

NOISE ASSESSMENT

**ACE Self Storage Development
PDS2016-MUP-16-010 AND PDS2016-ER-16-18-002
Bonita, CA**

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GLOSSARY OF TERMS

Sound Pressure Level (SPL): a ratio of one sound pressure to a reference pressure (L_{ref}) of 20 μ Pa. Because of the dynamic range of the human ear, the ratio is calculated logarithmically by $20 \log (L/L_{ref})$.

A-weighted Sound Pressure Level (dBA): Some frequencies of noise are more noticeable than others. To compensate for this fact, different sound frequencies are weighted more.

Minimum Sound Level (L_{min}): Minimum SPL or the lowest SPL measured over the time interval using the A-weighted network and slow time weighting.

Maximum Sound Level (L_{max}): Maximum SPL or the highest SPL measured over the time interval the A-weighted network and slow time weighting.

Equivalent sound level (L_{eq}): the true equivalent sound level measured over the run time. L_{eq} is the A-weighted steady sound level that contains the same total acoustical energy as the actual fluctuating sound level.

Day Night Sound Level (LDN): Representing the Day/Night sound level, this measurement is a 24 –hour average sound level where 10 dB is added to all the readings that occur between 10 pm and 7 am. This is primarily used in community noise regulations where there is a 10 dB “Penalty” for night time noise. Typically, LDN’s are measured using A weighting.

Community Noise Exposure Level (CNEL): The accumulated exposure to sound measured in a 24-hour sampling interval and artificially boosted during certain hours. For CNEL, samples taken between 7 pm and 10 pm are boosted by 5 dB; samples taken between 10 pm and 7 am are boosted by 10 dB.

Octave Band: An octave band is defined as a frequency band whose upper band-edge frequency is twice the lower band frequency.

Third-Octave Band: A third-octave band is defined as a frequency band whose upper band-edge frequency is 1.26 times the lower band frequency.

Response Time (F,S,I): The response time is a standardized exponential time weighting of the input signal according to fast (F), slow (S) or impulse (I) time response relationships. Time response can be described with a time constant. The time constants for fast, slow and impulse responses are 1.0 seconds, 0.125 seconds and 0.35 milliseconds, respectively.

EXECUTIVE SUMMARY

This noise study has been completed to determine the noise impacts associated with the development of the proposed ACE Self Storage Development. The applicant proposes to develop 133,598-square feet of personal self-storage in three buildings located in the Sweetwater Community Plan Area in the unincorporated area of San Diego County. The project site is located adjacent to Bonita Road to the east and south of Central Avenue.

- Construction Noise Analysis

The construction equipment will be spread out over the project site from distances near the occupied property to distances of over 150-feet away. Based upon the proposed site plan, most of the combined construction operations will be more than 75-feet away from the adjacent property lines. It was determined that at average distances over 75-feet the construction activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 75-feet no impacts are anticipated. Additionally, no offsite construction is proposed.

No blasting or rock crushing is required. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

- Operational Analysis

Based upon the property line noise levels determined above none of the proposed noise sources directly or cumulatively exceeds the daytime or nighttime property line standards at the shared property lines. Therefore, the proposed developments related operational noise levels comply with the noise standards at the property lines. No Impacts are anticipated and no mitigation is required.

1.0 INTRODUCTION

1.1 Project Description

This noise study was completed to determine the noise impacts associated with the development of the proposed ACE Self Storage Development. The project is located adjacent to Bonita Road to the east and south of Central Avenue, within the Sweetwater Community Planning Area of San Diego County CA. The general location of the project is shown on the Vicinity Map, Figure 1-A.

The project is a Major Pre-Application to construct 133,598 square-feet of personal self-storage in three buildings on approximately 4.2-acres. The site is subject to the Village Residential (VR-2) General Plan Regional Category. The proposed project site configuration is shown in Figure 1-B.

1.2 Environmental Settings & Existing Conditions

a) Settings & Locations

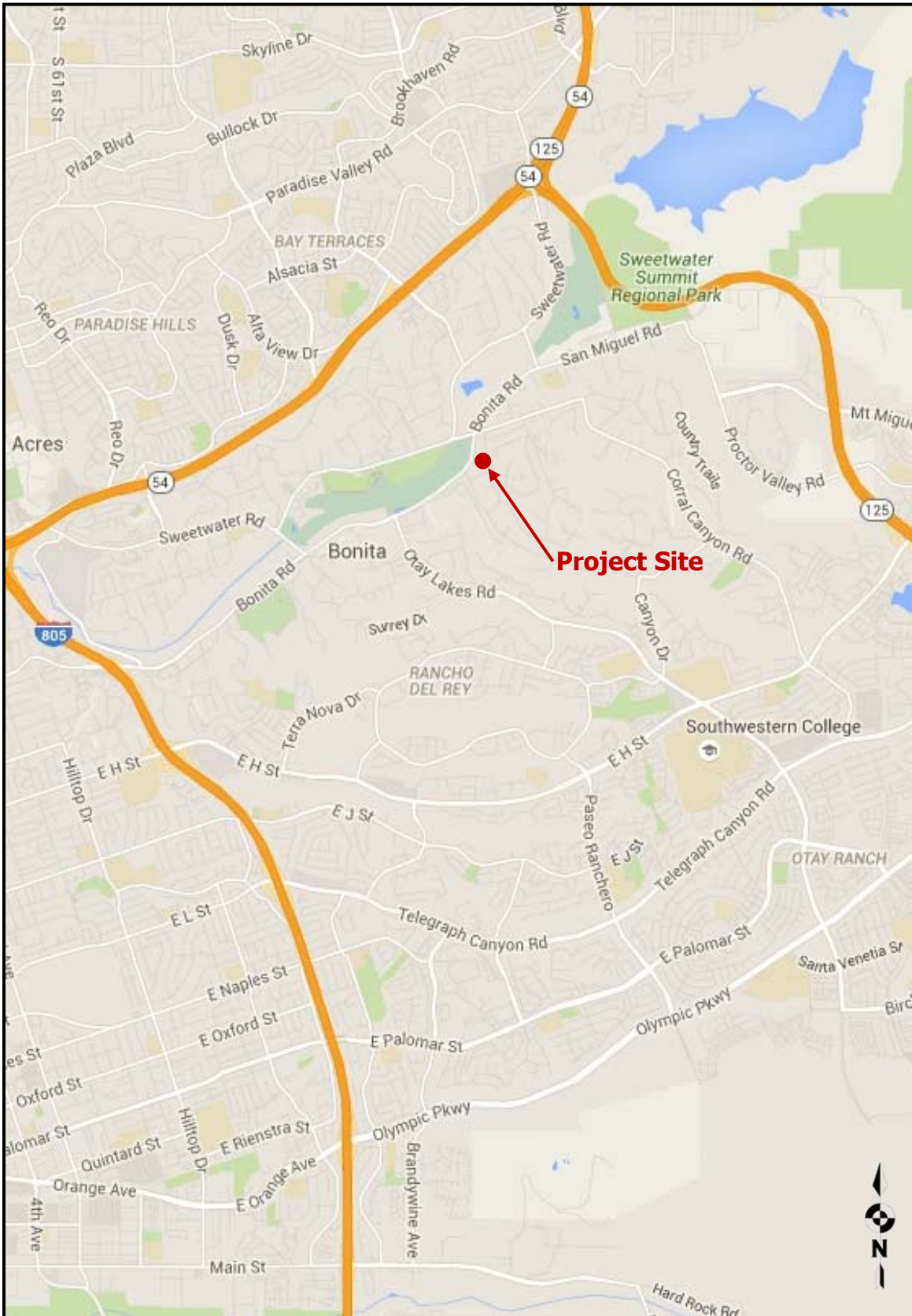
The property is generally level, undisturbed, and vacant. Access to the ACE Self Storage buildings would be provided by a driveway connecting to the project site from Bonita Road. The current Assessor's Parcel Number is 593-050-57-00.

The project development plan calls for the construction of three separate buildings with a total floor area of 133,598 SF and will be used for storage and an office space for the onsite operations. Access to the project site is provided by Bonita Road.

b) Existing Noise Conditions

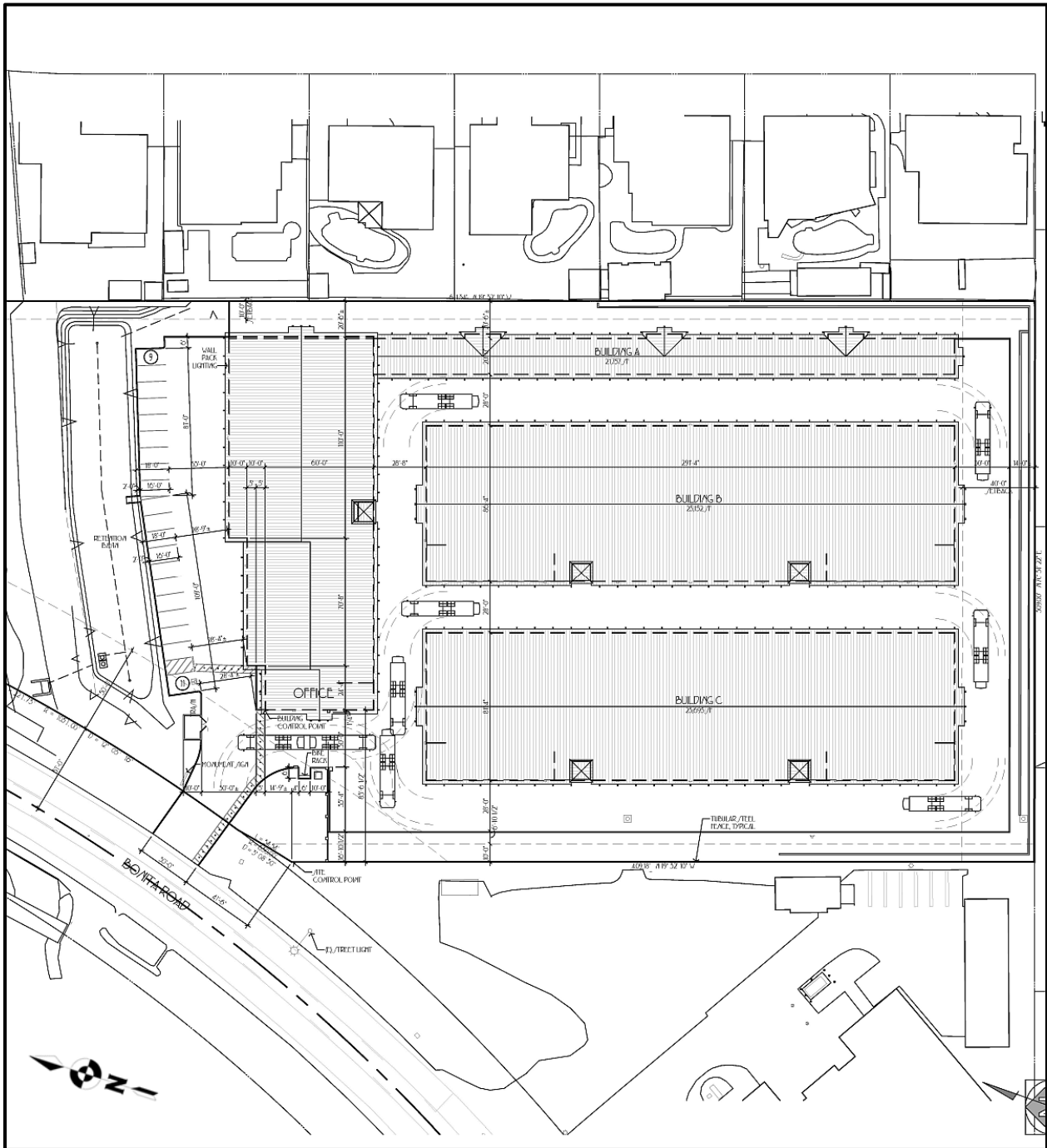
Existing noise occurs mainly from vehicle traffic along Bonita Road. Bonita Road is classified as *4.1B Major Road* on the County Mobility Element Network map. Bonita Road is generally constructed with intermittent turn lanes, and a shoulder on each side of the roadway. A posted speed limit of 45 MPH was observed along the road.

Figure 1-A: Project Vicinity Map



Source: Google, 2016

Figure 1-B: Project Site Plan



Source: ARE Associates, 2016

1.3 Methodology

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs and when the noise occurs.

Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency but of a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as Leq represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment can range from 60 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 75 dBA measured at 50 feet from the noise source to the receptor would be reduced to 69 dBA at 100 feet from the source to the receptor, and reduced to 63 dBA at 200 feet from the source. The most effective noise reduction methods consist of controlling the noise at the source, blocking the noise transmission with barriers or relocating the receiver. Any or all of these methods may be required to reduce noise levels to an acceptable level.

The most effective noise reduction methods consist of controlling the noise at the source, blocking the noise transmission with barriers or relocating the receiver. Any or all of these methods may be required to reduce noise levels to an acceptable level.

2.0 CONSTRUCTION ACTIVITIES

2.1 Guidelines for the Determination of Significance

Construction Noise: Noise generated by construction activities related to the project will exceed the standards listed in San Diego County Code Sections as follows.

SEC. 36.408: HOURS OF OPERATION OF CONSTRUCTION EQUIPMENT

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

- a. Between 7 p.m. and 7 a.m.
- b. On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

SEC. 36.409: SOUND LEVEL LIMITATIONS ON CONSTRUCTION EQUIPMENT

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

SEC. 36.410: SOUND LEVEL LIMITATIONS ON IMPULSIVE NOISE

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

- (a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A (provided below), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

TABLE 36.410A: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.

TABLE 36.410B: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA) FOR PUBLIC ROAD PROJECTS

OCCUPIED PROPERTY USE	dB(A)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

(c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

2.2 Potential Property Line Noise Impacts

a) Potential Build Out Noise Conditions

Construction noise represents a short-term impact on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers can reach relatively high levels. Grading activities typically represent one of the highest potential sources for noise impacts. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment can range from 60 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 75 dBA measured at 50 feet from the noise source to the receptor would be reduced to 69 dBA at 100 feet from the source to the receptor, and reduced to 63 dBA at 200 feet from the source.

b) Potential Noise Impact Identification

Using a point-source noise prediction model, calculations of the expected construction noise impacts were completed. The essential model input data for these performance equations include the source levels of each type of equipment, relative source to receiver horizontal and vertical separations, the amount of time the equipment is operating in a given day, also referred to as the duty-cycle and any transmission loss from topography or barriers.

Based empirical data and the amount of equipment needed, worst case noise impacts from this construction equipment would occur during the fine grading and building footprint preparations. In order to determine the worst case scenario for the construction activities all the equipment was placed in a common location, which is not physically possible. As can be seen in Table 2-1, even if all the equipment were placed together the cumulative construction activities noise levels would be 78.5 dBA and would attenuate 3.5 dBA at a distance of 75-feet from the point source noise and would be at or below the 75 dBA threshold.

The construction equipment will be spread out over the project site from distances near the occupied property to distances of over 150-feet away. Additionally, the project site is depressed below the occupied property to the north and the slope would help reduce the noise levels further.

At average distances over 75-feet the construction activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. This means that most of the time the average distance from the equipment to the occupied properties is more than 75-feet and in that situation no impacts are anticipated. Additionally, no offsite construction is proposed.

No blasting or rock crushing is required. Therefore, no impulsive noise sources are expected and the Project is anticipated to comply with Section 36.410 of the County Noise Ordinance and no further analysis is required.

Table 2-1: Construction Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA)¹	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Feet (dBA)
Tractor/Backhoe	1	72	8	72.0
Loader/Grader	1	73	8	73.0
Roller/Compactor	1	74	8	74.0
Water Truck	1	70	8	70.0
Cumulative Levels @ 50 Feet				78.5
Distance To Property Line (Feet)				75
Noise Reduction Due To Distance				-3.5
NEAREST PROPERTY LINE NOISE LEVEL				75.0
¹ Source: U.S. Environmental Protection Agency (U.S. EPA), 1971 and Empirical Data				

2.3 Conclusions

The construction equipment will be spread out over the project site from distances near the occupied property to distances of over 150-feet away. Based upon the proposed site plan, most of the combined construction operations will be more than 75-feet away from the adjacent property lines. It was determined that at average distances over 75-feet the construction activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 75-feet no impacts are anticipated. Additionally, no offsite construction is proposed.

No blasting or rock crushing is required. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

3.0 OPERATIONAL ACTIVITIES

3.1 Guidelines for the Determination of Significance

Section 36.404 of the County of San Diego noise ordinance provides performance standards and noise control guidelines for determining and mitigating non-transportation, or stationary, noise source impacts to adjacent properties. The purpose of the noise ordinance is to protect, create and maintain an environment free from noise and vibration that may jeopardize the health or welfare, or degrade the quality of life. The sound level limits in Table 36.404 of the County’s Noise Ordinance are provided below in Table 3-1.

Table 3-1: Property Line Sound Level Limits in Decibels (dBA)

Zone	Time	One-Hour Average Sound Level Limits (dBA)
(1) RS, RD, RR, RMH, A70, A72, S80, S81, S87, S90, S92, RV, and RU with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
(2) RRO, RC, RM, S86, V5, RV and RU with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
(3) S94, V4, and all commercial zones.	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
(4) V1, V2	7 a.m. to 7 p.m.	60
V1, V2	7 p.m. to 10 p.m.	55
V1	10 p.m. to 7 a.m.	55
V2	10 p.m. to 7 a.m.	50
V3	7 a.m. to 10 p.m.	70
	10 p.m. to 7 a.m.	65
(5) M50, M52, and M54	Anytime	70
(6) S82, M56, and M58.	Anytime	75
(7) S88 (see subsection (c) below)		

Source: County of San Diego Noise Ordinance Section 36.404

- a) Except as provided in section 36.409 of this chapter, it shall be unlawful for any person to cause or allow the creation of any noise, which exceeds the one-hour average sound level limits in Table 36.404, when the one-hour average sound level is measured at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise.
- b) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit, which authorizes the noise-generating use or activity and the decision making body approving the Major Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a) above.
- c) S88 zones are Specific Planning Areas which allow different uses. The sound level limits in Table 36.404

above that apply in an S88 zone depend on the use being made of the property. The limits in Table 36.404, subsection (1) apply to property with a residential, agricultural or civic use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52 or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

- d) If the measured ambient noise level exceeds the applicable limit in Table 36.404, the allowable one-hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.
- e) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones. The one-hour average sound level limit applicable to extractive industries, however, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone in which the extractive industry is located.
- f) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section measured at or beyond six feet from the boundary of the easement upon which the facility is located.

According to the stationary source exterior noise standards, no person shall operate any source of sound at any location within the County or allow the creation of any noise on a property which causes the noise levels to exceed the exterior noise limits at the property boundary. Additionally, Section 36.404(e) states that the sound level limits at a location on a boundary between two zones are the arithmetic mean of the respective limits for the two zones.

3.2 Potential Noise Impacts

This section examines the potential stationary noise source impacts associated with the development and operation of the proposed project. The Project site is zoned Rural Residential (RR) and surrounding residential to the west, east and south are zoned RS and RR. The property to the north is zoned commercial. Section 36.404 of the Noise Ordinance states that the sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones.

Section 36.404 sets an operational exterior noise limit of 50 dBA Leq for daytime hours of 7 a.m. to 10 p.m. and 45 dBA Leq during the nighttime hours of 7 p.m. to 10 p.m. for the property and surrounding residential noise sensitive land uses as shown in Table 3-1 above. The Project operations of the self-storage facility will only occur during the daytime and evening hours between 7 a.m. and 10 p.m. The daytime property line standards per Section 36.404 (e) for the project and adjacent uses are provided below in Table 3-2.

Table 3-2: Property Line Sound Level Limits in Decibels (dBA)

Property Line	Adjacent Land Use Zone	Adjacent Property Line Standard	Project's Property Line Standard
		7 a.m. to 10 p.m.	7 a.m. to 10 p.m.
North	RR	50	55
South	RR	50	55
East	RS	50	55
West	RR	50	55

Based on similar operational uses for self-storage facilities, on-site operational noise sources for this proposed project will be anticipated to include a moving truck utilized daily and one 3-ton HVAC unit would be required to provide climate control for the office. No climate control of the storage units is proposed.

3.3 Reference Noise Levels

This section provides a detailed description of the reference noise level measurement results. It is important to note that the following projected noise levels assume the worst-case noise environment with the moving trucks and roof-top mounted mechanical ventilation (HVAC) all occurring at the same time. In reality, these noise levels will vary throughout the day. The mechanical ventilation may operate during nighttime hours but all other operations will only occur during the daytime hours. Based on a Tractor Supply facility in Lakeside, the project related noise sources are provided in Table 3-3 (Source: Tractor Supply Company Community of Lakeside Acoustical Analysis Report, Arcadis 2014).

Table 3-3: Project Related Operational Noise Sources

Quantity	Equipment Description	Manufacturer	Frequency	Related Sound Level Distance (ft)	Noise Level (dBA)
1	Moving Trucks "reverse signal"	ECCO	Daily for 2.5 minutes each for unloading	4	87.0
1	3-ton rooftop HVAC unit	York (Model: ZJ037N07B4MAD5)	100%	3	67.0

Source: Tractor Supply Company Community of Lakeside Acoustical Analysis Report, Arcadis 2014.

Fixed or point sources radiate outward uniformly as sound travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance. Using a point-source noise prediction model, calculations of the expected operational noise impacts were completed. The essential model input data for these performance equations include the source levels of each type of equipment, relative source to receiver horizontal and vertical separations, the amount of time the equipment is operating in a given day (also referred to as the duty-cycle) and any transmission loss from topography or barriers. Noise levels drop 3 decibels each time the duration of the source is reduced in half. Therefore, hourly moving truck noise level over a 2.5 minute period would be reduced 13.8 decibels to 73.2 dBA at a distance of 4 feet based on the limited time of operation.

The noise levels for each source along with the calculated hourly noise levels based upon individual operating times are shown below in Table 3-4 for the eastern residential property line, Table 3-5 for the southern residential property line, and Table 3-6 for the western residential property line. The northern property line, zoned commercial, is located farther from the operational activities and will be shielded by the proposed buildings. No reductions from any parapet walls were incorporated into the modeling.

Also, included in Table 3-4 through Table 3-6 is the relative property line standards for clarity. The combined noise levels at the adjacent property lines based upon distance separation and limited duty-cycles were projected to be below the County’s Noise Ordinance Section 36.404 standards with no barriers or shielding of the equipment. Therefore, no impacts are anticipated and no mitigation is required for the operations.

Additionally, as can be seen in Tables 3-4 thru 3-6, the HVAC units that could operate during the nighttime hours are well below the 45 dBA Leq noise standard. Therefore, no nighttime noise impacts are anticipated and no mitigation is required.

Table 3-4: Operational Noise Levels (Eastern Property Line)

Source	Cumulative Noise Level (dBA)	Reference Distance (Feet)	Distance to Property Line (Feet)	Duty Cycle (Seconds/Hour)	Resultant Cumulative Noise Level (dBA Leq)
Moving Trucks	87.0	4	60	150	49.7
3-ton HVAC	67.0	3	202	900	27.4
CUMULATIVE NOISE LEVEL @ PROPERTY LINE (dBA)					49.7
Property Line Standard					50
Complies with Section 36.404					Yes

Table 3-5: Operational Noise Levels (Southern Property Line)

Source	Cumulative Noise Level (dBA)	Reference Distance (Feet)	Distance to Property Line (Feet)	Duty Cycle (Seconds/Hour)	Resultant Cumulative Noise Level (dBA Leq)
Moving Trucks	87.0	4	60	150	49.7
3-ton HVAC	67.0	3	390	900	21.7
CUMULATIVE NOISE LEVEL @ PROPERTY LINE (dBA)					49.7
Property Line Standard					50
Complies with Section 36.404					Yes

Table 3-6: Operational Noise Levels (Western Property Line)

Source	Cumulative Noise Level (dBA)	Reference Distance (Feet)	Distance to Property Line (Feet)	Duty Cycle (Seconds/Hour)	Resultant Cumulative Noise Level (dBA Leq)
Moving Trucks	87.0	4	60	150	49.7
3-ton HVAC	67.0	3	106	900	33.0
CUMULATIVE NOISE LEVEL @ PROPERTY LINE (dBA)					49.8
Property Line Standard					50
Complies with Section 36.404					Yes

3.4 Conclusions

Based upon the property line noise levels determined above none of the proposed noise sources directly or cumulatively exceeds the daytime or nighttime property line standards at the shared property lines. Therefore, the proposed developments related operational noise levels comply with the noise standards at the property lines. No Impacts are anticipated and no mitigation is required.

4.0 SUMMARY OF PROJECT IMPACTS, MITIGATION & CONCLUSIONS

- Construction Noise Analysis

The construction equipment will be spread out over the project site from distances near the occupied property to distances of over 150-feet away. Based upon the proposed site plan, most of the combined construction operations will be more than 75-feet away from the adjacent property lines. It was determined that at average distances over 75-feet the construction activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 75-feet no impacts are anticipated. Additionally, no offsite construction is proposed.

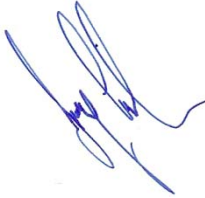
No blasting or rock crushing is required. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

- Operational Analysis

Based upon the property line noise levels determined above none of the proposed noise sources directly or cumulatively exceeds the daytime or nighttime property line standards at the shared property lines. Therefore, the proposed developments related operational noise levels comply with the noise standards at the property lines. No Impacts are anticipated and no mitigation is required.

5.0 CERTIFICATIONS

The contents of this report represent an accurate depiction of the future acoustical environment and impacts within and surrounding the ACE Self Storage development. The report was prepared by Jeremy Loudon; a County approved CEQA Consultant for noise.



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Date July 24, 2018