Before Phase 4	City of Hermosa Beach
NV-5c	All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.	Review of design documents and in-field inspections	Before Phase 4	City of Hermosa Beach
NV-5d	Install pads on the V-door and other appropriate areas, timbers and pads on the drill deck, pads between drill and casing pipe while in storage and pad and timbers at the boards on the mast to reduce metal-on-metal noise.	Review of design documents and in-field inspections	Before Phase 4	City of Hermosa Beach
NV-6a	Increase the height of the masonry walls on the north and west sides of the site to a	Review of design	Before Phase 4	City of Hermosa

Proposed Oil Project Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	minimum of 27-feet.	documents and in-field inspections		Beach
NV-6b	Apply outdoor acoustical panels to all available surfaces of the north and west walls that face the production operations above a height of 10-feet above the ground. The purpose of the acoustical panels is to control reflection of production noise in the direction of the sensitive uses to the east and south. The acoustical panels shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.28, 0.68, 0.95, 0.86, 0.89, 0.72.	Review of design documents and in-field inspections	Before Phase 4	City of Hermosa Beach

Proposed City Maintenance Yard Project Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
NV-7a	Provide a continuous, 25-foot high noise control barrier along the north, west and south boundaries of the City Yard site. Minimum sound insulation performance of the barrier material should be STC-32.	Review of design documents and in-field inspections	Before Phase 3 Yard Construction	City of Hermosa Beach
NV-7b	Provide a continuous, 16-foot high noise control barrier along the east boundary of the site. Minimum sound insulation performance of the barrier material shall be STC-25.	Review of design documents and in-field inspections	Before Phase 3 Yard Construction	City of Hermosa Beach
NV-7c	Access to the site for construction shall be limited to a gate on the east side in order to maintain the integrity of the noise barrier on the north side. Gates shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides. The intent is to maintain the acoustical integrity of the STC-25 noise barrier.	Review of design documents and in-field inspections	Before Phase 3 Yard Construction	City of Hermosa Beach
NV-7d	All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.	Review of design documents and in-field inspections	Before Phase 3 Yard Construction	City of Hermosa Beach
NV-8a	Increase the height of the masonry wall on the west side of the Yard (the wall that spans between the office and shop building) from 6-feet to 12-feet.	Review of design documents and in-field inspections	Before Phase 3 Yard Construction	City of Hermosa Beach
NV-8b	No noise-producing activity allowed in the City Yard before 8AM or after 7PM on weekdays and anytime on Saturdays and Sundays except during emergencies.	Review of schedules and in-field inspections	During Phase 3 Yard Operation	City of Hermosa Beach
NV-8c	For the Parking Option, there shall be no openings in the parking structure enclosure except for the vehicular entrance/exit opening on the north side. The entrance/exit should be located as far to the east as possible, to maximize its distance from the homes on Cypress Avenue. Garage exhaust fans shall be enclosed and fitted with duct silencers on the discharge and intake sides as necessary to limit noise emissions to less than significant levels at the nearby sensitive receivers.	Review of schedules and in-field inspections	During Phase 3 Yard Operation	City of Hermosa Beach
NV-9a	Provide a continuous, 25-foot high noise control barrier on the north, west and south	Review of design	Before construction	City of Hermosa

Proposed City Maintenance Yard Project Mitigation Measures				
Mitigation Measure	Requirements	Compliance Verification		
		Method	Timing	Responsible Party
	sides of the site and along those parts of the site boundary adjacent to City Hall. Minimum sound insulation performance of the barrier material should be STC-32. If visual and light concerns preclude a 25-foot high noise control barrier close to City Hall - because of visual and light concerns - the noise barrier here should be as tall as possible.	documents and in-field inspections	of temporary Yard	Beach
NV-9b	Provide a continuous, 16-foot high noise control barrier along the east boundary of the site. Minimum sound insulation performance of the barrier material should be STC-25.	Review of design documents and in-field inspections	Before construction of temporary Yard	City of Hermosa Beach
NV-9c	Access to the site for construction shall be limited to a gate on the east side in order to maintain the integrity of the noise barrier on the north side. Gates shall be constructed of solid (no holes) plywood or sheet metal and be designed to deliver a minimum sound insulation performance of STC-25. Any gaps above the gates must be closed off, by extending the acoustical barrier material from the sides. The intent is to maintain the acoustical integrity of the STC-25 noise barrier.	Review of design documents and in-field inspections	Before construction of temporary Yard	City of Hermosa Beach
NV-9d	All acoustical barriers around the site shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.49, 0.72, 0.74, 0.29, 0.21, 0.14.	Review of design documents and in-field inspections	Before construction of temporary Yard	City of Hermosa Beach
NV-10a	Increase the height of the concrete block Yard wall along the west and south sides of City Hall from 8-feet to 16-feet.	Review of design documents and in-field inspections	Before construction of temporary Yard	City of Hermosa Beach
NV-10b	Apply outdoor acoustical panels to the extended wall surfaces facing the Yard above a height of 8-feet above the ground. The purpose of the acoustical panels is to control reflection of operational noise in the direction of the sensitive uses to the west and south. The acoustical panels shall offer the following minimum sound absorption performance: Center Frequency (Hz), 125, 250, 500, 1k, 2k, 4k - Sound Absorption Coefficient, 0.28, 0.68, 0.95, 0.86, 0.89, 0.72.	Review of design documents and in-field inspections	Before construction of temporary Yard	City of Hermosa Beach
NV-10c	No noise-producing activity allowed in the temporary City Yard before 8 A.M. or after 7 P.M. on weekdays and anytime on	Review of schedules and in-field	During Phase 3 Yard	City of Hermosa

Proposed City Maintenance Yard Project Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	Saturdays and Sundays except during emergencies.	inspections	Operation	Beach

Table of Contents

4.11 Noise and Vibration 1
4.11.1 Environmental Setting 1
4.11.1.1 Characteristics of Noise 1
4.11.1.2 Characteristics of Vibration 5
4.11.1.3 Project Area - Existing Noise and Vibration Environment 7
4.11.2 Regulatory Setting 17
4.11.2.1 City of Hermosa Beach Noise Standards 17
4.11.2.2 City of Redondo Beach Noise Standards 22
4.11.2.3 City of Torrance Noise Standards 25
4.11.3 Significance Criteria 28
4.11.3.1 Oil Production Site 29
4.11.3.2 Pipeline Construction and Trucking Routes 29
4.11.3.3 Relocated City Yard 30
4.11.3.4 Significance Criteria Rationale 30
4.11.4 Project Impacts and Mitigation Measures 32
4.11.4.1 Proposed Oil Project Noise Impacts & Mitigation 32
4.11.4.2 Traffic Noise Analysis 90
4.11.4.3 Vibration Impact Analysis 94
4.11.4.4 Relocation of the City Yard 95
4.11.4.5 Temporary City Maintenance Yard 118
4.11.4.6 Proposed City Maintenance Yard Parking Options 126
4.11.5 Other Issue Area Mitigation Measure Impacts 126
4.11.6 Cumulative Impacts and Mitigation Measures 126
4.11.7 Mitigation Monitoring Plan 127

Table of Tables

Table 4.11-1 Common Environmental Noise Levels 2
Table 4.11-2 Noise Control Metrics 5
Table 4.11-3 Typical Levels of Ground-Borne Vibration 6
Table 4.11-4 Summary of Existing Ambient L_{eq} Noise Levels Around the Project Site 9
Table 4.11-5 Summary of Existing Ambient L_{50} Noise Levels Around the Project Site 10
Table 4.11-6 Existing Ambient Noise Levels Around the Project Site - Additional Statistics 10
Table 4.11-7 Comparison of Noise Monitoring Results from the Truck and Pipeline Routes 11
Table 4.11-8 Truck and Pipeline Route Ambient Noise Measurement Summary* 14
Table 4.11-9 Summary of Existing Ambient Noise Levels around the City Yard Relocation Site 15
Table 4.11-10 Recalculated Daytime Ambient Noise Levels around the City Yard Relocation Site 16
Table 4.11-11 Baseline Vibration Levels (2013) 16
Table 4.11-12 Baseline Vibration Levels (2012) 17
Table 4.11-13 Phase 1 Noise Models - Equipment Usage and Noise Level Data 33
Table 4.11-14 Phase 1 - Predicted Demolition Noise Impact 35
Table 4.11-15 Phase 1 - Predicted Construction Noise Impact 36
Table 4.11-16 Phase 1 - Predicted Demolition Noise Impact with Additional Mitigation 41
Table 4.11-17 Phase 1 - Predicted Construction Noise Impact with Additional Mitigation 41
Table 4.11-18 Phase 2 Noise Models - Equipment Usage and Noise Level Data 47
Table 4.11-19 Phase 2 - Predicted Drilling & Test Production Noise Impact 51
Table 4.11-20 Phase 2 - Compliance with the Hermosa Beach Oil Code 51
Table 4.11-21 Phase 2 - Predicted Test Production (Only) Noise Impact 52
Table 4.11-22 Phase 2 - Predicted Drilling & Test Production Noise Impact with Mitigation 55

Table 4.11-23 Phase 2 - Compliance with the Hermosa Beach Oil Code (with Mitigation) 56
Table 4.11-24 Phase 3 Site Construction Noise Model - Equipment Usage and Noise Level Data 60
Table 4.11-25 Phase 3 - Predicted Site Construction Noise Impact 60
Table 4.11-26 Phase 3 - Predicted Site Construction Noise Impact with Additional Mitigation.64
Table 4.11-27 Phase 3 Pipeline Construction Noise Models Equipment Usage and Noise Level Data 68
Table 4.11-28 Phase 3 - Predicted Pipeline Construction Noise Impact.....76
Table 4.11-29 Phase 4 Noise Model - Equipment Usage and Noise Level Data 78
Table 4.11-30 Phase 4 - Predicted Drilling + Production Noise Impact.....79
Table 4.11-31 Phase 4 - Compliance with the Hermosa Beach Oil Code 79
Table 4.11-32 Phase 4 - Predicted Drilling + Production Noise Impact with Mitigation 85
Table 4.11-33 Phase 4 - Compliance with the Hermosa Beach Oil Code (with Mitigation) 85
Table 4.11-34 Phase 4 - Predicted Production (only) Noise Impact.....86
Table 4.11-35 Phase 4 - Predicted Production (only) Noise Impact with mitigation 89
Table 4.11-36 Calculated Traffic CNEL Noise Level Increases on Valley Drive.....93
Table 4.11-37 Demolition & Construction Equipment Ground Vibration Levels 94
Table 4.11-38 City Maintenance Yard Relocation Demolition & Construction Equipment Usage and Noise Level Data.....98
Table 4.11-39 Relocated City Yard - Predicted Demolition Noise Impact 103
Table 4.11-40 Relocated City Yard - Predicted Construction Noise Impact 104
Table 4.11-41 Relocated City Yard - Predicted Demolition Noise Impact with Mitigation.....106
Table 4.11-42 Relocated City Yard - Predicted Construction Noise Impact With Additional Noise Mitigation 111
Table 4.11-43 Relocated City Yard - Predicted Operational Noise Impact.....112
Table 4.11-44 Relocated City Yard - Predicted Operational Noise Impact with Mitigation 113
Table 4.11-45 Temporary City Yard - Predicted Operational Noise Impact 120
Table 4.11-46 Temporary City Yard - Predicted Operational Noise Impact with Mitigation 121

Table of Figures

Figure 4.11-1 Noise Monitoring Locations around the Project Site 8
Figure 4.11-2 Typical Noise Monitor Installation 9
Figure 4.11-4 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study).....12
Figure 4.11-5 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study).....12
Figure 4.11-6 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study).....13
Figure 4.11-7 Noise Monitoring Locations along the Truck and Pipe Routes (2012 Study).....13
Figure 4.11-8 Noise Monitoring Locations around the City Yard Relocation Site 15
Figure 4.11-9 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION for a Receiver Height of 5-ft 37
Figure 4.11-10 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION for a Receiver Height of 5-ft 38
Figure 4.11-11 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION for a Receiver Height of 20-ft 39
Figure 4.11-12 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION for Receiver Height of 20-ft 40
Figure 4.11-13 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION with Mitigation for a Receiver Height of 5-ft 42
Figure 4.11-14 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 5-ft 43
Figure 4.11-15 Phase 1 - Predicted Daily Leq Noise Contours during DEMOLITION with Mitigation for a Receiver Height of 20-ft 44

Figure 4.11-16 Phase 1 - Predicted Daily Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 20-ft 45
Figure 4.11-17 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION for a Receiver Height of 5-ft 49
Figure 4.11-18 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION for a Receiver Height of 20-ft 50
Figure 4.11-19 Phase 2 - Leq Noise Contours during TEST PRODUCTION (ONLY) for a Receiver Height of 5-ft 53
Figure 4.11-20 Phase 2 - Leq Noise Contours during TEST PRODUCTION (ONLY) for a Receiver Height of 20-ft 54
Figure 4.11-21 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION with Mitigation for a Receiver Height of 5-ft 57
Figure 4.11-22 Phase 2 - Leq Noise Contours during DRILLING & TEST PRODUCTION with Mitigation for a Receiver Height of 20-ft 58
Figure 4.11-23 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION for a Receiver Height of 5-ft 61
Figure 4.11-24 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION for a Receiver Height of 20-ft 62
Figure 4.11-25 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION with Mitigation for a Receiver Height of 5-ft 66
Figure 4.11-26 Phase 3 - Leq Noise Contours during SITE CONSTRUCTION with Mitigation for a Receiver Height of 20-ft 67
Figure 4.11-27 Phase 3 - Leq Noise Contours during Pipeline Construction Valley Drive Scenario, Receiver Height of 5-feet.....70
Figure 4.11-28 Phase 3 - Leq Noise Contours during Pipeline Construction Valley Drive Scenario, Receiver Height of 20-feet.....70
Figure 4.11-29 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Westbound Scenario, Receiver Height of 5-feet.....71
Figure 4.11-30 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Westbound Scenario, Receiver Height of 20-feet.....71
Figure 4.11-31 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Eastbound Scenario, Receiver Height of 5-feet.....72
Figure 4.11-32 Phase 3 - Leq Noise Contours during Pipeline Construction Anita Street Eastbound Scenario, Receiver Height of 20-feet.....72
Figure 4.11-33 Phase 3 - Leq Noise Contours during Pipeline Construction Redondo Beach Edison Corridor Scenario, Receiver Height of 5-feet 73
Figure 4.11-34 Phase 3 - Leq Noise Contours during Pipeline Construction Redondo Beach Edison Corridor Scenario, Receiver Height of 20-feet 73
Figure 4.11-35 Phase 3 - Leq Noise Contours during Pipeline Construction 190th Street Westbound Scenario, Receiver Height of 5-feet.....74
Figure 4.11-36 Phase 3 - Leq Noise Contours during Pipeline Construction 190th Street Eastbound Scenario, Receiver Height of 5-feet.....74
Figure 4.11-37 Phase 3 - Leq Noise Contours during Pipeline Construction Torrance Edison Corridor Scenario, Receiver Height of 5-feet.....75
Figure 4.11-38 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION for a Receiver Height of 5-ft 80
Figure 4.11-39 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION for a Receiver Height of 20-ft 81
Figure 4.11-40 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION with Mitigation for a Receiver Height of 5-ft 83
Figure 4.11-41 Phase 4 - Leq Noise Contours during Long Term DRILLING & PRODUCTION with Mitigation for a Receiver Height of 20-ft 84

Figure 4.11-42 Phase 4 - Leq Noise Contours during Long Term PRODUCTION for a Receiver Height of 5-ft 87
Figure 4.11-43 Phase 4 - Leq Noise Contours during Long Term PRODUCTION for a Receiver Height of 20-ft 88
Figure 4.11-44 Phase 4 - Leq Noise Contours during Long Term PRODUCTION with Mitigation for a Receiver Height of 5-ft 91
Figure 4.11-45 Phase 4 - Leq Noise Contours during Long Term PRODUCTION with Mitigation for a Receiver Height of 20-ft 92
Figure 4.11-46 Relocated City Maintenance Yard - Leq Noise Contours during DEMOLITON for a Receiver Height of 5-feet.....99
Figure 4.11-47 Relocated City Yard - Leq Noise Contours during CONSTRUCTION for a Receiver Height of 5-feet 100
Figure 4.11-48 Relocated City Yard - Leq Noise Contours during DEMOLITON for a Receiver Height of 20-feet 101
Figure 4.11-49 Relocated City Yard - Leq Noise Contours during CONSTRUCTION for a Receiver Height of 20-feet 102
Figure 4.11-50 Relocated City Yard - Leq Noise Contours during DEMOLITON with Mitigation for a Receiver Height of 5-feet 107
Figure 4.11-51 Relocated City Yard - Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 5-feet 108
Figure 4.11-52 Relocated City Yard - Leq Noise Contours during DEMOLITON with Mitigation for a Receiver Height of 20-feet 109
Figure 4.11-53 Relocated City Yard - Leq Noise Contours during CONSTRUCTION with Mitigation for a Receiver Height of 20-feet 110
Figure 4.11-54 Relocated City Yard - Leq Noise Contours during OPERATIONS For a Receiver Height of 5-feet 114
Figure 4.11-55 Relocated City Yard - Leq Noise Contours during OPERATIONS for a Receiver Height of 20-feet 115
Figure 4.11-56 Relocated City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 5-feet 116
Figure 4.11-57 Relocated City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 20-feet 117
Figure 4.11-58 Temporary City Yard - Leq Noise Contours during OPERATIONS for a Receiver Height of 5-feet 122
Figure 4.11-59 Temporary City Yard - Leq Noise Contours during OPERATIONS for a Receiver Height of 20-feet 123
Figure 4.11-60 Temporary City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 5-feet 124
Figure 4.11-61 Temporary City Yard - Leq Noise Contours during OPERATIONS with Mitigation for a Receiver Height of 20-feet 125