Appendix E

Dock Vibration Study

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Environmental Noise Study for the Construction of the Proposed Carnation Cove Dock Replacement Project in the City of Newport Beach

Project File 08.032.00
March 12, 2009

Preliminary Report for Review Only

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1 Executive Summary

This report identifies and assesses the potential noise and vibration impacts associated with the reconstruction of the Carnation Cove dock in Newport Beach.

In order to identify the existing environment, noise and vibration measurements were taken at four locations throughout the study area. The construction activities associated with the project will result in a change to the acoustical environment at properties in the vicinity of the project.

Using the criteria established in this study, it is concluded that the project will not generate a significant noise or vibration impact at the nearby sensitive receptors. Therefore, mitigation measures are not required.

Although not required as mitigation measures, the following abatement measures have been recommended as conditions of approval to minimize noise levels associated with the construction activity:

1. Equip all construction equipment with properly operating and maintained muffling devices.
2. Develop a construction schedule that minimizes potential cumulative construction noise impacts.
3. Notify the residents of the construction schedule for the marina, and keep them informed of any changes to the schedule. Identify the name and phone number of a contact person in case of complaints. The contact person shall take whatever reasonable steps are necessary to resolve the complaint.

2 Introduction / Project Description

The purpose of this study is to identify and assess the potential noise impacts associated with the construction of the proposed Carnation Cove dock replacement project in Newport Beach. Refer to Figure 2-1 for the location of the study area. Currently, the dock has four slips; this will be increased to eight slips plus a side-tie dock. The new dock layout is shown in Figure 2-2.

The timber docks supported by rotationally molded plastic pontoons allow the dock system to be located as close to the rock outcropping as possible. Six steel dock guide piles support the existing docks and will be replaced with 19 new guide piles supporting the new dock system. Of these 19 piles, nine will be large diameter piles (approximately 2-foot diameter). The guide piles will be constructed of pre-stressed concrete set in pre-drilled augured holes. The existing 20-foot long gangway will be replaced by a safer 60-foot gangway.

The pile-supported pier walkway between the existing gangway platform and the existing terrace will be repaired or replaced with a structure in-like-kind (i.e., timber framing system, a 2x timber deck, and timber railings all around). The existing piers supporting the walkway will require concrete repairs. The gangway platform construction will include the four steel piles, timber framing with metal connectors, and a 2x timber deck with railings all around. The existing concrete pad, concrete steps, and safety railings will be repaired and patched as necessary.

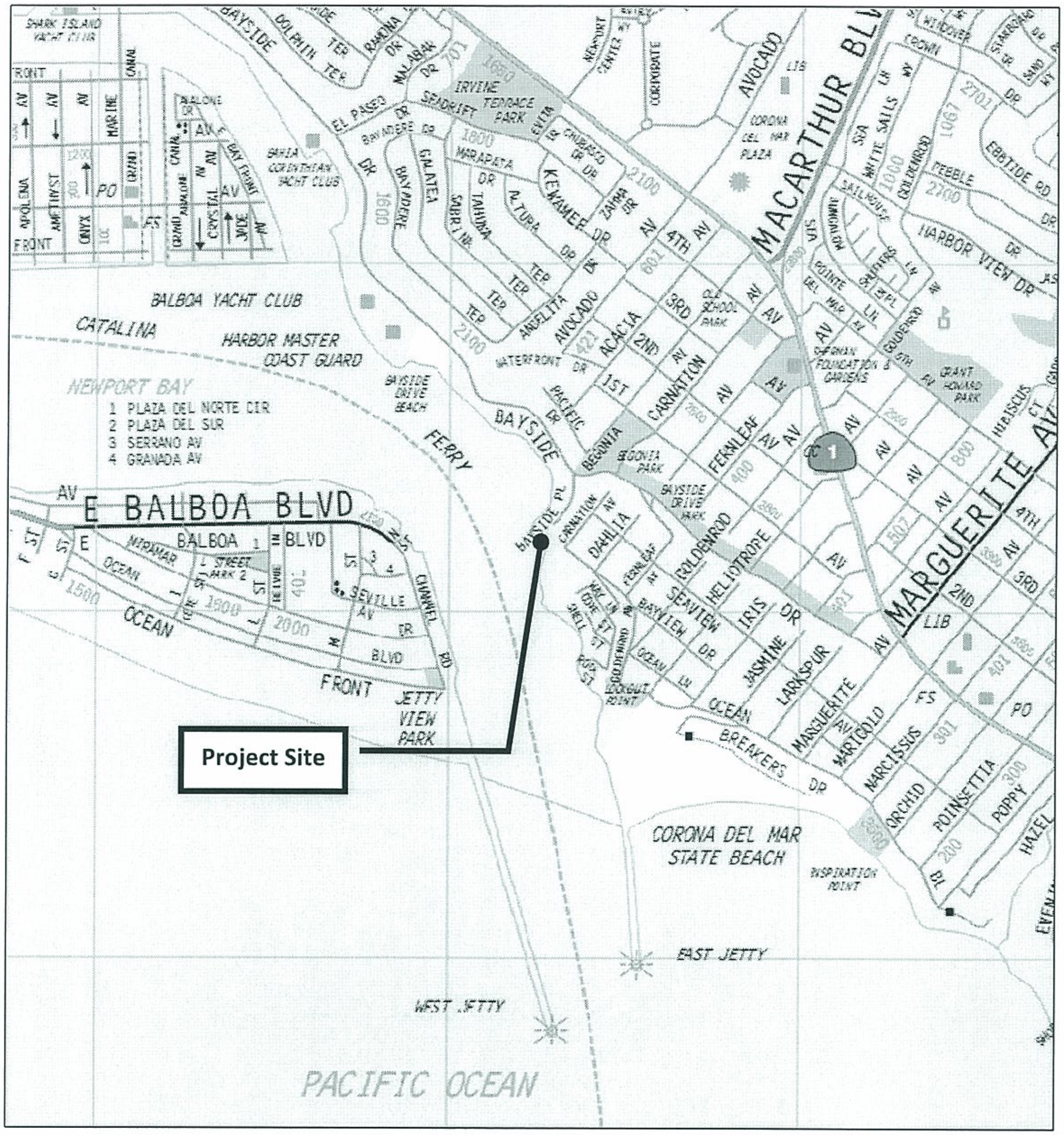

Figure 2-1. Location of the Study Area

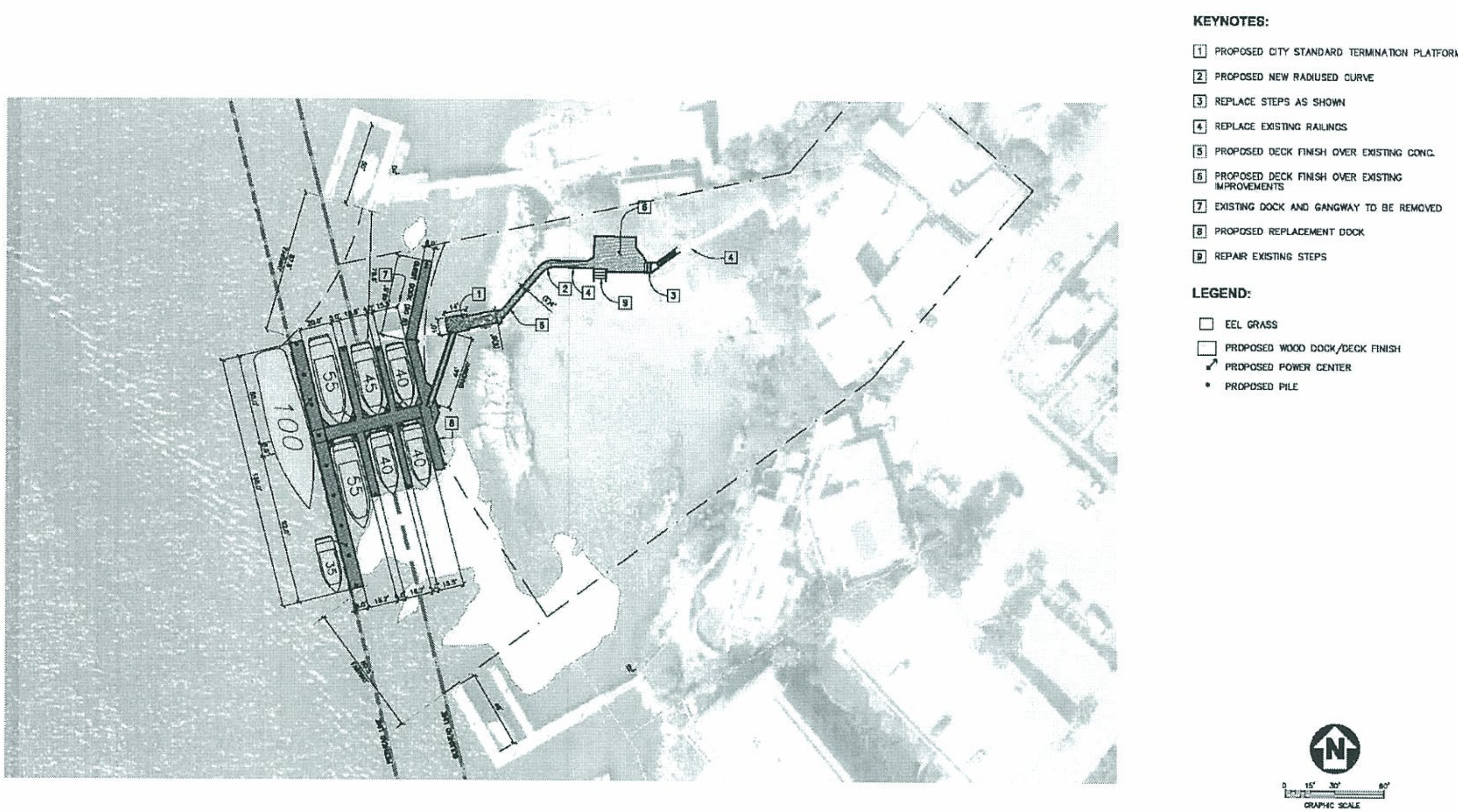

Figure 2-2. Proposed Dock Layout

3 Noise and Ground Vibration Descriptors

The following sections briefly describe the noise and ground vibration descriptors that will be used throughout this study:

3.1 Decibels

Sound pressures can be measured in units called microPascals (μPa). However, expressing sound levels in terms of μPa would be very cumbersome since it would require a wide range of very large numbers. For this reason, sound pressure levels are described in logarithmic units of ratios of actual sound pressures to a reference pressure squared. These units are called bels. In order to provide a finer resolution, a bel is subdivided into 10 decibels, abbreviated dB.

Since decibels are logarithmic units, sound pressure levels cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces a sound pressure level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB. In fact, they would combine to produce 73 dB. This same principle can be applied to other traffic quantities as well. In other words, doubling the traffic volume on a street or the speed of the traffic will increase the traffic noise level by 3 dB. Conversely, halving the traffic volume or speed will reduce the traffic noise level by 3 dB.

3.2 A-Weighting

Sound pressure level alone is not a reliable indicator of loudness. The frequency or pitch of a sound also has a substantial effect on how humans will respond. While the intensity of the sound is a purely physical quantity, the loudness or human response depends on the characteristics of the human ear.

Human hearing is limited not only to the range of audible frequencies, but also in the way it perceives the sound pressure level in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, and perceives both higher and lower frequency sounds of the same magnitude with less intensity. In order to approximate the frequency response of the human ear, a series of sound pressure level adjustments is usually applied to the sound measured by a sound level meter. The adjustments, or weighting network, are frequency dependent.

The A-scale approximates the frequency response of the average young ear when listening to most ordinary everyday sounds. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. A range of noise levels associated with common in- and outdoor activities is shown in Figure 3-1.

The A-weighted sound level of traffic and other long-term noise-producing activities within and around a community varies considerably with time. Measurements of this varying noise level are accomplished by recording values of the A-weighted level during representative periods within a specified portion of the day.

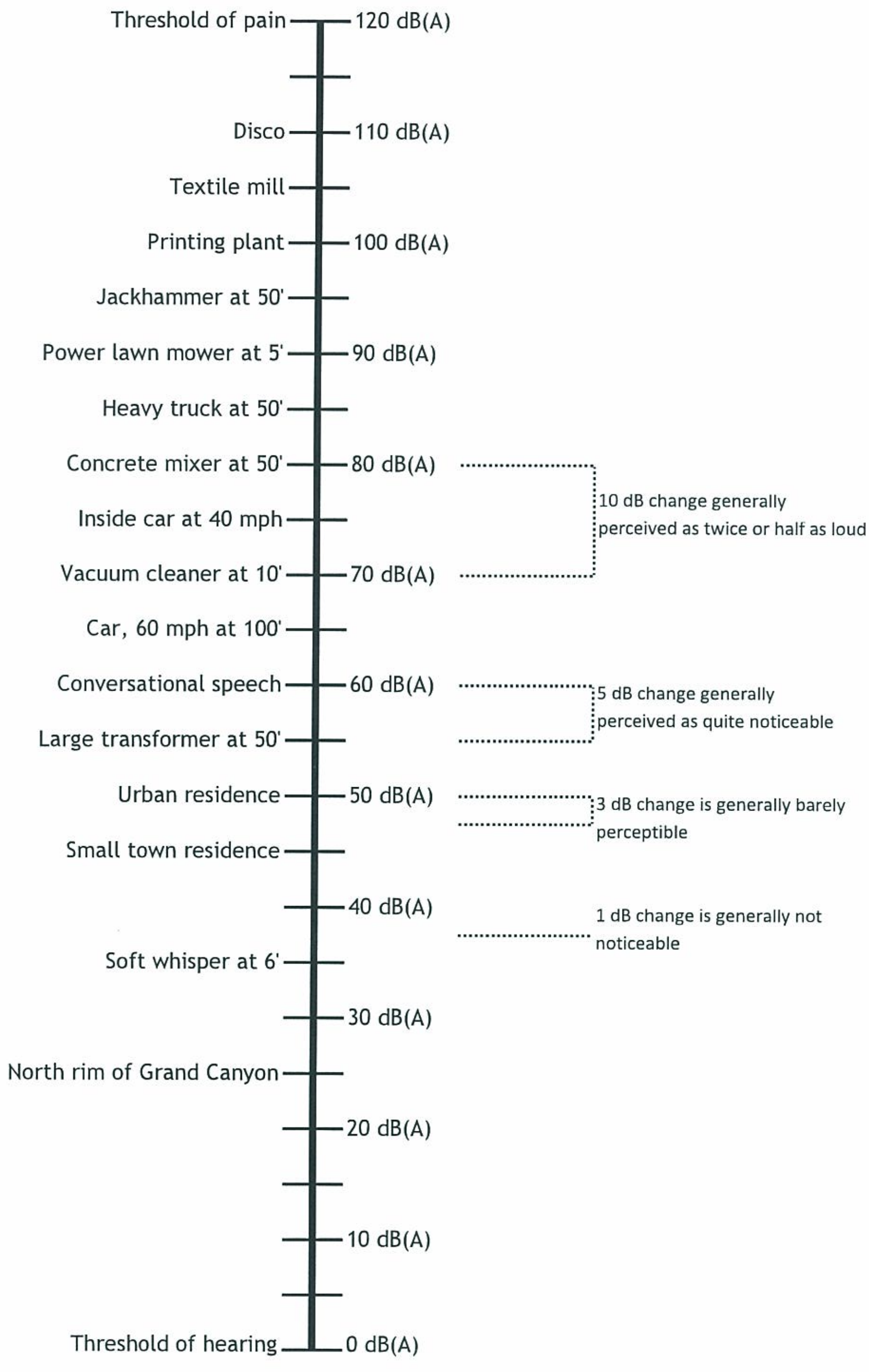

Figure 3-1. Common Noise Sources and A-Weighted Noise Levels

3.3 Peak Particle Velocity

Construction activities such as blasting, pile driving, and operation of heavy construction equipment induce ground and structure vibrations. Their effects can range from annoyance for the local residents to structural damage. The level of ground vibration experienced at any location depends mainly on the construction method, soil medium, distance from the vibratory source, and the structural dynamics of the building. There are several different methods that are used to quantify vibration amplitude. Of these, peak particle velocity (PPV) is most appropriate for evaluating potential building damage since it is related to the stresses that are exerted upon the buildings. PPV is most commonly assessed in the vertical direction because the floors of buildings vibrate mostly in the vertical direction. Near the source of vibration, the horizontal ground particle velocity is commonly lower than the vertical component. Far from the source of vibration, the ground horizontal and vertical velocities are about the same order of magnitude.

3.4 Vibration Velocity Level

Although PPV is appropriate for evaluating the potential for building damage, it is not suitable for evaluating human response to ground-borne vibration. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to an "average" vibration amplitude. However, the actual average level is not a useful measure of vibration because the net average of a vibration signal is zero. Instead, vibration velocity level (L_v) is used for evaluating human response. L_v describes the root-mean-square (rms) velocity amplitude of the vibration. This rms value may be thought of as a "smoothed" or "magnitude-averaged" amplitude. The rms of a signal is typically calculated over a 1 second period. The maximum L_v describes the maximum rms velocity amplitude that occurs during a vibration measurement.

L_v can be measured in inches per second (in/s). However, expressing these levels in terms of in/s would be very cumbersome since it would require a very wide range of numbers. For this reason, L_v is often stated in terms of decibels. Although it is not a universally accepted notation, the abbreviation "VdB" is used throughout this report to denote vibration velocity level decibels in order to reduce the potential for confusion with sound level decibels. The VdB is a logarithmic unit that describes the ratio of the actual rms velocity amplitude to a reference velocity amplitude. The accepted reference velocity amplitude is 1×10^{-6} in/s in the USA; therefore, this is the reference amplitude that is used throughout this report (it is noted that the accepted reference level varies globally and much confusion can arise if the reference is not clearly stated). Specifically, a vibration velocity level (L_v), in decibels (VdB), is calculated as follows:

$$L_V = 20\log_{10}\left(\frac{V}{1\times10^{-6}\,in./s}\right),$$

where V is the actual rms velocity amplitude and 1×10^{-6} in/s is the reference velocity amplitude.

Since decibels are logarithmic units, vibration velocity levels cannot be added or subtracted by ordinary arithmetic means.

4 Noise and Vibration Criteria

The following sections discuss the various criteria that have been considered in this study.

4.1 City of Newport Beach Municipal Code

Section 10.28.040 of the City's Municipal Code prohibits construction work which produces loud noise that disturbs, or could disturb, a person of normal sensitivity who works or resides in the vicinity, on any weekday except between the hours of 7:00 a.m. and 6:30 p.m., or on any Saturday except between the hours of 8:00 a.m. and 6:00 p.m. Construction work is prohibited on Sundays and federal holidays. The City's Municipal Code does not identify any quantitative noise level standards for construction activities, nor does it provide any standards or guidelines with respect to ground vibration.

4.2 Vibration Safety Limits for Buildings

General vibration damage criteria developed by the Federal Transit Administration [2] are summarized as follows:

Table 4-1. FTA Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
Reinforced concrete, steel or timber (no plaster)	0.5
Engineered concrete and masonry (no plaster)	0.3
Non-engineered timber and masonry buildings	0.2
Buildings extremely susceptible to vibration damage	0.12

Caltrans [3] uses the following criteria to evaluate the severity of problems associated with continuous[1] vibrations:

Table 4-2. Caltrans Vibration Damage Criteria

Building Category	PPV (in/sec)
Extremely fragile historic buildings, ruins, ancient monuments	0.08
Fragile buildings	0.1
Historic and some old buildings	0.25
Older residential structures	0.3
New residential structures	0.5
Modern industrial/commercial buildings	0.5

It is noteworthy that the risk of structural damage still exists even at relatively low vibration velocities (in particular due to dynamic settlements caused in loose soils).

[1] The drilling that will be used to set the piles is considered to be a continuous vibration source.

4.3 Vibration Perceptibility

Criteria developed by the Federal Transit Administration [2] indicate that when groundborne vibration exceeds 72 to 80 VdB, it is usually perceived as annoying to occupants of residential buildings.

5 Thresholds of Significance

Based on the noise and vibration criteria discussed above, and the CEQA guidelines, a significant impact will be assessed if the project will result in:

- 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. A noise impact will occur if construction activities occur outside of the time periods permitted in the City's noise ordinance.
- Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels. This impact will occur if any construction activity causes the vibration velocity level (L_v) to exceed 72 to 80 VdB at an adjacent residential building. Because of the potential for damage, a significant impact will be assessed if the PPV exceeds 0.20 in/sec at any existing residential building.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. As there are no permanent noise sources associated with the construction project, this aspect of the CEQA guidelines has not been considered in this study.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. As the City has no noise standards for construction activity, and the construction activity will only occur within the hours permitted by the Municipal Code, no significant impact will be assessed relative to this CEQA guideline.
- The project would expose people residing or working in the project area to excessive noise levels as a result of activities at an airport. As the project is located well outside the noise contours for John Wayne Airport, this aspect of the CEQA guidelines has not been considered in the study.

6 Existing Environment

The sensitive land uses of concern within the study area consist of the residences north and northeast of the project site on Bayside Place, the residences generally northeast of the project site on Carnation Avenue, the residences generally east and southeast of the project site on Ocean Boulevard, and the residences to the west of the project site on Channel Road.

6.1 Noise

The noise sources in the study area include traffic on the local streets, takeoffs from John Wayne Airport, activities on boats in the channel, and general residential activities in the area. In order to document the existing noise environment in the study area, continuous 24-hour measurements were obtained at four locations between April 23 and 30, 2008. (Refer to Figure 6-1 for the measurement locations.)

To obtain the measurements, the microphone was positioned at a height of 5 feet above the ground. The results of the noise measurements are provided in Appendix I, and are summarized in Table 6-1.

Table 6-1. Summary of Ambient Noise Measurements

Location #	Location Description	Range of Average Daytime (7 AM - 7 PM) Noise Levels, L_{eq}	Range of Maximum Daytime (7 AM - 7 PM) Noise Levels, L_{max}
1	Rear patio, 101 Bayside Pl.	50.5 - 57.4 dB(A)	63.1 - 80.9 dB(A)
2	Pool area, 2495 Ocean Blvd.	52.9 - 59.9 dB(A)	68.3 - 79.0 dB(A)
3	Rear patio, 2282 Channel Rd.	48.5 - 55.0 dB(A)	63.6 - 77.0 dB(A)
4	Rear patio, 2222 Channel Rd.	50.7 - 59.3 dB(A)	63.4 - 85.9 dB(A)

The instrumentation used to obtain the noise measurements consisted of integrating sound level meters (Model 712) and an acoustical calibrator (Model CAL150) manufactured by Larson Davis Laboratories. The accuracy of the calibrators is maintained through a program established by the manufacturer, and is traceable to the National Bureau of Standards. All instrumentation meets the requirements of the American National Standards Institute (ANSI) S1.4-1971.

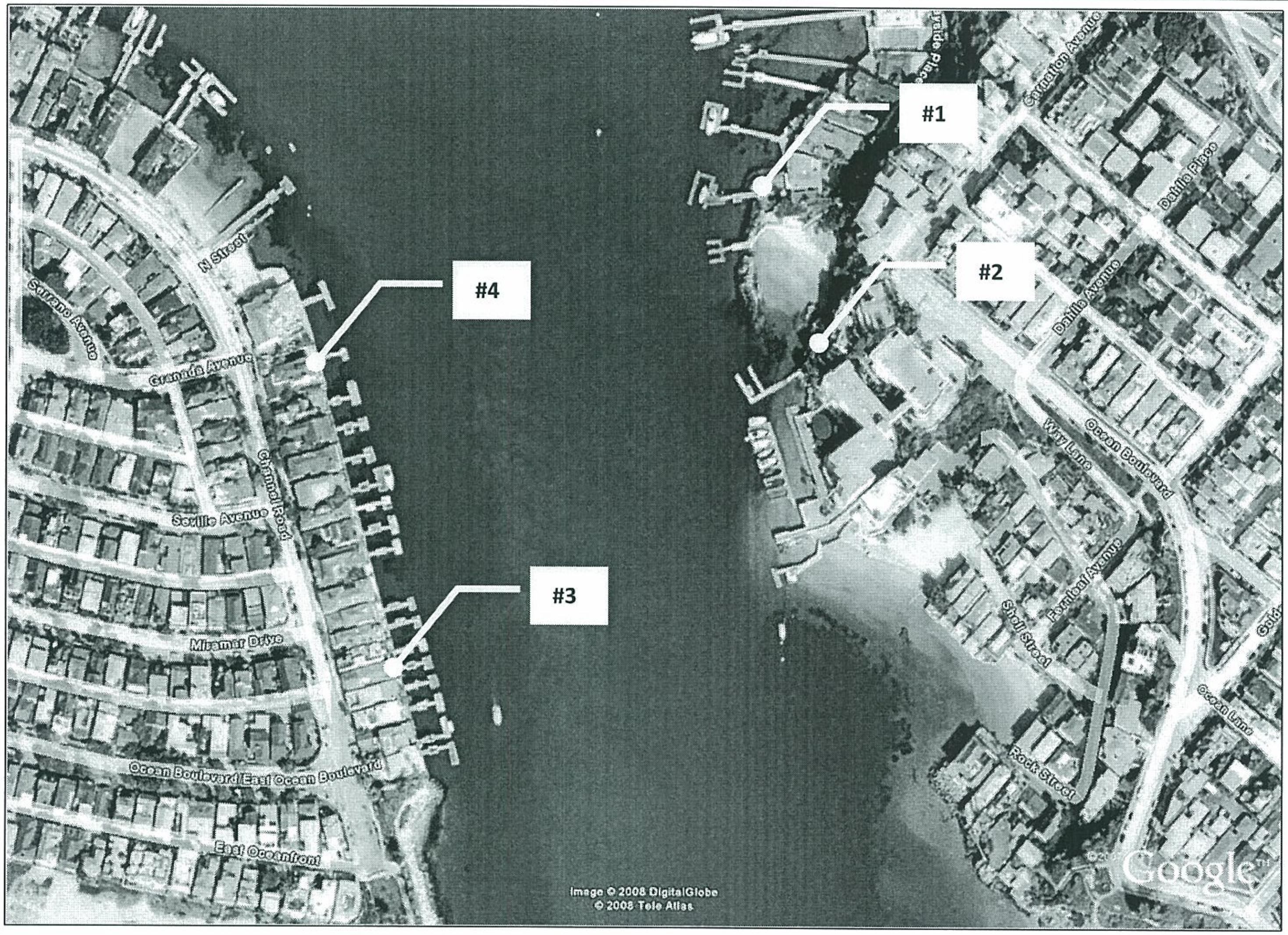

Figure 6-1. Noise and Vibration Measurement Locations

6.2 Vibration

Ambient ground vibration velocity levels were measured at all four locations (as shown in Figure 6-1) in the vertical direction using a PCB seismic accelerometer (Model 393C). The results of the measurements are provided in Appendix I, and are summarized in Table 6-2.

Table 6-2. Summary of Ambient Vibration Measurements

Location #	Location Description	Average Vibration Level	Maximum Vibration Level
1	Rear patio, 101 Bayside Pl.	0.00009 in/sec	0.00128 in/sec
2	Pool area, 2495 Ocean Blvd.	0.00007 in/sec	0.00086 in/sec
3	Rear patio, 2282 Channel Rd.	0.00008 in/sec	0.00298 in/sec
4	Rear patio, 2222 Channel Rd.	0.00011 in/sec	0.00121 in/sec

7 Future Environment within the Study Area

7.1 Noise

In compliance with the City's Code requirements, construction of the project will occur only between 7:00 a.m. and 6:30 p.m. on Monday through Friday, and between 8:00 a.m. and 6:00 p.m. on Saturday. There will be no construction activities on Sundays or legal holidays.

Construction noise levels in the vicinity of the project will fluctuate depending on the particular type, number and duration of use of various pieces of construction equipment. The exposure of persons to the periodic increase in noise levels will be short-term (on the order of several months).

To estimate the construction noise levels that will be experienced at the nearest sensitive receptors, the following assumptions have been made:

- A barge containing all the equipment necessary to drill and drop in the pre-stressed concrete pile will be located in the channel in the near vicinity of each pile that is being constructed.
- The noisiest pieces of equipment on the barge will be the drill and the crane. The drill and crane will operate simultaneously during the drilling phase of construction, and the crane will operate when the piles are being dropped into place.

Based on published data [4], the equipment to be used in the construction of the proposed dock will produce the following noise levels:

Table 7-1. Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level @ 50 Ft.	Combined Noise Level @ 50 Ft.
Drilling Phase		*88 dB(A)*
Crane	85 dB(A)	
Auger drill rig	85 dB(A)	
Concrete Pile Phase		*85 dB(A)*
Crane	85 dB(A)	

Using the noise levels cited in Table 7-1, above, the maximum noise levels at the nearest sensitive receptors can be estimated using the inverse square law, where noise decays at the rate of 6 dB for every doubling of distance. The average noise level at the nearest sensitive receptors can be estimated using the following standard prediction algorithm [2]:

$$L_{eq}(equip) = E.L. + 10 * \log(U.F.) - 20 * \log\left(\frac{D}{50}\right) - 10 * G * \log\left(\frac{D}{50}\right)$$

where,

L_{eq}(equip) is the average noise level at a receiver resulting from the operation of the equipment over a specified time period,

E.L. is the noise emission level of the equipment at a distance of 50 feet (from Table 7-1),

U.F. is a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period (U.F. = 0.16 for the crane and 0.20 for the auger drill rig [4]),

D is the distance from the receiver to the piece of equipment, and

G is a constant that accounts for ground effects (assume G = 0 for propagation over water or hard surfaces).

Table 7-2 provides the results of the analysis.

Table 7-2. Estimated Construction Noise Levels at Sensitive Receptors

Location #	Location Description	Drilling Phase		Concrete Pile Phase	
		Average Noise Level	Maximum Noise Level	Average Noise Level	Maximum Noise Level
1	Rear patio, 101 Bayside Pl.	71 dB(A) @ 155’	83 dB(A) @ 90’	67 dB(A) @ 155’	80 dB(A) @ 90’
2	Pool area, 2495 Ocean Blvd.	68 dB(A) @ 230’	77 dB(A) @ 175’	64 dB(A) @ 230’	74 dB(A) @ 175’
3	Rear patio, 2282 Channel Rd.	56 dB(A) @ 880’	64 dB(A) @ 785’	52 dB(A) @ 880’	61 dB(A) @ 785’
4	Rear patio, 2222 Channel Rd.	56 dB(A) @ 920’	65 dB(A) @675’	52 dB(A) @ 920’	62 dB(A) @675’

Note:
Average noise level is based on the average distance from all of the piles to each sensitive receptor. The maximum noise level is based on the distance from the closest pile to each sensitive receptor.

The estimated increase in average noise level due to construction may be calculated by adding, on an energy basis, the construction noise levels identified in Table 7-2 to the measured ambient noise levels identified in Table 6-1. This analysis is provided in Table 7-3 for the drilling phase, and in Table 7-4 for the concrete pile phase.

Table 7-3. Estimated Increase in Average Noise Level During Drilling Phase

Location #	Location Description	Range of Measured Ambient Noise Levels, L_{eq}	Estimated Average Construction Noise Level	Estimated Average Ambient + Construction Noise Level	Estimated Increase in Noise Level Due to Construction
1	Rear patio, 101 Bayside Pl.	50.5 - 57.4 dB(A)	71 dB(A)	71 dB(A)	13.6 - 20.5 dB(A)
2	Pool area, 2495 Ocean Blvd.	52.9 - 59.9 dB(A)	68 dB(A)	68 - 69 dB(A)	9.1 - 15.1 dB(A)
3	Rear patio, 2282 Channel Rd.	48.5 - 55.0 dB(A)	56 dB(A)	57 - 59 dB(A)	4.0 - 8.5 dB(A)
4	Rear patio, 2222 Channel Rd.	50.7 - 59.3 dB(A)	56 dB(A)	57 - 61.5 dB(A)	2.2 - 6.3 dB(A)

Table 7-4. Estimated Increase in Average Noise Level During Concrete Pile Phase

Location #	Location Description	Range of Measured Ambient Noise Levels, L_{eq}	Estimated Average Construction Noise Level	Estimated Average Ambient + Construction Noise Level	Estimated Increase in Noise Level Due to Construction
1	Rear patio, 101 Bayside Pl.	50.5 - 57.4 dB(A)	67 dB(A)	67 - 67.5 dB(A)	10.1- 16.5 dB(A)
2	Pool area, 2495 Ocean Blvd.	52.9 - 59.9 dB(A)	64 dB(A)	64.5 - 65.5 dB(A)	5.6 - 11.6 dB(A)
3	Rear patio, 2282 Channel Rd.	48.5 - 55.0 dB(A)	52 dB(A)	53.5 - 57 dB(A)	2.0 - 5.0 dB(A)
4	Rear patio, 2222 Channel Rd.	50.7 - 59.3 dB(A)	52 dB(A)	54.5 - 60.0 dB(A)	0.7 - 3.8 dB(A)

7.2 Vibration

The only vibratory activities during the construction of the project will be the extraction of the existing piles, and drilling into the channel bed to provide a socket for the concrete piles, which will then be grouted into place. For the most part, the new guide piles will be circular pre-stressed concrete piles 16 to 18 inches in diameter.

Based on published information, typical drilling produces a PPV of 0.089 in/sec at a distance of 25 feet. The PPV that will be experienced at the nearby sensitive properties can be estimated using the following formula [3]:

$$PPV_{Equipment} = PPV_{Reference} \times \left(\frac{25}{D}\right)^{1.1}$$

where,

$PPV_{Equipment}$ is the peak particle velocity in in/sec of the equipment adjusted for distance,

$PPV_{Reference}$ is the reference PPV in in/sec at 25 feet, or 0.089 in/sec, and

D is the distance from the equipment to the receiver

Table 7-5 compares the estimated construction PPVs to the measured ambient vibration level at each of the nearest sensitive receptors.

Table 7-5. Comparison of Estimated Construction PPVs to Ambient Levels

Location #	Location Description	Maximum Ambient Vibration Level	Estimated Construction PPV
1	Rear patio, 101 Bayside Pl.	0.00128 in/sec	0.02 in/sec
2	Pool area, 2495 Ocean Blvd.	0.00086 in/sec	0.01 in/sec
3	Rear patio, 2282 Channel Rd.	0.00298 in/sec	0.002 in/sec
4	Rear patio, 2222 Channel Rd.	0.00121 in/sec	0.002 in/sec

Based on published information, typical drilling produces a vibration level (L_v) of 87 VdB at a distance of 25 feet. The L_v that will be experienced at the nearby sensitive properties can be estimated using the following formula [2]:

$$L_V(D) = L_V(25ft) - 30 \times \log\left(\frac{D}{25}\right)$$

where,

$L_v(D)$ is the vibration level in VdB of the equipment adjusted for distance,

$L_v(25\ ft)$ is the reference vibration level in VdB at 25 feet, or 87 VdB, and

D is the distance from the equipment to the receiver

Table 7-6 provides the estimated construction vibration level at each of the nearest sensitive receptors.

Table 7-6. Estimated Construction Vibration Levels

Location #	Location Description	Estimated Construction Vibration Level
1	Rear patio, 101 Bayside Pl.	70 VdB @ 90’
2	Pool area, 2495 Ocean Blvd.	62 VdB @ 175’
3	Rear patio, 2282 Channel Rd.	42 VdB @ 785’
4	Rear patio, 2222 Channel Rd.	44 VdB @ 675’

It should be noted that the most reliable way to evaluate vibration is in situ. The theoretical analysis in this study provides approximate results and may not be accurate.

8 Assessment of Impact

Using the criteria established in this study, the following may be concluded regarding the impact of the proposed project:

- The project will not result in the 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. Therefore, the impact is not significant.
- The project will not generate excessive groundborne vibration or groundborne noise levels. Therefore, the impact is not significant.

Because it is outside our area of expertise, the risk (if any) of structural damage due to transmitted vibrations or dynamic settlements has not been evaluated in this study. This risk should be analyzed and assessed by qualified structural and geotechnical engineers.

9 Mitigation Measures

As indicated in Section 8, there are no significant impacts associated with the construction of the dock replacement project. Therefore, mitigation measures are not required.

10 Abatement Measures

Although not required in order to mitigate a significant impact, the following measures are recommended as conditions of approval to minimize the construction noise levels caused by the project:

1. All construction equipment, stationary and mobile, shall be equipped with properly operating and maintained muffling devices.
2. A construction schedule shall be developed that minimizes potential cumulative construction noise levels.
3. The construction contractor shall notify the residents of the construction schedule for the dock, and shall keep them informed on any changes to the schedule. The notification shall also identify the name and phone number of a contact person in case of complaints. The contact person shall take whatever reasonable steps are necessary to resolve the complaint.

11 Unmitigated Impacts

There will be no unmitigated impacts associated with the project.

12 References

1. 201-207 Carnation, "Aerie Docks". Site plan provided by Keeton Kreitzer Consulting.
2. *Transit Noise and Vibration Impact Assessment*. Federal Transit Administration. April 1995.
3. *Transportation- and Construction-Induced Vibration Guidance Manual*. Jones & Stokes. Contract No. 43A0049 for California Department of Transportation; Environmental Program; Environmental Engineering; Noise, Vibration, and Hazardous Waste Management Office. June 2004.
4. *Roadway Construction Noise Model Version 1*.00. U.S. Department of Transportation Research and Innovative Technology Administration, John A. Volpe Nation Transportation Systems Center, Environmental Measurement and Modeling Division. February 2, 2006.

APPENDIX I

Ambient Noise and Vibration Measurements

Table I-1. Summary of Measured Ambient Noise Levels

Location: #1, Rear patio at 101 Bayside Place

Date	Time	Avg. Noise Level, dBA	Max. Noise Level, dBA	Min. Noise Level, dBA	Noise Level Exceeded for More Than...			
					1 Min/Hr	5 Min/Hr	15 Min/Hr	30 Min/Hr
4/29/08	12:00 PM	52.1	63.7	43.9	60.9	57.1	50.7	48.1
4/29/08	1:00 PM	53.1	65.1	43.6	61.7	58.5	52.3	47.7
4/29/08	2:00 PM	52.0	64.4	43.3	61.6	56.1	50.3	47.8
4/29/08	3:00 PM	52.0	66.4	41.9	62.3	55.5	49.8	46.9
4/29/08	4:00 PM	52.9	69.0	41.0	62.8	57.6	48.9	46.0
4/29/08	5:00 PM	50.5	64.1	41.7	60.3	54.4	48.9	45.8
4/29/08	6:00 PM	56.9	80.9	40.5	62.3	57.6	51.0	47.5
4/29/08	7:00 PM	54.0	73.0	40.0	64.2	58.3	49.4	45.2
4/29/08	8:00 PM	51.3	64.5	42.4	59.9	55.8	49.9	47.2
4/29/08	9:00 PM	51.4	65.8	42.9	60.8	54.6	49.9	48.0
4/29/08	10:00 PM	49.4	56.5	43.6	53.2	51.8	50.4	49.0
4/29/08	11:00 PM	50.1	56.1	44.6	53.7	52.4	51.0	49.7
4/30/08	12:00 AM	49.0	58.3	43.3	53.0	51.4	49.8	48.5
4/30/08	1:00 AM	48.2	57.2	42.7	52.6	50.9	49.0	47.5
4/30/08	2:00 AM	45.5	55.6	39.5	49.9	48.2	46.4	44.8
4/30/08	3:00 AM	52.0	61.4	43.8	57.0	54.8	52.7	51.2
4/30/08	4:00 AM	52.4	61.5	45.9	57.0	55.1	53.1	51.6
4/30/08	5:00 AM	52.2	62.9	45.4	57.0	55.0	53.0	51.4
4/30/08	6:00 AM	53.2	61.3	45.9	57.5	56.0	54.1	52.6
4/30/08	7:00 AM	57.4	71.5	49.0	64.7	61.6	57.0	54.5
4/30/08	8:00 AM	57.3	76.0	46.8	65.6	61.5	55.8	53.3
4/30/08	9:00 AM	55.1	67.5	47.6	62.3	58.5	54.9	53.1
4/30/08	10:00 AM	56.3	75.4	47.1	63.8	59.8	54.8	52.5
4/30/08	11:00 AM	54.0	67.7	47.0	62.2	58.0	53.4	50.7

Table I-2. Summary of Measured Ambient Noise Levels

Location: #2, pool patio at 2495 Ocean Boulevard

Date	Time	Avg. Noise Level, dBA	Max. Noise Level, dBA	Min. Noise Level, dBA	Noise Level Exceeded for More Than...			
					1 Min/Hr	5 Min/Hr	15 Min/Hr	30 Min/Hr
4/23/08	2:00 PM	56.4	72.7	41.6	66.6	61.1	53.1	48.6
4/23/08	3:00 PM	54.9	70.6	42.8	65.8	58.8	51.6	48.1
4/23/08	4:00 PM	59.9	79.0	44.8	69.6	63.1	53.7	49.9
4/23/08	5:00 PM	53.9	70.1	42.9	64.4	57.2	50.7	47.3
4/23/08	6:00 PM	52.9	72.2	40.5	63.0	55.9	48.6	45.1
4/23/08	7:00 PM	55.5	73.0	39.6	65.8	60.2	50.6	45.6
4/23/08	8:00 PM	53.0	67.3	39.4	63.7	58.0	49.4	44.8
4/23/08	9:00 PM	51.1	69.9	39.6	61.3	55.2	44.2	41.9
4/23/08	10:00 PM	42.6	57.8	37.3	49.5	45.5	41.9	40.6
4/23/08	11:00 PM	45.0	69.8	35.7	48.9	42.7	39.5	38.3
4/24/08	12:00 AM	40.1	52.2	35.6	42.7	41.6	40.6	39.8
4/24/08	1:00 AM	39.9	56.7	35.2	45.9	41.0	39.1	38.0
4/24/08	2:00 AM	37.8	56.6	34.9	41.5	39.2	37.8	36.9
4/24/08	3:00 AM	38.2	47.9	35.3	41.0	39.8	38.8	37.9
4/24/08	4:00 AM	38.8	53.6	34.9	43.9	40.9	38.9	38.0
4/24/08	5:00 AM	40.9	60.2	36.6	46.4	43.0	40.7	39.6
4/24/08	6:00 AM	45.5	62.8	38.6	54.1	48.7	44.5	41.7
4/24/08	7:00 AM	59.5	73.8	39.9	69.8	65.3	56.6	47.5
4/24/08	8:00 AM	54.4	70.6	39.9	65.4	59.1	48.6	44.4
4/24/08	9:00 AM	55.4	69.4	40.5	65.9	59.9	52.9	48.7
4/24/08	10:00 AM	57.6	78.7	40.3	66.7	60.3	52.9	48.1
4/24/08	11:00 AM	56.8	71.4	41.9	65.9	61.4	56.1	51.2
4/24/08	12:00 PM	54.0	68.3	40.2	64.6	58.6	51.8	46.6
4/24/08	1:00 PM	55.8	74.4	40.7	64.9	60.7	54.5	49.6

Table I-3. Summary of Measured Ambient Noise Levels

Location: #3, rear patio of 2282 Channel Road

Date	Time	Avg. Noise Level, dBA	Max. Noise Level, dBA	Min. Noise Level, dBA	Noise Level Exceeded for More Than...			
					1 Min/Hr	5 Min/Hr	15 Min/Hr	30 Min/Hr
4/23/08	4:00 PM	54.6	73.0	42.3	63.9	57.3	51.7	49.4
4/23/08	5:00 PM	50.5	65.4	40.8	59.4	54.1	49.6	47.0
4/23/08	6:00 PM	48.5	65.8	38.6	55.5	52.1	48.0	45.7
4/23/08	7:00 PM	51.7	67.3	38.7	60.3	56.0	50.0	46.7
4/23/08	8:00 PM	51.3	69.9	38.8	59.6	55.1	49.4	46.3
4/23/08	9:00 PM	48.8	66.1	38.5	55.7	52.0	48.2	45.6
4/23/08	10:00 PM	48.7	62.4	38.0	55.6	52.3	49.0	46.4
4/23/08	11:00 PM	51.5	72.9	38.0	55.8	50.6	47.4	45.3
4/24/08	12:00 AM	46.3	55.2	40.2	51.1	49.0	47.1	45.3
4/24/08	1:00 AM	46.9	57.9	40.3	52.2	49.2	47.5	46.0
4/24/08	2:00 AM	45.5	52.9	40.2	48.8	47.7	46.4	45.1
4/24/08	3:00 AM	44.5	55.5	39.3	48.7	47.3	45.5	43.8
4/24/08	4:00 AM	45.1	56.9	39.9	50.0	47.8	45.6	43.9
4/24/08	5:00 AM	45.2	59.1	39.8	49.7	47.8	46.0	44.3
4/24/08	6:00 AM	50.0	69.1	42.0	57.1	51.8	49.0	47.3
4/24/08	7:00 AM	54.5	71.2	40.6	62.7	59.5	54.0	48.9
4/24/08	8:00 AM	49.4	66.0	40.8	57.1	54.0	49.2	46.3
4/24/08	9:00 AM	51.7	65.3	41.0	59.4	56.5	51.4	48.1
4/24/08	10:00 AM	53.8	70.3	41.1	62.8	56.2	51.7	48.8
4/24/08	11:00 AM	52.9	66.8	42.3	60.1	56.9	53.0	50.2
4/24/08	12:00 PM	51.7	63.6	42.7	60.0	56.5	50.8	48.2
4/24/08	1:00 PM	52.2	64.5	43.1	60.4	56.3	51.8	48.9
4/24/08	2:00 PM	55.0	77.0	42.4	62.7	58.2	53.4	49.5
4/24/08	3:00 PM	52.9	75.3	42.6	59.2	55.1	50.8	48.3

Table I-4. Summary of Measured Ambient Noise Levels

Location: #4, rear patio of 2222 Channel Road

Date	Time	Avg. Noise Level, dBA	Max. Noise Level, dBA	Min. Noise Level, dBA	Noise Level Exceeded for More Than...			
					1 Min/Hr	5 Min/Hr	15 Min/Hr	30 Min/Hr
4/29/08	11:00 AM	51.1	63.4	43.0	58.5	54.4	51.1	48.8
4/29/08	12:00 PM	52.3	64.9	45.0	59.4	56.4	52.3	50.0
4/29/08	1:00 PM	54.5	69.8	43.8	63.6	57.1	53.3	50.4
4/29/08	2:00 PM	51.1	66.3	41.8	59.6	54.7	50.6	47.9
4/29/08	3:00 PM	51.4	69.7	41.2	59.2	55.6	50.3	47.8
4/29/08	4:00 PM	50.7	66.7	41.3	59.5	54.5	50.0	47.2
4/29/08	5:00 PM	51.0	65.6	41.9	59.1	54.4	50.5	48.1
4/29/08	6:00 PM	55.2	76.0	42.5	63.1	57.6	52.5	49.3
4/29/08	7:00 PM	53.8	72.8	42.0	63.0	56.7	50.7	48.3
4/29/08	8:00 PM	51.2	63.0	44.1	58.2	54.1	51.1	49.4
4/29/08	9:00 PM	51.1	65.3	45.7	56.5	53.1	51.3	50.0
4/29/08	10:00 PM	50.3	61.8	44.6	55.2	52.5	51.0	49.4
4/29/08	11:00 PM	49.3	55.1	44.6	51.9	51.0	50.1	49.2
4/30/08	12:00 AM	51.4	59.7	43.9	54.6	53.6	52.5	51.2
4/30/08	1:00 AM	51.0	58.6	46.4	53.8	52.7	51.7	50.8
4/30/08	2:00 AM	48.7	56.1	43.2	52.3	51.0	49.7	48.2
4/30/08	3:00 AM	51.2	61.4	45.8	53.9	53.0	52.0	51.0
4/30/08	4:00 AM	50.5	57.7	46.3	53.1	52.2	51.2	50.2
4/30/08	5:00 AM	52.1	69.3	45.3	55.9	53.9	52.6	51.2
4/30/08	6:00 AM	53.3	66.2	48.3	58.5	54.9	53.5	52.5
4/30/08	7:00 AM	55.8	69.1	49.7	62.3	58.4	55.7	54.3
4/30/08	8:00 AM	59.3	85.9	49.4	62.5	57.8	54.6	53.1
4/30/08	9:00 AM	55.4	68.0	48.5	61.7	58.1	55.4	54.0
4/30/08	10:00 AM	56.7	69.5	50.5	63.5	59.7	56.5	54.6

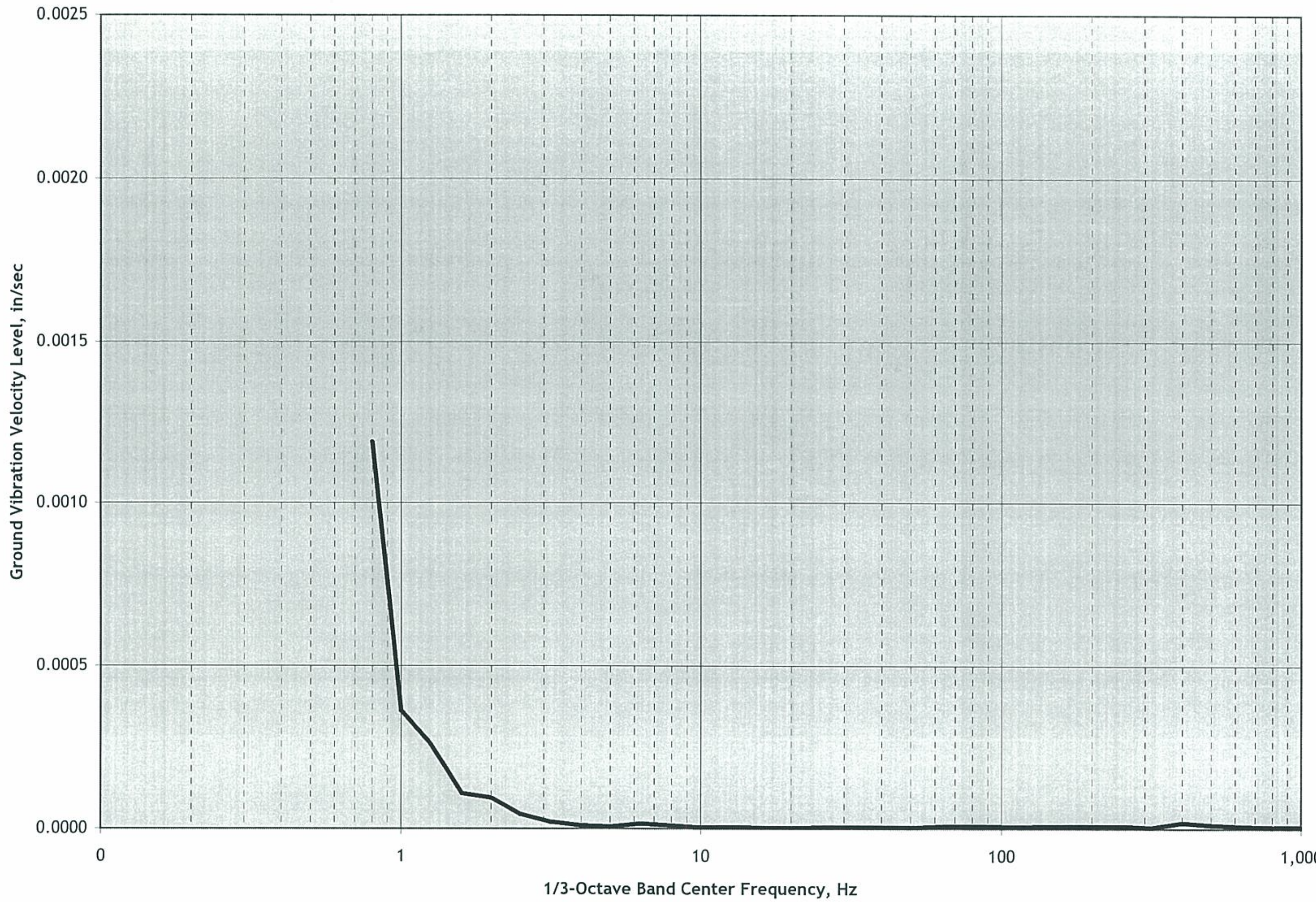

Figure I-1. Measured Ambient Ground Vibration Velocity Levels at Location #1

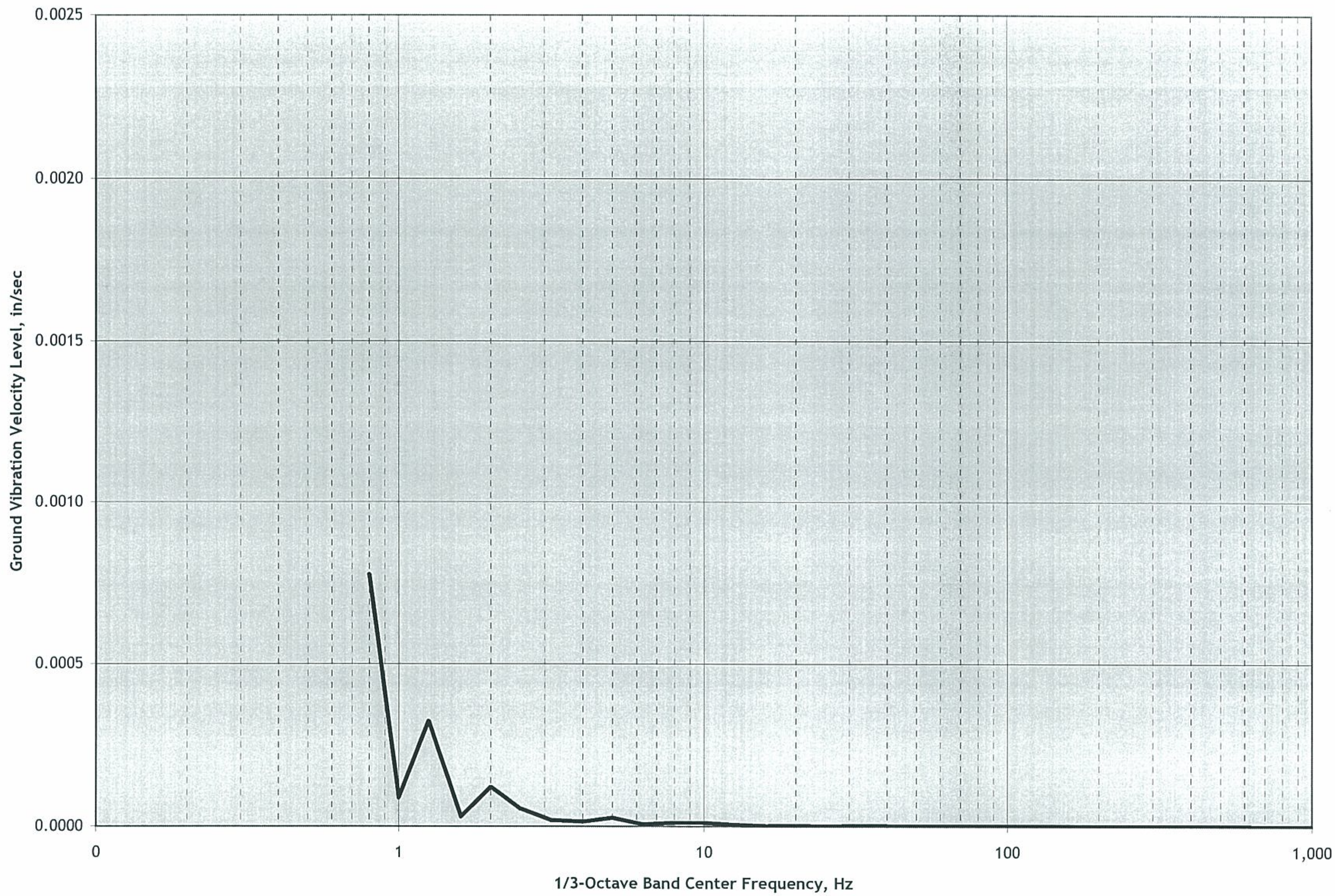

Figure I-2. Measured Ambient Ground Vibration Velocity Levels at Location #2

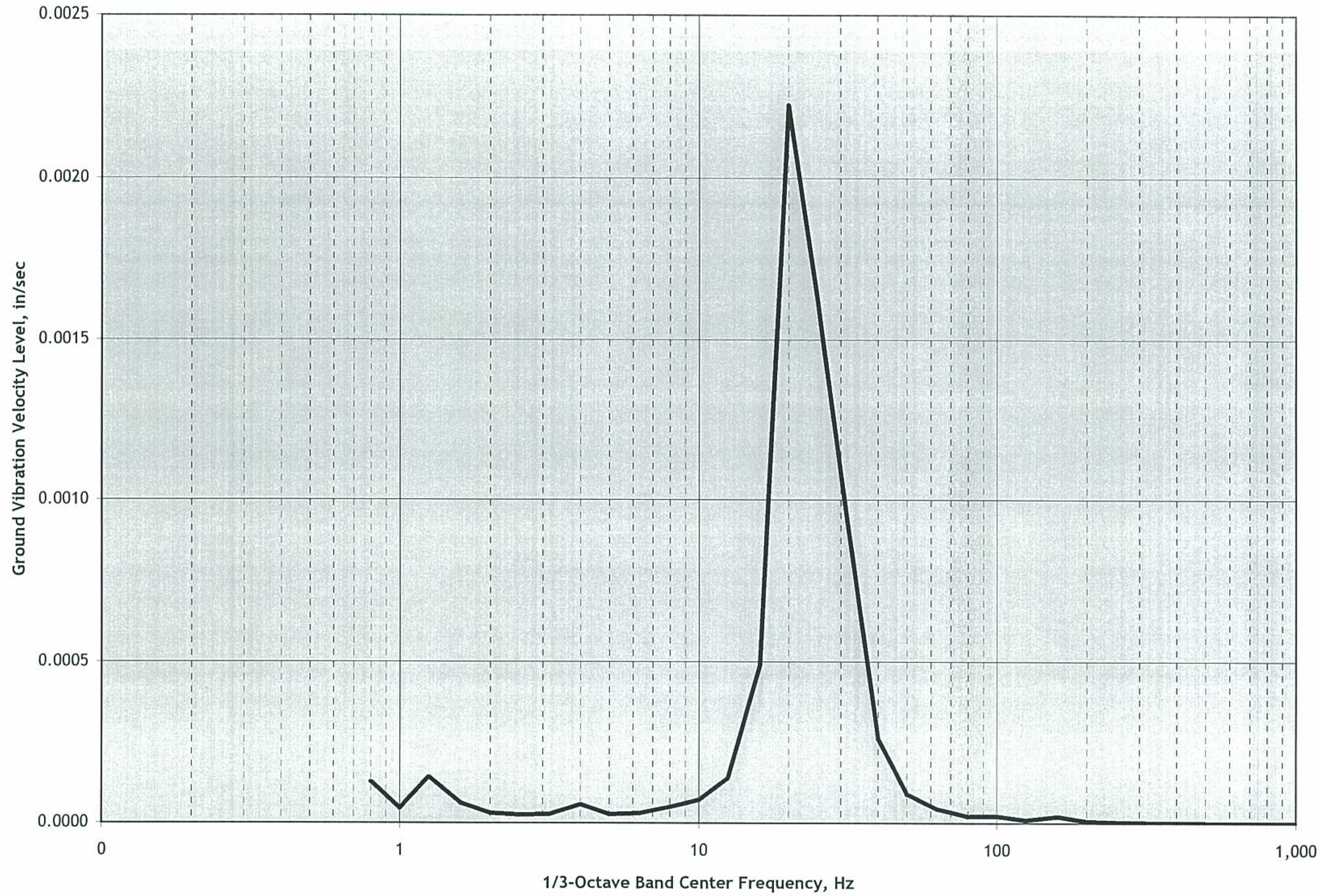

Figure I-3. Measured Ambient Ground Vibration Velocity Levels at Location #3

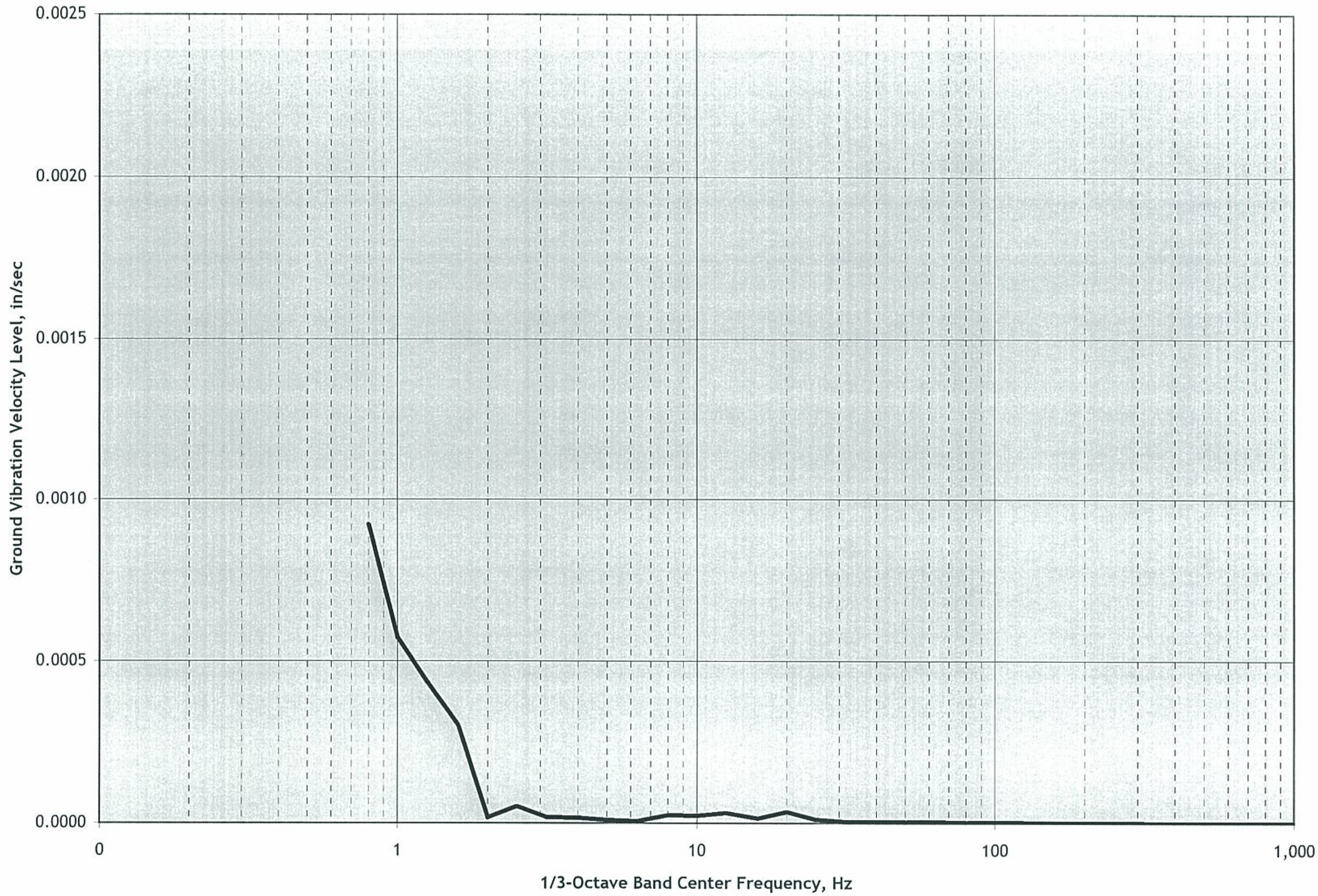

Figure I-4. Measured Ambient Ground Vibration Velocity Levels at Location #4

Photograph 1. View of discharge pipe with African umbrella sedge mixed with other ornamentals. Photograph taken on 12-10-2008.

Photograph 2. This photograph depicts irrigation lines visible immediately above the area vegetated with African umbrella sedge. Photograph taken on 12-10-2008.

GLENN LUKOS ASSOCIATES

EXHIBIT 3

AERIE PROPERTY

Site Photographs

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Aerie Project site City/County: Orange Sampling Date: 12/10/08

Applicant/Owner: Manatt, Phelps + Phillips State: CA Sampling Point: 1

Investigator(s): T Bomkamp / P Schwartz Section, Township, Range: T7S, R10W, sec 1

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Slope/none Slope (%): 40–50

Subregion (LRR): Med Lat: 33°35'54.0N Long: 117°52'45.6W Datum: WGS84

Soil Map Unit Name: Myford NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? NO Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pittosporum undulatum	10	N	UNK
2. Ligustrum sp.	10	N	UNK
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Cyperus involucratus	80%	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? * Yes X No ____

Remarks: * Appears to be supported by irrigation for adjacent landscaping + nuisance water

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/1	100	NONE				Loamy Sand	Smells very fresh i.e. good garden soil — no hydric indicators of any kind

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______

Water Table Present? Yes ___ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: