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June 24, 2024

Mr. Brian Sorensen
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19191 S. Vermont Avenue, Suite 680
Torrance, CA 90502

Reference: Noise Analysis for the Quarry Road Self-Storage and RV Parking Facility Project (Project Number PDS2021-MUP-21-009; RECON Number 9891)

Dear Mr. Sorensen:

The purpose of this report is to assess potential noise impacts from construction and operation of the Quarry Road Self-Storage Facility Project (project). This analysis was prepared in accordance with the County of San Diego (County) Guidelines for Determining Significance and Report Format and Content Requirements, Noise (County Noise Guidelines) (County of San Diego 2009).

- Project Common Name: Quarry Road Self-Storage Facility Project
- Project Numbers: PDS2021-MUP-21-009
- Date: June 24, 2024
- County-approved Preparer: Jessica Fleming
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- Project Proponent: Mr. Brian Sorensen
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  19191 S. Vermont Avenue, Suite 680
  Torrance, CA 90502
- Prepared for the County of San Diego (County)

1.0 Introduction

1.1 Project Description

The project site consists of three parcels in the unincorporated community of Bonita-Sunnyside in San Diego County. It is situated just east of Quarry Road at the intersection with Sweetwater Road, approximately 0.33 mile south of the State Route (SR) 125/SR-54 interchange. Figure 1 shows the regional location of the project. Figure 2 shows an aerial photograph of the project site and vicinity.

Project Location

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FIGURE 1
Regional Location

Image Source: NearMap (flown April 2021)

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FIGURE 2
Project Location on Aerial Photograph

The project is a Major Use Permit (MUP) to develop a mini self-storage facility on an approximately 10.74-acre parcel. The proposed MUP boundary would be limited to 4.99 acres pursuant to Zoning Ordinance Section 2185.c. While the MUP boundary is 4.99 acres, the project includes a fuel management zone, limited building zone, trail, pathway and frontage improvements that bring the total area of disturbance to 9.03 acres both within the 10.74-acre parcel and within off-site areas (such as grading for the realignment of Quarry Road). The project proposes to develop a 1,023-unit, 132,425-square-foot storage facility and a 1,000-square-foot leasing office and will include 109 recreational vehicle (RV) parking spaces and 21 standard passenger vehicle parking spaces for customers and employees. There will be 5 loading spaces provided by the entrances to the storage building. Additionally, the project proposes to develop and enhance the trails system at the boundary of the development for public benefit. The project includes the dedication of a biological open space easement over 1.97 acres located in the northern portion of the project site, which would be separated from the MUP boundary by lodgepole fencing and include open space signage. The project will improve Quarry Road along the project's entire frontage from a 20-foot improved width to varying 26 feet to 32 feet wide plus a 10-foot-wide pathway parallel to Quarry Road. The site would operate from 8 a.m. to 8 p.m., seven days per week, 361 days a year. The site is currently vacant and undeveloped. Fire service is provided by the Bonita-Sunnyside Fire Protection District. Water service is provided by Sweetwater Authority. Sewer service is provided by San Diego County Sanitation District. School service is not required as the project does not propose residential uses. The project proposes approximately 8.3 acres of grading and will require approximately 30,275 cubic yards of cut and 22,535 cubic yards yard of fill. Approximately 7,740 cubic yards of material will be exported. The site is subject to the General Plan Regional Category Village and General Plan Land Use Designation Village Residential 2 (VR-2). Zoning for the site is Rural Residential (RR). The project is located directly to the east of Sweetwater Road and is directly to the south of State Routes 54 and 125 in the Sweetwater Community Planning Area within unincorporated San Diego County (Assessor Parcel Numbers 586-050-36, -44, and -48). Figure 3 shows the proposed site plan.

1.2 Environmental Settings and Existing Condition

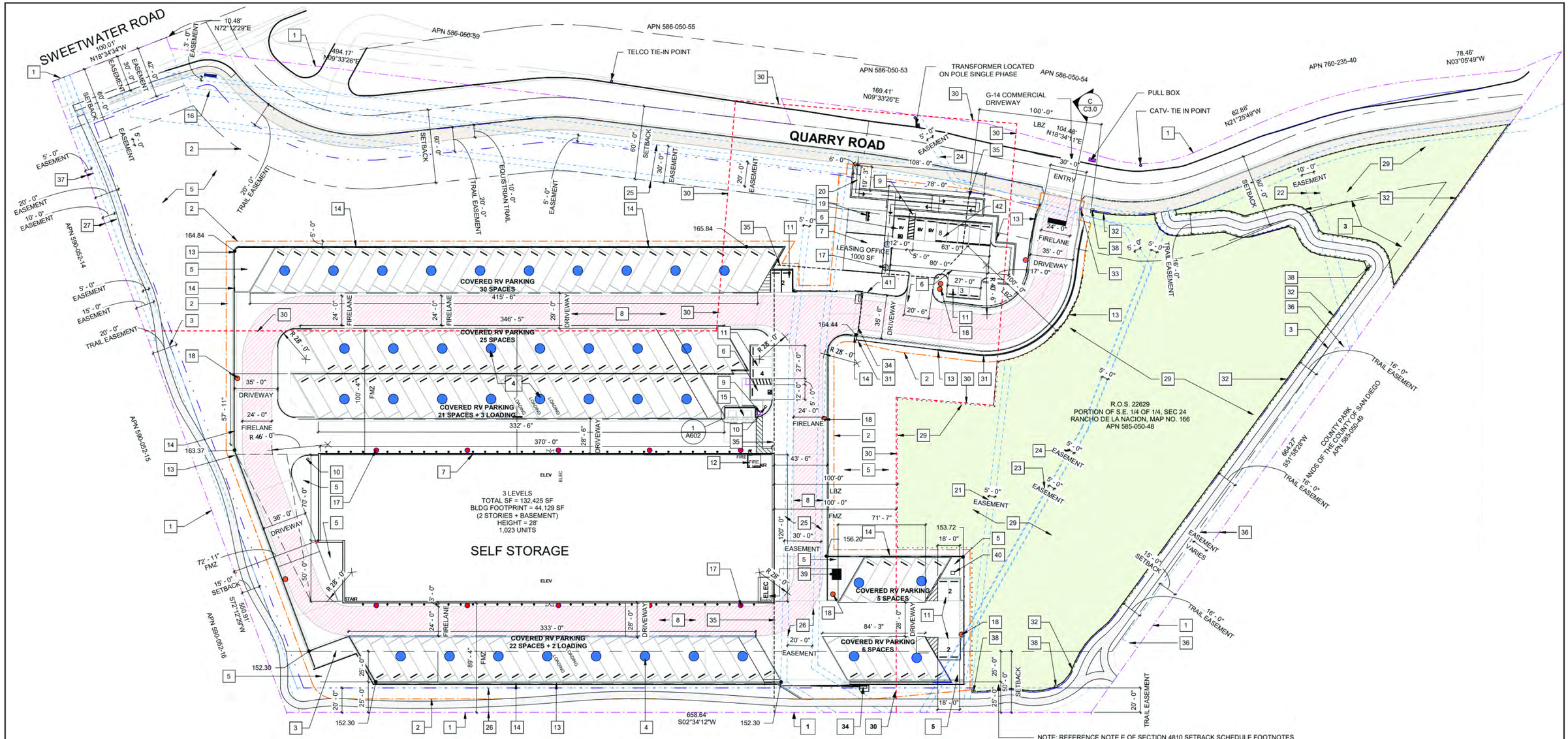
1.2.1 Noise Terminology

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is generally defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in the extreme, hearing impairment.

The unit of measurement used to describe a sound, or noise, level is the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. A 10 dB increase represents a 10-fold increase in sound intensity, a 20 dB change is a 100-fold difference, 30 dB is a 1,000-fold increase, etc. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease.

Additionally, in technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while commonly confused are two distinct characteristics of sound. Both share the same unit of measure, the dB. However, sound power is the energy converted into sound by the source. The sound power level of the source is expressed as L_{pw}. Equipment sound power ratings are determined in an acoustics laboratory, usually by the manufacturer or an independent test lab. Testing facilities utilize specific standards and methods to promote data uniformity and allow objective comparisons across industries. The L_{pw} is used to estimate how far a noise will travel and to predict the sound levels at various distances from the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an ear drum or microphone and is the sound pressure level. Noise measurement instruments only measure sound pressure.

Map Source: roZEN



1. PROPERTY LINE.
2. MUP BOUNDARY.
3. SETBACK LINE.
4. LIGHT FIXTURE, SEE LEGEND AND LIGHTING PLAN.
5. LANDSCAPE AREA, SEE LANDSCAPE SHEETS.
6. PROPOSED ACCESSIBLE PARKING.
7. BUILDING FOOTPRINT.
8. 24' FIRE ACCESS DRIVE AISLE.
9. TRUNCATED DOMES, SEE CIVIL.
10. PROPOSED FIRE HYDRANT, SEE UTILITIES.
11. PROPOSED STANDARD PARKING TO MEET MIN. REQUIREMENT OF 9'x18' STALL.
12. FIRE RISER.
13. RETAINING WALL , SEE SHEET A11 & A401
14. 6'-0" WROUGHT IRON FENCING, SEE SHEET A111.
15. TRASH ENCLOSURE, SEE SHEET A602.
16. MONUMENT SIGN, SEE SIGNAGE ON SHEET A903.
17. EXTERIOR WALL PACK LIGHT FIXTURES, SEE LEGEND AND LIGHTING PLAN
18. EXTERIOR POLE LIGHTING, SEE LEGEND AND LIGHTING PLAN
19. BICYCLE RACK FOR 3 BICYLES.
20. ADA RAMP FROM QUARRY ROAD, SEE CIVIL FOR FINAL SLOPES.
21. SPRING VALLEY SANTIATION DISTRICT SEWER EASEMENT.
22. 10' WATER PIPE LINE EASEMENT
23. 5' WATER PIPE LINE EASEMENT.
24. 5' WATER PIPE LINE EASEMENT.
25. 30' SOUTH BAY IRRIGATION WATER MAIN EASEMENT.
26. 20' SPRING VALLEY SANITATION DISTRICT ACCESS EASEMENT.
27. 10' CALIFORNIA WATER AND TELEPHONE COMPANY SEWER MAIN EASEMENT.
28. 42' PUBLIC HIGHWAY EASEMENT.
29. BIOLOGICAL OPEN SPACE EASEMENT
30. 100' FUEL MANAGEMENT ZONE (FMZ)
31. 6' WOOD FENCING, SEE SHEET A111.
32. 4' LODGE POLE FENCING AT BIOLOGICAL OPEN SPACE EASEMENT.
33. WAYFINDING SIGN, SEE SIGNAGE ON SHEET A903.
34. LIFT GATE, SEE SHEET A111 FOR DETAILS.
35. LIMITED BUILDING ZONE (LBZ).
36. SAN DIEGO COUNTY GAS AND ELECTRIC COMPANY PUBLIC UTILITES EASEMENT.
37. 5' WIDE EASEMENT FOR WATER PIPE LINE PURPOSES PER SURVEY (NOTE15)
38. BIOLOGICAL OPEN SPACE EASEMENT SIGN. (SEE NOTES)
39. ELECTRICAL TRASNFORMER.
40. SOLAR BATTERY.
41. KEY BOX FOR SWEETWATER AUTHORITY AND SANITATION.
42. EV CAPABLE STANDARD PARKING, TO MEET MIN. REQUIREMENT OF 9'x18' STALL.

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FIGURE 3
Site Plan

The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, a method called "A-weighting" is used to filter noise frequencies that are not audible to the human ear. A-weighting approximates the frequency response of the average young ear when listening to most ordinary everyday sounds. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the "A-weighted" levels of those sounds. Therefore, the A-weighted noise scale is used for measurements and standards involving the human perception of noise. In this report, all noise levels are A-weighted and dB(A) is understood to identify the A-weighted decibel.

In addition to noise levels, the duration or exceedance of noise over time is also important for the assessment of potential noise disturbance. Average noise levels over a period of minutes or hours are usually expressed as dB(A) L_{eq}, or the equivalent noise level for that period. The period of time averaged may be specified; $L_{eq(3)}$ would be a 3-hour average; when no period is specified, a 1-hour average is assumed.

The timing of noise is also an important factor to consider in assessing potential noise impacts as noise levels that may be acceptable during the day may create disturbance during evening or nighttime hours. Community noise equivalent level (CNEL) is the energy average of the A-weighted sound levels occurring during a 24-hour period, with a 5 dB(A) penalty added to the sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dB(A) added to the sound levels occurring between 10:00 p.m. and 7:00 a.m.

Human perception of noise has no simple correlation with acoustical energy. A sound power is the energy converted into sound by the source. The sound power level of a source is expressed as L_{pw}. The L_{pw} is used to estimate how far a noise will travel and to predict the sound pressure levels at various distances from the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an ear drum or microphone.

The perception of noise is not linear in terms of dB(A) or in terms of acoustical energy. Two equivalent noise sources do not sound twice as loud as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dB(A), increase or decrease; that a change of 5 dB(A) is readily perceptible; and that an increase (decrease) of 10 dB(A) sounds twice (half) as loud (California Department of Transportation [Caltrans] 2013a).

From the source to the receiver, noise changes both in level and frequency spectrum. The most obvious change is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on the following important factors: ground absorption, atmospheric effects and refraction, shielding by natural and man-made features, noise barriers, diffraction, and reflection. For a point or stationary noise source, such as construction equipment, the attenuation or drop-off in noise level would be at least -6 dB(A) for each doubling of unobstructed distance between source and the receiver and could increase to -7.5 dB(A) depending on the acoustic characteristics of the intervening ground. For a linear noise source, such as vehicles traveling on a roadway, the attenuation or drop-off in noise level would be approximately -3 dB(A) for each doubling of unobstructed distance between source and the receiver and could increase to -4.5 dB(A) depending on the acoustic characteristics of the intervening ground.

A large object in the path between a noise source and a receiver can significantly attenuate noise levels at that receiver. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features, such as hills and dense woods, as well as man-made features, such as buildings and walls, can significantly alter noise levels. Walls or berms are often specifically used to reduce or attenuate noise.

Noise-sensitive receptors are generally considered humans engaged in activities, or occupying land uses, that may be subject to the stress of significant interference from noise. Human activities usually associated with sensitive receptors include, but are not limited to, talking, reading, and sleeping. Land uses associated with noise sensitive human

receptors include residential dwellings including mobile homes, hotels/motels, hospitals, nursing homes, educational facilities, and libraries. In addition to human receptors, protected animal species and their habitats may be considered sensitive noise receptors, especially during their breeding season.

1.2.2 Settings and Location

The 10.73-acre project site is zoned RR (Rural Residential) and is currently undeveloped. The project site is surrounded by residential uses to the south and west, a golf course to the southeast, and open space and SR-125 to the east and north. The surrounding properties are zoned RR (Rural Residential) and A70 (Agriculture).

1.2.3 Existing Noise Conditions

Existing noise levels in the vicinity of the project site were measured on August 10, 2021, using one Larson-Davis Model LxT, Type 1 Integrating Sound Level Meter, serial number 3898. The following parameters were used:

Filter:	A-weighted
Response:	Slow
Interval Period	1 minute
Time History Period:	5 seconds

The meter was calibrated before measurement. The meter was set five feet above the ground level for each measurement. The weather was mostly sunny with a temperature of approximately 77 degrees Fahrenheit and a slight breeze during the measurement period. Figure 4 shows the noise measurement locations. Noise measurement data is provided in Attachment 1.

Measurement 1 was located near the southwestern property boundary, approximately 50 feet from Sweetwater Road. The main source of noise during the measurement period was vehicle traffic on Sweetwater Road. Other sources of noise included aircraft flyovers and residents in the adjacent homes. Noise levels were measured for 15 minutes, and traffic on Sweetwater Road was counted. During the 15-minute measurement period, 99 automobiles and 4 medium trucks were observed. The average measured noise level was 58.2 dB(A) L_{eq}.

Measurement 2 was located near the eastern property line. The main source of noise during the measurement period was vehicle traffic on SR-125 to the northeast. Other sources of noise included aircraft flyovers. Noise levels were measured for 15 minutes. The average measured noise level was 56.6 dB(A) L_{eq}.

Table 1 summarizes the measured noise levels.

Table 1
Noise Measurements

Measurement	Location	Time	Main Noise Sources	L_{eq}
1	Near southwest property line, 50 feet from Sweetwater Road	10:57 a.m. – 11:12 a.m.	Vehicle traffic on Sweetwater Road	58.2
2	Eastern property line southwest of SR-125.	11:25 a.m. – 11:40 a.m.	Vehicle traffic on SR-125	56.6
NOTE: Noise measurement data is contained in Attachment 1. L_{eq} = equivalent noise level				

Image Source: NearMap (flown January 2022)

Project Boundary

Noise Measurement Locations

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FIGURE 4
Noise Measurement Locations

1.3 Methodology

Noise level predictions and contour mapping for construction and on-site noise sources were developed using noise modeling software, SoundPLAN Essential, version 4.1 (Navcon Engineering 2018). SoundPLAN calculates noise propagation based on the International Organization for Standardization method (ISO 9613-2 – Acoustics, Attenuation of Sound during Propagation Outdoors). The model calculates noise levels at selected receiver locations using input parameter estimates such as total noise generated by each noise source; distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. The model outputs can be developed as noise level contour maps or noise levels at specific receivers. In all cases, receivers were modeled at 5 feet above ground elevation, which represents the average height of the human ear. Noise levels were modeled at the adjacent residential receivers (Receivers 1 through 10) and at the adjacent habitat (Receivers 11 through 15).

1.3.1 Project Operation

The operational noise sources on the project site are anticipated to be those that would be typical of any self-storage facility. Based on similar operational uses for self-storage facilities, on-site operational noise sources associated with the project are anticipated to be RVs, moving trucks and heating, ventilations, and air conditioning (HVAC) units.

RV noise at the project site would include idling and air brake activity. Based on noise measurements taken at an RV facility, RV idling and air brakes generate a noise level of 62.4 dB(A) L_{eq} at 50 feet (Urban Crossroads 2017). It was assumed that it would take an RV up to five minutes to park. Taking this duration into account, hourly noise levels would be 51.6 dB(A) L_{eq} at 50 feet, which is equivalent to a sound power level of approximately 83 dB(A). This noise level was modeled as two area sources at RV parking locations on the west and east side of the proposed building.

The main noise source associated with moving trucks would be the reverse signals. Based on measurements taken at a similar facility, reverse signals generate a noise level of 87.0 dB(A) at four feet and operate for approximately 2.5 minutes for each unloading event. Taking this duration into account, hourly noise levels would be 73.2 dB(A) L_{eq} at four feet (Ldn Consulting Inc. 2018), which is equivalent to a sound power level of 82.9 dB(A). This noise level was modeled at the western and eastern storage facility entrances.

The project would be mechanically air conditioned by rooftop HVAC and condenser units. Based on review of manufacturer specifications for a sample unit (Trane Model T/YSCE120ED), a representative noise level for a 10-ton unit would be a sound power level of 79 dB (Attachment 2). Typically, a capacity of one ton per 340 square feet would be required for large office buildings. It was assumed that the storage facility would have similar cooling requirements. Based on this ratio, the storage facility would require a capacity equivalent to 39 10-ton units. Additionally, the office would also include an HVAC unit. It was assumed that this unit would be similar to a 3-ton Carrier unit (Carrier Model 50VG-A) with a sound power level of 73 dB (Attachment 2). All HVAC units were modeled at full capacity during the daytime and nighttime hours.

The project access hours would be 6:00 a.m. to 10:00 p.m. As a worst-case analysis, noise sources were modeled during the daytime and nighttime hours.

1.3.2 Project Construction

Project construction activities would include grading and paving. Project construction noise would be generated by diesel engine-driven construction equipment used for site preparation and grading, building construction, loading, unloading, and placing materials and paving. Diesel engine-driven trucks also would bring materials to the site and remove the soils from excavation.

Construction equipment with a diesel engine typically generates maximum noise levels from 70 to 95 dB(A) L_{eq} at a distance of 50 feet (Federal Highway Administration [FHWA] 2006 and 2008, Federal Transit Authority 2006). During construction, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Table 2 summarizes typical construction equipment noise levels and duty cycles.

The loudest construction noise levels typically occur during the grading phase. Grading noise levels were modeled assuming the simultaneous operation of a dozer, an excavator, and a grader for a total sound power level of 117.4 dB(A) L_{pw}. The northern portion of the project site would be dedicated as an open space with park and equestrian amenities. The project proposes only minimal ground disturbance in the proposed open space to create the equestrian trails. However, as a conservative construction noise analysis, noise levels were modeled as an area source over the entire footprint of the project site.

Table 2
Typical Construction Equipment Noise Levels

Equipment	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
Auger Drill Rig	85	20%
Backhoe	80	40%
Blasting	94	1%
Chain Saw	85	20%
Clam Shovel	93	20%
Compactor (ground)	80	20%
Compressor (air)	80	40%
Concrete Mixer Truck	85	40%
Concrete Pump	82	20%
Concrete Saw	90	20%
Crane (mobile or stationary)	85	20%
Dozer	85	40%
Dump Truck	84	40%
Excavator	85	40%
Front End Loader	80	40%
Generator (25 kilovolt amps or less)	70	50%
Generator (more than 25 kilovolt amps)	82	50%
Grader	85	40%
Hydra Break Ram	90	10%
Impact Pile Driver (diesel or drop)	95	20%
In situ Soil Sampling Rig	84	20%
Jackhammer	85	20%
Mounted Impact Hammer (hoe ram)	90	20%
Paver	85	50%
Pneumatic Tools	85	50%
Pumps	77	50%
Rock Drill	85	20%
Roller	74	40%
Scraper	85	40%
Tractor	84	40%
Vacuum Excavator (vac-truck)	85	40%
Vibratory Concrete Mixer	80	20%
Vibratory Pile Driver	95	20%

SOURCE: Federal Highway Administration 2006 and 2008; Federal Transit Authority 2006.
dB(A) L_{eq} = A-weighted decibels average noise level

2.0 Project-Generated Airborne Noise

2.1 Guidelines for Determination of Significance

2.1.1 Operation

The County Noise Ordinance, Section 36.404, sets limits on the noise levels generated from one property to another, such as from mechanical equipment. It is unlawful for a person to cause or allow noise generated on a particular property to exceed the 1-hour average sound level, at any point on or beyond the boundaries of the property, as shown in Table 3.

Table 3
County of San Diego Noise Ordinance Sound Level Limits

Zone	Applicable Hours	Sound Level Limit dB(A) L_{eq}
(1) RS, RD, RR, RMH, A70, A72, S80, S81, S90, S92, RV, and RU with a General Plan Land Use Designation density of less than 10.9 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
(2) RRO, RC, RM, S86, V5, RV and RU with a General Plan Land Use Designation density of 10.9 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
(3) S-94, V4 and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
(4) V1 V2 V1 V2 V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m. 7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 55 50 70 65
(5) M-50, M-52, and M-54	Anytime	70
(6) S82, M56 and M58	Anytime	75
(7) S88 (see subsection (c) below)		

SOURCE: County Noise Ordinance, Section 36.404.
dB(A) L_{eq} = A-weighted decibels average noise level
Notes:
(a) Except as provided in section 36.409, 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 MUP, which authorizes the noise-generating use or activity and the decision making body approving the MUP 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 for different uses. The sound level limits in Table 3 above that apply in an S88 zone depend on the use being made of the property. The limits in Table 3, 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 6 feet from the boundary of the easement upon which the facility is located.

The project site is zone RR (Rural Residential) and the surrounding properties are zone RR (Rural Residential) and A70 (Agriculture). Therefore, the applicable noise level limits are 50 dB(A) L_{eq} during the daytime hours from 7:00 a.m. to 10:00 p.m. and 45 dB(A) L_{eq} during the nighttime hours from 10:00 p.m. to 7:00 a.m.

2.1.2 Construction

Section 36.409 states:

> Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause the construction equipment to be operated, exceeding an average sound level of 75 dB(A) for an 8-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.

Section 36.410 states:

> 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 4, 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 4 are as described in the County Zoning Ordinance.

Table 4 [County Noise Ordinance Table 3.6410A] Maximum Sound Level (Impulsive) Measured at Occupied Properties for Public Road Projects	
Occupied Property Use	Noise Level [dB(A)]
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85
dB(A) L_{eq} = A-weighted decibels	

> (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 5, 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 5 are as described in the County Zoning Ordinance.

Table 5 [County Noise Ordinance Table 3.6410B] Maximum Sound Level (Impulsive) Measured at Occupied Properties	
Occupied Property Use	Noise Level [dB(A)]
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90
dB(A) L_{eq} = A-weighted decibels	

(c) The minimum measurement period for any measurements conducted under this section shall be 1 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.

2.1.3 Biological Guidelines

Habitat suitable for the coastal California gnatcatcher (*Polioptila californica californica*) is located along the eastern/northeastern project boundary, and habitat suitable for the least Bell's vireo (*Vireo bellii pusillus*) is located approximately 150 feet east of the project site. Nesting birds may be adversely affected by high noise levels through either interference with nest-tending activities and/or interference or "masking" of auditory communication. Generally, during the breeding season of federally endangered species, noise levels are required by the County to be less than 60 decibels dB(A) L_{eq} or the ambient noise level, whichever is greater. The coastal California gnatcatcher breeding season occurs from March 1 to August 15, and the least Bell's vireo breeding season occurs from March 15 to September 15.

2.2 Potential Operational Noise Impacts (Non-Construction Noise)

2.2.1 Potential Build-out Noise Conditions without Mitigation

2.2.1.1 On-site Noise Sources

The operational noise sources on the project site are anticipated to be those that would be typical of any self-storage facility. Based on similar operational uses for self-storage facilities, on-site operational noise sources associated with the project are anticipated to be RVs, moving trucks and HVAC units. Using the on-site noise source parameters discussed in Section 1.3.1, noise levels were modeled at a series of 15 receivers located at the adjacent residential properties and the adjacent open space.

Figure 5 shows the operational noise contours along with the modeled receivers. SoundPLAN data is included in Attachment 3. Future projected noise levels are summarized in Table 6.

As shown, noise levels at the adjacent residential and golf course receivers would range from 38 to 43 dB(A) L_{eq} and would not exceed the applicable noise ordinance limits. Additionally, noise levels at the adjacent habitat would range from 33 to 48 dB(A) L_{eq} and would not exceed 60 dB(A) L_{eq}. Therefore, impacts due to noise generated on the project site would be less than significant. Additionally, as noted previously, the vans would only be active on-site during two periods in the morning and the evening and would not be continuous throughout the day.

Image Source: NearMap (flown January 2022)

Project Boundary
Site Plan
Building
Receivers

Noise Sources
HVAC
Moving Truck
RV Parking Area

Operational Noise
40 dB(A) L_{eq}
45 dB(A) L_{eq}
50 dB(A) L_{eq}
55 dB(A) L_{eq}

0 Feet 150

FIGURE 5
Operational Noise Contours

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Table 6 Operational Noise Levels			
Receiver	Use (Zone)	Operational Noise Level [dB(A) L_{eq}]	Noise Level Limit Daytime/Nighttime [dB(A) L_{eq}]
1	Residential (RR)	39	50/45
2	Residential (RR)	40	50/45
3	Residential (RR)	42	50/45
4	Residential (RR)	43	50/45
5	Residential (RR)	43	50/45
6	Residential (RR)	38	50/45
7	Residential (RR)	41	50/45
8	Residential (RR)	42	50/45
9	Residential (RR)	42	50/45
10	Golf Course (A70)	40	50/45
11	CAGN Habitat (A70)	48	60
12	CAGN Habitat (A70)	47	60
13	CAGN Habitat (A70)	45	60
14	CAGN Habitat (A70)	40	60
15	LBV Habitat (A70)	33	60
dB(A) L_{eq} = A-weighted decibels equivalent noise level; CAGN = California gnatcatcher; LBV = least Bell's vireo			

2.2.1.2 Vehicle Traffic Noise

The project was also evaluated to determine if the addition of project-generated trips would result in a significant direct or cumulative increase in noise at nearby noise sensitive land uses. The project would increase traffic volumes on local roadways, specifically Sweetwater Road. Noise level increases would be greatest nearest the project site, which would represent the greatest concentration of project-related traffic. Traffic noise is primarily a function of volume, vehicle mix, speed, and proximity. For purposes of this evaluation, the vehicle mix, speed, and proximity are assumed to remain constant. Thus, the primary factor affecting noise levels would be increased traffic volumes. Existing traffic volumes, project traffic volumes, vehicle speed and truck mixes were obtained from the Transportation Assessment prepared for the project (Kimley-Horn 2021). Vehicle traffic noise was calculated using FHWA algorithms. The vehicle classification mix on Sweetwater Road is 84 percent automobiles, 14 percent medium trucks, and 2 percent heavy trucks. A speed of 50 miles per hour was modeled. The modeled noise levels are summarized in Table 7. Calculations are contained in Attachment 4.

Table 7 Sweetwater Road Noise Levels		
	Average Daily Traffic	Noise Level at 50 Feet (CNEL)
Sweetwater Road - Project Only	191	54.8
Sweetwater Road – Without Project	8,440	71.2
Sweetwater Road – With Project	8,631	71.3
Source: Kimley-Horn 2021		

As shown, project-only traffic would generate a noise level of approximately 55 CNEL at nearby land uses adjacent to Sweetwater Road. The project would not expose noise sensitive land uses to noise levels in excess of 60 CNEL.

Typically, a project would have to double the traffic volume on a roadway in order to have a significant direct noise increase of 3 dB or more or to be major contributor to the cumulative traffic volumes. An increase of 191 trips on Sweetwater Road would result in a noise increase of 0.1 dB, which would not be an audible change in noise levels. Therefore, the project would not result in the exposure of noise sensitive land uses to significant noise levels, and impacts would be less than significant.

2.2.2 Design Considerations and Mitigation Measures

On-site generated noise impacts would be less than significant; therefore, no mitigation would be required.

2.3 Potential General Construction Noise Impacts

2.3.1 Potential Temporary Construction Noise Impacts without Mitigation

Noise associated with project construction would potentially result in short-term impacts to surrounding properties. To reflect the nature of grading activities, equipment was modeled as an area source distributed over the project footprint. The total sound energy of the area source was modeled with the simultaneous operation of a dozer, excavator, and grader. Noise levels were modeled at a series of 15 receivers located at the adjacent residential properties and the adjacent habitat. The results are summarized in Table 8. Modeled receiver locations and construction noise contours are shown on Figure 6. SoundPLAN data is contained in Attachment 5.

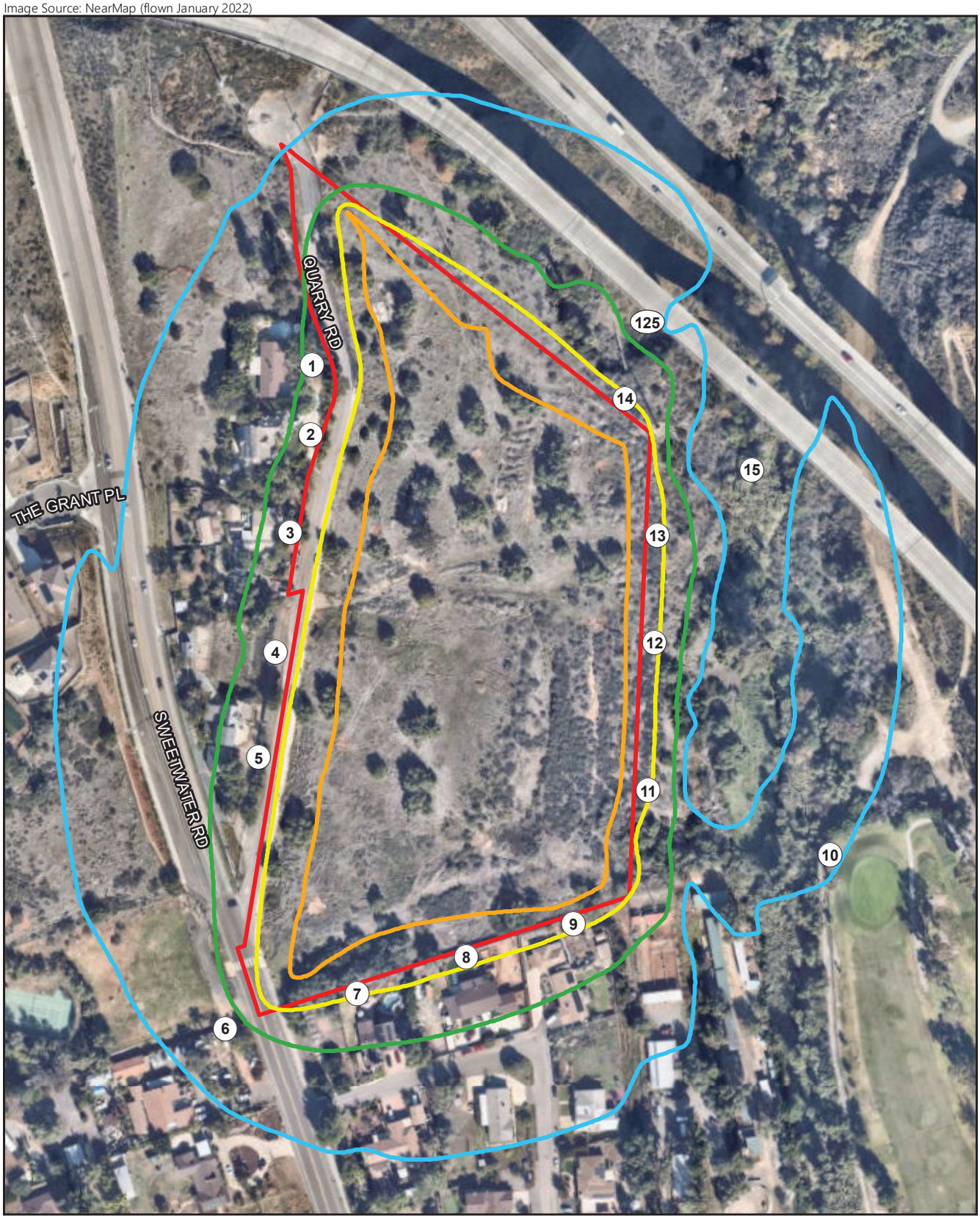
Table 8
Construction Noise Levels

Receiver	Use (Zone)	Construction Noise Level [dB(A) L_{eq}]	Noise Level Limit [dB(A) L_{eq}]
1	Residential (RR)	66	75
2	Residential (RR)	67	75
3	Residential (RR)	67	75
4	Residential (RR)	68	75
5	Residential (RR)	68	75
6	Residential (RR)	63	75
7	Residential (RR)	70	75
8	Residential (RR)	71	75
9	Residential (RR)	71	75
10	Golf Course (A70)	60	--
11	CAGN Habitat (A70)	71	60
12	CAGN Habitat (A70)	71	60
13	CAGN Habitat (A70)	71	60
14	CAGN Habitat (A70)	70	60
15	LBV Habitat (A70)	59	60

dB(A) L_{eq} = A-weighted decibels equivalent noise level; CAGN = California gnatcatcher; LBV = least Bell's vireo

As shown, construction noise levels are not anticipated to exceed 75 dB(A) L_{eq} at the adjacent residential properties. Although the existing adjacent residences would be exposed to construction noise levels that could be heard above ambient conditions, the exposure would be temporary. As construction activities associated with the project would comply with noise level limits from the County's Noise Ordinance, temporary increases in noise levels from construction activities would be less than significant at the adjacent residential uses.

Image Source: NearMap (flown January 2022)



Project Boundary
Receivers

Construction Noise
60 dB(A) L_{eq}
65 dB(A) L_{eq}
70 dB(A) L_{eq}
75 dB(A) L_{eq}

0 Feet 150

RECON

M:\JOBS5\9891\common_gis\fig6_nos.mxd 05/13/2022 bma

FIGURE 6
Construction Noise Contours

However, construction noise levels at the adjacent habitat are projected to exceed 60 dB(A) L_{eq}, therefore, impacts to nesting coastal California gnatcatchers would be potentially significant during the breeding season without mitigation. Noise levels at the nearest Least Bell's vireo habitat are not projected to exceed 60 dB(A) L_{eq}.

Further, blasting is not anticipated for the proposed project; however, should blasting occur, then monitoring would be required if done within 225 feet from an occupied noise sensitive land use. Blasting shall not exceed 0.1 inch per second (in/sec) peak particle velocity (PPV) at the nearest occupied residence in accordance with County Noise Guidelines Section 4.3. In addition, all blasting activities would comply with the requirements of the Sheriff's Department.

2.3.2 Design Considerations and Temporary Mitigation Measures

Construction activities from the loudest activities are not predicted to exceed County construction noise level limits at any property line or any property with an occupied structure; thus, no impacts are anticipated to occur and no mitigation measures are required for the adjacent residential uses. However, avoidance measures would be required to reduce potential construction noise impacts at the adjacent California gnatcatcher habitat. The Biological Resources Letter Report prepared for the project outlines the following avoidance measure (RECON 2021).

Coastal California gnatcatcher (federally listed threatened; California Department of Fish and Wildlife Species of Special Concern; County of San Diego Group 1; MSCP-covered species) was observed in Diegan coastal sage scrub on-site and was assumed to be nesting. Thus, all of the Diegan coastal sage scrub on-site (0.94 acre) would be considered occupied. The project would impact 0.94 acre of occupied Diegan coastal sage scrub habitat for this species (see Figure 6). This impact would be considered significant and would be avoided by grading outside of the breeding season. Indirect noise impacts to nesting coastal California gnatcatchers in the adjacent off-site habitat may occur if vegetation clearing, grubbing, grading, or construction is conducted during this species nesting season of March 1 to August 15 (County of San Diego 2010). Therefore, avoidance measures, which will be implemented by the applicant, are discussed below and are expected to avoid direct impacts and reduce the potential indirect impacts to a level of less than significant.

- To avoid impacts to coastal California gnatcatcher, grading, brush clearing, and all other construction within 500 feet of the edge of the site should be conducted between August 16 and February 28. However, if construction must occur between April 15 and September 1, the following actions would be required:
    - A qualified biologist shall conduct a pre-construction clearance survey for nesting birds within suitable adjacent habitat to determine whether avian species are nesting within 500 feet of the construction area.
    - If coastal California gnatcatcher is detected nesting within 500 feet of the construction boundary, construction activity should be avoided within 500 feet of the active nest, if possible. If construction must occur within 500 feet of an active nest temporary sound barriers may be required or grading may be restricted in construction areas near the nest site to reduce noise levels. Temporary sound barriers must be placed within the project footprint and not in the habitat. In addition, an acoustician shall measure noise levels during construction activities at the edge of the project footprint near the occupied habitat closest to the nest. Generally, noise levels are required by the County to be less than 60 dB averaged over a one-hour period on a dB(A) scale (i.e., 1 hour L_{eq}/dB[A]) or the ambient noise level, whichever is greater.
    - If no coastal California gnatcatcher are observed nesting within 500 feet of the project boundary, no grading or construction restrictions associated with coastal California gnatcatcher would apply. No restrictions are required for this species outside its nesting season.

3.0 Groundborne Vibration and Noise Impacts

3.1 Guidelines for Determination of Significance

Exposure of noise sensitive land uses to groundborne vibration and noise arising from operations related to, but not limited by, materials handling, blasting, transportation corridors, railroads, and extractive industries would be significant. Table 9 summarizes the County's guidelines for assessing groundborne vibration and noise impacts. For residential uses, the impact level is 0.0040 for frequent events, defined as 70 events per day, and the impact level is 0.010 for occasional or infrequent events, defined as fewer than 70 events per day. These impact levels typically apply to rapid transit and commuter rail as well as the industries listed above. However, the project does not propose any major, new, or expanded infrastructure such as mass transit, highways or major roadways or intensive extractive industry that could generate excessive groundborne vibration or groundborne noise levels on-site or in the surrounding area. However, construction equipment could produce groundborne vibration. As noted in footnote (6), non-transportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inch in/sec PPV. Based on this guidance, vibration impacts would be significant if the level exceeds 0.1 at the nearest noise sensitive land uses.

Table 9
Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts

Land Use Category	Groundborne Vibration Impact Levels (in/sec RMS)		Groundborne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior operations (research & manufacturing facilities with special vibration constraints)[6]	0.0018[3]	0.0018[3]	Not applicable[4,5]	Not applicable[4,5]
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, & other sleeping facilities)[6]	0.0040	0.010	35 dB(A)	43 dB(A)
Category 3: Institutional land uses with primarily daytime use (schools, churches, libraries, other institutions, & quiet offices)[6]	0.0056	0.014	40 dB(A)	48 dB(A)

SOURCE: County of San Diego 2009.
in/sec = inches per second; RMS = root mean square; dB = decibels; re = relative

1 "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

2 "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

3 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilation, and air conditioning systems and stiffened floors.

4 Vibration-sensitive equipment is not sensitive to groundborne noise.

5 There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 13 gives criteria for acceptable levels of groundborne vibration and noise for these various types of special uses.

6 For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the peak particle velocity (PPV) exceeds 0.1 inch per second. Nontransportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans and will be used to evaluate these continuous or transient sources in the County of San Diego.

3.1.1 Potential Groundborne Vibration and Noise Impacts without Mitigation

Construction activities produce varying degrees of ground vibration, depending on the equipment and methods employed. While ground vibrations from typical construction activities very rarely reach levels high enough to cause damage to structures, special consideration must be made when sensitive or historic land uses are near the construction site (Caltrans 2013b). The construction activities that typically generate the highest levels of vibration are blasting and impact pile driving. However, the project would not require pile driving. Further, blasting is not anticipated for the proposed project; however, should blasting occur, then monitoring would be required if done within 225 feet from an occupied noise sensitive land use. Each blast shall be monitored and recorded with an air-blast overpressure monitor and groundborne vibration accelerometer that is located outside the closest residence to the blast. Blasting shall not exceed 0.1 in/sec PPV at the nearest occupied residence, in accordance with County's Noise Guidelines, Section 4.3. Where potential exceedance of the County Ordinance is identified, the applicant shall not continue any blasting activities until the blast drilling and monitoring plan is prepared and submitted to the County, which identify mitigation measures shown to effectively reduce noise and vibration levels (e.g., altering orientation of blast progression, increased delay between charge detonations, presplitting) to be implemented to comply with the noise level limits of the County's Noise Ordinance, Sections 36.409 and 36.410. In addition, all blasting activities would comply with the requirements of the Sheriff's Department.

On-site construction equipment that would cause the most noise and vibration would be associated with site grading. According to the Caltrans, vibration levels associated with the use of bulldozers range from approximately 0.003 to 0.089 in/sec PPV at 25 feet. The closest occupied residential structure is located approximately 50 feet from the project footprint. There are no structures within 25 feet of the construction area. A vibration level of 0.089 in/sec PPV at 25 feet would attenuate to 0.053 in/sec PPV at 40 feet. Therefore, vibration levels at not anticipated to exceed 0.1 in/sec PPV. Groundborne vibration impacts during project construction would be less than significant. The project does not include any operational sources of vibration.

3.1.2 Design Considerations and Mitigation Measures

Should blasting occur, then monitoring would be required if done within 225 feet from an occupied noise sensitive land use. Each blast shall be monitored and recorded with an air-blast overpressure monitor and groundborne vibration accelerometer that is located outside the closest residence to the blast. Blasting shall not exceed 0.1 in/sec PPV at the nearest occupied residence, in accordance with County's Noise Guidelines, Section 4.3. Where potential exceedance of the County Ordinance is identified, the applicant shall not continue any blasting activities until the blast drilling and monitoring plan is prepared and submitted to the County, which identify mitigation measures shown to effectively reduce noise and vibration levels (e.g., altering orientation of blast progression, increased delay between charge detonations, presplitting) to be implemented to comply with the noise level limits of the County's Noise Ordinance, Sections 36.409 and 36.410. In addition. In addition, all blasting activities would comply with the requirements of the Sheriff's Department. All other groundborne vibration impacts would be less than significant; therefore, no further mitigation would be required.

4.0 Conclusion

The proceeding analysis provides an evaluation of noise impacts to the adjacent properties due to construction and operation of the project. Construction noise levels are not anticipated to exceed 75 dB(A) L_{eq} at the adjacent properties. As construction activities associated with the project would comply with noise level limits from the County's Noise Ordinance, temporary increases in noise levels from construction activities would be less than significant at the adjacent residential uses. However, construction noise levels at the adjacent habitat are projected to exceed 60 dB(A) L_{eq}, therefore, impacts to nesting coastal California gnatcatchers would be potentially significant

during the breeding season without mitigation. As outlined in the avoidance measure in Section 2.3.2, if construction activities must take place during the coastal California gnatcatcher breeding season (March 1 to August 15), a pre-construction survey will be conducted to determine if the species is present within the adjacent 500-feet from the project. If present, an acoustician shall work with the County to implement noise attenuation devices (e.g., noise walls), noise monitoring, and/or other methods to reduce noise levels at the edge of occupied habitat to coastal California gnatcatcher to a level of less than significant.

Once operational, on-site sources of noise would include RVs, moving trucks and HVAC units. On-site generated noise levels at the adjacent residential properties and golf course are not anticipated to exceed the applicable Noise Ordinance limits. Additionally, noise levels at the adjacent habitat are not projected to exceed 60 dB(A) L_{eq}. On-site generated noise impacts would be less than significant.

Lastly, due to the distance between the construction area and the nearest structures, groundborne vibration levels due to on-site construction activities would be less than significant.

If you have any questions about the results of this analysis, please contact me at jfleming@reconenvironmental.com or (619) 308-9333 extension 177.

Sincerely,

Jessica Fleming

Jessica Fleming
Noise Specialist

JLF:jg

5.0 Certification

The following is a list of preparers, persons, and organizations involved with the noise assessment.

RECON Environmental, Inc.
- Jessica Fleming, County-approved Noise Consultant
- Wendy Loeffler, Senior Biologist/Project Manager
- Frank McDermott, GIS Specialist
- Jennifer Gutierrez, Production Specialist

6.0 References Cited

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Federal Highway Administration (FHWA)
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2008 Roadway Construction Noise Mode, V1.1. Washington, DC.

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2006 Transit Noise and Vibration Impact Assessment. Washington, DC. May.

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2018 SoundPLAN Essential version 4.1.

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San Diego, County of
2009 Guidelines for Determining Significance and Report Format and Content Requirements, Noise. January 27.

2010 Guidelines for Determining Significance. Biological Resources, Land Use and Environment Group. Department of Planning and Land Use. Department of Public Works. Fourth Revision. September 15.

ATTACHMENTS

ATTACHMENT 1

Noise Measurement Data

Summary

File Name on Meter	LxT_Data.798.s
File Name on PC	LxT_0003898-20210810 105722-LxT_Data.798.ldbin
Serial Number	0003898
Model	SoundTrack LxT®
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2021-08-10 10:57:22
Stop	2021-08-10 11:15:54
Duration	00:18:31.7
Run Time	00:15:01.3
Pause	00:03:30.4
Pre-Calibration	2021-08-10 10:46:36
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1
Microphone Correction	Off
Integration Method	Linear
Overload	145.7 dB

	A	**C**	**Z**
Under Range Peak	**101.9**	98.9	103.9 dB
Under Range Limit	**38.0**	36.0	44.0 dB
Noise Floor	25.1	25.7	33.1 dB

Results

L_{Aeq}	58.2	
LAE	87.8	
EA	66.536 µPa²h	
EA8	2.126 mPa²h	
EA40	10.630 mPa²h	
$L_{Apeak\ (max)}$	2021-08-10 10:59:51	87.3 dB
L_{ASmax}	2021-08-10 10:59:51	67.3 dB
L_{ASmin}	2021-08-10 11:03:29	48.3 dB
SEA	-99.9 dB	
LAS > 60.0 dB (Exceedance Counts / Duration)	37	250.9 s
LAS > 70.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Ceq}	66.6 dB	
L_{Aeq}	58.2 dB	
L_{Ceq} - L_{Aeq}	8.4 dB	
L_{AIeq}	60.3 dB	
L_{Aeq}	58.2 dB	
L_{AIeq} - L_{Aeq}	2.1 dB	

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	58.2		66.6			
$L_{S(max)}$	67.3	2021/08/10 10:59:51				
$L_{S(min)}$	48.3	2021/08/10 11:03:29				
$L_{Peak(max)}$	87.3	2021/08/10 10:59:51				

Overload Count	0	
Overload Duration	0.0 s	

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.94	-99.94 %
Projected Dose	-99.94	-99.94 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	43.2	43.2 dB

Statistics

LA5.00	63.0 dB
LA10.00	61.9 dB
LA33.30	58.2 dB
LA50.00	56.2 dB
LA66.60	54.4 dB
LA90.00	51.9 dB

Summary

File Name on Meter	LxT_Data.799.s
File Name on PC	LxT_0003898-20210810 112523-LxT_Data.799.ldbin
Serial Number	0003898
Model	SoundTrack LxT®
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2021-08-10 11:25:23
Stop	2021-08-10 11:40:50
Duration	00:15:27.3
Run Time	00:15:03.2
Pause	00:00:24.1
Pre-Calibration	2021-08-10 10:46:30
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1
Microphone Correction	Off
Integration Method	Linear
Overload	145.7 dB

	A	**C**	**Z**
Under Range Peak	**101.9**	98.9	103.9 dB
Under Range Limit	**38.0**	36.0	44.0 dB
Noise Floor	25.1	25.7	33.1 dB

Results

L_{Aeq}	56.6	
LAE	86.1	
EA	45.451 µPa²h	
EA8	1.449 mPa²h	
EA40	7.246 mPa²h	
$L_{Apeak\ (max)}$	2021-08-10 11:40:21	88.9 dB
L_{ASmax}	2021-08-10 11:28:34	67.1 dB
L_{ASmin}	2021-08-10 11:34:45	47.2 dB
SEA	-99.9 dB	
LAS > 60.0 dB (Exceedance Counts / Duration)	5	76.8 s
LAS > 70.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Ceq}	65.2 dB	
L_{Aeq}	56.6 dB	
L_{Ceq} - L_{Aeq}	8.6 dB	
L_{AIeq}	58.9 dB	
L_{Aeq}	56.6 dB	
L_{AIeq} - L_{Aeq}	2.3 dB	

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	56.6		65.2			
$L_{S(max)}$	67.1	2021/08/10 11:28:34				
$L_{S(min)}$	47.2	2021/08/10 11:34:45				
$L_{Peak(max)}$	88.9	2021/08/10 11:40:21				

Overload Count	0
Overload Duration	0.0 s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.94	-99.94 %
Projected Dose	-99.94	-99.94 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	41.5	41.5 dB

Statistics

LA5.00	61.6 dB
LA10.00	58.6 dB
LA33.30	56.1 dB
LA50.00	54.9 dB
LA66.60	53.6 dB
LA90.00	51.1 dB

ATTACHMENT 2

HVAC Specifications

Fan Performance

Table 6. Standard motor & low static drive accessory sheave/fan speed (rpm)

Tons	Unit Model Number	Fan Sheave	6 Turns Open	5 Turns Open	4 Turns Open	3 Turns Open	2 Turns Open	1 Turn Open	Closed
5	WSC060ED	AK44x3/4"	N/A	720	791	861	931	1002	1072
6	WSC072ED	AK56x1"	N/A	558	612	665	718	772	825
7½	WSC090ED	AK57x1"	N/A	688	737	787	837	887	N/A
10	WSC120ED	AK105X1"	N/A	724	776	828	880	932	984

Note: Factory set at 3 turns open.

Table 7. Standard motor & high static drive accessory sheave/fan speed (rpm)

Tons	Unit Model Number	Fan Sheave	6 Turns Open	5 Turns Open	4 Turns Open	3 Turns Open	2 Turns Open	1 Turn Open	Closed
6	WSC072ED	AK56x1"	N/A	968	1018	1068	1118	1169	1219
7½	WSC090ED	AK57x1"	1053	1091	1129	1166	1204	1242	N/A
10	WSC120ED	AK105X1"	1110	1159	1209	1258	1308	1357	N/A

Note: Factory set at 3 turns open.

Table 8. Oversized motor & high static drive accessory sheave/fan speed (rpm)

Tons	Unit Model Number	Fan Sheave	6 Turns Open	5 Turns Open	4 Turns Open	3 Turns Open	2 Turns Open	1 Turn Open	Closed
7½	WSC090ED	AK85x1"	1186	1249	1311	1373	1436	N/A	N/A

Note: Factory set at 3 turns open.

Table 9. Outdoor sound power level—dB (ref. 10—2 W)

Tons	Unit Model Number	Octave Center Frequency								Overall dBA
		63	125	250	500	1000	2000	4000	8000	
5	T/YSC060ED	84	91	79	77	74	71	68	63	80
6	T/YSC072ED	83	90	86	82	79	75	70	63	85
7½	T/YSC090ED	83	90	86	83	80	75	71	64	85
8.5	T/YSC102ED	83	89	84	81	77	72	69	62	83
10	T/YSC120ED	83	86	80	77	73	69	66	60	79

Note: Tests follow ARI270-95.

Table 10. Outdoor sound power level—dB (ref. 10—12 W)

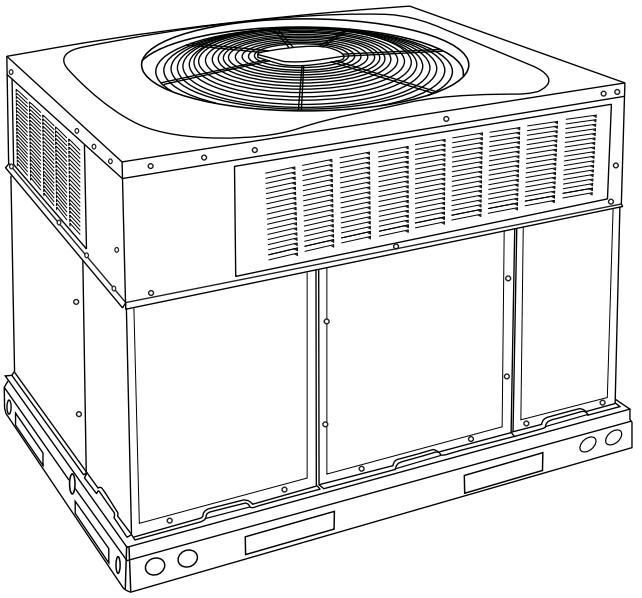
Tons	Unit Model Number	Octave Center Frequency								Overall dBA
		63	125	250	500	1000	2000	4000	8000	
5	WSC060ED	84	91	79	77	74	71	68	63	80
6	WSC072ED	83	90	86	82	79	75	70	63	85
7½	WSC090ED	83	90	86	83	80	75	71	64	85
10	WSC120ED	83	86	80	77	73	69	66	60	79

Note: Tests follow ARI270-95.

50VG–A
Performance™ 16 SEER 2–Stage Packaged Air Conditioner System with Puron® (R–410A) Refrigerant
Single and Three Phase
2 to 5 Nominal Tons (Sizes 24–60)

Carrier
turn to the experts

Product Data



A09033

Fig. 1 - Unit 50VG-A

Single-Packaged Products with Energy-Saving Features and Puron® refrigerant.

- 15.0-16.0 SEER / 12.0-12.5 EER
- Factory-Installed TXV
- Multi-speed ECM Blower Motor - Standard
- Sound levels as low as 72dBA
- Two Stages of Cooling
- Dehumidification Feature

FEATURES/BENEFITS

One-piece cooling unit with optional electric heater, low sound levels, easy installation, low maintenance, and dependable performance.

Puron Environmentally Sound Refrigerant is Carrier's unique refrigerant designed to help protect the environment. Puron is an HFC refrigerant which does not contain chlorine that can harm the ozone layer. Puron refrigerant is in service in millions of systems proving highly reliable, environmentally sound performance.

Easy Installation

Factory-assembled package is a compact, fully self-contained, electric cooling unit that is prewired, pre-piped, and pre-charged for minimum installation expense. These units are available in a variety of standard cooling sizes with voltage options to meet residential and light commercial requirements. Units are lightweight and install easily on a rooftop or at ground level. The high tech composite base eliminates rust problems associated with ground level applications.

Innovative Unit Base Design

On the inside a high-tech composite material will not rust and incorporates a sloped drain pan which improves drainage and helps inhibit mold, algae and bacterial growth. On the outside metal base rails provide added stability as well as easier handling and rigging.

Convertible duct configuration

Unit is designed for use in either downflow or horizontal applications. Each unit is converted from horizontal to downflow and includes horizontal duct covers. Downflow operation is provided in the field to allow vertical ductwork connections. The basepan seals on the bottom openings to ensure a positive seal in the vertical airflow mode.

Efficient operation High-efficiency design offers SEER (Seasonal Energy Efficiency Ratios) of up to 16.0. (See page 4.)

Durable, dependable components

Scroll Compressors have 2 stages of cooling and are designed for high efficiency. Each compressor is hermetically sealed against contamination to help promote longer life and dependable operation. Each compressor also has vibration isolation to provide quieter operation. All compressors have internal high pressure and overcurrent protection.

Multi-speed ECM Blower Motor is standard on all 50VG-A.

Direct-drive PSC (Permanent Split Capacitor) condenser-fan motors are designed to help reduce energy consumption and provide for cooing operation down to 40°F (4.4°C) outdoor temperature. Motormaster® II low ambient kit is available as a field-installed accessory.

Thermostatic Expansion Valve - A hard shutoff, balance port TXV maintains a constant superheat at the evaporator exit (cooling cycle) resulting in higher overall system efficiency.

Refrigerant system is designed to provide dependability. Liquid filter driers are used to promote clean, unrestricted operation. Each unit leaves the factory with a full refrigerant charge. Refrigerant service connections make checking operating pressures easier.

High and Low Pressure Switches provide added reliability for the compressor.

Indoor and Outdoor coils are computer-designed for optimum heat transfer and efficiency. The indoor coil is fabricated from copper tube and aluminum fins and is located inside the unit for protection against damage. The outdoor coil is internally mounted on the top tier of the unit.

Low sound ratings ensure a quiet indoor and outdoor environment with sound ratings as low as 72dBA. (See Page 4.)

Easy to service cabinets provide easy 3 panel accessibility to serviceable components during maintenance and installation. The basepan with integrated drain pan provides easy ground level installation with a mounting pad. A nesting feature ensures a positive basepan to roof curb seal when the unit is roof mounted. A convenient 3/4-in. (19.05 mm) wide perimeter flange makes frame mounting on a rooftop easy.

AHRI* CAPACITIES

Cooling Capacities and Efficiencies

Unit Model 50VG-A	Nominal Tons	Standard CFM (High / Low Stage)	Net Cooling Capacities - Btuh (High Stage)	EER @A**	SEER†
24	2	800 / 600	23000	12.0	15.0
30	2-1/2	1000 / 750	29000	12.0	15.0
36	3	1200 / 900	35400	12.5	16.0
42	3-1/2	1400 / 1050	42000	12.5	16.0
48	4	1600 / 1200	47500	12.3	16.0
60	5	1750 / 1200	57000	12.3	16.0

LEGEND
dB–Sound Levels (decibels)
db—Dry Bulb
SEER—Seasonal Energy Efficiency Ratio
wb—Wet Bulb
COP–Coefficient of Performance
* Air Conditioning, Heating & Refrigeration Institute.
**At "A" conditions–80°F (26.7°C) indoor db/67°F (19.4°C) indoor wb & 95°F (35°C) outdoor db.
† Rated in accordance with U.S. Government DOE Department of Energy) test procedures and/or AHRI Standards 210/240.

Notes:
1. Ratings are net values, reflecting the effects of circulating fan heat. Ratings are based on:
Cooling Standard: 80°F (26.7°C) db, 67°F wb (19.4°C) indoor entering–air temperature and 95°F db (35°C) outdoor entering–air temperature.
2. Before purchasing this appliance, read important energy cost and efficiency information available from AHRIdirectory.org.

A-WEIGHTED SOUND POWER LEVEL (dBA)

Model 50VG-A	Sound Ratings (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
24	73	60.0	62.5	68.5	68.5	64.0	60.0	53.0
30	77	57.5	67.0	73.5	72.0	67.0	61.0	52.5
36	73	62.5	65.5	67.5	68.0	65.5	60.0	52.5
42	73	60.5	63.5	68.0	68.0	66.0	60.5	53.0
48	72	60.0	63.5	66.0	67.0	63.5	58.5	49.5
60	75	69.0	67.0	69.0	68.0	65.0	61.5	54.0

NOTE: Tested in accordance with AHRI Standard 270 (not listed in AHRI).

ATTACHMENT 3

SoundPLAN – Operational Noise

9891 Quarry Road Self-Storage and RV Parking Facility

SoundPLAN Data - Operational Noise

Source name	Reference	Level	Corrections		
		Leq1	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
HVAC - Office	Lw/unit	73.0	-	-	-
HVAC - Storage Facility	Lw/unit	94.9	-	-	-
Moving Truck - West Side	Lw/unit	82.9	-	-	-
Moving Truck - East Side	Lw/unit	82.9	-	-	-
RV - West Side	Lw/unit	83.2	-	-	-
RV - East Side	Lw/unit	83.2	-	-	-

9891 Quarry Road Self-Storage and RV Parking Facility

SoundPLAN Data - Operational Noise

	Coordinates			Noise Level
No.	X	Y	Height	Leq1
	(meters)		(meters)	dB(A)
1	498565.39	3616773.90	62.80	38.6
2	498564.92	3616744.15	61.36	40.2
3	498556.42	3616701.65	59.02	42.1
4	498550.28	3616649.71	56.36	43.3
5	498543.20	3616604.38	56.62	43.1
6	498529.98	3616487.03	55.12	38.3
7	498586.64	3616502.61	49.49	41.2
8	498633.86	3616518.67	46.61	41.9
9	498680.14	3616533.31	46.00	42.2
10	498790.64	3616564.00	34.23	39.6
11	498711.83	3616591.28	44.09	47.9
12	498714.23	3616655.18	44.69	47.2
13	498715.03	3616701.51	45.39	45.0
14	498700.65	3616760.62	46.00	39.7
15	498755.77	3616730.26	33.20	33.2

9891 Quarry Road Self-Storage and RV Parking Facility
SoundPLAN Data - Operational Noise

Source name			Noise Level Leq1 dB(A)
1	1.Fl	38.6	
HVAC - Office			22.4
HVAC - Storage Facility			37.6
Moving Truck - East Side			13.0
Moving Truck - West Side			27.7
RV - East Side			24.9
RV - West Side			25.8
2	1.Fl	40.2	
HVAC - Office			27.1
HVAC - Storage Facility			39.1
Moving Truck - East Side			13.5
Moving Truck - West Side			29.0
RV - East Side			25.5
RV - West Side			27.8
3	1.Fl	42.1	
HVAC - Office			32.0
HVAC - Storage Facility			40.7
Moving Truck - East Side			13.7
Moving Truck - West Side			31.2
RV - East Side			25.1
RV - West Side			30.7
4	1.Fl	43.3	
HVAC - Office			26.2
HVAC - Storage Facility			42.1
Moving Truck - East Side			14.0
Moving Truck - West Side			33.1
RV - East Side			23.7
RV - West Side			33.5
5	1.Fl	43.1	
HVAC - Office			21.0
HVAC - Storage Facility			41.9
Moving Truck - East Side			13.7
Moving Truck - West Side			33.2
RV - East Side			21.8
RV - West Side			33.7
6	1.Fl	38.3	
HVAC - Office			13.6
HVAC - Storage Facility			37.3
Moving Truck - East Side			11.6
Moving Truck - West Side			28.1
RV - East Side			17.9
RV - West Side			27.7
7	1.Fl	41.2	
HVAC - Office			14.7
HVAC - Storage Facility			40.2
Moving Truck - East Side			10.1
Moving Truck - West Side			30.8
RV - East Side			16.4
RV - West Side			32.0
8	1.Fl	41.9	
HVAC - Office			15.3

Contributions

HVAC - Storage Facility			40.7
Moving Truck - East Side			13.8
Moving Truck - West Side			30.5
RV - East Side			21.4
RV - West Side			33.8
9	1.Fl	42.2	
HVAC - Office			12.7
HVAC - Storage Facility			40.1
Moving Truck - East Side			34.9
Moving Truck - West Side			16.7
RV - East Side			33.8
RV - West Side			28.3
10	1.Fl	39.6	
HVAC - Office			11.6
HVAC - Storage Facility			38.8
Moving Truck - East Side			29.0
Moving Truck - West Side			9.0
RV - East Side			28.2
RV - West Side			16.8
11	1.Fl	47.9	
HVAC - Office			13.9
HVAC - Storage Facility			45.5
Moving Truck - East Side			41.2
Moving Truck - West Side			15.6
RV - East Side			40.9
RV - West Side			19.4
12	1.Fl	47.2	
HVAC - Office			17.1
HVAC - Storage Facility			45.1
Moving Truck - East Side			38.7
Moving Truck - West Side			15.1
RV - East Side			41.2
RV - West Side			19.9
13	1.Fl	45.0	
HVAC - Office			18.8
HVAC - Storage Facility			42.0
Moving Truck - East Side			33.4
Moving Truck - West Side			13.8
RV - East Side			41.1
RV - West Side			22.8
14	1.Fl	39.7	
HVAC - Office			18.2
HVAC - Storage Facility			38.5
Moving Truck - East Side			26.6
Moving Truck - West Side			13.9
RV - East Side			31.5
RV - West Side			23.9
15	1.Fl	33.2	
HVAC - Office			10.1
HVAC - Storage Facility			32.4
Moving Truck - East Side			21.2
Moving Truck - West Side			8.5
RV - East Side			22.9
RV - West Side			11.4

ATTACHMENT 4

FHWA RD-77-108 – Off-site Traffic Noise

FHWA RD-77-108

Traffic Noise Prediction Model

Data Input Sheet

Project Name : Quarry Road Self-Storage and RV Parking
Project Number : 9891
Modeled Condition : Without and With Project

Surface Refelction: CNEL
Assessment Metric: Hard
Peak ratio to ADT: 10.0
Traffic Desc. (Peak or ADT) : ADT

Segment	Roadway	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	K-Factor
1	Sweetwater Road - Project Only		191	50	50	84.00	14.00	2.00	77.00	10.00	13.00	
2	Sweetwater Road - Without Project		8,440	50	50	84.00	14.00	2.00	77.00	10.00	13.00	
3	Sweetwater Road - With Project		8,631	50	50	84.00	14.00	2.00	77.00	10.00	13.00	

FHWA RD-77-108

Traffic Noise Prediction Model

Predicted Noise Levels

Project Name : Quarry Road Self-Storage and RV Parking
Project Number : 9891
Modeled Condition : Without and With Project
Assessment Metric: Hard

			Noise Levels, dBA Hard				Distance to Traffic Noise Level Contours, Feet					
Segment	Roadway	Segment	Auto	MT	HT	Total	75 dB	70 dB	65 dB	60 dB	55 dB	50 dB
1	Sweetwater Road - Project Only		51.1	51.0	46.7	54.8	0	2	5	15	48	151
2	Sweetwater Road - Without Project		67.6	67.4	63.2	71.2	21	66	208	659	2,084	6,591
3	Sweetwater Road - With Project		67.7	67.5	63.3	71.3	21	67	213	674	2,133	6,745

ATTACHMENT 5

SoundPLAN – Construction Noise

9891 Quarry Road Self-Storage and RV Parking Facility

SoundPLAN Data - Construction

		Level	Corrections		
Source name	Reference	Leq1	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
Construction	Lw/unit	117.4	-	-	-

9891 Quarry Road Self-Storage and RV Parking Facility

SoundPLAN Data - Construction

	Coordinates			Noise Level
No.	X	Y	Height	Leq1
	(meters)		(meters)	dB(A)
1	498565.39	3616773.90	62.80	65.7
2	498564.92	3616744.15	61.36	66.8
3	498556.42	3616701.65	59.02	67.2
4	498550.28	3616649.71	56.36	67.6
5	498543.20	3616604.38	56.62	67.8
6	498529.98	3616487.03	55.11	63.2
7	498586.64	3616502.61	49.49	70.4
8	498633.86	3616518.67	46.61	71.1
9	498680.14	3616533.31	45.99	71.0
10	498790.64	3616564.00	34.14	60.3
11	498711.83	3616591.28	44.09	70.5
12	498714.23	3616655.18	44.78	70.5
13	498715.03	3616701.51	45.39	70.8
14	498700.65	3616760.62	46.00	70.4
15	498755.77	3616730.26	33.20	58.7