PORT-RELATED NOISE IMPACT STUDY FOR COMMUNITY OF SAN PEDRO, CALIFORNIA

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SECTION 1 INTRODUCTION

1.1 Study Background

The Harbor Community Benefit Foundation (HCBF) was initially created under the settlement agreement known as the "TraPac MOU," an historic and precedent-setting agreement whereby the Port of Los Angeles and the City of Los Angeles agreed to address the negative cumulative environmental and public health impacts of its business operations on its neighbors, i.e. local port communities and their residents. The purpose of the HCBF is to address, through mitigation projects, off-port impacts from existing and future operations at the Port of Los Angeles in the Communities of Wilmington and San Pedro, California. One of the first tasks for the HCBF identified in the MOU was to develop a school and residential sound insulation program in the Wilmington Community. The results of that study are summarized in Section 1.2 below.

1.2 Reference to Wilmington Study

The purpose of the study for the Wilmington Community was to provide acoustical building upgrades to the schools and residences most impacted by noise from port related operations, and most importantly those impacted by noise from the TraPac facility.

The "Wilmington School and Residence Sound Attenuation Program" (Wilmington Study) was completed in 2013 and was undertaken in four (4) separate sections and documents, as follows:

1. *Report #1 – Noise Measurement Report (September 19, 2012)* – this report presents background information on noise, describes the measurement site selection, and results for the 25 measurement locations.
2. *Report #2 – Criteria and Prioritization Recommendations Report (June 28, 2013)* – this report presents a review of noise impact criteria, and recommendations to prioritize noise impacts.
3. *Report #3 – Noise Contour Development Methodology Report (December 20, 2013)* – this report provides the methodology for noise level calculation, and the development of noise contours.
4. *Report #4 – Property Inventory and Mitigation Recommendations Report (October 31, 2013)* – the final report for the study provides an inventory of the highly impacted residences and an analysis of the major housing architectural styles in the study area. In addition, noise measurements were undertaken on a select group of residences and schools to determine building noise level reduction. Finally, acoustical criteria was applied to determine recommended treatments, projected acoustical performance, and estimated costs for mitigation.

The follow-on to the Wilmington study was to undertake a similar study in the San Pedro Community. The Noise Impact Study for the Community of San Pedro, California was based on the initial study for the Wilmington Community with some refinement based on feedback provided by the HCBF Board of Directors. The purpose of this study was to survey the San Pedro Community to determine areas, including schools and residences, which are potentially affected by Port-related operations. Following the survey, the next phase of the study would include a noise measurement study and recommendations for noise mitigation for any noise-impacted areas.

This study includes the following work tasks:

1. Undertake community windshield and key stakeholder survey;
2. Review applicable laws and regulations;
3. Develop noise metrics and impact criteria;
4. Perform noise measurement study;
5. Determine noise exposure and related impacts;
6. Prepare property inventory and mitigation recommendations; and
7. Present study conclusions.

SECTION 2 COMMUNITY WINDSHIELD & KEY STAKEHOLDER SURVEY

2.1 Review of Existing Plans and Documents

Prior to undertaking the community windshield survey Team staff reviewed San Pedro land use and zoning maps, aerial photos and other documents from the Port. The purpose was to identify potential truck routes and rail lines from Port-related activity as well as to identify noise-sensitive residential areas and schools prior to undertaking the community windshield survey. The documents made available for review for the San Pedro study included the following:

- *"Port of Los Angeles, Port Master Plan", February 2014*
- *"Los Angeles Harbor Department, San Pedro Waterfront Project EIS/EIR, Section 3.9 – Noise", September 2008*
- *"San Pedro Community Plan EIR, Section 4.10 – Noise", August 2012*
- *"City of Los Angeles, Department of City Planning, Generalized Circulation, San Pedro" October 2010*
- *"City of Los Angeles, Department of City Planning, Generalized Land Use, San Pedro" October 2010*
- *"City of Los Angeles, Department of City Planning, General Plan Land Use Map, San Pedro Community Plan" October 2010*

A review of the various documents and plans provided background information related to areas of noise-sensitive residential and schools as well as industrial port-related facilities, rail lines and freeways.

2.2 Kick-Off Meeting with HCBF Staff

An initial kick-off meeting was undertaken with staff from HCBF and from The Jones Payne Group on October 19, 2016. The purpose of the meeting was to discuss specific concerns regarding port related noise in the San Pedro Community. The meeting was used to help identify the major offending noise sources and their operational characteristics. Furthermore, the location of any specific noise sensitive areas and known degrees of severity of noise problems in the community were discussed.

A preliminary project plan was discussed among team members setting forth expected tasks, responsibilities, milestones and timeframes pertaining to the study.

2.3 Undertake Initial Community Windshield Survey

An initial windshield survey for the San Pedro Community was undertaken on Wednesday January 11, 2017. During the survey almost all major arterials, areas adjacent to major freeways, waterfront roadways, and roadways adjacent to port-related facilities were surveyed. A map showing the generalized land use in San Pedro is presented in **Figure 1**.

2.4 Identification of Potential Noise Impact Areas

The intent of the initial survey was to identify noise from port-related sources in the San Pedro Community including operations at the Port, container trucks on public roadways, railroad operations, and shipping container facilities. The results of the windshield survey revealed that the majority of the potential noise impact areas were confined to the northeast section of San Pedro and the major noise sources identified included some port-related facilities, some rail lines, the Harbor Freeway (IH-110), and the Terminal Island Freeway (SR-47). A total of seven (7) potentially impacted areas were noted in northeast San Pedro during the survey. The location of the seven (7) areas are presented in **Figure 2.** The seven (7) areas are summarized in **Table 1.** Each of the areas are described in the following sections.

Table 1. Summary of Noise Impact Areas – San Pedro

Site No.	Area Description	Impact Area	Source of Noise Impact
1	Gatun Street Area	Residential	Refinery Rail Line
2	Gaffey Place Area	Residential	Harbor Freeway (IH-110)
3	MacArthur Avenue Area	Residential	Harbor Freeway (IH-110) & Port Rail Line
4	LAUSD – Harbor Occupational Center	School	Terminal Island Freeway (SR-47) & Port Rail Line
5	Knoll Hill Area	Residential	Terminal Island Freeway (SR-47) & Port Rail Line
6	Samoan Sea Apartments	Multi-Family Apartments	Terminal Island Freeway (SR-47)
7	Palos Verde Street Area	Residential	Terminal Island Freeway (SR-47)

Figure 1. Generalized Land Use – San Pedro

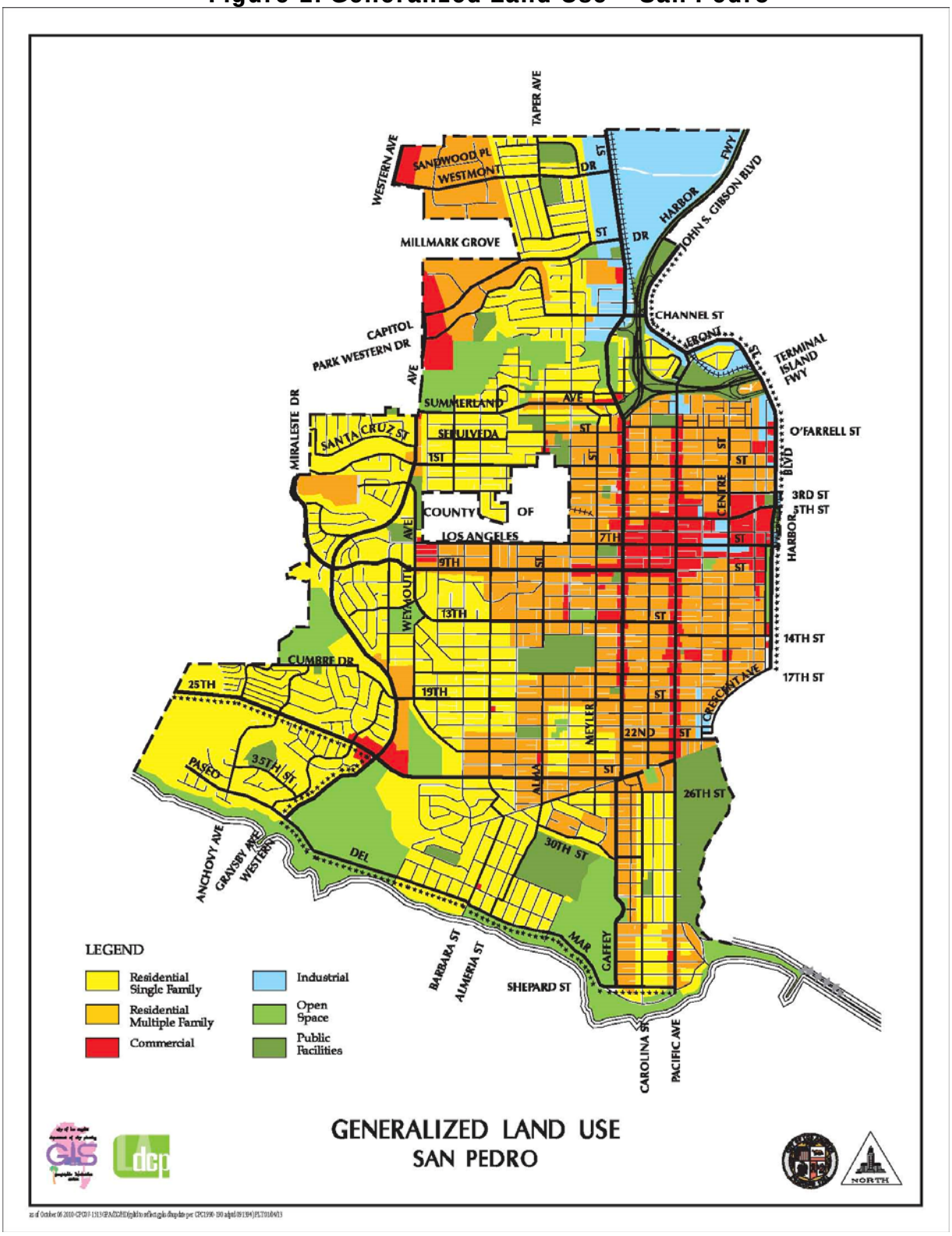
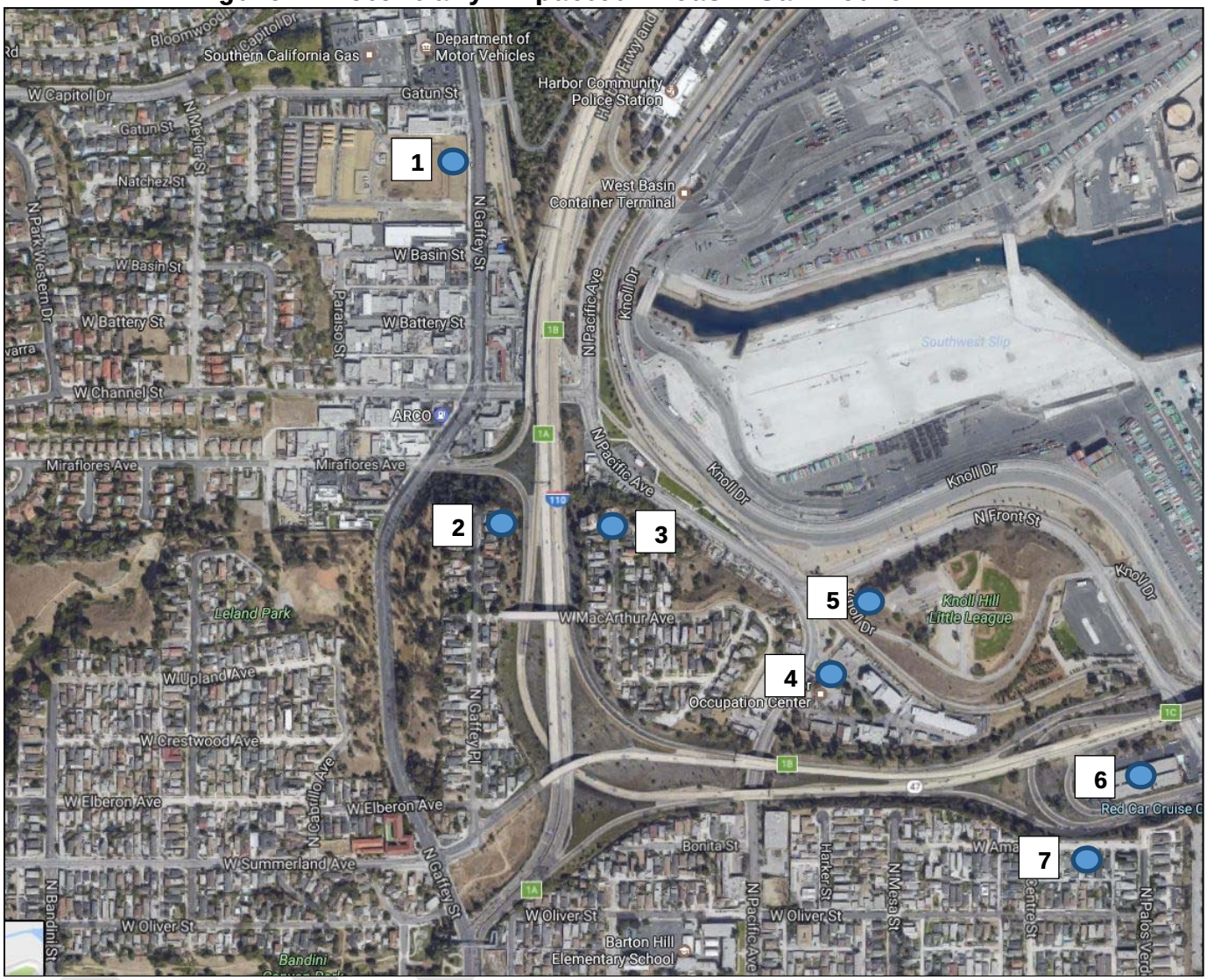


Figure 2. Potentially Impacted Areas – San Pedro



2.4.1 Gatun Street Area (Site #1)

The Gatun Street area (Site #1) is a dense multi-family development called Harbor Highlands located south of Gatun Street and west of Gaffey Street. The east end of the development abuts Gaffey Street, a major north-south arterial. Immediately east of Gaffey Street a north-south railroad track that parallels Gaffey Street and runs north to the Rancho LPG Holdings facility. While no rail traffic was observed during our survey, railroad tank cars were noted in the facility and are likely moved periodically or daily from the facility. A close-in view of the Harbor Highlands development is noted in **Figure 3**. It should be noted that at the time the aerial photos was taken, not all of the development was complete. **Figure 4** shows photographs of the development abutting Gaffey Street as well as the rail line and facility at Rancho LPG.

Figure 3. Map of Gatun Street Area
(Site #1)

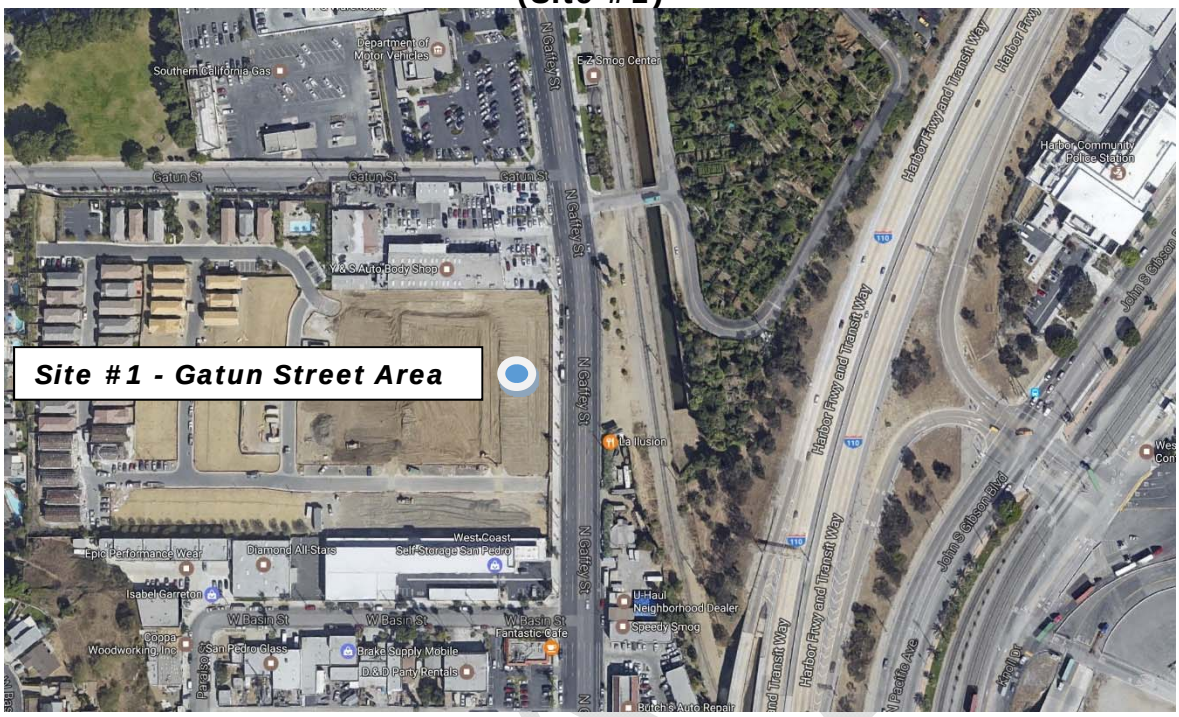
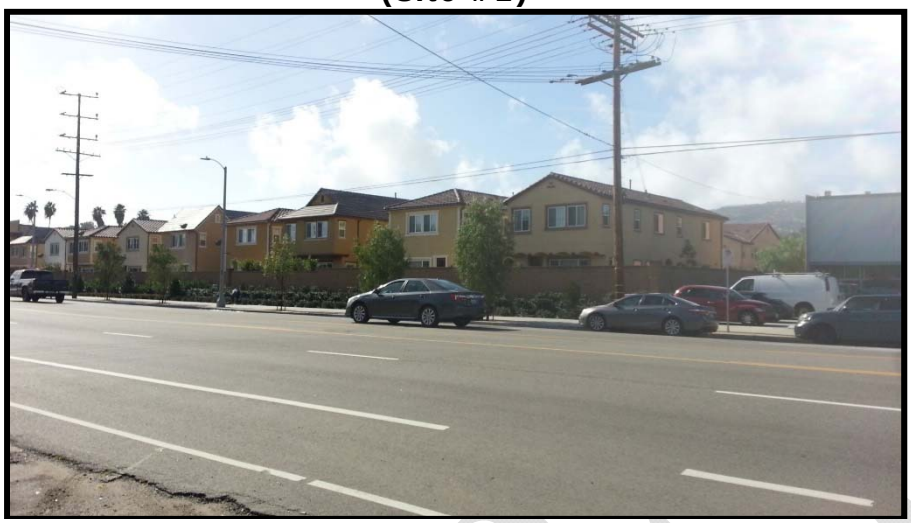
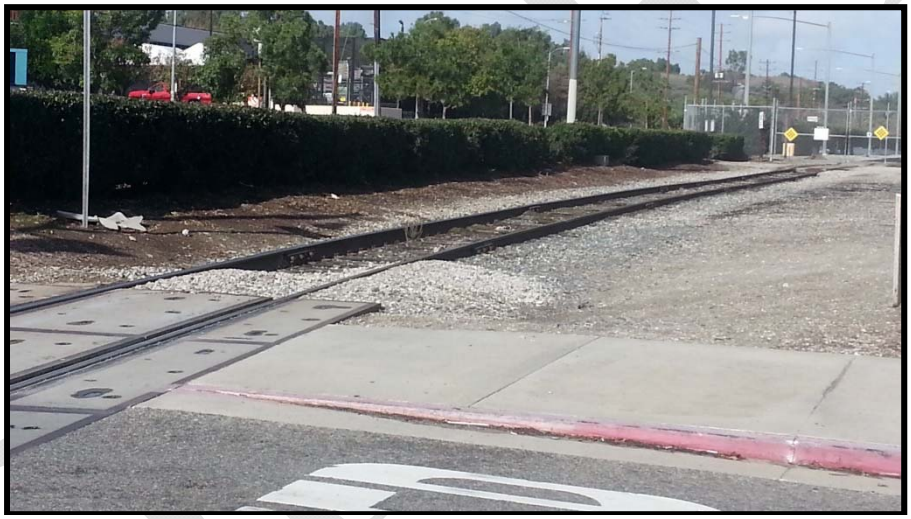
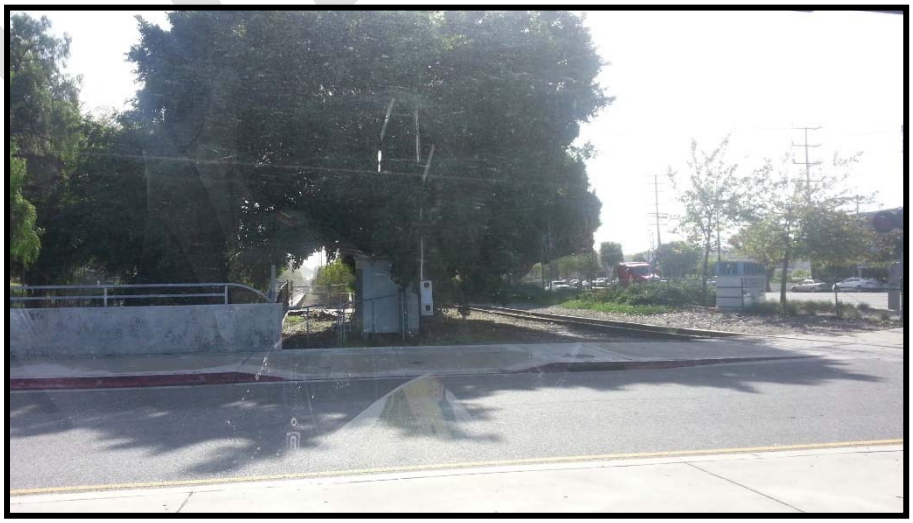


Figure 4. Photos of Gatun Street Area (Site #1)





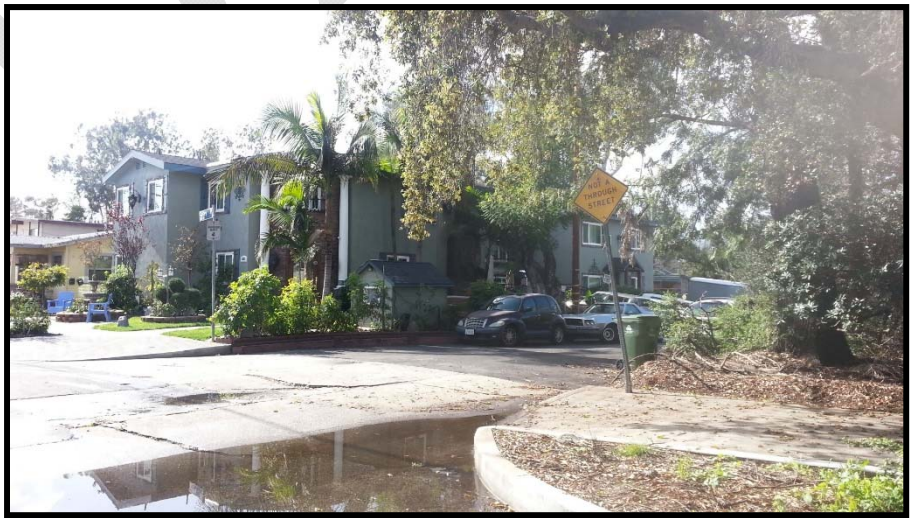


2.4.2 Gaffey Place Area (Site #2)

The Gaffey Place area (Site #2) is a dense single-family development located east of Gaffey Street and west of the Harbor Freeway (IH-110). The east end of the neighborhood abuts the Harbor Freeway (IH-110) and other major ramps leading to and from the Terminal Island Freeway (SR-47). The major noise source here is likely the traffic, and specifically truck traffic on both freeways and on the ramps leading to local port roads. The neighborhood is at a much higher elevation than the Harbor Freeway and much of the development has some noise protection from a seven (7) to eight (8)-foot high noise wall. However, some properties at the end of the walls and all two (2)-story homes are afforded no protection. A close-in view of the neighborhood is noted in **Figure 5**. **Figure 6** shows photographs of some of the housing in the Gaffey Place Area.

Figure 5. Map of Gaffey Place & MacArthur Avenue Area (Site #2 & #3)

Figure 6. Photos of Gaffey Place & MacArthur Avenue Area (Site #2 & #3)



2.4.3 MacArthur Avenue Area (Site #3)

The MacArthur Avenue area (Site #3) is a dense single-family development located east of the Harbor Freeway (IH-110), and west of some port facilities. The south end of the neighborhood abuts the Harbor Freeway (IH-110) and other major ramps leading to and from the Terminal Island Freeway (SR-47). The major noise source here is likely two-fold: truck traffic on both freeways and on the ramps leading to local port roads to the west and south of the neighborhood and rail and other port-related facility noise to the east of the neighborhood. This neighborhood is also at a much higher elevation than the Harbor/Terminal Island Freeways and much of the development has some noise protection from a seven (7) to eight (8)-foot high noise wall. However, some properties at the end of the walls and all two (2)-story homes are afforded no protection. A close-in view of the neighborhood is noted in **Figure 5**. **Figure 6** also shows photographs of some of the housing in the MacArthur Avenue Area.

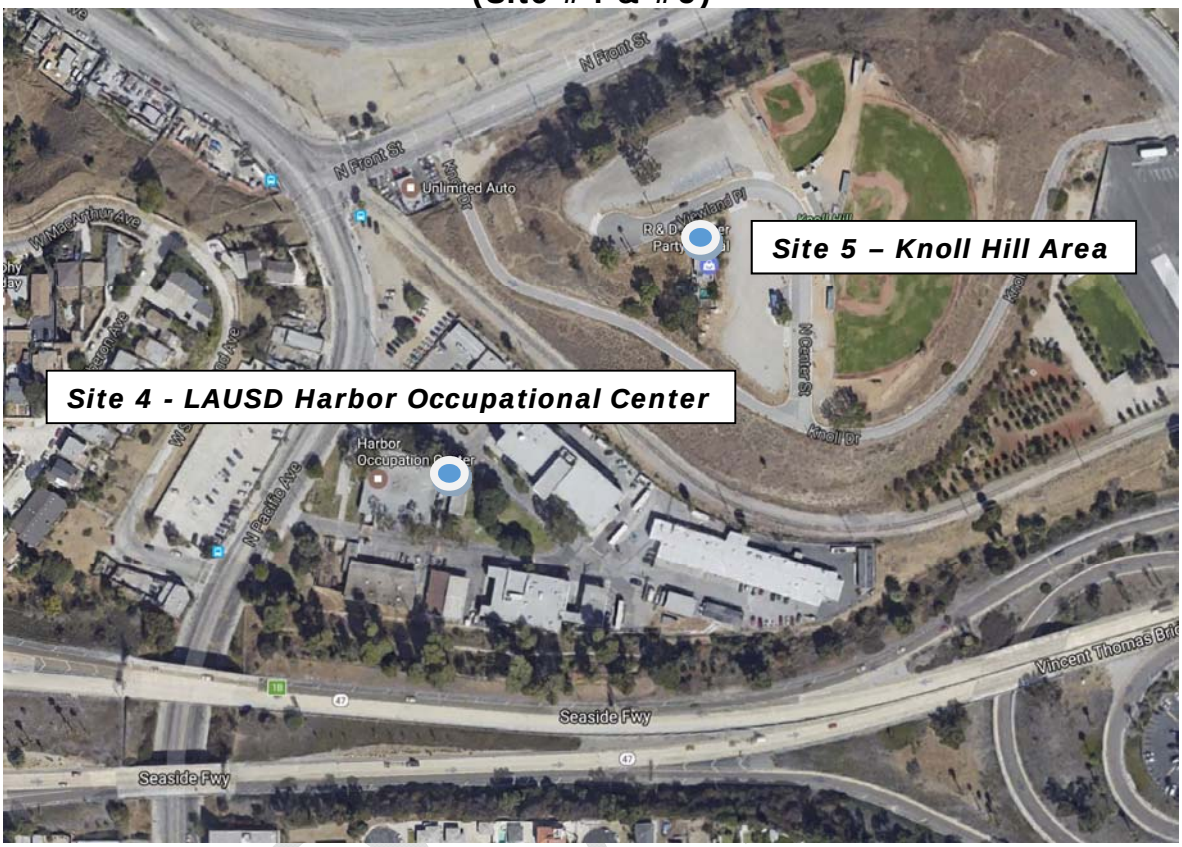
2.4.4 LAUSD Harbor Occupational Center (Site #4)

Site #4 is the Los Angeles Unified School District (LAUSD) Harbor Occupational Center, San Pedro-Wilmington Skills Center. Although some of the complex seems to be vocational training areas, some of the buildings seem to be classrooms. The Harbor Occupational Center is a school complex located north of the Terminal Island Freeway (SR-47) and south of some port facilities. The major noise sources here include truck traffic on the Terminal Island Freeway (SR-47), rail, and other port-related facility noise to the north of the school complex. The school complex is also at a much lower elevation than the Terminal Island Freeways and is partially shielded from some of the port by Knoll Hill. A close-in view of the school complex is noted in **Figure 7**. **Figure 8** also shows photographs of some of the buildings in the school complex.

2.4.5 Knoll Hill Area (Site #5)

Site #5 located at the top of Knoll Hill and the area includes one (1) single-family residence along with the baseball fields for the Knoll Hill Little League. Knoll Hill is elevated and offers sweeping views of all freeways and port facilities. It is located north of the Terminal Island Freeway (SR-47), east of the Harbor Freeway (IH-110) and south of the port facilities. The major noise sources here include truck traffic on the freeways and rail and other port-related facility noise. A close-in view of the Knoll Hill area is noted in **Figure 7**. **Figure 9** shows photographs of the single residential building and the views to the freeways and port.

Figure 7. Map of LAUSD Harbor Occupational Center & Knoll Hill Area (Site #4 & #5)



2.4.6 Samoan Sea Apartments (Site #6)

Site #6 is the Samoan Sea Apartment complex. It is located south of the Terminal Island Freeway (SR-47) with entrance/exit ramps to the freeway that wrap around the west and south side of the complex. While the freeway is elevated at this location, the ramps are at the same level as the complex. The major noise sources here include truck traffic on the freeway and trucks on the ramps that are heading to the port facilities. This is probably one of the most impacted properties that we noted in our windshield survey. This two-story complex was built in 1973 and includes 148 rental units. Most units seem to have window air conditioning units, which does not provide the window an opportunity to close and seal. The noise impacts are likely very high at this location. A close in view of the Samoan Sea Apartment complex is noted in **Figure 10**. **Figure 11** shows photographs of the apartment building and surrounding roads.

Figure 8. Photos of LAUSD Harbor Occupational Center Area (Site #4)

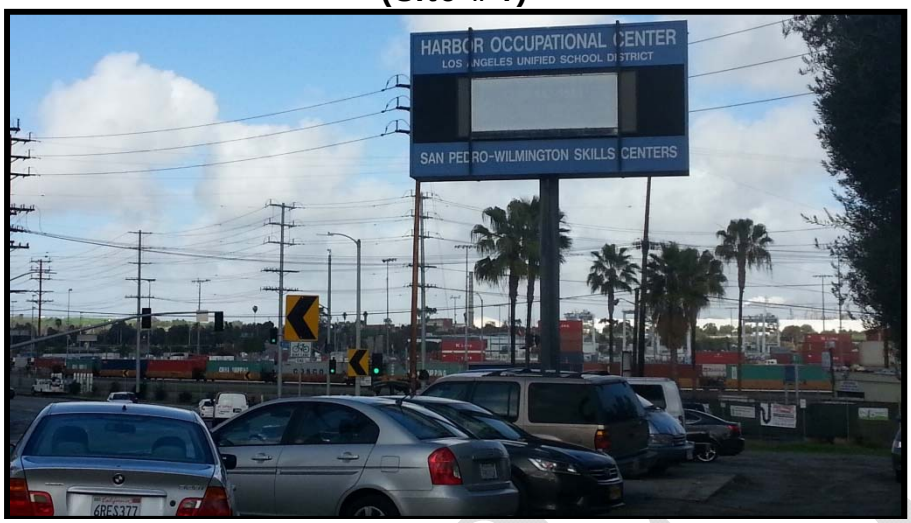


Figure 9. Photos of Knoll Hill Area (Site #5)

Figure 10. Map of Samoan Sea Apartments & Palos Verdes Street Area (Site #6 & #7)

2.4.7 Palos Verdes Street Area (Site #7)

The Palos Verdes Street area (Site #7) is a dense single-family development located south of the Terminal Island Freeway (SR-47) and other major ramps leading to and from the freeway. The major noise source here is likely truck traffic on the freeway and on the ramps leading to local port roads. This neighborhood is at a much higher elevation than the ramps, but about level with the freeway. A close-in view of the neighborhood is noted in **Figure 10**. **Figure 12** also shows photographs of some of the housing in the Palos Verdes Street Area.

Figure 11. Photos of Samoan Sea Apartments (Site #6)

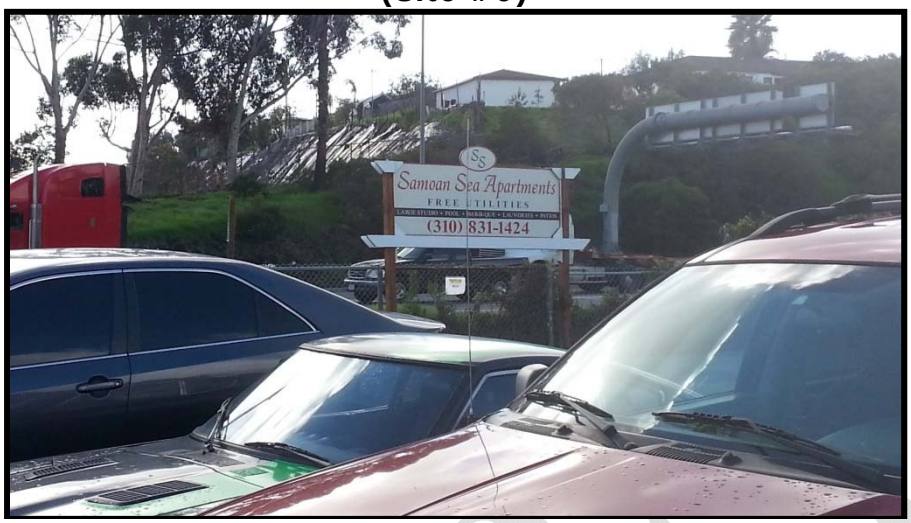


Figure 12. Photos of Palos Verdes Street Area (Site #7)

2.5 Undertake Key Stakeholder Survey

2.5.1 Definition and Identification of Community Stakeholder

The study scope includes the development and implementation of a survey instrument that was to be used to solicit input from key community stakeholders regarding community noise impacts. HCBF provided a list of key community stakeholders. These stakeholders are identified in **Table 2** below.

Table 2. List of Key Community Stakeholders – San Pedro

Homeowner	Harbor Selected Stakeholder (Y/N)	Affiliation	Response Received (Y/N)
(1)	Y	Northwest San Pedro Neighborhood Council	Y
	N	San Pedro Peninsula Homeowners United	Y
	N	San Pedro Peninsula Homeowners United	Y
	N	San Pedro Peninsula Homeowners United	Y
	N	San Pedro Peninsula Homeowners United	Y
	N	San Pedro Peninsula Homeowners United	Y
	N	San Pedro Peninsula Homeowners United	Y
	N	Resident & Port Community Advisory Committee (former member)	Y
	Y	Former Port City Attorney	Y
	Y	Resident	N
	Y	Central San Pedro Neighborhood Council (President)	N
	Y	San Pedro Peninsula Homeowners United	Y
	Y	Resident	N
	N	Resident	Y

Notes: (1) Homeowner names have been removed from Table 2 and in the surveys received in Appendix B.

2.5.2 Development of Stakeholder Survey

The survey was developed after the windshield survey was completed, was reviewed by HCBF staff, and was distributed to the community stakeholders on February 9th, 2017. The questions included in the community stakeholder survey are presented in **Appendix A**. The survey focused on the following questions:

1. What type of noise sources do you notice at your residence?
    a. Port
    b. Train
    c. Trucks (container)
    d. Local traffic
    e. Other
2. Would you consider the sources that you are identifying as impactful or annoying?
    a. Yes

b. No (it's tolerable)
c. If you answered "Yes", describe the noise that annoys/impact you the most.
d. If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most.
    i. Daytime (7:00 a.m. - 6:00 p.m.)
    ii. Evening (6:00 p.m. - 10:00 p.m.)
    iii. Nighttime (10:00 p.m. - 7:00 a.m.)
    iv. All hours
    v. Intermittently

3. How do the noise sources impact you the most?
    a. Watching TV
    b. Normal conversation
    c. Outdoor activities
    d. Sleeping
    e. No Impact
    f. Other
4. Do you have a direct line-of-sight to the noise source that impacts you?

2.5.3 Results of Stakeholder Survey

The results of the community stakeholder survey are included in **Appendix B.** Out of the 14 surveys sent out, 11 surveys (79%) were returned, although one was incomplete and provided limited usefulness. The majority of the surveys identified port noise including general port noise, trains and container trucks as causing most of the noise impacts. Several respondents also identified local traffic and motorcycles as a noise impact. Most respondents also identified that the noise was more of an issue at nighttime and was annoying and generally caused issues with sleeping. Only a few of the respondents noted that they actually have a line-of-sight from their property to the noise source causing the impact.

Of the ten (10) complete survey responses:

- Seven (7) properties were in relatively close proximity to the trains identified in the Gatun Street Area (Site #1) as noted in Section 2.3;
- Two (2) properties were in close proximity to the truck traffic on the Harbor Freeway (I-110) identified in the Gaffey Place Area (Site #2) and MacArthur Avenue Area (Site #3) as noted in Section 2.3; and
- One (1) property seemed to be well away from any major port activities.

2.6 Undertake Follow-up Community Windshield Survey

A follow-up windshield survey for the San Pedro Community was undertaken on Wednesday December 13, 2017. The purpose of this survey was to finalize the noise measurement locations within the generalized noise impact areas identified in Section 2.4.

SECTION 3 NOISE TERMINOLOGY

The information presented in this section discusses some fundamentals of acoustics and a number of noise metrics (e.g., L_{eq}, CNEL, L_{max}, DNL) commonly used to quantify noise that can be used to assess the noise impacts on humans. This information, along with the discussion of local and state laws and regulations in Section 4, form the noise criteria used for determining noise impact.

The following sections provide background information on sound and noise that will allow the reader to more fully understand the information presented in the remainder of the report. Section 3.1 provides an introduction to sound and noise descriptors. Section 3.2 discusses the applicable noise metrics that will be used in this analysis. Section 3.3 presents the relevant noise effects on humans.

3.1 Noise Descriptors

Sound is created by a vibrating source that induces vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source like ripples on a pond. Sound waves dissipate with increasing distance from the source. Sound waves can also be reflected, diffracted, refracted, or scattered. When the source stops vibrating, the sound waves disappear almost instantly and the sound ceases.

Sound conveys information to listeners. It can be instructional, alarming, pleasant and relaxing, or annoying. Identical sounds can be characterized by different people, or even by the same person at different times, as desirable or unwanted. Unwanted sound is commonly referred to as "noise." Sound can be defined in terms of three components or descriptors:

- Level (or amplitude)
- Frequency (or pitch)
- Duration (or time pattern)

Level
The level of sound is measured by the difference between atmospheric pressure (without the sound) and the total pressure (with the sound). Amplitude of sound is like the relative height of the ripples caused by the stone thrown into the water. Although physicists typically measure pressure using the linear Pascal scale, sound is measured using the logarithmic decibel (dB) scale. This is because the range of sound pressures detectable by the human ear can vary from 1 to 100 trillion units. A logarithmic scale allows us to discuss and analyze noise using more manageable numbers. The range of audible sound ranges from approximately one dB to 140 dB, although everyday sounds rarely rise above about 120 dB. The human ear is extremely sensitive to sound pressure fluctuations. A sound of 140 dB, which is

sharply painful to humans, contains 100 trillion times more sound pressure than the least audible sound.

By definition, a 10 dB increase in sound is equal to a tenfold (10^1) increase in the mean square sound pressure of the reference sound. A 20 dB increase is a 100 fold (10^2) increase in the mean square sound pressure of the reference sound. A 30 dB increase is a 1,000-fold (10^3) increase in mean sound pressure. A logarithmic scale requires different mathematics than used with linear scales. The sound pressures of two separate sounds, expressed in dB, are not arithmetically additive. For example, if a sound of 80 dB is added to another sound of 74 dB, the total is a one dB increase in the louder sound (81 dB), not the arithmetic sum of 154 dB. If two equally loud noise events occur simultaneously, the sound pressure level from the combined events is three dB higher than the level produced by either event alone.

Logarithmic averaging also yields results that are quite different from simple arithmetic. Consider the example where two sound levels of equal duration are averaged. One has a maximum level of 100 dB, the other 50 dB. Using conventional arithmetic, the average would be 75 dB. The true result, using logarithmic math, is 97 dB. This is because 100 dB has far more energy than 50 dB (100,000 times as much!) and is overwhelmingly dominant in computing the average of the two sounds.

Frequency
The pitch (or frequency) of sound can vary greatly from a low-pitched rumble to a shrill whistle. If we consider the analogy of ripples in a pond, high frequency sounds are vibrations with tightly spaced ripples, while low rumbles are vibrations with widely spaced ripples. The rate at which a source vibrates determines the frequency. The rate of vibration is measured in units called "Hertz" -- the number of cycles, or waves, per second. One's ability to hear a sound depends greatly on the frequency composition. Humans hear sounds best at frequencies between 1,000 and 6,000 Hertz (Hz). Sound at frequencies above 10,000 Hz (high-pitched hissing) and below 100 Hz (low rumble) are much more difficult to hear.

If we are attempting to measure sound in a way that approximates what our ears hear, we must give more weight to sounds at the frequencies we hear well and less weight to sounds at frequencies we do not hear well. Acousticians have developed several weighting scales for measuring sound. The A-weighted scale was developed to correlate with the judgments people make about the loudness of sounds. The A-weighted decibel scale (dBA) is used in studies where audible sound is the focus of inquiry. **Figure 13** provides examples of various noises and their typical A-weighted noise level.

Duration
The duration of sounds – their patterns of loudness and pitch over time – can vary greatly. Sounds can be classified as continuous like a waterfall, impulsive like a firecracker, or intermittent like train horn. Intermittent sounds are produced for relatively short periods, with the instantaneous sound level during the event roughly appearing as a bell-shaped curve. An aircraft event is characterized by the period

Figure 13. Typical A-Weighted Noise Levels

SOUND LEVELS AND LOUDNESS OF ILLUSTRATIVE NOISES IN INDOOR AND OUTDOOR ENVIRONMENTS

Numbers in Parentheses are the A-Scale Weighted Sound Levels for that Noise Event

dB(A)	OVER-ALL LEVEL	COMMUNITY (Outdoor)	HOME OR INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
120		Military Jet Aircraft Take-Off With After-Burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
110	UNCOMFORTABLY LOUD	Concord Takeoff (113)*	Riveting Machine (110) Rock-N-Roll Band (108-114)	110 dB(A) 16 Times as Loud
100		Boeing 747-200 Takeoff (101)*		100 dB(A) 8 Times as Loud
90	VERY LOUD	Power Mower (96) DC-10-30 Takeoff (96)* Motorcycle @25 Ft. (90)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 Ft. (89) Boeing 727 w/ Hushkit Takeoff (96)* Diesel Truck, 40 MPH @ 50 Ft. (84) Diesel Train, 45 MPH @ 100 Ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 MPH @ 25 Ft. (77) Freeway @ 50 Ft. From Pavement Edge, 10:00 AM (76 +or- 6) Boeing 757 Takeoff (76)*	Living Room Music (76) TV-Audio, Vacuum Cleaner	70 dB(A)
60		Propeller Airplane Takeoff (67)* Air Conditioning Unit @ 100 Ft. (60)	Cash Register @ 10 Ft. (65-70) Electric Typewriter @ 10 Ft. (64) Dishwasher (Rinse) @ 10 Ft. (60) Conversation (60)	60 dB(A) 1/2 as Loud
50	QUIET	Large Transformers @ 100 Ft. (50)		50 dB(A) 1/4 as Loud
40		Bird Calls (44) Lower Limit Urban Ambient Sound (40)		40 dB(A) 1/8 as Loud
20	JUST AUDIBLE	(dB[A] Scale Interrupted) Desert at Night		
10	THRESHOLD OF HEARING			

*Aircraft takeoff noise measured 6,500 meters from beginning of takeoff roll

Source:
Leo L. Beranek "Noise And Vibration Control," 1971
*Aircraft Levels From FAA Advisory Circular AC-36-3G

during which it rises above the background sound level, reaches its peak, and then recedes below the background level.

3.2 Noise Metrics

Given the multiple dimensions of sound, a variety of metrics, have been developed for describing sound and noise. Some of the most commonly used metrics in this analysis are discussed in this section. They include:

- Maximum Level (L_{max})
- Equivalent Sound Level (L_{eq})
- Community Noise Equivalent Level (CNEL)
- Levels Exceeded Percentage of the Time (L%)
- Day-Night Average Sound Level (DNL)

Maximum Level (L_{max})
The Maximum Level, or L_{max}, is simply the highest sound level recorded during an event or over a given period of time. It provides a simple and understandable way to describe a sound event and compare it with other events. In addition to describing the peak sound level, L_{max} can be reported on an appropriate weighted decibel scale (A-weighted, for example) so that it can disclose information about the frequency range of the sound event in addition to the loudness.

L_{max}, however, fails to provide any information about the duration of the sound event. This can be a critical shortcoming when comparing different sounds. Even if they have identical L_{max} values, sounds of greater duration contain more sound energy than sounds of shorter duration. Research has demonstrated that for many kinds of sound effects, the total sound energy, not just the peak sound level, is a critical consideration.

Equivalent Sound Level (L_{eq})
The Equivalent Sound Level (L_{eq}) metric may be used to define cumulative noise dosage, or noise exposure, over a period of time. In computing L_{eq}, the total noise energy over a given period of time, during which numerous events may have occurred, is logarithmically averaged over the time period. The L_{eq} represents the steady sound level that is equivalent to the varying sound levels actually occurring during the period of observation. For example, an eight-hour L_{eq} (L_{eq8}) of 67 dBA indicates that the amount of sound energy in all the peaks and valleys that occurred in the eight-hour period is equivalent to the energy in a continuous sound level of 67 dBA. L_{eq} is typically computed for measurement periods of one hour, eight hours, or 24 hours, although any time period can be specified.

L_{eq} is a critical noise metric for many kinds of analysis where total noise dosage, or noise exposure, is under investigation. As already noted, noise dosage is important in understanding the effects of noise on both animals and people. Indeed, research

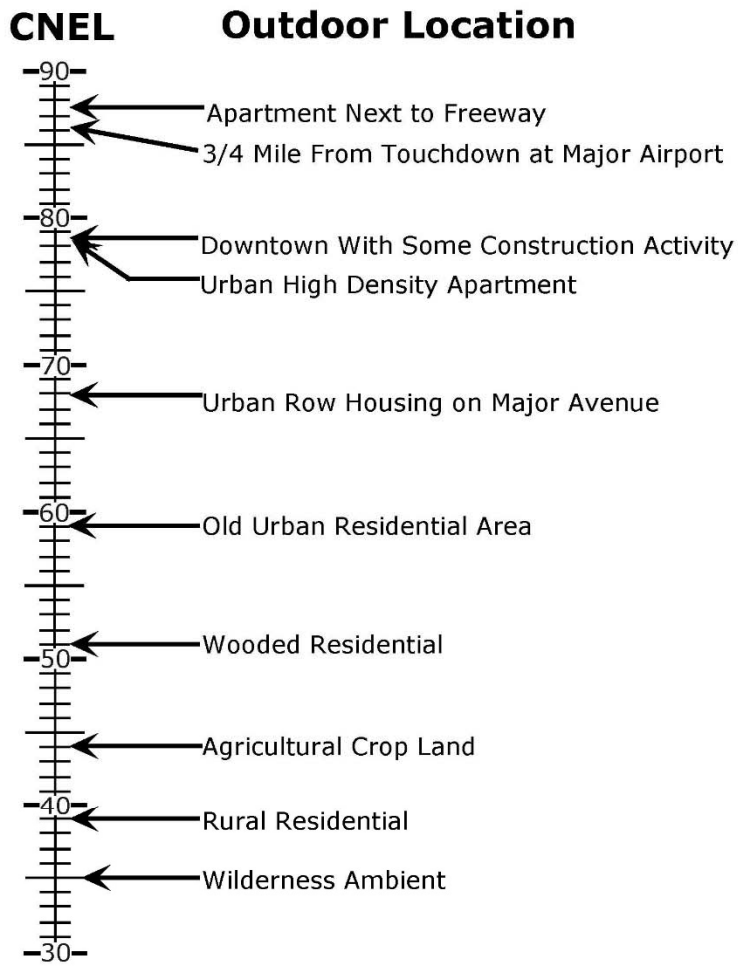
has led to the formulation of the "equal energy rule." This rule states that it is the total acoustical energy to which people are exposed that explains the effects the noise will have on them. That is, a very loud noise with a short duration will have the same effect as a lesser noise with a longer duration if they have the same total sound energy.

Community Noise Equivalent Level (CNEL)
Community Noise Equivalent Level, is the predominant rating scale now in use in California for land use compatibility assessment. The CNEL scale represents a time weighted 24-hour average noise level based on the A-weighted decibel. Time weighted refers to the fact that noise that occurs during certain sensitive time periods is penalized. The evening time period (7 p.m. to 10 p.m.) penalizes noises by 5 dBA, while nighttime (10 p.m. to 7 a.m.) noises are penalized by 10 dBA. These time periods and penalties were selected to reflect people's increased sensitivity to noise during these time periods. A CNEL noise level may be reported as a "CNEL of 60 dBA," "60 dBA CNEL," or simply "60 CNEL." Typical noise levels in terms of the CNEL scale for different types of communities are presented in **Figure 14**.

Level Exceeded Percentage of the Time L(%)
The level that is exceeded a percentage of the time L(%) is a statistical method of describing noise which accounts for variance in noise levels throughout a given measurement period. L(%) is a way of expressing the noise level exceeded for a percentage of time in a given measurement period. For example since 5 minutes is 25% of 20 minutes, L_{25} is the noise level that is equal to or exceeded for five minutes in a twenty-minute measurement period. It is L(%) that is used for many Noise Ordinance standards. For example, most daytime City, State and City Noise Ordinances use an ordinance standard of 55 dBA for 30 minutes per hour or an L_{50} level of 55 dBA. In other words the Noise Ordinance states that no noise level should exceed 55 dBA for more that fifty percent of a given period. The L(%) levels are not used for the City of Noise Ordinance. In this report it will be used to present the median sound pressure level during a measurement period and shows how, for example, train horn noise, exceeds this level. The difference provides information about how audible single events are expected to be.

Day Night Average Sound Level (DNL)
The Day-Night Average Sound Level is similar to the CNEL except that evening noises are not penalized. It is a measure of the overall noise experienced during an entire day. The time-weighted refers to the fact that noise that occurs during certain sensitive time periods is penalized. In the L_{dn} scale, those noise levels that occur during the night (10 p.m. to 7 a.m.) are penalized by 10 dB. This penalty was selected to attempt to account for increased human sensitivity to noise during the quieter period of a day, where resting at home and sleep are the most probable activities.

Figure 14. Typical Outdoor Noise Levels



Source:
U.S. Environmental Protection Agency, "Impact Characterization of Noise Including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure," EPA Report NTID 73.4, 1973.

Sound levels decrease as a function of distance from the source due to wave divergence, atmospheric absorption and ground attenuation. As the sound wave

travels away from the source, the sound energy is dispersed over a greater area, thereby dispersing the sound pressure level of the wave. Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence and the resultant reduction in the sound pressure levels. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air. Turbulence and gradients of wind, temperature and humidity also play a significant role in determining the degree of attenuation. Intervening topography can also have a substantial effect on the effective perceived noise levels. Noise has been defined as unwanted sound and it is known to have several adverse effects on people.

3.3 Noise Effects

Noise has known effects on people and criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. The noise criteria are based on known impacts of noise on people, such as hearing loss, speech interference, sleep interference, physiological responses and annoyance. Each of these potential noise impacts on people are briefly discussed below.

Hearing Loss
Hearing loss is not a concern in community noise situations of this type. The potential for noise induced hearing loss is more commonly associated with occupational noise exposures in heavy industry or very noisy work environments. Noise levels in neighborhoods, even in very noisy airport environs, are not sufficiently loud as to cause hearing loss problems. Normal conversational speech is in the range of 60 to 65 dBA and any noise in this range or louder may interfere with speech. There are specific methods of describing speech interference as a function of distance between speaker and listener and voice level.

Sleep Interference
Sleep interference is a major noise concern for traffic noise. Sleep disturbance studies have identified interior noise levels from transportation noise that have the potential to cause sleep disturbance. Note that sleep disturbance does not necessarily mean awakening from sleep, but can refer to altering the pattern and stages of sleep.

Physiological Responses
Physiological responses are those measurable effects of noise on people that are realized as changes in pulse rate, blood pressure, etc. While such effects can be induced and observed, the extent is to which these physiological responses cause harm or are signs of harm is presently unknown.

Annoyance
Annoyance is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability.

SECTION 4 NOISE LAWS AND REGULATIONS

The following sections discuss a brief history and applicable criteria of the Environmental Protection Agency (EPA), the Department of Housing and Urban Development (HUD), the State of California, and the City of Los Angeles. The EPA focuses primarily on outdoor noise, while HUD have set forth noise criteria that drive interior noise exposure limits.

4.1 Environmental Protection Agency

In 1972 the Noise Control Act was passed which required the U.S. Environmental Protection Agency (EPA) to establish noise standards on a gamut of motor vehicles, industrial machinery, and household appliances. Noise emissions standards were adopted for motor vehicles traveling on public roads, and train locomotives and cars. The Federal Aviation Administration (FAA) originally adopted noise standards new aircraft in 1960. Over the years these standards have been revised downward as technological advancements to reduce noise have been developed. For the most part these standards establish maximum noise levels that cannot be exceeded by specific vehicle categories and operating conditions. These standards are largely based on noise emission levels that are considered technologically feasible to achieve considering cost, reliability and safety among other factors. The standards are intended to minimize noise impacts but do not prevent them from occurring. These standards largely preempt state and local agencies from adopting more stringent noise regulations.

In 1969 congress passed the National Environmental Protection Act (NEPA). NEPA requires federal agencies to document and address the environmental impacts of their actions, including noise impacts. The three federal agencies charged with regulation of the three major transportation noise sources have established noise regulations for assessing compliance with the National Environmental Protection Act (NEPA) as well as other purposes. In addition, the Department of Housing and Urban Development has established criteria for its housing projects.

In March 1974, in response to a federal statutory mandate, the EPA published what is often referred too as the EPA Levels document (Environmental Protection Agency, 1974). This document was intended to "provide State and Local governments as well as the Federal Government and the private sector with an informational point of departure for the purpose of decision-making". The analysis presented in document concluded that 55 dB DNL was the requisite level to protect public health and welfare with an adequate margin of safety for areas with outdoor uses, including residences and recreational areas. Note that these levels were developed for suburban type uses. In some urban settings, the noise levels will be significantly above this level, while in some wilderness settings, the noise levels will be well below this level. The EPA "levels document" does not constitute a standard, specification or regulation, but identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations. These EPA

guidelines have not been adopted or recommended for use by the FAA, the State of California, or the City of Los Angeles.

4.2 Department of Housing and Urban Development

Part 51, Subpart B of Title 24 of the Code of Federal Regulations (24 CFR 51.B) presents the noise exposure requirements for residential uses receiving funding from the U.S. Department Housing and Urban Development (HUD). These requirements effectively set an outdoor residential noise standard of 65 dB DNL (or CNEL) and an indoor standard of 45 dB DNL. Projects exposed to noise levels less than 65 dB DNL are considered compatible and require no additional review. Projects with noise exposures between 65 and 75 dB DNL are considered normally unacceptable. Projects with this level of noise exposure are required to implement sound barriers (walls, berms or wall/berm combination) to reduce exterior noise exposures to less than 65 dB DNL and demonstrate that the outdoor-to-indoor noise reduction is sufficient to achieve an interior noise level of 45 dB DNL or less. Projects with noise exposures exceeding 75 dB DNL are considered unacceptable. However, projects with these exposures can be implemented if it can be demonstrated that the outdoor and indoor noise levels meet the 65 dB DNL and 45 dB DNL standards and require special approval by the Assistant Secretary for Community Planning and Development.

4.3 State of California

The State of California has historically been forward thinking in regulating environmental impacts. California established 65 dB CNEL as the noise impact boundary for airports prior to the Federal Government promulgating airport noise standards. Every city and county in California is required to prepare a comprehensive General Plan and one of the required elements of these plans is a Noise Element to ensure that noise is considered in municipal planning. The Governor's Office of Planning and Research has prepared guidelines for the content of these plans including providing recommended land use noise compatibility recommendations. These are discussed in Section 4.3.1. The state's building code contains requirements for interior noise levels in new residential buildings are discussed in Section 4.3.2.

4.3.1 General Plan Guidelines

Each City and County in California must prepare a comprehensive, long-term general plan for the development of its community. The Governor's Office of Planning and Research (OPR) are required to adopt and periodically revise guidelines for the preparation and content of local general plans (Governor's Office of Planning And Research, 2003). One of the required general plan elements is a Noise Element. Appendix D of the OPR Guidelines presents specific guidelines for preparation of a noise element along with recommended land-use noise compatibility guidelines and with factors that may be used to adjust the guideline noise levels based on the specific source. **Table 3** presented in Section 4.4.1 presents the land-use noise compatibility guidelines adopted in the City of Los Angeles Noise Element.

The objective of the noise compatibility guidelines is to provide communities with a means of judging the noise environment they deem to be generally acceptable. A range of values is given to accommodate the variability in perceptions of environmental noise that exist between communities and within a given community. Specified adjustment factors may be applied to the CNEL to account for some of the aspects that may cause the noise to be more or less acceptable that the mean response.

4.3.2 California Building Code (Title 24)

Section 1207.11 of the 2010 California Building Code (State of California, 2010) requires that residential structures located where the noise level exceeds 60 dB DNL (or CNEL) require an acoustical analysis demonstrating that the proposed design will limit interior noise from exterior sources to 45 dBA DNL (or CNEL). If the interior noise limits are met by requiring that windows remain closed, the design for the structure bust also specify a ventilation or air conditioning system to provide a habitable interior environment. The ventilation system is required to not compromise the noise reduction, that is, the noise generated by the ventilation system must not result in the combined noise level to exceed 45 dBA DNL (or CNEL).

4.4 City of Los Angeles

The following sections provide a summary of the noise criteria used by the City of Los Angeles. Section 4.4.1 presents the land use noise compatibility guidelines adopted in the City's General Plan that is nearly identical to those recommended by the state. Section 4.4.2 presents the City's residential interior noise standard from its building code that mirrors the state's code.

4.4.1 General Plan Noise Element

The Noise Element of the City of Los Angeles General Plan was adopted in 1999 (City of Los Angeles, 1999). The Noise Element identifies land uses that are deemed "noise sensitive" uses: single-family and multi-unit dwellings, long-term care facilities (including convalescent and retirement facilities), dormitories, motels, hotels, transient lodgings and other residential uses; houses of worship; hospitals; libraries; schools; auditoriums; concert halls; outdoor theaters; nature and wildlife preserves, and parks. **Table 3** presents The City's adopted Noise Compatibility Guidelines. These guidelines are based on the Noise Compatibility Guidelines presented in Governor's Office of Planning and Research "General Plan Guidelines" presented in Section 4.3.1. The guidelines categorize noise levels in four categories of acceptability for various land uses. A description of each of the four acceptability categories is presented at the bottom of the table. For land uses where the primary activities are indoors (residences, schools, libraries, churches, hospitals, motel/hotels, office buildings) are based on buildings being able to provide adequate outdoor-to-indoor sound isolation for acceptable interior noise levels.

4.4.2 City of Los Angeles Municipal Code

Chapter IX – Building Regulations, Article 1 – Buildings, Section 91.1207 – Sound Transmission Control of the City of Los Angeles Municipal Code requires new hotels, motels, dormitories, residential care facilities, apartment houses, dwellings, private schools, and places of worship to achieve an interior noise level of 45 dBA CNEL consistent with the State's building code discussed in Section 4.3.2. Acoustical reports demonstrating compliance with this standard are required for any new or substantially modified building that is exposed to the CNEL exceeding 60 dB prior to issuance of building permits.

Table 3. City of Los Angeles Land Use Noise Compatibility Guidelines

Land Use	Community Noise Exposure, CNEL, dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Single Family, Duplex, Mobile Homes	50-60	55-70	70-75	Above 70
Multi-Family Homes	50-65	60-70	70-75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	Above 80
Transient Lodging-Motels, Hotels	50-65	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	--	50-70	--	Above 65
Sports Arena, Outdoor Spectator Sports	--	50-75	--	Above 70
Playgrounds, Neighborhood Parks	50-70	--	67-75	Above 72
Golf Courses Riding Stables, Water, Recreation, Cemeteries	50-75	--	70-80	Above 80
Office Buildings, Business and Professional Commercial	50-70	67-77	Above 75	--
Industrial Manufacturing, Utilities, Agriculture	50-75	70-80	Above 75	--
Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.				
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.				
Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.				
Clearly Unacceptable: New construction or development should generally not be undertaken.				

SECTION 5 NOISE IMPACT CRITERIA

5.1 Background

The HCBF was formed to address the negative cumulative environmental and public health impacts of the Port of Los Angeles' and port-related business operations on its neighbors. It is clear that excessive community noise degrades the environment resulting in speech interference, sleep disturbance and annoyance, which can impact to a person's sense of well-being and productivity. However, there is considerable uncertainty regarding the public health impacts of community noise exposures.

This report is intended to give the HCBF Board the best available information regarding the noise impacts on humans from various noise exposures based on state and local laws and regulations.

Research suggests that community noise exposure is correlated with ischemic heart disease, hypertension and possibly diabetes but this correlation is not strong and the mechanism of how noise contributes to these diseases is not understood. Our understanding of the dose-response relationship (i.e., the relationship between noise exposure level and its effect on persons) of the negative environmental impacts of community noise (annoyance, sleep disturbance, speech interference) is incomplete. In fact, it's not clear what quality or metric of community noise (e.g. DNL, $L_{eq(24)}$, $L_{eq(day)}$, $L_{eq(night)}$, L_{max}, L%, variance in noise levels, etc.) is best correlated with human response.

One potential explanation is that the environmental impacts of community noise, speech interference, sleep disturbance and annoyance, contribute to general stress, which is a known risk factor for these diseases. This suggests that the adverse health impacts from community noise exposure may be a secondary effect of the noise exposure. That is, the health impact arises from our response to community noise, both conscious and unconscious, and it is the mechanics of that response that contribute to disease rather than the disease being a direct result of the noise exposure as in hearing loss. This only increases the complexity in relating noise exposures to health impacts. Considerable additional research is needed for a more complete understanding of the relationship between community noise exposures ad adverse health impacts.

As discussed in Section 3 and 4, the noise criteria established in the United States are primarily based on annoyance, as that has been the most recognized and studied impact of community noise. However, even the typical 65 dB DNL outdoor noise standard would result in 10% to 13% of the population being highly annoyed based on the FICON/ANSI adopted relationship. The data used to derive this curve shows that that the percentage of highly annoyed from surveys ranges from 0% to 70%.

Building construction of the type common in San Pedro typically achieves an outdoor-to-indoor noise reduction of at least 20 to 25 dB with windows closed. More modern construction that complies with energy efficiency standards typically achieves a

reduction of greater than 25 dB. With open windows the noise reduction drops to about 12 dB. In order for windows to be able to remain closed, adequate ventilation is required per the Uniform Building Code. With acoustically upgraded windows, doors, and insulation, the noise reduction can typically be improved to approximately 28 dB or higher, depending on the type of building construction. The noise reduction from typical construction can be improved to approximately 33 dB but this would require modifying the walls of the structure (e.g.; adding a layer of gypsum board to the interior walls). This level of reduction can be quite expensive to implement.

The largest reductions in interior noise levels (8 dB) resulting from upgrading a single building element are by providing mechanical ventilation to allow windows to remain closed, and upgrading older homes' windows. Note, that per the Uniform Building Code, mechanical ventilation can be provided by fans introducing the required amount of fresh air and air conditioning is not required. Ventilation alone would likely allow residents to comfortably keep their windows closed most of the year. However, during hot summer days it is unlikely that a system meeting the minimum air change requirements would lower interior temperatures during the evenings and nighttime and provide a reasonable indoor temperature for sleeping as effectively as open windows. However, operating air conditioning can be prohibitively expensive for low-income households. In either case, it is also important to consider recognize that the ventilation system can generate considerable noise levels if the acoustics of the system are not considered during design.

5.2 Noise Impact Criteria

From State and Local laws and regulations, noise impact is driven by indoor CNEL levels. If the NLR of a room can be as low as 15 dB when windows are open during warmer days, an exterior CNEL of 60 dB may not be exceeded to meet the interior CNEL of 45 dB. In practice, the NLR can be lower than 15 dB with windows open and therefore, the City of Los Angeles has adopted the 60 dB CNEL as the threshold where interior noise exposure of residential units should be evaluated for new developments. L&B proposes to use the 60 dB CNEL criterion to determine potential noise impact.

In addition, the L_{max} in combination with the L_{50} of a measurement period is useful in determining whether train horns are expected to be audible indoors. If the indoor L_{max} is 45 dBA or greater or the L_{max} is 10 dB greater than the L_{50} during a measurement period, the noise event is expected to be clearly audible. Due to the subjective nature of noise, L&B recommends using the L_{max} as supportive information. **Table 4** presents a summary of the noise impact criteria and the expectations of audibility of noise events. When noise is clearly audible, one can expect noise complaints.

Table 4. Noise Impact Criteria and Audibility

Outdoor CNEL	≥60 dB Conditionally Acceptable
Indoor CNEL	≥45 dB Impacted
Difference between L_{max} and L_{50}	≥10 dBA Expected to be Clearly Audible
Indoor L_{max}	≥45 dBA Expected to be Clearly Audible

It should be noted that a determination of impact does not guarantee implementation of sound abatement. If properties are found to be impacted, implementation criteria will be developed to determine the conditions required for the implementation of sound abatement as well as the scope of sound abatement. These criteria will consider the cost of the attenuation compared to the noise reduction benefit provided, as well as permanence of the noise sources impacting the structure and expected duration of the benefit (i.e. if the permanence of the structure).

SECTION 6 NOISE EXPOSURE

This section described the noise exposure at the selected sites. Short term noise monitoring was performed to determine single event noise from trains and to measure the L_{eq} of highway noise with corresponding traffic counts to be used to verify the highway noise modeling results. Initial noise measurements were undertaken at all seven (7) sites beginning Monday January 29, 2018 thru Wednesday January 31, 2018. After review of the draft document by HCBF, additional nighttime noise measurements were conducted at four (4) sites the evening of Friday October 18 into the early morning of Saturday October 19, 2019.

6.1 Measurement Site Selection

The locations where measurements were performed were selected based on the TraPac MOU and related documents, conversations with HCBF staff, stakeholder surveys, a review of aerial photographs, and a windshield survey. The intent of the measurement locations was to examine and quantify levels of noise from port related sources in the San Pedro Community. These sources included operations at the TraPac facility, container trucks on public roadways, railroad operations, and any other port-related facilities.

As with the Wilmington study, the trucks traveling through the community is an issue throughout the community. Trucks access the port facilities on the northern edge of San Pedro as well as transition the area on freeways and local roadways. In addition, trains are used extensively to move shipping containers and other materials in and out of the port, as well as petroleum products from the areas refineries. The trains generally travel at relatively low speeds (~25 mph) in the vicinity of the port. While this results in the noise generated by the locomotives and rolling train cars to be considerable, it is considerably less than from a train traveling at higher speeds. Typically, noise impacts from the train operation itself are limited to areas directly adjacent to the train lines. The noise generated from horns and warning signals as the trains pass across at-grade crossings with roadways results in impacts that are more widespread. Most of the roadway crossings by the rail line are at grade crossings. Per Federal Regulations, the locomotive engineer must sound the horn in advance of a crossing in a sequence of two long blasts, followed by a short blast, then followed by one long blast. The train horns must produce a minimum sound level of 96 dBA and a maximum sound level of 110 dBA at a distance of 100 feet in front of the locomotive. These train horns are audible throughout the community and very loud in close proximity to the crossing. Further, the crossing guards used to block vehicular traffic during a train pass have audible warnings, typically bells, which sound while the guards are closed. These bells generate considerable noise levels in the immediate vicinity of the guard. Situations where the train has to stop near or in the crossing for an extended period of time results in these bells sounding for the same period of time.

Information from the kickoff meeting, a review of the Port documents, results of the community windshield survey, and results from the community stakeholder survey were used to determine the potential for areas that could be impacted from port-related activities. The seven (7) areas identified above have the potential to be impacted by truck traffic and/or rail noise and a noise measurement program was undertaken to further quantify the impacts.

Prior to the start of the noise measurement program, a distinction was made between sites where trains cause the primary noise impact and sites where trucks cause the primary noise impact. Sites mainly impacted by train noise include Site #1 from the refinery/LPG spur line, and Site #3 (east side) where the rail line is part of the port facility. Site #1 seems to have infrequent rail traffic, while Site #3 has continuous rail traffic. Sites mainly impacted by truck traffic or highway noise include Site #2, Site #3 (west side), and Site #6. Both rail lines and truck traffic influence Site #4 and Site #5.

Noise measurements will be a combination of single-event measurements and short-term 3-hour measurements. Prior to initiating the noise measurement program, several issues were resolved in selecting exact measurement locations. These include:

1. Site #1 – How frequent are the trains and what period of the day/night do they run.
2. Site #2 – Parts of this neighborhood already has a noise wall. Site selection is important to pick a location exposed to the freeway.
3. Site #3 – Two measurement locations required in this neighborhood. One on the west side exposed to the freeway noise and one on the east side exposed to the port rail noise. The west location will have to be one with exposure to the freeway due to the noise wall.
4. Site #4 – The types of activities at the school will need to be confirmed that noise-sensitive uses are being undertaken at the site. Classroom or teaching activities will considering noise-sensitive, while other industrial teaching or shop classes may not be considered noise-sensitive. In addition, due to the size of the complex, site selection for the noise monitors will be very important.
5. Site #5 – This location has one residence. We will need to confirm it is still a legal residence and not zoned commercial and to determine the long-term use for the property.
6. Site #6 – Due to the size of the complex and the wide extent of the noise sources, site selection will be very important.
7. Site #7 – Site selection will be very important in this area to ensure exposure to the freeway noise.

Once the noise measurements are undertaken, the intent will be quantify the levels of noise from port related sources, determine highly impacted properties, and recommend a plan of action for any mitigation program.

6.2 Measurement Equipment

The noise measurements were performed using Larson Davis Model 824 sound level meters equipped with ½-inch electret microphones. The sound level meters satisfy ANSI Type I specifications for laboratory grade meters. Brüel and Kjær Model 4155 acoustic calibrators were used to check calibration before and after each measurement. The sound level meters and acoustic calibrators used are tested and calibrated annually with calibration traceable to the National Institute of Standards and Technology.

6.3 Noise Exposure

For most of the sites, a series of multi-hour observed noise measurements were performed. The purpose was three-fold; first to determine the single event noise levels of trains including horn noise; second, to determine the L_{eq} of highway/roadway noise with simultaneous traffic counts that are to be used to verify the highway/roadway noise modeling process; and three, to focus on nighttime noise levels at selected sites. This information is summarized in Sections 6.3.1 thru 6.3.3 below. In addition, noise measurements at each of the seven (7) sites are discussed in Sections 6.3.4 thru 6.3.10.

Sound level meters were set up to save one-second spectral Leq and Lmax noise data. In addition, the L_{eq}, L_{max} and L(%) and other statistical noise date for the entire measurement period were recorded. An observer was situated with the sound level meter during each measurement period. The observer recorded the sources of noise present at each site along with the times of significant noise events (e.g., a truck pass or train horn) during the measurement period. In addition, where highway/roadway noise may be an issue, traffic counts were performed.

6.3.1 Train Noise

This section presents a summary of the measured noise exposure at the seven sites identified in Section 2.4. **Table 5** includes a summary of all the measured noise levels at all seven (7) sites.

Table 5. Train Horn Noise Measurements

Site No.	Description	Measured L_{max} (dBA)
1 - Reference Monitor	Reference location chosen at 135 feet from train horn, used to identify train horn noise in measurements	111
1	Representing 2nd floor façade exposure	104
2	Representing 2nd floor facade exposure	71-72
3	Representing facade exposure	65-73
4	Representing facade exposure	72-76
5 - Port	Unshielded location for determining attenuation from edge of hill	73
5 - House	Representing facade exposure at the house	60

6.3.2 Highway Noise

To verify the modeling process, noise measurements were compared to the modeled levels with the traffic counts and speeds observed during the measurements. For the modeling how highway/roadway noise, the Federal Highway Administration's (FHWA) Traffic Noise Model 2.5 (TNM) was used. **Appendix C** presents the traffic input data used for the modeling process. Annual average daily traffic (AADT) data for state highways were obtained from Caltrans website and hourly distributions were obtained from Caltrans Caltrans Performance Measurement System (PEMS). Local AADT were obtained from Los Angeles Department of Transportation (LADOT). Data from SR-47 were used for truck percentages and hourly distributions for local streets. Speeds were estimated from posted speed limits. Elevation and geometric data was obtained from Google Earth Pro, and traffic data was obtained from Caltrans Traffic Census Program and Caltrans Performance Measurement System. **Table 6** presents the measured and modeled highway noise at the various sites used to verify the noise modeling process. The measured and modeled data differs three (3) dB or less for all sites. TNM over-predicts at Site 5 and 6, and under-predicts at Site 7. The under-prediction at Site 6 is possibly related to the noise source signature of the trucks. On SR-47, many trucks pulling trailers with shipping containers had distinct clanging or rattling noise. On the off-ramp, many trucks had squealing brakes as they approached the intersection with North Harbor Boulevard. The squealing brakes and rattling or clanging noise are not accounted for in the noise source data in TNM.

Table 6. Highway Noise Measurements and Modeled Levels

Site No.	L_{eq} (dBA)	
	Measured	Modeled (1)
2	67	67
3	66	65
4	64	67
5 - Edge	63	65
5 - House	56	59
6 - North	71	68
6 - South	69	68
7 - Edge	65	68
7 - House	57	60

Notes: (1) Modeled L_{eq} by normalizing traffic counts to one hour

6.3.3 Nighttime Noise Measurements

Nighttime noise monitoring was performed at four (4) sites starting at 6:00 p.m. on October 18, 2019. Two noise monitoring periods of about 40 to 45 minutes each were performed at each site from 6:00 p.m. thru 9:00 p.m. and again from 12 midnight thru 3:00 a.m. **Table 7** presents the site number, time of the measurements, and the measured L_{eq}. Noise exposure between 7:00 p.m. and 10:00 p.m. and 10:00 p.m. and 7:00 a.m. are increased by 5 dB and 10 dB respectively for CNEL calculations. The last three columns present the percentiles that provide characteristics of the noise exposure. The L_{95}, L_{50}, L_5, and L_1 present the noise exposure that is exceeded 95%, 50%, 5%, and 1% of the time. L_{50} is the noise level that is exceeded for 50% of the time and is statistically the mid-point of the noise exposure, and represents the median of the fluctuating noise levels. Often the L_{10} and L_{90} are used for traffic noise assessments, where the L_{90} represents the background levels, and L_{10} is often used when assessing traffic noise and in planning applications. L_{10} typically reflects noise levels of sporadic or intermittent events. In this study, the L_1, L_5, and L_{95} are used to quantify the more extreme characteristics of clanging, banging, and horn noise from port related activity. When there are a significant number of louder short duration events, the L_{eq} will be higher than the L_{50}. When the difference between the L_{eq} and L_{50} is 2 dB or more, the contribution noise of loud events is significant. L_1 captures typical loud events that clearly stand out from the background, that can be considered "typical maximum levels". Because of the continuous distant traffic and port machinery noise, L_{95} has been chosen to represent the background noise levels.

Each site had specific noise from port related activity. The characteristics of the noise exposure differed from site to site, discussed below.

Site 2
Traffic noise dominated the noise exposure during both the evening (8:15 p.m. – 9:00 p.m.) and nighttime (12 midnight – 12:45 a.m.) noise monitoring. Road construction was being performed at Site 2 during the first 40 minutes of the noise monitoring that contributed to non-typical noise exposure at this site. As a result the traffic noise from port related was not audible. The L_{95} and L_5 differ by eight (8) dBA during the evening and seven (7) dBA during the nighttime measurements, indicating that the noise exposure varied slightly less at night. This is most likely due to the construction work being further away from the measurement site. No port related activity was observed during the evening and nighttime, while the L_1 as well as L_{50} decreased. Noise from roadway traffic appears to be the main noise source at this site during the evening nighttime periods.

Site 3
In the evening (7:30 p.m. – 8:15 p.m.), Site 3 was mostly general traffic noise. In addition, Site 3 had audible port related noise events that was mostly backup signals from trucks and banging sounds from port related activity on Smith Island. During the nighttime monitoring (12:45 a.m. – 1:30 a.m.), the traffic noise reduced significantly and port related noise became more audible. However, due to the

limited activity on Smith Island, only a train horn was noted at 12:41 a.m. and measured 63 dBA. The L_{95} and L_5 differ by five (5) dBA, indicating that the noise exposure is within five (5) dBA 90% of the time. This indicates that the noise exposure was relatively constant. More port related activity was observed during the evening than nighttime, while the L_1 as well as L_{50} decreased. Noise from roadway traffic appears to be the main noise source at this site during both periods.

Site 5

At Site 5, traffic noise and continuous noise from port related activities were the main sources of the noise exposure. In the evening (6:45 p.m. – 7:30 p.m.), noise from traffic masked much of the noise of the port related activities from the Southwest Slip and Smith Island. During the nighttime monitoring (1:30 a.m. – 2:15 a.m.), the traffic noise reduced significantly and port related noise became more noticeable. The nighttime noise included truck horns and general clanging sounds. There was little activity on the Southwest Slip, however, significant activity was observed at Smith Island. The L_{95} and L_5 differ by eight (8) dBA during the evening and six (6) dBA during the nighttime measurements, indicating that the noise exposure varied less at night. L_1 is the noise exposure that is exceeded for 1% of the time, which decreased from 69 dBA during the evening to 62 dBA at nighttime. The nighttime L_1 of approximately 62 dBA was the typical maximum noise level from port related activities from Smith Island. Noise from roadway traffic on SR-47 appears to be the dominant noise source at this site during the day and evening, and reduces at night where noise from port related activities become more noticeable.

Site 7

During the evening noise monitoring period (6:00 p.m. – 6:45 p.m.), traffic noise from SR-47 was the most significant noise source at Site 7. Only one significant noise event was observed; a boat horn from a cruise ship, blown at 6:01 p.m. and measured 81 dBA. During the nighttime monitoring (2:15 a.m. – 3:00 a.m.), the traffic noise reduced significantly and port related noise from Smith Island became more noticeable. The L_{95} and L_5 differ by six (6) dBA, indicating that the noise exposure is within six (6) dBA 90% of the time. This indicates that the noise exposure variation was relatively constant. L_1 is the noise exposure that is exceeded for 1% of the time, which decreased from 68 dBA during the evening to 65 dBA at nighttime. The nighttime L_1 of approximately 65 dBA was the typical maximum noise level from port related activities from Smith Island. Noise from roadway traffic on SR-47 and the ramps appear to be the dominant noise source at this site during the day and evening, and reduces at night where noise from port related activities become more noticeable.

Table 7. Nighttime Noise Measurements

Site No.	Address	Noise Monitoring Schedule	L_{eq} (dBA)	L_{95} (dBA)	L_{50} (dBA)	L_5 (dBA)	L_1 (dBA)
2	Along N Gaffey Pl.	8:15 p.m. - 9:00 p.m. 12 mid. - 12:45 a.m.	68 67	64 62	68 66	71 70	73 72
3	Along Shields Dr.	7:30 p.m. - 8:15 p.m. 12:45 a.m. - 1:30 a.m.	64 60	61 57	63 59	66 63	68 65
5	Along Viewland Pl. (Edge)	6:45 p.m. - 7:30 p.m. 1:30 a.m. - 2:15 a.m.	63 56	59 53	62 56	67 59	69 62
7	Along N Palos Verdes St. (Edge)	6:00 p.m. - 6:45 p.m. 2:15 a.m. - 3:00 a.m.	64 59	60 55	63 58	66 61	68 65

6.3.4 Gatun Street Area (Site 1)

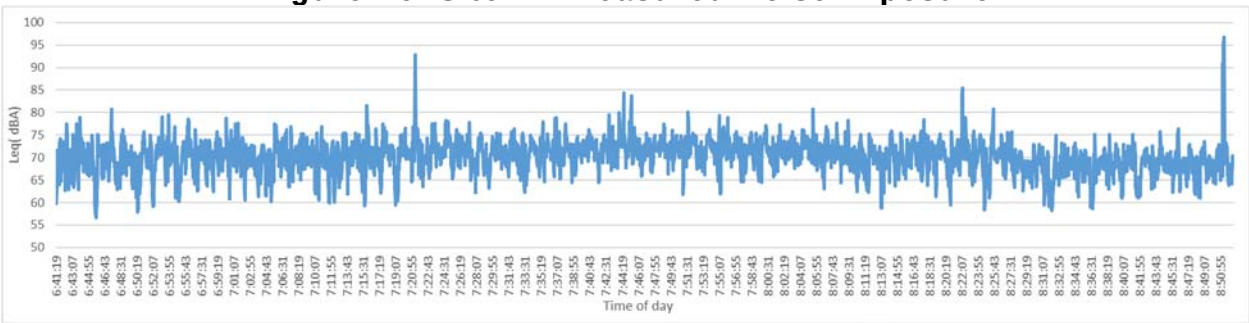
On Tuesday January 30, 2018, two monitors were set up at Site 1 between 6:41 a.m. and 8:52 a.m. The monitors were used to measure the noise exposure from a train pass-by that occurs regularly early every morning. One monitor was located closer to the tracks and is used as a reference monitor, as shown in **Figure 15**. Figure 15 also shows the location of the Site 1 monitor representing the noise exposure of the non-shielded portions of the first row of the Harbor Highlands residences just south of Y&S Auto Body Shop. At 8:24 a.m. a train backed into the Rancho LPG Holdings facility and crossed the grade crossing of a private road off North Gaffey Street and did not sound the horn. Due to the high ambient noise from North Gaffey Street, the train engine noise was barely audible. The median sound pressure level of the of the two (2) hour and 11 minute monitoring period was 70 dBA. At 8:41 a.m. a distant train horn was audible. At 8:51 a.m. the train passed the grade crossing again and sounded the horn. The maximum sound pressure level was 104 dBA measured across the street from the rail line. Upon further study, it was learned that the train typically passes after 7:00 a.m. once in each direction every week day. The CNEL from the train horns alone from one train pass-by per day was 55 dB.

The CNEL contribution from North Gaffey Street is not included in this report, as it is not directly adjacent to residential structures except those in the new Gatun Street development. For this development to be approved by the city, an acoustical study of the noise from North Gaffey Street was performed and included any necessary noise mitigation measures already.

The Harbor Highlands residences are of fairly recent construction and must meet the City's noise standards for new construction. A typical noise level reduction (NLR) for residential structures with stucco walls and acoustically upgraded dual glazed windows is assumed to be 28 dB. The interior CNEL in upper floor rooms is expected to be approximately 27 dB.

One-second L_{eq} noise exposure over time at Site 1 is presented in **Figure 16** showing the train horn noise at 8:51 a.m. Other loud events are from motorcycles and loud trucks/cars on North Gaffey Street. Due to the proximity of North Gaffey Street, the residences are primarily exposed to roadway noise.

Figure 16. Site #1 Measured Noise Exposure



6.3.5 Gaffey Place Area (Site #2)

Site 2 is located in a residential area west of I-110, where I-110 is the primary noise source. A six-foot concrete masonry unit (CMU) noise wall is constructed along the rear of the properties on North Gaffey Place that face I-110. The backyards and rear patios of these properties are shielded from the noise of I-110. **Figure 17** presents the location of Site 2 at the property on North Gaffey Place. The measurements were performed on Wednesday January 31, 2018 between 10:00 a.m. and 1:09 p.m. to document the typical noise exposure during the busy part of the day. Traffic counts were performed that are used for modeling verification. For calculating the CNEL, the FHWA TNM v2.5 was used. A typical noise level reduction of 23 dB is assumed for residential structures with stucco walls and single glazed windows.

The calculated CNEL at 15-feet from the ground in the rear patio at 952 North Gaffey Place is 72 dB, and represents the second floor building exposure. At a typical height of five feet above the ground, the CNEL at Site 2 is 61 dB. The contribution of truck noise to the overall CNEL was 63 and 54 dB at the upper and lower heights respectively. Though the relative contribution is not significant, the 63 dB CNEL exterior exposure exceeds 60 dB CNEL. It is expected that most trucks are from port related activities, and therefore is considered to be contributing to port related noise. The interior CNEL of second floor rooms are expected to be approximately 49 dB of homes on North Gaffey Place. Some properties on that street have a single floor, where the interior CNEL is approximately 38 dB.

Three measurements were obtained of train horns at Site 2, and the L_{max} ranged from 71 to 72 dBA. Inside homes, the train horn noise will have an approximate L_{max} of 48 dBA, which is expected to be audible to occupants in the rooms facing the port due to the tonal and intermittent characteristics of the train horn noise.

Figure 15. Site #1 and Reference Site Noise Monitor Locations

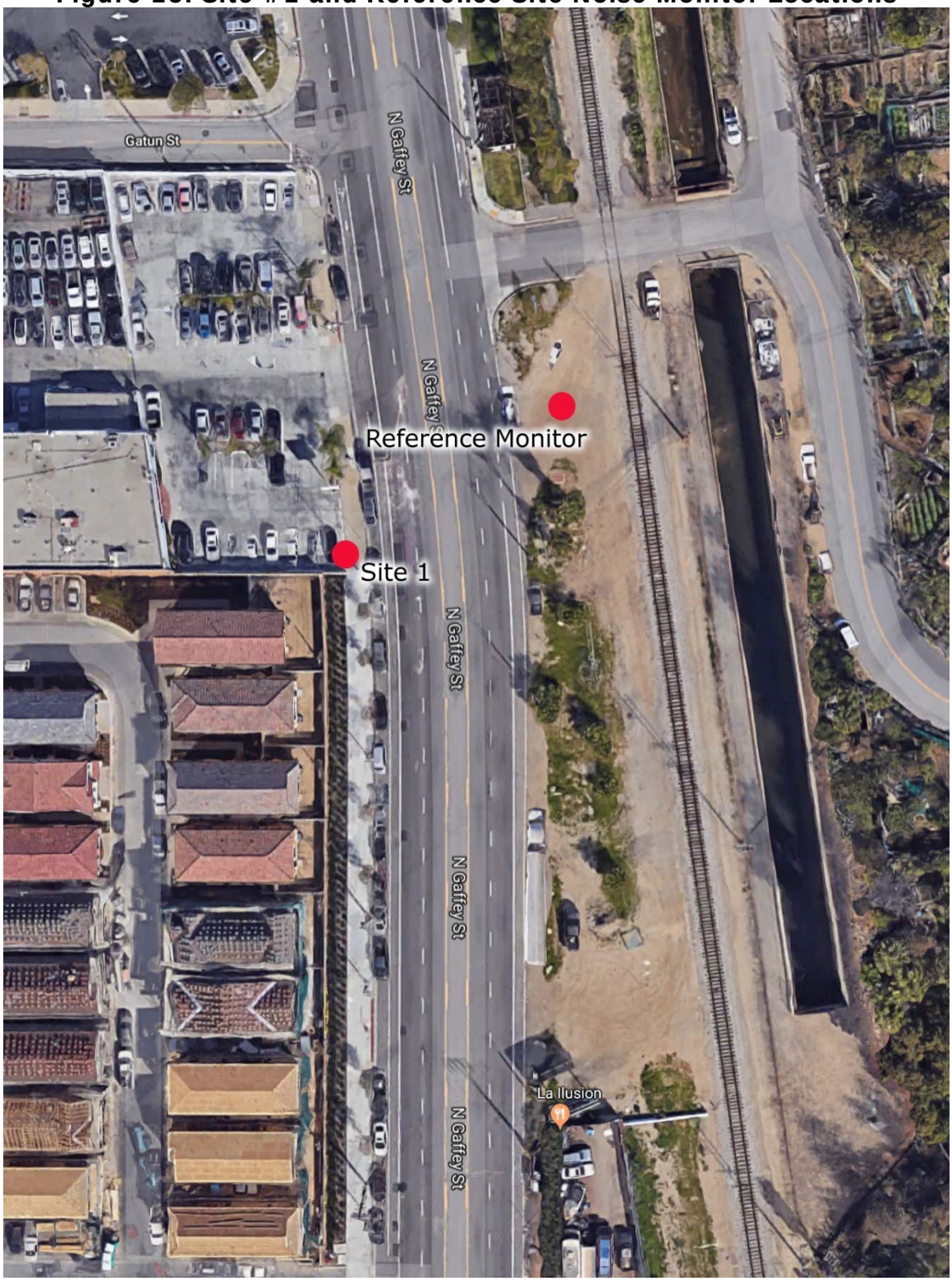
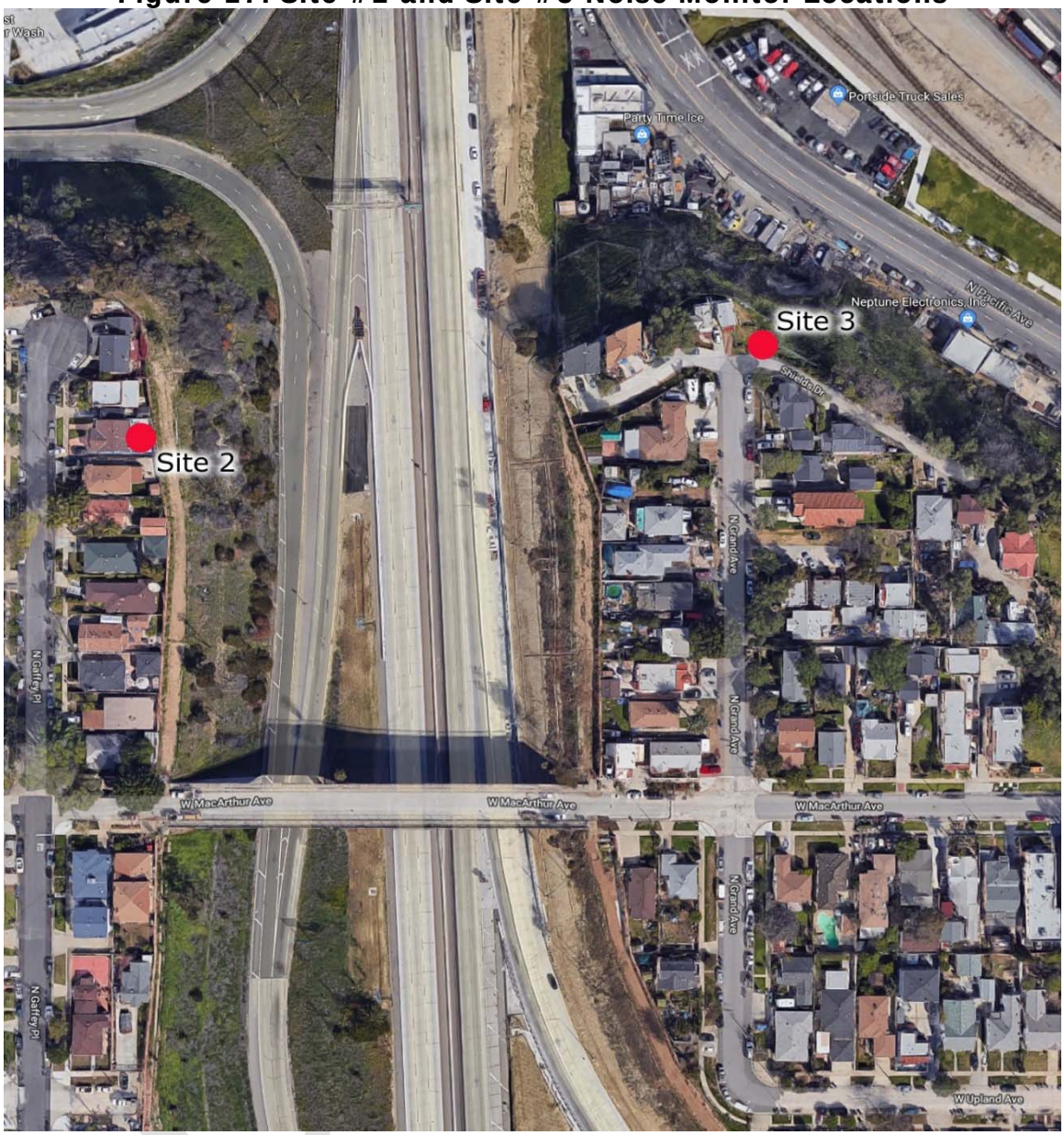


Figure 17. Site #2 and Site #3 Noise Monitor Locations



6.3.6 MacArthur Avenue Area (Site #3)

Site 3 is located east of I-110, where I-110 is the primary noise source. However, Site 3 also has noise exposure from North Pacific Avenue. A six-foot CMU noise wall is constructed along the rear of the properties on North Grand Avenue that face I-110. The backyards and rear patios of these properties are shielded from the noise of I-110. However, a number of properties on Shields Drive face North Pacific Avenue. **Figure 17** presents the location of Site 3 (end of North Grand Avenue). The measurements were performed on Wednesday January 31, 2018 between 10:04 a.m. and 1:09 p.m. to document the typical noise exposure during the busy part of the day. Traffic counts were performed that are used for modeling verification. For

calculating the CNEL, the FHWA's TNM 2.5 was used. A typical NLR of 23 dB is assumed for residential structures with stucco walls and single glazed windows.

The calculated overall CNEL at Site 3 was 65 dB, where the contribution from trucks is 62 dB. Here the contribution from trucks is significant in relation to the overall CNEL due to the trucks on North Pacific Avenue.

The interior CNEL of is expected to be approximately 42 dB of homes on Shields Drive that face North Pacific Avenue.

The CNEL was modeled in the rear of several properties along Shields Dr. The two single-family residential structures at the end of Shields Drive that face I-110 do not have a CMU noise wall blocking noise exposure from I-110, and the rear balconies and building facades are directly exposed to noise from I-110. The modeled CNEL of the rear location of a property along Shields Drive is 75 dB, where the contribution from trucks is 66 dB. Though the relative contribution is not significant, the 66 dB CNEL exterior exposure exceeds 60 dB CNEL. It is expected that most trucks are from port related activities, and therefore is considered to be contributing to port related noise.

The interior CNEL of is expected to be approximately 52 dB of the two single-family residential structures at the end of Shields Drive that face I-110.

At a typical height of five (5) feet above the ground in the rear locations for the property along North Grande Avenue, the CNEL at Site 3 is 59 dB. The calculated CNEL at ten feet above the ground is 71 dB, and represents the second floor building exposure at all other addresses. The contribution of truck noise to the overall CNEL was 63 and 52 dB at the upper and lower heights; respectively. Though the relative contribution is not significant, the 63 dB CNEL exterior exposure exceeds 60 dB CNEL. It is expected that most trucks are from port related activities, and therefore is considered to be contributing to port related noise. The interior CNEL of 1'st floor rooms are expected to be approximately 36 dB at homes on North Grand Avenue. Some properties on that street have a 2'nd floor, where the interior CNEL is approximately 48 dB.

Three measurements of train horns were obtained at Site 3 and the L_{max} ranged from 65 to 73 dBA. Inside homes, the train horn noise will have an approximate L_{max} of 50 dBA, which is expected to be audible to occupants in the rooms facing the port due to the tonal and intermittent characteristics of the train horn noise.

6.3.7 LAUSD Harbor Occupational Center (Site #4)

Site 4 was located at the Harbor Occupational Center. Two noise monitors were set up on the roof of the main classroom building. One monitor recorded primarily noise exposure from Seaside/Harbor Freeway (SR-47), and the other monitor recorded primarily noise exposure from activity from the harbor, including train horns. A NLR of 25 dB is assumed for the building classrooms based on the building being

constructed with CMU walls without windows and single exterior doors. **Figure 18** presents the two selected monitor locations to monitor highway and port noise.

The modeled CNEL from highway noise is 69 dB, where 65 dB is contributed by trucks. The truck noise contribution is significant and is mostly port related traffic. The modeled CNEL at the facades at the first and second floors facing SR-47 have an CNEL of 62 and 65 dB. The modeled elevation of the classrooms is lower and shielded by the edge of the highway. Therefore, the CNEL at the building facades of lower floors are lower. The CNEL in the classrooms are approximately 40 dB on the top floors. This noise is expected to be barely audible to occupants in the classrooms facing SR-47.

Three train horns were measured during the monitoring period from 11:29 a.m. to 1:32 p.m. on Tuesday January 30, 2018 where the L_{max} ranged from 72 to 76 dBA on the roof. The median sound pressure level was 61 dBA. The train horns are approximately 10 dB higher than the median sound pressure level. Train horn noise will have an approximate L_{max} of 51 dBA inside the classrooms, which is expected to be audible to occupants in the classrooms facing the port due to the tonal and intermittent characteristics of the train horn noise.

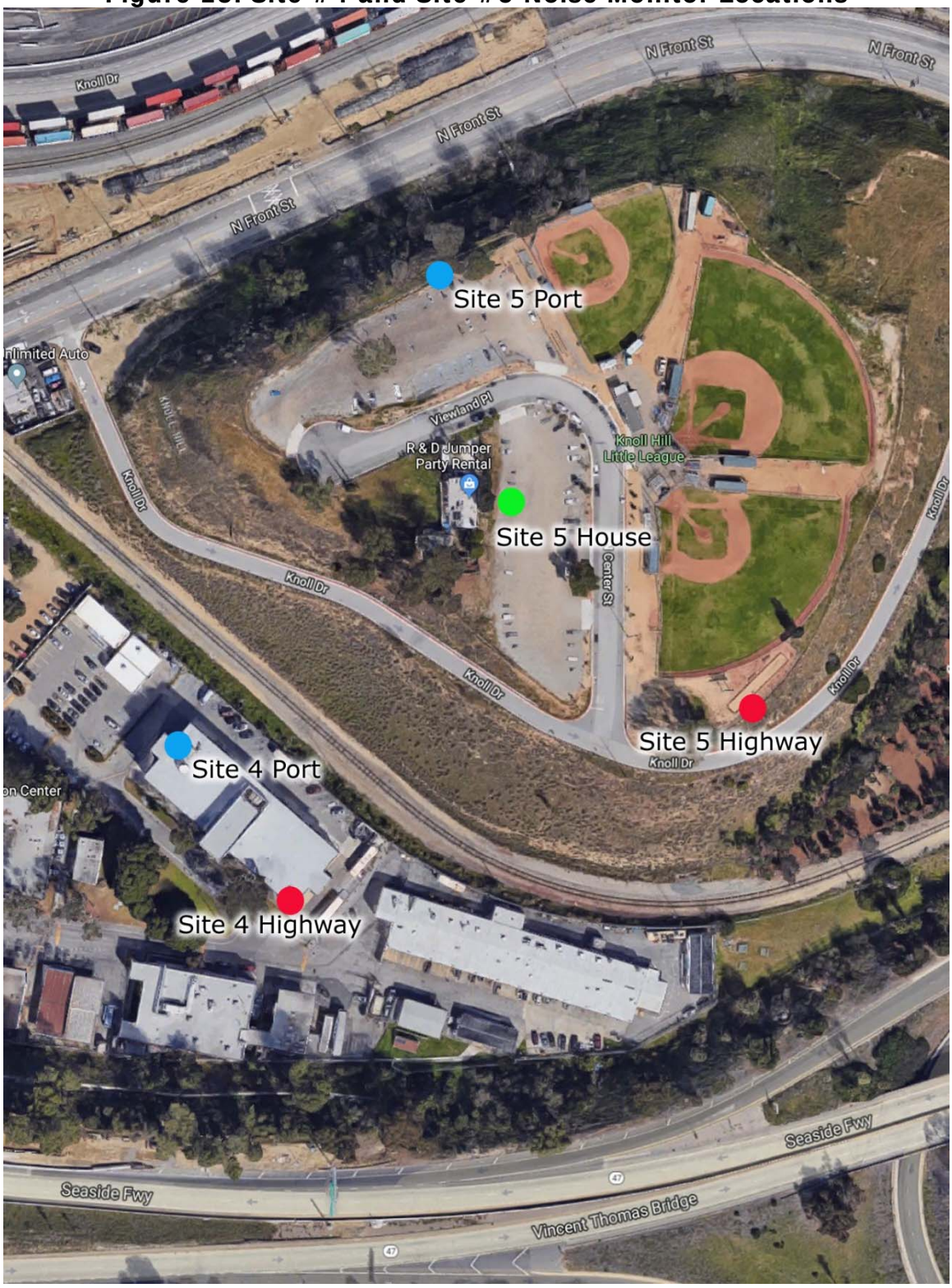
6.3.8 Knoll Hill Area (Site #5)

Site 5 represents a single house located on Knoll Hill. Two noise monitors were set up where one monitor recorded noise exposure at the house. The other monitor recorded noise from activity from the harbor, including train horns for part of the time and was later moved to monitor noise from SR-47. A typical NLR of 23 dB is assumed for residential structures with stucco walls and single glazed windows. **Figure 18** presents the three selected monitor locations to monitor highway and port noise at Site 5. The monitor that was moved to two locations to isolate highway and port noise was used to verify the TNM modeling efforts. The attenuation from noise propagation diffracting over the edge of the hill was determined using the two monitors by evaluating the difference in noise levels between the two locations.

The modeled CNEL from highway noise at the house is 59 dB, where 56 dB is contributed by trucks. The truck noise contribution is significant and is mostly port related traffic. The interior CNEL of is expected to be approximately 33 dB.

One train horn was measured during the monitoring period between 2:01 p.m. and 4:05 p.m. on Tuesday January 30, 2018. The measured L_{max} was 60 dBA at the house. The median sound pressure level was 56 dBA. The train horns are approximately four (4) dB higher than the median sound pressure level. Train horn noise inside the home will have an approximate L_{max} of 37 dBA, which is unlikely to be audible to occupants in the home despite to the tonal and intermittent characteristics of the train horn noise.

Figure 18. Site #4 and Site #5 Noise Monitor Locations



6.3.9 Samoan Sea Apartments (Site #6)

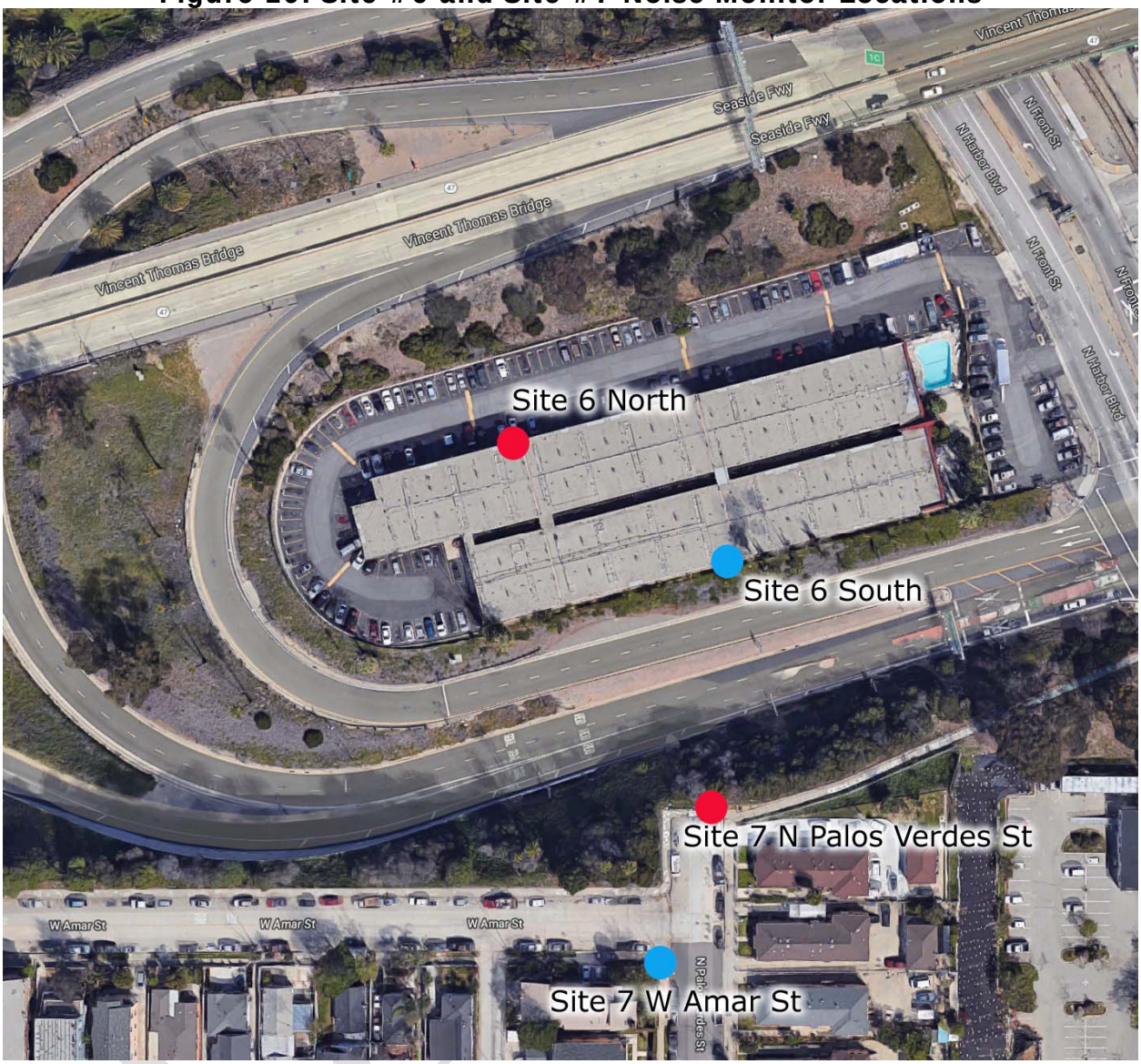
Site 6 represents Samoan Sea Apartments which is surrounded by Harbor Blvd., SR-47, and the ramps to SR-47. Two monitors were set up where one monitor recorded noise exposure from SR-47 on the north side of the building. The other monitor recorded noise from the on- and off-ramps to SR-47 on the south side of the building. The measured NLR was 22 dB in a living room and two bedrooms. **Figure 19** presents the two selected monitor locations to monitor roadway noise at Site 6. The measurements were performed on Monday January 29, 2018 between 9:49 a.m. and 11:51 p.m. to document the typical noise exposure during the busy part of the day. However, the on-ramp and SR-47 northbound was closed and an additional set of measurements were performed on Wednesday January 31, 2018 between 8:37 a.m. and 9:11 a.m. Traffic counts were performed that are used for modeling verification. For calculating the CNEL, the FHWA's TNM 2.5 was used.

The calculated CNEL on the north and south side of Samoan Sea Apartments was 71 dB, and represents the second floor building exposure. The contribution of truck noise to the overall CNEL was 68 dB and 67 dB on the north and south side of the building; respectively. The truck noise contribution is significant and is mostly port related traffic. The interior CNEL of second floor rooms are expected to be approximately 49 dB.

6.3.10 Palos Verdes Street Area (Site #7)

Site 7 represents the homes on West Amar Street and North Palos Verdes Street. Two monitors were set up where one monitor recorded noise exposure at the last building on North Verdes Palos Street. The other monitor was set back further from the ramps and records the noise exposure at the homes on West Amar Street. A typical NLR of 23 dB is assumed for residential structures with stucco walls and single glazed windows. **Figure 19** presents the two selected monitor locations to monitor roadway noise at Site 7. The measurements were performed on Wednesday January 31, 2018 between 2:33 p.m. and 3:03 p.m. to document the typical noise exposure during the busy part of the day. Traffic counts were performed that are used for modeling verification. For calculating the CNEL, the FHWA's TNM v2.5 was used. The attenuation from noise propagation diffracting over the edge of the hill was determined using the two monitors by evaluating the difference in noise levels between the two locations.

Figure 19. Site #6 and Site #7 Noise Monitor Locations



The calculated CNEL at West Amar Street and North Palos Verdes Street 65 and 60 dB; respectively. The contribution of truck noise to the overall CNEL was 62 and 57 on the north and south side of the building respectively. The truck noise contribution is significant and is mostly port related traffic. The interior CNEL of homes on West Amar Street and North Palos Verdes Street are expected to be approximately 43 and 38 dB; respectively.

SECTION 7 NOISE IMPACTS

The modeled and measured noise exposure from the previous section is summarized in **Table 8**, and compared against the City of Los Angeles noise criterion of 45 dB interior CNEL. The following sections summarizes the noise exposure and comparison against the noise criterion at all sites in detail.

Table 8. Noise Exposure and Impact Summary

Site No.	Description	Exterior CNEL (dB)	Interior CNEL (dB)	Exterior L_{max} (dBA)	Interior L_{max} (dBA)	Exceeds 45 dB Interior CNEL
1	2nd floor façade - Exposure from train noise	55	27 (1)	104	76 (1)	No
2	1st floor/2nd floor – exposure from highway and train noise	61/72	38/49 (2)	71-72	48-49 (2)	Likely (3)
3	Shields Drive facing N Pacific Ave – exposure from highway, roadway and train noise	65	42 (2)	65-73	42-50 (2)	Likely (3)
	Shields Drive facing I-110 – exposure from highway, roadway and train noise	73	50 (2)	65-73	42-50 (2)	Likely (3)
	1st floor/2nd floor – Grande Ave facing I- 110 – exposure from highway, roadway and train noise	59/71	36/48 (2)	---	---	Likely (2)
4	1st floor/2nd floor – exposure from highway, roadway and train noise	62/65	37/40 (4)	72-76	47/51 (4)	No
5	Facade facing SR 47 – exposure from highway, and train noise	59	33 (2)	60	38 (2)	No
6	Facade facing SR 47/ramps – exposure from highway and roadway noise	71	49 (5)	---	---	Yes (6)
7	Last building on Palos Verdes St facing SR 47/ramps – exposure from roadway and highway noise	65	43 (2)	---	---	Likely (2)
	Last building on Amar St facing SR 47/ramps – exposure from roadway and highway noise	60	38 (2)	---	---	No

Notes:
(1) New construction expected to have upgraded windows and room NLR of approximately 28 dB
(2) NLR of 23 dB for typical construction
(3) TNM modeling and measured shows up to a 3 dB difference and the typical NLR is estimated. The final determination of noise impact pending further NLR tests.
(4) Masonry wall construction and no windows, expected NLR is approximately 25 dB
(5) Interior CNEL determined from measured NLR
(6) Noise impact confirmed through NLR measurements

It should be noted that since the TNM modeling results are within three (3) dB of the measured data and given the uncertainty of the actual NLR of the rooms, a calculated interior CNEL as low as 42 dB should be considered as being "likely impacted".

7.1 Gatun Street Area (Site 1)

In the Gatun Street area a train passes on the spur line once a day in each direction after 7:00 a.m. on weekdays. It crosses the private at- grade crossing adjacent to the Harbor Highlands residential development across North Gaffey Street. The train uses the horn when is leaves the refinery and, therefore, the area is exposed to train horn noise once a day. Even though the individual noise event is significant, the daily noise exposure from the train (55 dB CNEL) is below the the standard of 65 CNEL exterior level. In addition, a ten-foot CMU noise wall is constructed to reduce noise exposure to exterior areas and 1st floor areas around the homes. The interior CNEL is expected to be approximately 27 dB CNEL in upper 2'nd floor rooms that are not shielded by the noise wall, and would not exceed the 45 dB CNEL standard. The horns are expected to be clearly audible with interior L_{max} of approximately 76 dBA.

The Harbor Highlands residential development in the Gatun Street area does not have noise impact from the train spur line, measured against City of Los Angeles noise criterion of 45 dB interior CNEL. Nighttime port activities are not a factor in this area. This assumes that homes in the Gatun Street have adequate ventilation and air conditioning to ensure the windows may remain closed throughout the year to provide adequate interior noise reduction.

7.2 North Gaffey Place Area (Site #2)

The exterior 2'nd floor facade CNEL is 72 dB and the rear yards and patio areas have a CNEL at 61 dB. The truck noise contribution of 63 and 54 dB for the 2'nd and 1'st level noise exposure indicates that truck noise contribution exceeds 60 dB CNEL and is siginificant. The interior CNEL of 2'nd and 1'st floor rooms is 45 and 39 dB; respectively. None of these exceed the 45 dB interior CNEL standard. The 48 dBA L_{max} train noise is expected to be audible inside the rooms, however the noise does not increase the interior CNEL significantly.

Only residential home(s) with a 2'nd floor *on North Gaffey Place likely has noise impact from the truck noise on I-110, and no noise impact from the train activity in the port area, measured against City of Los Angeles noise criterion of 45 dB interior CNEL. Additional nighttime noise monitoring also supports the conclusion that noise impact in this area is primarily from roadway operations. This assumes that the homes in the Gaffey Street area have adequate ventilation and air conditioning to ensure the windows may remain closed throughout the year to provide adequate interior noise reduction.*

7.3 MacArthur Avenue Area (Site #3)

The facade CNEL of the home on Shield Drive facing North Pacific Avenue is 65 dB The truck noise contribution of 62 dB indicates that truck noise exceeds 60 dB CNEL and is significant. The interior CNEL inside rooms is approximately 42 dB and is three (3) dB lower than the 45 dB interior CNEL standard. The 48 dBA L_{max} train noise is expected to be audible inside the rooms. However the noise does not increase the interior CNEL significantly.

The facade CNEL of the home on Shield Drive facing I-110 is 75 dB. The truck noise contribution of 66 dB noise exposure indicates that truck noise exceeds 60 dB CNEL and is significant. The interior CNEL inside rooms is approximately 52 dB and does exceed the 45 dB interior CNEL standard. The 48 dBA Lmax train noise is expected to be audible inside the rooms. However the noise does not increase the interior CNEL significantly.

The exterior 2'nd floor facade CNEL is 66 dB (at one home) and the rear yards and patio areas have a CNEL at 59 dB. The truck noise contribution of 63 and 52 dB for the 2'nd and 1'st level noise exposure indicates that truck noise exceeds 60 dB CNEL and is significant. The interior CNEL of 2'nd and 1'st floor rooms is 43 and 36 dB; respectively. The interior CNEL of 2'nd floor rooms is 2 dB lower than the 45 dB interior CNEL criterion. The 48 dBA L_{max} train noise is expected to be audible inside the rooms, however the noise does not increase the interior CNEL significantly.

The residential homes on Shield Drive facing North Pacific Avenue may have noise impact from the truck noise on North Pacific Avenue. The residential homes on Shield Drive with exposure from I-110 may have noise impact from the trucks on I-110. Only residential home(s) with a 2'nd *floor on North Grande Avenue facing I-110 likely have noise impact from the trucks on I-110. Nighttime noise measurements shows that noise impact is primarily from roadway traffic. While port operations at night are noticeable, they do not factor into the overall noise impact for the area. The noise assessments are all measured against City of Los Angeles noise criterion of 45 dB interior CNEL and assumes that the homes have adequate ventilation and air conditioning to ensure the windows may remain closed throughout the year to provide adequate interior noise reduction. There is no noise impact from train activity in the port area.*

7.4 LAUSD Harbor Occupational Center (Site #4)

The exterior CNEL of 1'st and 2'nd floor classrooms facing SR-47 is 62 and 65 dB; respectively. The truck noise contribution (61 and 62 dB CNEL on the 1'st and 2'nd floor classrooms respectively) is significant. The interior CNEL inside rooms is approximately 37 and 40 dB and does not exceed the 45 dB interior CNEL standard. The 51 dBA interior L_{max} train noise is expected to be audible inside the rooms, however the noise does not increase the interior CNEL significantly.

The LAUSD Harbor Occupational Center does not have noise impact from truck noise on SR-47 or from the train activity in the port area on the classroom building as measured against City of Los Angeles noise criterion of 45 dB interior CNEL This assumes that the classrooms have adequate ventilation and air conditioning to ensure the windows may remain closed throughout the year to provide adequate interior noise reduction.

7.5 Knoll Hill Area (Site #5)

The exterior CNEL of the single family home on Knoll Hill is 59 dB. The truck noise contribution of 56 dB indicates that noise exposure from truck noise is significant. The interior CNEL inside rooms is approximately 36 dB and does not exceed the 45 dB interior CNEL standard. The 37 dBA interior L_{max} train noise is not expected to be clearly audible inside the rooms, and does not increase the interior CNEL significantly.

The single family home on Knoll Hill does not have noise impact from the truck noise on SR-47 or from the train activity in the port area, measured against City of Los Angeles noise criterion of 45 dB interior CNEL. While nighttime operations from the port activity are noticeable, this area includes a single residential property and athletic fields and impacts are minimal.

7.6 Samoan Sea Apartments (Site #6)

The exterior CNEL of the Samoan Sea Apartments is 71 dB. The north and south façade exposure is identical. The truck noise contribution of 68 to 69 dB CNEL indicates that truck noise is significant due to the proximity of the ramps to/from SR 47 and from trucks on SR 47 itself. The interior CNEL inside rooms is approximately 49 dB and exceeds the 45 dB interior CNEL standard.

The units of Samoan Sea Apartments have noise impact from the truck noise on SR-47 and related ramps to Harbor Blvd, measured against City of Los Angeles noise criterion of 45 dB interior CNEL. No nighttime noise impacts from the port activities are noticeable.

7.7 Palos Verde Area (Site #7)

The exterior facade CNEL of the last building on North Palos Verdes Street is 65 dB. The truck noise contribution of 62 dB CNEL indicates that truck noise is significant. The interior CNEL inside rooms is approximately 42 dB and does not exceed the 45 dB interior CNEL standard.

The exterior facade CNEL of the home on the corner of North Palos Verdes Street and West Amar Street (203 West Amar Street) is 60 dB. The truck noise contribution of 57 dB CNEL indicates that truck noise is significant. The interior CNEL inside rooms is approximately 37 dB and does not exceed the 45 dB interior CNEL standard.

Some of the buildings on Palos Verde, Mesa and Bonita Streets have noise impact from the truck noise SR- 47 and related ramps, measured against City of Los Angeles noise criterion of 45 dB interior CNEL. Port activities become more noticeable during the nighttime period once traffic operations decrease. This assumes that the homes have adequate ventilation and air conditioning to ensure the windows may remain closed throughout the year to provide adequate interior noise reduction.

SECTION 8 PROPERTY INVENTORY AND MITIGATION RECOMMENDATIONS

8.1 Property Inventory

Properties that are exposed to 60 dB CNEL or greater need to have windows closed to meet interior CNEL criterion of 45 dB. Properties exposed to a CNEL 65 dB or greater, will likely require upgraded windows and doors to ensure that interior CNEL meets the 45 dB criterion. **Table 9** summarizes the inventory of noise impacted residential properties and classrooms. Total impact includes 86 multi-family units confirmed impacted and 18 single-family units possibly noise impacted pending final NLR measurements. **Appendix D** presents the 65 dB CNEL noise contours where noise impact is likely with the assumption that the NLR is 23 dB. The 65 dB CNEL contour represents first floor levels, however, if a noise wall is present, the second floor noise exposure will typically be higher. Using the 2010 source data from the United States Census Bureau, the average family size in Los Angeles County is 3.58. It is assumed that each property or unit houses one family. Multiplying this number with the number of properties impacted, provides an indication of the number of people affected by port related noise.

8.1.1 Gatun Street Area (Site 1)

No properties are impacted or within three (3) dB from the 45 dB interior CNEL criterion.

8.1.2 Gaffey Place Area (Site #2)

All 1'st floor rooms for the homes on North Gaffey Place, West Crestwood Avenue, West Upland Avenue, and West Elberon Avenue facing I-110 are protected by a noise wall and only require adequate ventilation and air conditioning to assume the windows may remain closed throughout the year.

Some homes that have 2'nd floor rooms are possibly impacted and include 952 & 964 North Gaffey Place, 683 West MacArthur Avenue, 678 West Crestwood Avenue, and 676 & 676a West Elberon Avenue.

Site 2 includes a total of six properties that are likely impacted, representing approximately 21 people.

8.1.3 MacArthur Avenue Area (Site #3)

All 1'st floor rooms for the homes at 600, 604, 612 and 620 Shields Drive that face I-110 have noise impact. All homes on Shields Drive, in addition to North Grande Avenue and West MacArthur Avenue facing I-110 require adequate ventilation and air conditioning to assume the windows may remain closed throughout the year.

Some homes that have 2'nd floor rooms are possibly noise impacted and include 602 & 935 North Grande Ave, and 610 West MacArthur Avenue.

The residential homes at 557 Shield Drive and 960 North Grande Avenue that face North Pacific Avenue are possibly noise impacted from the truck noise on North Pacific Avenue. The homes must have adequate ventilation and air conditioning to assume the windows may remain closed throughout the year.

Site 3 includes a total of five properties that are likely impacted, representing approximately 18 people.

8.1.4 LAUSD Harbor Occupational Center (Site #4)

No classrooms at the LAUSD Harbor Occupational Center are impacted from truck noise on SR-47 or from the train activity in the port. The classrooms must have adequate ventilation and air conditioning to assume the exterior doors may remain closed throughout the year.

8.1.5 Knoll Hill Area (Site #5)

The single family home on Knoll Hill does not have noise impact.

8.1.6 Samoan Sea Apartments (Site #6)

A total of 76 units of the Samoan Sea Apartments that face SR-47, related ramps, and North Harbor Blvd are considered noise impacted from the truck noise. These include 38 units facing the ramps and 38 units facing SR-47. The 72 units in the interior courtyard of the building are not considered impacted.

Site 6 includes a total of 76 properties that are impacted, representing approximately 272 people.

8.1.7 Palos Verde Street Area (Site #7)

The last building on North Palos Verdes Street with house numbers 600, 602 and 604 are possibly noise impacted. They require adequate ventilation and air conditioning to assume the windows may remain closed throughout the year.

All 1'st floor rooms for the homes on Bonita Street, Harker Street, and North Mesa Street that face SR-47 are protected by a noise wall and only require adequate ventilation and air conditioning to assume the windows may remain closed throughout the year.

Some homes that have 2'nd floor rooms are possibly impacted and include 623 North Mesa Street, and 578, 576, 572, 566, 560, 554, 536, 530 and 522 Bonita Street.
Site 7 includes a total of 13 properties that are likely impacted, representing approximately 47 people.

Table 9. Inventory Summary of Noise Impacted Properties

Site No.	Inventory of Impacted Properties	Number of Impacted Properties	Number of People Impacted
1	None	0	0
2	952 & 964 North Gaffey Place 683 West MacArthur Avenue 678 West Crestwood Avenue 676 & 676a West Elberon Avenue	6 (1)	21
3	600, 604, 620 & 612 Shields Drive	4 (1)	18
	602 & 935 North Grande Ave 610 MacArthur Avenue	3 (1)	
	557 Shields Drive 960 North Grande Avenue	2 (2)	
4	None	0	0
5	None	0	0
6	661 North Harbor Boulevard (76 Exterior Facing Units Only)	76 (3)	272
7	600, 602 & 604 North Palos Verdes Street	3 (2)	47
	623 North Mesa Street	1 (1)	
	578, 576, 572, 566, 560, 554, 536, 530 and 522 Bonita Street	9 (1)	
	Total Units Impacted	104 (4)	358 (5)

Notes:

(1) Likely 2'nd floor rooms only, pending final NLR measurements
(2) Pending final NLR measurements
(3) Confirmed noise impact through NLR measurements
(4) Includes 76 multi-family units confirmed impacted and 18 single-family units possibly noise impacted pending final NLR measurements.
(5) Based on Los Angeles County average family size of 3.58 persons per family and one family per property or unit.

8.2 Mitigation Recommendations

Per the discussion in Section 8.1 above a total of 76 multi-family residential properties (Site #6) are confirmed impacted.

Four (4) single-family homes on Shields Drive (Site #3) are possibly noise impacted, pending building inspection and NLR measurements

Nine (9) properties with a 2'nd floor (Site #2 & #3) are possibly noise impacted, pending building inspection and NLR measurements.

Five (5) properties are possibly noise impacted (Site #3 & #7), pending building inspection and NLR measurements.

8.2.1 Treatment Goals

LAUSD Harbor Occupational Center, and homes in areas of all sites except Site #1 and Site #5 have exterior CNEL of 60 dB or greater. In these buildings, windows and doors must remain closed to meet the 45 dB interior CNEL. The goal from these

buildings is to have comfortable indoor conditions throughout the year if windows and doors remain closed.

For properties with confirmed noise impact with windows and doors closed, the basic goals to reduce building interior noise is to achieve a minimum five (5) dB noise level reduction (NLR). The minimum five (5) dB noise reduction provides a noticeable reduction in the interior noise levels. Although a design goal is for at least a five (5) dB noise reduction, designing for a slightly higher NLR increase as a margin of safety is common practice. In reality, the measured NLR increase after construction typically can vary by two (2) to three (3) dB from projected values. These differences are caused by many factors such as quality of installation, changes in furnishings that affect the interior acoustical conditions and due to the many variations in environmental conditions that result in differences in the acoustical tests in the field.

8.2.2 Treatment Recommendations

This section discusses preliminary treatment options for the residential buildings and classrooms to ensure that noise impact is mitigated.

LAUSD Harbor Occupational Center and homes in areas of all sites except Site #1 and Site #5 have exterior CNEL of 60 dB or greater. If these properties do not have adequate ventilation or air conditioning, these are recommended to be installed.

Properties that were determined to be impacted in the San Pedro area with the goal to provide a minimum of five (5) dB increase in the NLR (5 dB noise reduction). The selected treatments target primarily the "weaker" performing elements such as windows and doors.

Noise acts like water, if it finds a hole it will leak through. The typical paths of entry for noise into a home include windows, doors, walls, vents, and thru-wall heaters/air conditioners. The principals involved in mitigating how noise enters a home are straightforward:

- The more airtight the product or installation, the more resistant it will be to airborne noise.
- The denser the material, or the more mass it has, the more resistant it will be to airborne noise.
- Decoupling, or the physical isolation of interior and exterior surfaces, reduces the transmission of noise.
- Insulation, in certain cases, will help reduce noise energy by absorption.

These four principles form the basis for our acoustical treatment recommendations. Typical treatment recommendations for residences impacted by noise related to transportation systems include replacement of doors and windows in habitable spaces, provision of adequate ventilation for homeowner comfort and air quality, and

baffling of vents, chimneys, and other pores in the building envelope. Depending in the noise source and sponsoring authority, treatments are applied to either the entire building envelope, or to the portions of the building envelope that are within the line-of-sight of the noise source.

The major noise sources in the San Pedro residential areas are truck pass-by's, train pass-by's and train horns. Typically, residents express concern with the the night noise events that often awakened them. As a result, the main focus of the treatment for the impacted single-family residential structures was to treat bedrooms that have a direct line-of-sight to the source, especially given that there is not nearly enough money to consider whole-house treatments as a mitigation approach. Treatment for the multi-family units would likely consider treatment of the building façade since it would typically be just a few windows and a door.

As with the study in Wilmington, the key challenge that HCBF faces relative to the noise mitigation of residences in the impacted areas is budget. Based on the windshield surveys and other challenges should be noted:

- Most of the impacted units will require cutting and patching of stucco and interior wall surfaces which can drive up costs.
- There will be some impacted units that have permitting, code and occupancy violations that can limit the ability of the program to install noise mitigation treatments.

All of these factors influence our process in determining how to best leverage program funds to address the noise impacted residences. The principals employed in creating our recommended treatment strategy are:

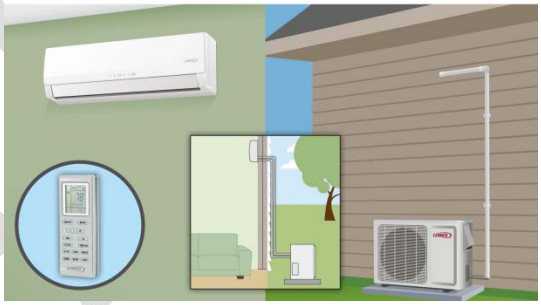
- Limit treatments to rooms with line-of-sight. This is a typical approach for surface transportation projects (road and rail noise).
- Limit treatments to address primary noise nuisance. Homeowners typically note that primary noise nuisance was at night. Therefore, bedrooms are the primary rooms to be treated.
- Limit the amount of disturbance to the existing construction materials in the homes. This approach can reduce costs of cutting/patching and environmental mitigation (lead paint and asbestos).
- Limit treatments to code compliant structures and/or spaces. Intent of program should not be code enforcement, however if a space is unpermitted or exhibits evidence of code or occupancy issues, it should not be eligible for treatment unless homeowner is willing acknowledge and address the observed violations.

In acknowledge of the noise impact criteria, treatment goals, and limited budgets our recommendation for the HCBF sound attenuation program for San Pedro would not

recommended the "Quiet Room" treatment approach to bedrooms that are within the line-of-sight of the noise source. This Quiet Room treatment effectively creates a room within the existing room providing higher levels noise reduction than what is possible with typical treatments. Since the noise levels and proximity to the noise source are not the same as the Wilmington study this approach is not recommended.

The recommended treatment options would focus only on window, door, and ventilation treatments to the rooms considered line-of-sight to the noise source. Following the general Wilmington recommendations the treatment options would be as follows:

- Windows – All windows should be replaced with acoustical product rated a minimum of STC 35.
- Doors - All doors in the rooms should be replaced with acoustical product rated a minimum of STC 38.
- Ventilation - In the process of replacing windows and doors and sealing other points of airflow, a home's exterior envelope becomes considerably tighter than it was before. As a consequence indoor air quality and occupant comfort may suffer. Further, in order for a homeowner to benefit from the noise reduction treatments windows and doors to the exterior must be closed. To address these space conditioning issues we recommend that if the treated rooms do not have existing central HVAC (heating, ventilating, air-conditioning system), the program provide for cooling and air-change through the use of a ductless mini-split systems. The main advantages of mini splits (illustration by Lennox) are their small size and flexibility for zoning or heating and cooling individual rooms. Ductless mini-split systems are easier and more flexible to install than other space conditioning systems.



The acoustical treatment options for the residences are summarized in **Table 10.**

Table 10. Treatment Options - Residences

Element	Recommended Treatment
Windows	Replace existing windows with acoustical products rated a minimum STC 35
Doors	Replace existing exterior doors with acoustical products rated a minimum STC 38
Ventilation	Install mini-split ductless system to provide ventilation and AC if nothing presently exists.

SECTION 9 CONCLUSIONS

A total of six (6) single- or multi-family residential areas and one (1) school were identified in the north San Pedro area as having the potential to be impacted from port-related activity. The major noise sources in the San Pedro area were either truck pass-by's, train pass-by's, or train horns. Train related noise is purely port-related, while the port-related truck noise is primarily on I-110 and SR-47 and is not on local streets. While most of the truck noise on I-110 or SR-47 are assumed to be from port activities, this noise source is also mixed in with automobile noise which are likely not from port activities. In most cases, the truck noise is a significant vehicle noise source.

A number of homes and the LAUSD Harbor Occupational Center are exposed to CNEL of 60 dB or greater that will only meet interior CNEL of 45 dB with windows closed. These homes and classrooms require adequate ventilation and air conditioning to assume windows and doors may remain closed throughout the year.

The majority of the homes that overlook I-110 and SR-47 are protected by noise walls that reduce noise from the highways. These noise walls protect exterior ground level areas and the 1'st floor areas of the residences. The noise walls do not protect the 2'nd story level of any of the homes and these areas may be impacted. A number of homes have interior CNELs approaching 45 within three (3) dB. Due to uncertainties in highway noise modeling and not having measured NLRs of the rooms, NLR measurements may be warranted to make the final determination of noise impact.

Only two (2) rail lines are noted in the north San Pedro area that impact sensitive areas. One is a rail line to the port that is in continuous operations and one is a rail spur that sees activity once per day. Train horn noise is expected to be audible indoors in most areas. Although the indoor noise exposure from the train horns is not considered noise impact, it is in most cases clearly audible, and may prompt noise complaints from the community.

A total of 76 multi-family residential properties at Samoan Sea Apartments (Site #6) are considered impacted.

Four (4) single-family homes on Shields Drive (Site #3) are possibly noise impacted, pending building inspection and NLR measurements

Nineteen (19) properties with a 2'nd floor (Site #2, #3 & #7) are possibly noise impacted, pending building inspection and NLR measurements.

Five (5) properties are possibly noise impacted (Site #3 & #7), pending building inspection and NLR measurements.

Further study would be required to determine the costs to mitigate these properties. In addition, if HCBF were considering moving forward on the Wilmington and San Pedro mitigation programs, it would be recommended that prioritization be undertaken to consider the highest impacted properties to be mitigated in Wilmington and San Pedro.

APPENDIX A – QUESTIONS FOR COMMUNITY STAKEHOLDER SURVEY

Questions for San Pedro Stakeholders

1. Name:

2. Address:

3. Contact Information (email & telephone number)

4. Entity Represented/Position

5. What noise sources do you notice at your residence?
   a. Port
   b. Train
   c. Trucks (container)
   d. Local Traffic
   e. Other

6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently

7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

8. Do you have a direct line-of-sight to the noise source that impacts you?

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

10. Any other comments you would like to share with us?

APPENDIX B – RESULTS FOR COMMUNITY STAKEHOLDER SURVEY

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name: _____
2. Address: _____
3. Contact Information (email & telephone number):

_____

4. Entity Represented/Position:

   SAN PEDRO PENINSULA HOMEOWNERS UNITED

5. What noise sources do you notice at your residence?
   a. Port – OCCASIONALLY WHEN OUTSIDE
   b. Train – REGULARLY – DIFFERNT TIMES
   c. Trucks (container) – SLAMMING OF DROPPING OCCASIONALLY
   d. Local Traffic –
   e. Other I HAVE INSTALLED DOUBLE PANE WINDOWS TO REDUCE IMPACTS
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   TRAIN TRAFFIC ENGINES AND WHISTLES

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

1*

8. Do you have a direct line-of-sight to the noise source that impacts you?

   NO

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

   ANY TIME OF DAY

10. Any other comments you would like to share with us?

   ATMOSPHERIC CONDITIONS PLAY A ROLE IN THE NOISE IMPACTS

(Please return via email to: maldana@jonespayne.com)

1

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name:
2. Address:
3. Contact Information (email & telephone number):
4. Entity Represented/Position:
   SAN PEDRO PENINSULA HOMEOWNERS [illegible]
5. What noise sources do you notice at your residence?
   a. Port
   b. Train
   c. Trucks (container)
   d. Local Traffic
   e. Other
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?
   at night

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

(2)

8. Do you have a direct line-of-sight to the noise source that impacts you?

Yes I live close By

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

day time only

10. Any other comments you would like to share with us?

Please Stop those Trains and noise That goes thru our neiborhood's Thank's

(Please return via email to: maldana@jonespayne.com)

Richard Jurnit and Family"

②

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name: _____
2. Address: _____ 2
3. Contact Information (email & telephone number): _____
4. Entity Represented/Position:
   SAN PEDRO PENINSULA HOMEOWNERS UNITED INC.
5. What noise sources do you notice at your residence?
   a. Port
   b. Train
   c. Trucks (container)
   d. Local Traffic
   e. Other
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently

   early morning
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

   but i hear it

3

8. Do you have a direct line-of-sight to the noise source that impacts you?

No - Kids back windows face Gaffey

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

email please

10. Any other comments you would like to share with us?

(Please return via email to: maldana@jonespayne.com)

3

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name:
2. Address:
3. Contact Information (email & telephone number):
4. Entity Represented/Position:
   SAN PEDRO PENINSULA HOMEOWNERS UNITED
5. What noise sources do you notice at your residence?
   a. Port
   b. Train
   c. Trucks (container)
   d. Local Traffic
   e. Other
6. Would you consider the noise source(s) that you are identifying as impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

(4)*

8. Do you have a direct line-of-sight to the noise source that impacts you?

Trucks on Westmont.

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

After 4:00

10. Any other comments you would like to share with us?

(Please return via email to: maldana@jonespayne.com)

4

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name:
2. Address:
3. Contact Information (email & telephone number):
4. Entity Represented/Position:

   SAN PEDRO PENINSULA HOMEOWNERS UNITED

5. What noise sources do you notice at your residence?
   a. Port
   b. Train
   c. Trucks (container)
   d. Local Traffic
   e. Other

6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently

7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

5

8. Do you have a direct line-of-sight to the noise source that impacts you?

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

10. Any other comments you would like to share with us?

(Please return via email to: maldana@jonespayne.com)

5

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name:
2. Address:
3. Contact Information (email & telephone number):
4. Entity Represented/Position:
   SAN PEDRO PENINSULA HOMEOWNERS UNITED
5. What noise sources do you notice at your residence?
   a. Port
   b. Train
   c. Trucks (container)
   d. Local Traffic
   e. Other
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact
   f. Other

6*

8. Do you have a direct line-of-sight to the noise source that impacts you?

No

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

M-F 9am - 2pm

10. Any other comments you would like to share with us?

Train & containers can be heard at night.

(Please return via email to: maldana@jonespayne.com)

6

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name: _____
2. Address: _____
3. Contact Information (email & telephone number): _____
4. Entity Represented/Position: San Pedro Peninsula Homeowners United
5. What noise sources do you notice at your residence?
   a. Port
   b. Train X
   c. Trucks (container) X
   d. Local Traffic
   e. Other
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes X
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?
   Train engines noise at night

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.) X
   f. All hours
   g. Intermittently
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping X
   e. No Impact
   f. Other

7*

8. Do you have a direct line-of-sight to the noise source that impacts you? NO

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

   PHONE ANYTIME

10. Any other comments you would like to share with us? NONE

(Please return via email to: maldana@jonespayne.com)

7

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name:
2. Address:8
3. Contact Information (email & telephone number):
4. Entity Represented/Position: Citizen
5. What noise sources do you notice at your residence?
   a. Port Yes
   b. Train Yes
   c. Trucks (container)
   d. Local Traffic: Motorcycles
   e. Other
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable Yes

   If you answered "Yes", describe the noise that annoys/impacts you the most?
   motor cycle

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently Yes
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact Yes
   f. Other

8*

8. Do you have a direct line-of-sight to the noise source that impacts you? No

Only the motorcycles

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?
I do not respond the unknown callers.

leave a message or email

10. Any other comments you would like to share with us?

(Please return via email to: maldana@jonespayne.com)

(8)

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name: _____
2. Address: _____
3. Contact Information (email & telephone number):

   _____

   _____

4. Entity Represented/Position:

   Self

5. What noise sources do you notice at your residence?

   a. Port: Terminal operations adjacent to John S. Gibson Blvd.
   b. Train: Train horns, train rail noise on N. Gaffey St.
   c. Trucks (container): Container trucks on Gaffey St. to and from the packing station at Westmont
   d. Local Traffic: on Park Western Dr.
   e. Other: We seem to have periodic gunfire and random fireworks in our area.

6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?

(9)

The problem with working with the Port on these and other issues, is that the Port never responds. You never know if they are listening and certainly never know if they are actually doing something about the problems.

(Please return via email to: maldana@jonespayne.com)

9

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

1. Name: _____
2. Address: _____
3. Contact Information (email & telephone number): _____
4. Entity Represented/Position: ?
5. What noise sources do you notice at your residence?
   a. Port - Yes
   b. Train - Yes
   c. Trucks (container) Yes
   d. Local Traffic
   e. Other
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes +
   b. No, it's tolerable

   If you answered "Yes", describe the noise that annoys/impacts you the most?
   Sound of steel containers hitting dock – Crashing sounds at night – Train horns

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.) +
   f. All hours
   g. Intermittently +
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping +
   e. No Impact
   f. Other

(10)

8. Do you have a direct line-of-sight to the noise source that impacts you? At times

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?
   Yes.....

10. Any other comments you would like to share with us?
    The issue of lighting impacts is also another problem.

(Please return via email to: maldana@ onespayne.com)

10

Questions for San Pedro Stakeholders

Preliminary San Pedro Area Noise Study

(The Jones Payne Group in Partnership with Harbor Community Benefit Foundation)

January 2017

INCOMPLETE

1. Name:
2. Address:
3. Contact Information (email & telephone number):
4. Entity Represented/Position:
5. What noise sources do you notice at your residence?
   a. Port Yes
   b. Train Yes
   c. Trucks (container)
   d. Local Traffic
   e. Other Sounds like containers being placed on chassis at the port.
6. Would you consider the noise source(s) that you are identifying as Impactful or Annoying?
   a. Yes
   b. No, it's tolerable .

   If you answered "Yes", describe the noise that annoys/impacts you the most?

   If you answered "Yes", please select the time of day where the noise sources annoy/impact you the most?
   c. Daytime (7:00 a.m. – 6:00 p.m.)
   d. Evening (6:00 p.m. – 10:00 p.m.)
   e. Nighttime (10:00 p.m. – 7:00 a.m.)
   f. All hours
   g. Intermittently
7. How do the noise sources impact you the most?
   a. Watching TV
   b. Normal conversation
   c. Outdoor activities
   d. Sleeping
   e. No Impact XXX
   f. Other

(11)

8. Do you have a direct line-of-sight to the noise source that impacts you?
No.

9. We may want to follow-up this survey with a telephone call for more information. What would be the best day of the week, time of day, and contact numbers to reach you?

10. Any other comments you would like to share with us?

(Please return via email to: maldana@jonespayne.com)

APPENDIX C – TNM TRAFFIC INPUT DATA

I-110NB

	Calculated Traffic Volume Distribution				
	Day	**Eve**	**Night**	**CNEL Equiv**	**CNEL Volume**
Auto	67.09%	10.87%	19.04%	291.90%	4318
MT	0.72%	0.12%	0.20%	3.12%	46
HT	1.36%	0.22%	0.39%	5.91%	87
				Speed (mph):	60
Future ADT Calculation			**Source:**		
AADT:	35,500		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	3%		Caltrans 2016		
Trucks by Axle:					
2	35%	(MT)			
3	17%				
4	3%	(HT)			
5+	46%				
Autos	97%				
Medium Trucks	1%				
Heavy Trucks	2%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	890.9				
1:00	597				
2:00	502.4				
3:00	509.8				
4:00	1009.2				
5:00	2730.2				
6:00	3836.1				
7:00	4090.6				
8:00	4043.3				
9:00	4060.6				
10:00	4046.1				
11:00	3947.1				
12:00	3693.7				
13:00	3622.6				
14:00	3781.2				
15:00	3987.2				
16:00	4090.8				
17:00	4155.1				
18:00	3766.5				
19:00	3091.9				
20:00	2313				
21:00	2255.9				
22:00	2004.4				
23:00	1342.9				
Total					
Day	47284.8	69.16%			
Evening	7660.8	11.21%			
Night	13422.9	19.63%			
Total	68368.5				

I-110 SB

	Calculated Traffic Volume Distribution				
	Day	**Eve**	**Night**	**CNEL Equiv**	**CNEL Volume**
Auto	67.09%	10.87%	19.04%	291.90%	2493
MT	0.72%	0.12%	0.20%	3.12%	27
HT	1.36%	0.22%	0.39%	5.91%	50
				Speed (mph):	60
Future ADT Calculation			**Source:**		
AADT:	20,499		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	3%		Caltrans 2016		
Trucks by Axle:					
2	35%	(MT)			
3	17%				
4	3%	(HT)			
5+	46%				
Autos	97%				
Medium Trucks	1%				
Heavy Trucks	2%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	890.9				
1:00	597				
2:00	502.4				
3:00	509.8				
4:00	1009.2				
5:00	2730.2				
6:00	3836.1				
7:00	4090.6				
8:00	4043.3				
9:00	4060.6				
10:00	4046.1				
11:00	3947.1				
12:00	3693.7				
13:00	3622.6				
14:00	3781.2				
15:00	3987.2				
16:00	4090.8				
17:00	4155.1				
18:00	3766.5				
19:00	3091.9				
20:00	2313				
21:00	2255.9				
22:00	2004.4				
23:00	1342.9				
Total					
Day	47284.8	69.16%			
Evening	7660.8	11.21%			
Night	13422.9	19.63%			
Total	68368.5				

Offramp from I-110 SB

	Calculated Traffic Volume Distribution				
	Day	Eve	Night	CNEL Equiv	CNEL Volume
Auto	67.09%	10.87%	19.04%	291.90%	1824
MT	0.72%	0.12%	0.20%	3.12%	19
HT	1.36%	0.22%	0.39%	5.91%	37
				Speed (mph):	50

Future ADT Calculation			**Source:**		
AADT:	15,001		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	3%		Caltrans 2016		
Trucks by Axle:					
2	35%	(MT)			
3	17%				
4	3%	(HT)			
5+	46%				
Autos	97%				
Medium Trucks	1%				
Heavy Trucks	2%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	890.9				
1:00	597				
2:00	502.4				
3:00	509.8				
4:00	1009.2				
5:00	2730.2				
6:00	3836.1				
7:00	4090.6				
8:00	4043.3				
9:00	4060.6				
10:00	4046.1				
11:00	3947.1				
12:00	3693.7				
13:00	3622.6				
14:00	3781.2				
15:00	3987.2				
16:00	4090.8				
17:00	4155.1				
18:00	3766.5				
19:00	3091.9				
20:00	2313				
21:00	2255.9				
22:00	2004.4				
23:00	1342.9				
Total					
Day	47284.8	69.16%			
Evening	7660.8	11.21%			
Night	13422.9	19.63%			
Total	68368.5				

SR-47 NB and SB per direction

	Calculated Traffic Volume Distribution				
	Day	**Eve**	**Night**	**CNEL Equiv**	**CNEL Volume**
Auto	63.82%	10.37%	15.68%	253.44%	2798
MT	2.17%	0.35%	0.53%	8.60%	95
HT	5.03%	0.82%	1.24%	19.97%	220
				Speed (mph):	50
Future ADT Calculation			**Source:**		
AADT:	26,500		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	10%		Caltrans 2016		
Trucks by Axle:					
2	30%	(MT)			
3	31%				
4	2%	(HT)			
5+	36%				
Autos	90%				
Medium Trucks	3%				
Heavy Trucks	7%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	284.8				
1:00	227.7				
2:00	458.7				
3:00	232.8				
4:00	126.8				
5:00	293.1				
6:00	605				
7:00	915.5				
8:00	904.3				
9:00	789.1				
10:00	745				
11:00	1006				
12:00	852.7				
13:00	831.6				
14:00	1069.7				
15:00	1164.4				
16:00	1575.7				
17:00	1286.1				
18:00	977.1				
19:00	728.3				
20:00	597.6				
21:00	643.4				
22:00	461.9				
23:00	286.9				
Total					
Day	12117.2	71.01%			
Evening	1969.3	11.54%			
Night	2977.7	17.45%			
Total	17064.2				

Onramp to SR-47

	Calculated Traffic Volume Distribution				
	Day	Eve	Night	CNEL Equiv	CNEL Volume
Auto	64.91%	10.31%	14.65%	244.03%	526
MT	2.20%	0.35%	0.50%	8.28%	18
HT	5.11%	0.81%	1.15%	19.22%	41
				Speed (mph):	35

Future ADT Calculation			Source:		
AADT:	5,170		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			Source:		
Total Percentage of Trucks	10%		Caltrans 2016		
Trucks by Axle:					
2	30%	(MT)			
3	31%				
4	2%	(HT)			
5+	36%				
Autos	90%				
Medium Trucks	3%				
Heavy Trucks	7%				
Hourly Mean Volumes			Source:		
Time	Mean		PEMS measurements January 1 - March 1, 2018		
0:00	45.4				
1:00	29.3				
2:00	29.5				
3:00	24.7				
4:00	38.3				
5:00	106.6				
6:00	234				
7:00	315.2				
8:00	235				
9:00	123.7				
10:00	124.9				
11:00	134.5				
12:00	197				
13:00	244.6				
14:00	296.9				
15:00	333.2				
16:00	412				
17:00	396				
18:00	301.6				
19:00	208.7				
20:00	162.2				
21:00	123.7				
22:00	124.4				
23:00	70.9				
Total					
Day	3114.6	72.23%			
Evening	494.6	11.47%			
Night	703.1	16.30%			
Total	4312.3				

Offramp Combined from SR-47

	Calculated Traffic Volume Distribution				
	Day	**Eve**	**Night**	**CNEL Equiv**	**CNEL Volume**
Auto	65.65%	11.55%	12.67%	228.87%	1591
MT	2.23%	0.39%	0.43%	7.77%	54
HT	5.17%	0.91%	1.00%	18.03%	125
				Speed (mph):	35
Future ADT Calculation			**Source:**		
AADT:	16,680		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	10%		Caltrans 2016		
Trucks by Axle:					
2	30%	(MT)			
3	31%				
4	2%	(HT)			
5+	36%				
Autos	90%				
Medium Trucks	3%				
Heavy Trucks	7%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	117.1				
1:00	77.6				
2:00	55.3				
3:00	43.1				
4:00	60.6				
5:00	147.2				
6:00	237.2				
7:00	487.1				
8:00	423.2				
9:00	422.1				
10:00	441.5				
11:00	510.2				
12:00	527.4				
13:00	516.2				
14:00	556.8				
15:00	600.9				
16:00	556.2				
17:00	505				
18:00	492.9				
19:00	427.3				
20:00	341.6				
21:00	294.1				
22:00	255.6				
23:00	171.8				
Total					
Day	6039.5	73.05%			
Evening	1063	12.86%			
Night	1165.5	14.10%			
Total	8268				

Offramp from SR-47

	Calculated Traffic Volume Distribution				
	Day	Eve	Night	CNEL Equiv	CNEL Volume
Auto	65.65%	11.55%	12.67%	228.87%	764
MT	2.23%	0.39%	0.43%	7.77%	26
HT	5.17%	0.91%	1.00%	18.03%	60
				Speed (mph):	35

Future ADT Calculation			Source:		
AADT:	8,010		Caltrans 2016		
Source Year:	2016				
Vehicle Mix			Source:		
Total Percentage of Trucks	10%		Caltrans 2016		
Trucks by Axle:					
2	30%	(MT)			
3	31%				
4	2%	(HT)			
5+	36%				
Autos	90%				
Medium Trucks	3%				
Heavy Trucks	7%				
Hourly Mean Volumes			Source:		
Time	Mean		PEMS measurements January 1 - March 1, 2018		
0:00	117.1				
1:00	77.6				
2:00	55.3				
3:00	43.1				
4:00	60.6				
5:00	147.2				
6:00	237.2				
7:00	487.1				
8:00	423.2				
9:00	422.1				
10:00	441.5				
11:00	510.2				
12:00	527.4				
13:00	516.2				
14:00	556.8				
15:00	600.9				
16:00	556.2				
17:00	505				
18:00	492.9				
19:00	427.3				
20:00	341.6				
21:00	294.1				
22:00	255.6				
23:00	171.8				
Total					
Day	6039.5	73.05%			
Evening	1063	12.86%			
Night	1165.5	14.10%			
Total	8268				

	Calculated Traffic Volume Distribution				
	Day	**Eve**	**Night**	**CNEL Equiv**	**CNEL Volume**
Auto	65.65%	11.55%	12.67%	228.87%	1526
MT	2.23%	0.39%	0.43%	7.77%	52
HT	5.17%	0.91%	1.00%	18.03%	120
				Speed (mph):	35
Future ADT Calculation			**Source:**		
AADT:	16,000		LADOT download February 3, 2018		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	10%		Caltrans 2016		
Trucks by Axle:					
2	30%	(MT)			
3	31%				
4	2%	(HT)			
5+	36%				
Autos	90%				
Medium Trucks	3%				
Heavy Trucks	7%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	117.1				
1:00	77.6				
2:00	55.3				
3:00	43.1				
4:00	60.6				
5:00	147.2				
6:00	237.2				
7:00	487.1				
8:00	423.2				
9:00	422.1				
10:00	441.5				
11:00	510.2				
12:00	527.4				
13:00	516.2				
14:00	556.8				
15:00	600.9				
16:00	556.2				
17:00	505				
18:00	492.9				
19:00	427.3				
20:00	341.6				
21:00	294.1				
22:00	255.6				
23:00	171.8				
Total					
Day	6039.5	73.05%			
Evening	1063	12.86%			
Night	1165.5	14.10%			
Total	8268				

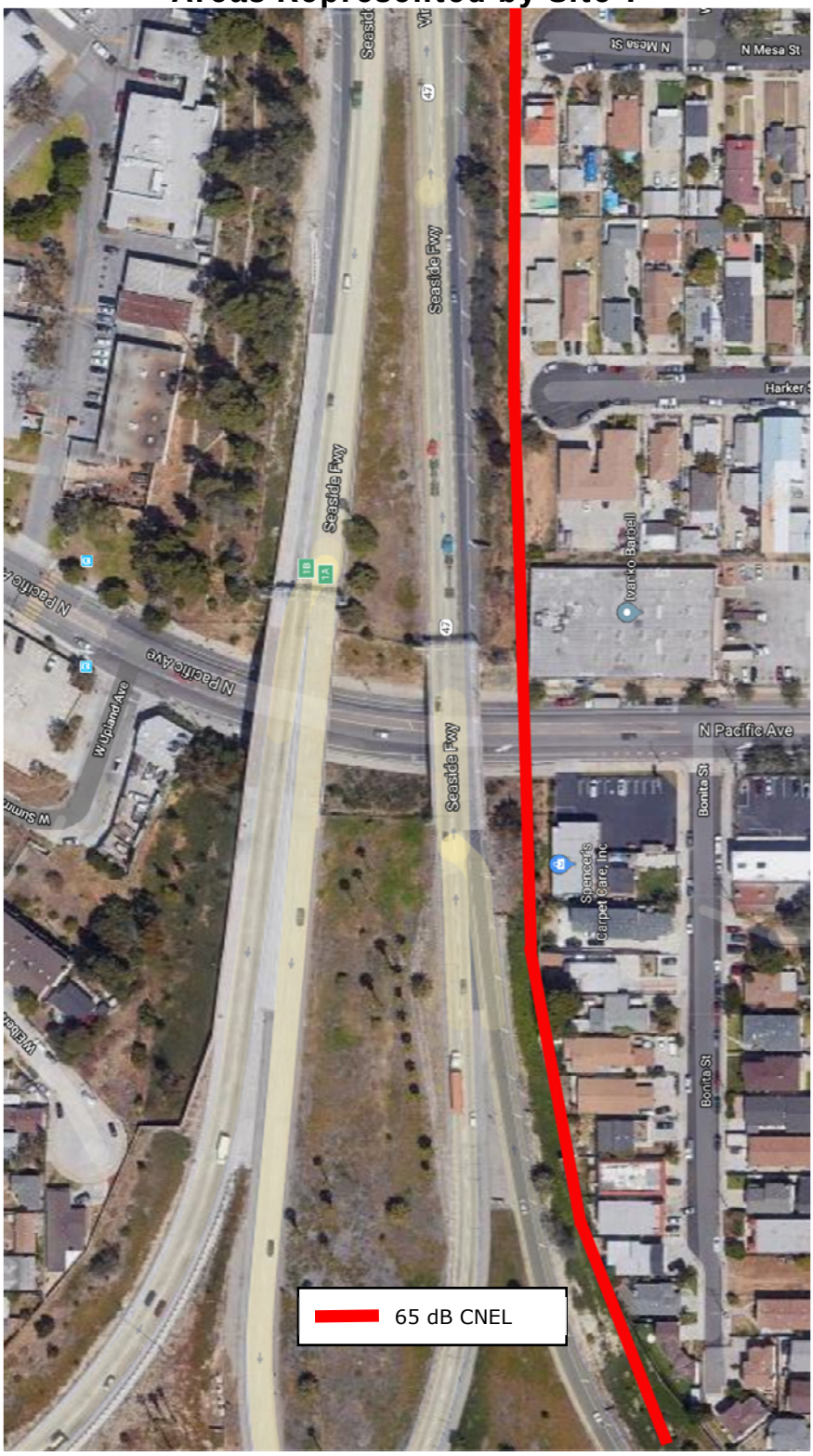
N Pacific Ave. both directions

	Calculated Traffic Volume Distribution				
	Day	**Eve**	**Night**	**CNEL Equiv**	**CNEL Volume**
Auto	65.65%	11.55%	12.67%	228.87%	2494
MT	2.23%	0.39%	0.43%	7.77%	85
HT	5.17%	0.91%	1.00%	18.03%	196
				Speed (mph):	35
Future ADT Calculation			**Source:**		
AADT:	26,148		LADOT download February 3, 2018		
Source Year:	2016				
Vehicle Mix			**Source:**		
Total Percentage of Trucks	10%		Caltrans 2016		
Trucks by Axle:					
2	30%	(MT)			
3	31%				
4	2%	(HT)			
5+	36%				
Autos	90%				
Medium Trucks	3%				
Heavy Trucks	7%				
Hourly Mean Volumes			**Source:**		
Time	**Mean**		PEMS measurements January 1 - March 1, 2018		
0:00	117.1				
1:00	77.6				
2:00	55.3				
3:00	43.1				
4:00	60.6				
5:00	147.2				
6:00	237.2				
7:00	487.1				
8:00	423.2				
9:00	422.1				
10:00	441.5				
11:00	510.2				
12:00	527.4				
13:00	516.2				
14:00	556.8				
15:00	600.9				
16:00	556.2				
17:00	505				
18:00	492.9				
19:00	427.3				
20:00	341.6				
21:00	294.1				
22:00	255.6				
23:00	171.8				
Total					
Day	6039.5	73.05%			
Evening	1063	12.86%			
Night	1165.5	14.10%			
Total	8268				

APPENDIX D – 65 DB CNEL NOISE CONTOURS

65 dB CNEL Contours for
Areas Represented by Site 2 and Site 3

65 dB CNEL Contours for Areas Represented by Site 7



65 dB CNEL Contours for Areas Represented by Site 7