

Viejas Hotel South Tower Project Draft TEIR

Appendix D

Noise Assessment

Prepared by Ldn Consulting, Inc.

March 11, 2014

NOISE ASSESSMENT

**Viejas Second Hotel Project
County of San Diego, CA**

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March 11, 2014

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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 potential impacts (if any) that may be created by construction or operations from the proposed Project to any off-Reservation sensitive receptors located in the County of San Diego. The project area is located north of Willows Road and south of Viejas Creek within the Viejas Indian Reservation. The Project is located in the unincorporated community of Alpine in eastern portion of San Diego County, CA.

The nearest occupied off-Reservation property line from the construction activities is located more than 950 feet to the west. This would result in an anticipated worst-case combined noise level of 56.5 dBA at the property line. Given the distance separation, the noise levels will comply with the County of San Diego's 75 dBA standard at all Project property lines.

No blasting or rock crushing is anticipated during the grading operations. 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. Per this analysis, no construction impacts are anticipated at any off-Reservation land uses and no further analysis is required.

In 1991, the U.S. Fish and Wildlife Service (USFWS) recommended that hourly noise levels not exceed 60 dBA Leq or ambient conditions, whichever is greater, to protect the California Gnatcatcher and other bird species. The County of San Diego has adopted this standard for all sensitive species. Therefore, the 60 dBA Leq or ambient was used as the noise criteria to assess noise impacts on sensitive wildlife both onsite and offsite. Construction activities may occur during a sensitive habitat nesting/breeding season. Based on the worst-case noise levels identified in above of 84.8 dBA at 50 feet, the nearest off Reservation sensitive habitat area is located 2,200 feet from the proposed construction activities. At a distance of 2,200 feet the worst-case construction noise level would be 52 dBA Leq. Thus, the construction noise levels would be below the 60 dBA Leq threshold. This is a worst-case scenario that does not take into account topography or the separation of the anticipated equipment.

Based on the empirical data, the proposed parapet and the distances to the property lines the unshielded cumulative noise levels from the proposed HVAC units were found to be below the most restrictive nighttime property line standard of 45 dBA at the adjacent off-Reservation residential properties. No impacts are anticipated and no mitigation is required.

The Project does not create a direct or cumulative impact of more than 3 dBA CNEL on any roadway segment. Therefore, the proposed Project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any off-Reservation sensitive land uses.

1.0 INTRODUCTION

The purpose of this noise study is to determine potential impacts (if any) that may be created by construction or operations from the proposed Project to any off-Reservation sensitive receptors located in the County of San Diego. Should impacts be determined, the intent of this study would be to recommend suitable mitigation measures to bring those impacts to a level that would be considered less than significant.

1.1 Project Location

The project area is located north of Willows Road and south of Viejas Creek within the Viejas Indian Reservation. The project is located north of Interstate 8 (I-8) and the community of Alpine. I-8 and Willows Road (with two interchanges to I-8) provide access to the site. A general project vicinity map is shown in Figure 1–A on the following page.

1.2 Project Description

The project is an approximately 128-room, 6-story hotel, adjacent to the existing Viejas Casino. The expansion would demolish the existing office space on the southeastern portion of the casino and replace it with a second hotel tower. The south hotel tower project would include additional gaming space, a kitchen in the basement, ballroom, pre-function terrace, meeting rooms, bar, retail, and pool area. The office space would be relocated within the existing facility.

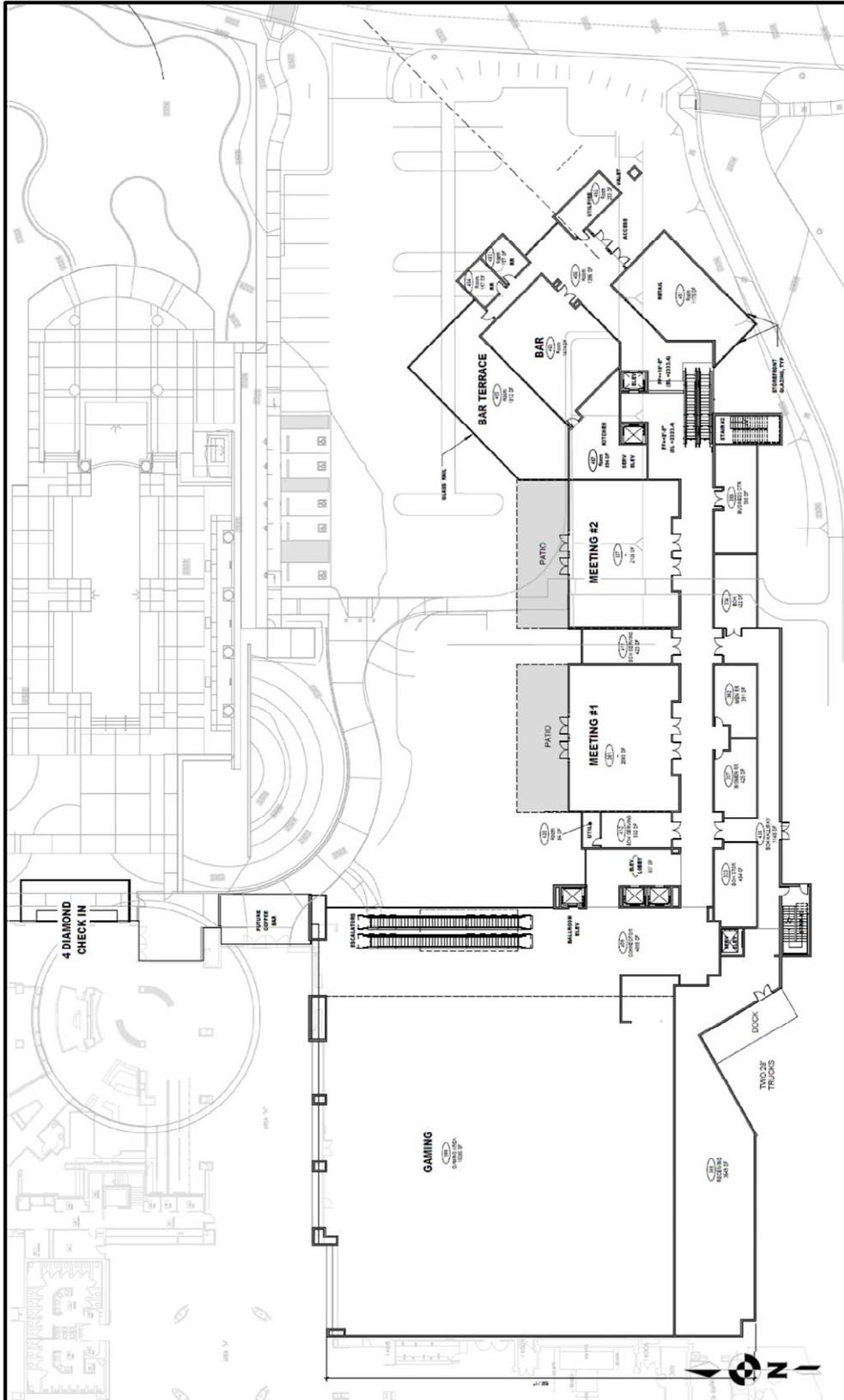
The Casino currently offers approximately 133,000 square feet (sf) of gaming area in a 325,000 square foot casino. Current gaming offerings include 2,000 slot machines, 86 gaming tables, a 150-seat off-track betting facility, a 750 seat bingo pavilion, a special events venue, five restaurants, a 150-room hotel, and a parking structure. With construction of the recently developed first Viejas Hotel, the Casino reduced the amount of original gaming area by approximately 20,000 sf. The proposed project would add approximately 16,500 sf of gaming area in the new development, resulting in a net reduction of approximately 3,500 sf of gaming area. It should also be noted that no new infrastructure would be required, or is proposed, for the Viejas South Tower Hotel. A general site layout is shown in Figure 1–B on Page 3 of this report.

Figure 1-A: Project Vicinity Map



Source: Google Maps, 3/14

Figure 1-B: Proposed Project Site Plan



Source: JCJ Architecture, 2013

1.3 Terminology

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 L_{eq} represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The Community Noise Equivalent Level (CNEL) is the 24 hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 decibels to sound levels in the evening hours between 7 p.m. and 10 p.m. and an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder.

Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA. Mobile noise levels radiate in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. Hard site conditions consist of concrete, asphalt and hard pack dirt while soft site conditions exist in areas having slight grade changes, landscaped areas and vegetation. On the other hand, fixed/point sources radiate outward uniformly as it travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance.

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 could be required to reduce noise levels to an acceptable level.

2.0 CONSTRUCTION ACTIVITIES

The Tribe has not developed or adopted noise standards and no federal or local regulations are directly applicable to the proposed project. However, federal and local agencies have developed standards for similar projects or that are applicable to off-Reservation receptors. The thresholds used in this analysis for off-Reservation receptors were primarily developed from the County of San Diego noise standards and policies.

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 Construction Noise Impacts

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 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 County's Noise Ordinance states that when noise is 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. The properties surrounding the Project site are mostly occupied with the exception of a few parcels to the south and west of the site. As can be seen in Figure 2-A below, the nearest off-Reservation occupied properties are separated by distances of 980 feet or more from the construction operations.

Construction of the hotel structure will be located within an existing one acre paved lot. It's estimated that preparation of the site would require demolition of the existing office building and equipment to break up and remove the asphalt. Once the site is clear of all asphalt the contractors would then excavate all footings and utility trenches necessary for the parking structure. It was estimated that site grading activities would require a one month period. The structure would be constructed using reinforced concrete, which is estimated to last several months. The final phase of the project would include asphalt paving and finish landscaping around the structure to incorporate the parking structure into the existing parking areas surrounding the project and could take an additional month to complete. The estimated durations for the proposed project from start to finish were estimated to require 6 months to complete.

The equipment estimates and associated noise levels are shown in Table 2-1 below. From a noise standpoint the worst case construction activities will occur during the Building construction phase. As can be seen in Table 2-1, Building construction is when the noisiest and largest number of construction equipment will be required.

Figure 2-A: Potential Properties Affected near the Project Site

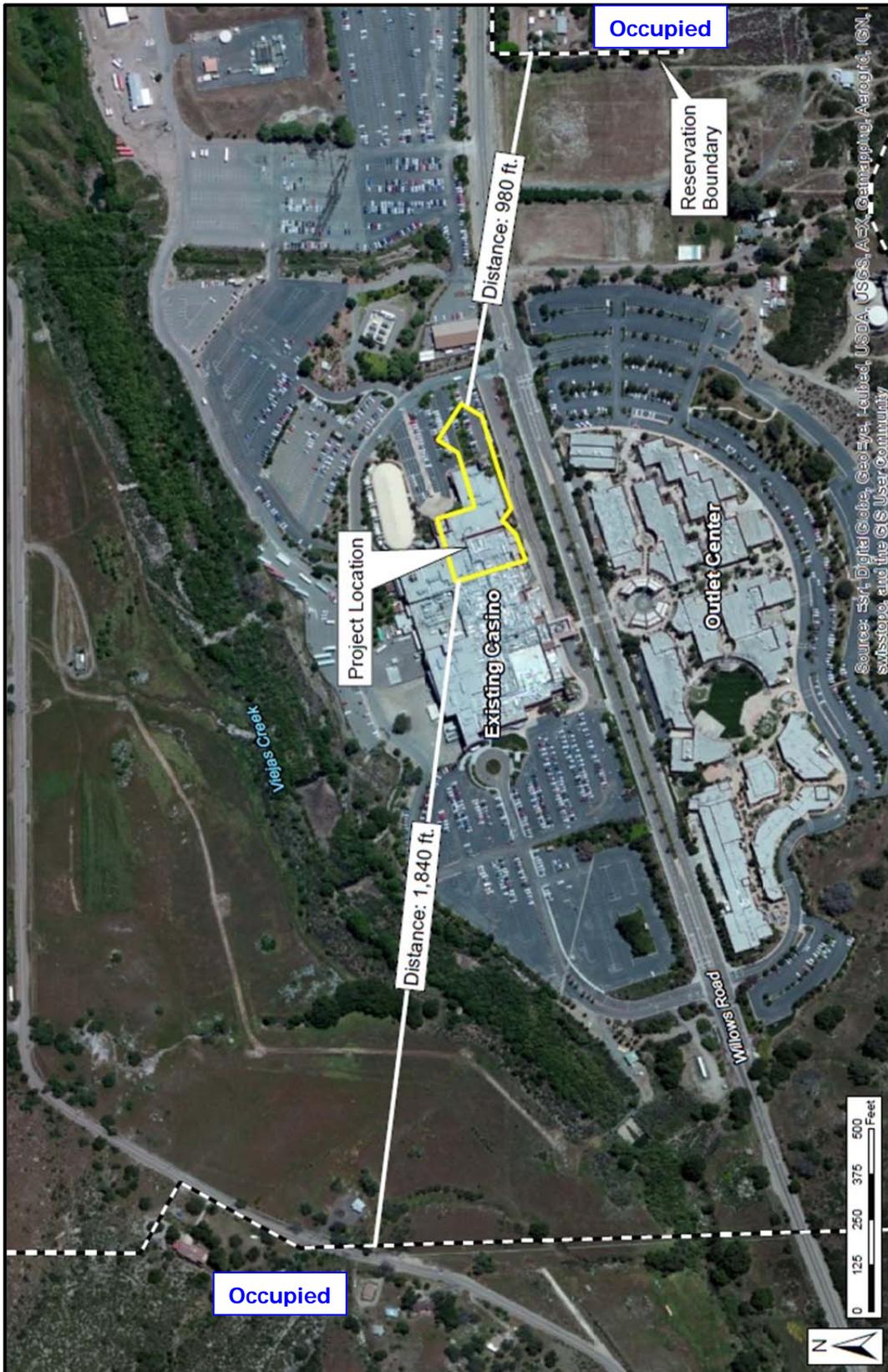


Table 2-1: Reference Noise Levels for Construction

Construction Phase	Construction Equipment	Quantity	Source Level @ 50-Feet (dBA Leq) ¹
Grading	Backhoe/loader	2	72
	Rubber Tired Loaders	1	73
	Grader	1	74
	Water Trucks	1	70
Building Construction Equipment	Air Compressor	2	76
	Aerial lift	1	70
	Cranes	2	78
	Forklifts	2	72
	Welder	3	71
	Backhoe/loader	1	72
Paving Equipment	Mortar Mixer	4	70
	Paver	1	74
	Asphalt paving equipment	1	72
	Roller	1	70
	Backhoe/loader	1	72

¹ Source: U.S. DOT, 1995 and Empirical Data

2.3 Construction Conclusions

Using a point-source noise prediction model with a typical 6 dBA reduction per doubling of distance, 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.

As can be seen in Table 2-2 below, if all the equipment were operating in the same location, which is not physically possible, the cumulative noise level from the equipment during the noisiest phase would be 84.8 dBA at a distance of 50-feet. The nearest occupied off-Reservation property line from the construction activities is located more than 980 feet to the west. This would result in an anticipated worst-case combined noise level of 58.9 dBA at the property line. Given the distance separation, the noise levels will comply with the County of San Diego’s 75 dBA standard at all Project property lines.

Occasionally, construction activities may occur outside the normal working hours or workdays as described in the County Ordinance above. These activities will be limited in the amount of equipment that will be utilized. The anticipated noise levels during these occurrences would be lower than the cumulative noise level described in Table 2-2 and no off-Reservation impacts are anticipated.

Table 2-2: Building Construction Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA) ¹	Cumulative Noise Level @ 50-Feet (dBA)
Air Compressor	2	76	79.0
Aerial lift	1	70	70.0
Cranes	2	78	81.0
Forklifts	2	72	75.0
Welder	3	71	75.8
Backhoe/loader	1	72	72.0
Cumulative Levels @ 50 Feet (dBA)			84.8
Average Distance To Property Line			980
Noise Reduction Due To Distance			-25.9
NEAREST PROPERTY LINE NOISE LEVEL			58.9
¹ Source: U.S. EPA 1971, U.S. DOT, 1995 and Empirical Data			

No blasting or rock crushing is anticipated during the grading operations. 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. Per this analysis, no construction impacts are anticipated at any off-Reservation land uses and no further analysis is required.

Biological Noise

In 1991, the U.S. Fish and Wildlife Service (USFWS) recommended that hourly noise levels not exceed 60 dBA Leq or ambient conditions, whichever is greater, to protect the California Gnatcatcher and other bird species. The County of San Diego has adopted this standard for all sensitive species. Therefore, the 60 dBA Leq or ambient was used as the noise criteria to assess noise impacts on sensitive wildlife both onsite and offsite. Construction activities may occur during a sensitive habitat nesting/breeding season. Based on the worst-case noise levels identified in above of 84.8 dBA at 50 feet, the nearest off Reservation sensitive habitat area is located 2,200 feet from the proposed construction activities. At a distance of 2,200 feet the worst-case construction noise level would be 52 dBA Leq. Thus, the construction noise levels would be below the 60 dBA Leq threshold. This is a worst-case scenario that does not take into account topography or the separation of the anticipated equipment.

3.0 OPERATIONAL ACTIVITIES

The Tribe has not developed or adopted noise standards and no federal or local regulations are directly applicable to the proposed project. However, federal and local agencies have developed standards for similar projects or that are applicable to off-Reservation receptors. The thresholds used in this analysis for off-Reservation receptors were primarily developed from the County of San Diego noise standards and policies.

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 that may jeopardize the health or welfare, or degrade the quality of life. The County Noise Ordinance states that it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property exceeds the applicable limits provided in Table 3-1.

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

ZONE		APPLICABLE LIMIT ONE-HOUR AVERAGE SOUND LEVEL (DECIBELS)
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U Use Regulations 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
R-RO, R-C, R-M, C-30, S-86, R-V, R-U and V5. Use Regulations 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
S-94, V4, and all other commercial zones.	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
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
M-50, M-52, M-54	Anytime	70
S-82, M-58, and all other industrial zones.	Anytime	75

Source: County of San Diego Noise Ordinance Section 36.404

Section 36.404 of the Noise Ordinance sets a most restrictive operational exterior noise limit for residential noise sensitive land uses of 50 dBA Leq for daytime hours of 7 a.m. to 10 p.m. and 45 dBA Leq during the noise sensitive nighttime hours of 10 p.m. to 7 a.m. as shown in Table 3-1 above. Most of the Project components will only operate during the daytime hours but a few may operate during nighttime or early morning hours and therefore the most restrictive and conservative approach is to apply the 45 dBA Leq nighttime standard at the property lines.

3.2 Potential Stationary Noise Impacts

This section examines the potential stationary noise source impacts associated with the operation of the proposed Project. Specifically, noise levels from the proposed HVAC units.

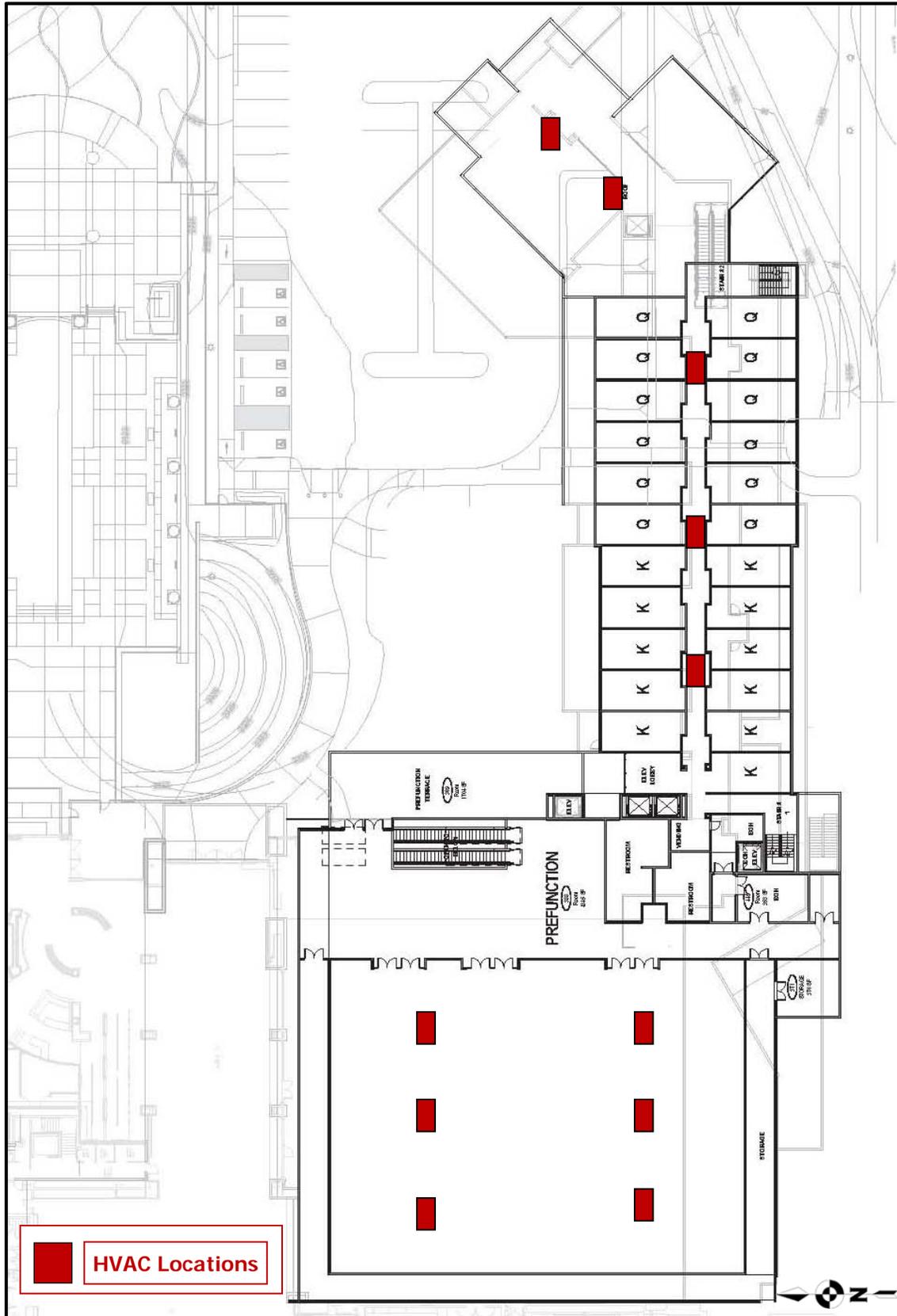
The HVAC units are proposed on the roof of the building. To predict the worst-case future noise environment, continuous reference noise levels were used to represent the mechanical ventilation system. Even though the mechanical ventilation system will cycle on and off throughout the day and night, this approach presents the worst-case condition. In addition, these units have been designed to provide cooling during the peak summer daytime periods, and it is unlikely that all the units will be operating continuously throughout the noise sensitive nighttime periods. To assess the mechanical equipment noise impacts the worst-case nighttime standard of 45 dBA was utilized.

Sound from a small localized source (a "point" source) radiates uniformly outward as it travels away from the source. The sound level attenuates or drops-off at a rate of 6 dBA for each doubling of distance. A drop-off rate of 6 dBA per doubling of distance was used for this piece of equipment.

The project is proposing the installation of eleven (11) 20 Ton condensers. In order to evaluate the HVAC noise impacts, the analysis utilized reference noise level measurements taken at a Kaiser Health Care Facility in Los Angeles, CA (Ldn 2012). The unshielded noise levels for the HVAC units were measured at 84-85 dBA Leq at a distance of 6 feet. To predict the worst-case future noise environment, a continuous reference noise level of 85 dBA at 6 feet was used to represent the roof-top mechanical ventilation system. Even though the mechanical ventilation system will cycle on and off throughout the day, this approach presents the worst-case noise condition.

It was determined based on the site configuration and the existing off-Reservation sensitive receptors (as shown in Figure 2-A above) that the worst case noise exposure would occur to the east of the site. The distance from the project site to the Reservation boundary is slight more than 400 feet away. The HVAC units will be spread out over the entire structure with the units located 450 feet to 750 feet from the property line. The representative locations of the mechanical equipment can be seen in Figure 3-A.

Figure 3-A: Roof Top HVAC Conceptual Layout



The noise levels associated with the roof-top mechanical ventilation system will be limited with the proposed parapet walls on the building that may vary in height but will be used to shield them both visually and acoustically based upon the Project plans (Source: JCJ Architecture, 2013). For modeling purposes, all the HVAC equipment was considered to be operating in the same location, which is not physically possible.

To determine the noise level reductions from the parapet walls, the Fresnel Barrier Reduction Calculations were modeled based on distance, source height, receiver elevation, and the top of barrier. The noise level reductions due to distance and the parapet walls for the nearest property line located to the east are provided in Table 3-2 below along with the cumulative noise level. The Fresnel barrier reduction calculations for the parapets are provided in **Attachment A** of this report.

Table 3-2: Cumulative HVAC Noise Levels at Nearest Property Line

Source	Noise Level @ 6-feet (dBA)	Quantity	Combined Noise Level (dBA)	Distance To Nearest Property Line (Feet)	Reduction from Distance (dBA)	Reduction Due To Parapets (dBA)	Resultant Noise Level (dBA)*
HVAC	85	11	95.4	450	-37.5	-12.6	45.3
*Complies with the nighttime Noise Standard of 45 dBA.							

Since the HVAC units will be spread out over the entire roof, no impacts are anticipated at the property lines with the incorporation of the mechanical wells along with the distance from the properties. All other property lines are located further from the proposed HVAC units and the resulting noise levels would also be below the 45 dBA threshold.

3.3 Potential Off-Site Transportation Noise Impacts

The offsite project related roadway segment noise levels projected in this report were calculated using the methods in the Highway Noise Model published by the Federal Highway Administration (FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108, December, 1978). The FHWA Model uses the traffic volume, vehicle mix, speed, and roadway geometry to compute the equivalent noise level. A spreadsheet calculation was used which computes equivalent noise levels for each of the time periods used in the calculation of CNEL. Weighting these equivalent noise levels and summing them gives the CNEL for the traffic projections. The noise contours are then established by iterating the equivalent noise level over many distances until the distance to the desired noise contour(s) are found. For this project the 60 dBA CNEL contour was calculated based upon the County of San Diego thresholds.

Hard site conditions, as identified in the previous report, were used to develop the noise contours and analyze noise impacts along all roadway segments. The future traffic noise model utilizes a typical, conservative vehicle mix of 95% Autos, 3% Medium Trucks and 2% Heavy Trucks for all analyzed roadway segments. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the FHWA Model.

Direct and cumulative roadway noise impacts would be considered significant if the project increases noise levels for a noise sensitive land use by 3 dBA CNEL and if: (1) the existing noise levels already exceed the 60 dBA CNEL residential standard, or (2) the project increases noise levels from below the 60 dBA CNEL standard to above 60 dBA CNEL in the area adjacent to the roadway segment.

If cumulative impacts are found, the County of San Diego requires that the Cumulative without Project scenario and the cumulative with project scenario be compared to the existing noise levels to determine if the project has a cumulatively considerable significant impact. Project generated cumulatively considerable roadway noise impacts would be significant if the project raises the Cumulative without Project noise level by 1 dBA or greater. If the project and cumulative projects do not increase the existing noise levels to sensitive land uses by 3 dBA CNEL, no significant cumulative noise impacts occur and the project would not result in a cumulatively considerable impact.

Direct Off-Site Noise Impacts

To determine if direct offsite noise level increases associated with the development of the project will create noise impacts. The existing conditions were compared with the noise level increase from the project. Utilizing the project's traffic assessment (Source: Linscott, Law and Greenspan, 2014) noise contours were developed for the following weekday and weekend traffic scenarios:

Existing: Current day noise conditions without construction of the project.

Existing Plus Project: Current day noise conditions plus the completion of the project.

Existing vs. Existing Plus Project: Comparison of the direct project related noise level increases in the vicinity of the project site.

The noise levels and the distances to the 60 dBA CNEL contours for the roadways in the vicinity of the Project site are given in Table 3-3 for the Existing Scenario and in Table 3-4 for the Existing Plus Project Scenario. Note that the values given do not take into account the effect of any noise barriers or topography that may affect ambient noise levels. Table 3-5 presents the comparison of the Existing Year with and without project related noise levels. The overall roadway segment noise levels will increase of 0.1 dBA CNEL with the development of the project. The project would not create a direct noise increase of more than 3 dBA CNEL on any roadway segment. Therefore, the

project's direct contributions to offsite roadway noise increases would not cause any significant impacts to any existing or future noise sensitive land uses.

Table 3-3: Existing Noise Levels

Roadway	Segment	ADT ¹	Vehicle Speeds (MPH) ¹	Noise Level @ 50-Feet (dBA CNEL)	60 dBA CNEL Contour Distance (Feet)
<i>Weekday</i>					
Willow Road	West of Viejas Casino	8,080	45	68.5	352
	East of Viejas Casino	2,550	45	63.5	111
<i>Weekend</i>					
Willow Road	West of Viejas Casino	11,760	45	70.1	510
	East of Viejas Casino	3,360	45	64.6	145

¹ Source: Project Traffic study prepared by Linscott, Law and Greenspan, 2014

Table 3-4: Existing + Project Noise Levels

Roadway	Segment	ADT ¹	Vehicle Speeds (MPH) ¹	Noise Level @ 50-Feet (dBA CNEL)	60 dBA CNEL Contour Distance (Feet)
<i>Weekday</i>					
Willow Road	West of Viejas Casino	8,387	45	68.6	365
	East of Viejas Casino	2,627	45	63.6	114
<i>Weekend</i>					
Willow Road	West of Viejas Casino	12,067	45	70.2	526
	East of Viejas Casino	3,397	45	64.7	148

¹ Source: Project Traffic study prepared by Linscott, Law and Greenspan, 2014

Table 3-5: Existing vs. Existing + Project Noise Levels

Roadway	Segment	Existing Noise Level @ 50-Feet (dBA CNEL)	Existing Plus Project Noise Level @ 50-Feet (dBA CNEL)	Project Related Direct Noise Level Increase (dBA CNEL)
<i>Weekday</i>				
Willow Road	West of Viejas Casino	68.5	68.6	0.1
	East of Viejas Casino	63.5	63.6	0.1
<i>Weekend</i>				
Willow Road	West of Viejas Casino	70.1	70.2	0.1
	East of Viejas Casino	64.6	64.7	0.1

Sound Levels provided are worst-case and do not take into account topography or shielding from barriers.

Cumulative Off-Site Noise Impacts

To determine if cumulative offsite noise level increases associated with the development of the project and other planned or permitted projects in the vicinity will create noise impacts. The noise levels for the near-term project Buildout and other planned and permitted projects were compared with the existing conditions. Utilizing the project's traffic assessment (Source: Linscott, Law and Greenspan, 2014) noise contours were developed for the following weekday and weekend traffic scenarios:

Existing: Current day noise conditions without construction of the project.

Existing Plus Cumulative Projects Plus Project: Current day noise conditions plus the completion of the project and the completion of other permitted or planned projects.

Existing vs. Existing Plus Cumulative Plus Project: Comparison of the existing noise levels and the related noise level increases from the combination of the project and all other planned or permitted projects in the vicinity of the site.

The existing noise levels and the distances to the 60 dBA CNEL contours for the roadways in the vicinity of the Project site are given in Table 3-3 above for the Existing Scenario. The near-term cumulative noise conditions are provided in Table 3-6. No noise barriers or topography that may affect noise levels were incorporated in the calculations. Table 3-7 presents the comparison of the Existing Year and the Near-Term Cumulative noise levels. The overall roadway segment noise levels will increase of 0.3 dBA CNEL with the development of the project. No cumulative noise level increases of 3 dBA CNEL were found on any of the roadway segments. Therefore, no cumulative or cumulatively considerable impacts are anticipated and no future analysis is required.

Table 3-6: Existing + Project + Cumulative Noise Levels

Roadway	Segment	ADT ¹	Vehicle Speeds (MPH) ¹	Noise Level @ 50-Foot (dBA CNEL)	60 dBA CNEL Contour Distance (Feet)
<i>Weekday</i>					
Willow Road	West of Viejas Casino	8,537	45	68.7	372
	East of Viejas Casino	2,777	45	63.8	121
<i>Weekend</i>					
Willow Road	West of Viejas Casino	12,217	45	70.3	532
	East of Viejas Casino	3,547	45	64.9	155

¹ Source: Project Traffic study prepared by Linscott, Law and Greenspan, 2014

Table 3-7: Existing vs. Existing + Project + Cumulative Noise Levels

Roadway	Segment	Existing Noise Level @ 50-Feet (dBA CNEL)	Cumulative Plus Project Noise Level @ 50-Feet (dBA CNEL)	Cumulative Noise Level Increase (dBA CNEL)
<i>Weekday</i>				
Willow Road	West of Viejas Casino	68.5	68.7	0.2
	East of Viejas Casino	63.5	63.8	0.3
<i>Weekday</i>				
Willow Road	West of Viejas Casino	70.1	70.3	0.2
	East of Viejas Casino	64.6	64.9	0.3
Sound Levels provided are worst-case and do not take into account topography or shielding from barriers.				

3.4 Conclusions

Based on the empirical data, the proposed parapet and the distances to the property lines the unshielded cumulative noise levels from the proposed HVAC units were found to be below the most restrictive nighttime property line standard of 45 dBA at the adjacent off-Reservation residential properties. No impacts are anticipated and no mitigation is required.

The Project does not create a direct or cumulative impact of more than 3 dBA CNEL on any roadway segment. Therefore, the proposed Project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any off-Reservation sensitive land uses.

ATTACHMENT A

FRESNEL BARRIER REDUCTION CALCULATIONS (HVAC Units)

Elevated Point Source

Source to Receiver Horizontal Distance (ft) = 450.00

Source to Barrier Horizontal Distance (ft) = 50.00

Barrier to Receiver Horizontal Distance (ft) = 400.00

Source Height (ft) = 86.00

Receiver Height (ft) = 5.00

Barrier Height (ft) = 86.00

Distance Source to Receptor (ft) $d = 457.23$

Distance Source to Barrier top (ft) $d_1 = 50.00$

Distance Barrier top to Receiver (ft) $d_2 = 408.12$

Frequency (Hz) = 8000 Attenuation (db) = 20.0 Fresnel N = 12.592

Frequency (Hz) = 4000 Attenuation (db) = 20.0 Fresnel N = 6.296

Frequency (Hz) = 2000 Attenuation (db) = 17.9 Fresnel N = 3.148

Frequency (Hz) = 1000 Attenuation (db) = 14.9 Fresnel N = 1.574

Frequency (Hz) = 500 Attenuation (db) = 12.6 Fresnel N = 0.787

Frequency (Hz) = 250 Attenuation (db) = 10.6 Fresnel N = 0.394

Frequency (Hz) = 125 Attenuation (db) = 8.9 Fresnel N = 0.197

Frequency (Hz) = 63 Attenuation (db) = 7.6 Fresnel N = 0.098