Appendix H:
Noise Assessment

Environmental Noise Assessment

Terra-Topgolf Development Project

San Jose, California

BAC Job # 2015-275

Prepared For:

David J. Powers & Associates, Inc.

1871 The Alameda, Suite 200
San Jose, CA 95126

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

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Introduction

The Terra-Topgolf project (project) is located on the south side of North 1st Street, east of Liberty Street and north of the Guadalupe River, in the City of San Jose, California. The project site vicinity is shown on Figure 1. The project proposes the following specific uses:

- Ten commercial/retail buildings
- One hotel building
- One outdoor recreation facility (Top Golf)

In addition to these uses, the project includes 1,344 total parking spaces (709 in underground parking garages, 635 paved surface parking). Figures 2 and 3 show the project ground and surface level site plans, respectively.

Existing land uses in the project vicinity include a mix of residential, commercial, library/community center, park, open space, school, and light industrial uses. Due to the potential noise generation of the project relative to nearby noise-sensitive land uses, Bollard Acoustical Consultants, Inc. (BAC) was retained by David J. Powers & Associates, Inc. to prepare a noise analysis for the project.

The purposes of this analysis are to quantify existing ambient noise levels in the vicinity of the nearest sensitive receptors to the project site, to predict the noise generation of the various aspects of the project, and to compare project-generated noise levels against both the City of San Jose noise standards as well as against the measured ambient noise environment.

It should be noted that, during BAC field inspections of the project site, no sources of local vibration were identified and ambient vibration levels were observed to be imperceptible. Because the project does not propose any appreciable sources of vibration, vibration impacts associated with this project are not anticipated and no further analysis of vibration impacts was considered to be warranted.

Figure 1

Project Site Vicinity and Noise Measurement Locations
Terra-Topgolf Development Project - San Jose, California

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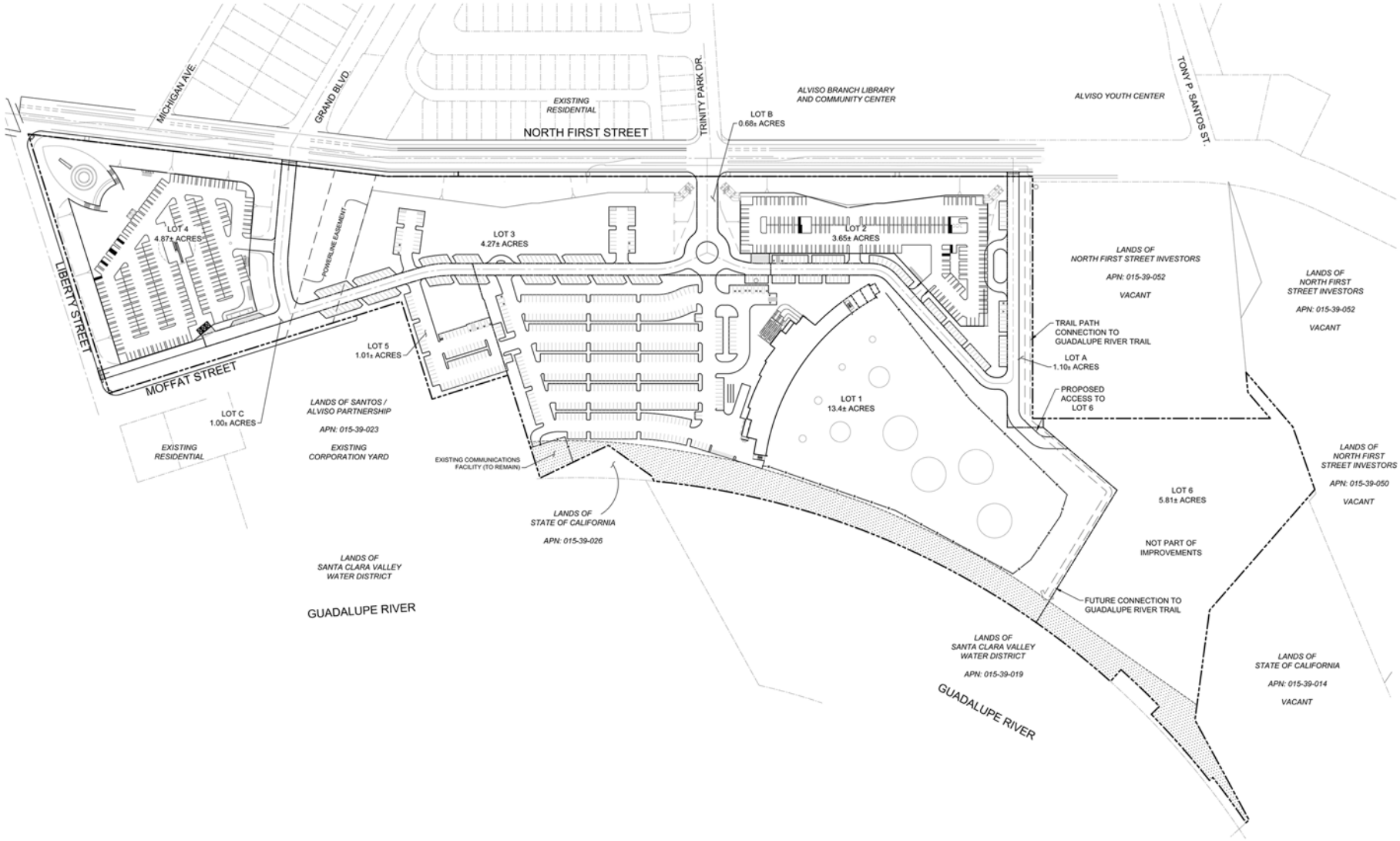
Scale (feet)
0 250 500

Figure 2

Site Plan - Lower Level

Terra-Topgolf Development Project - San Jose, California



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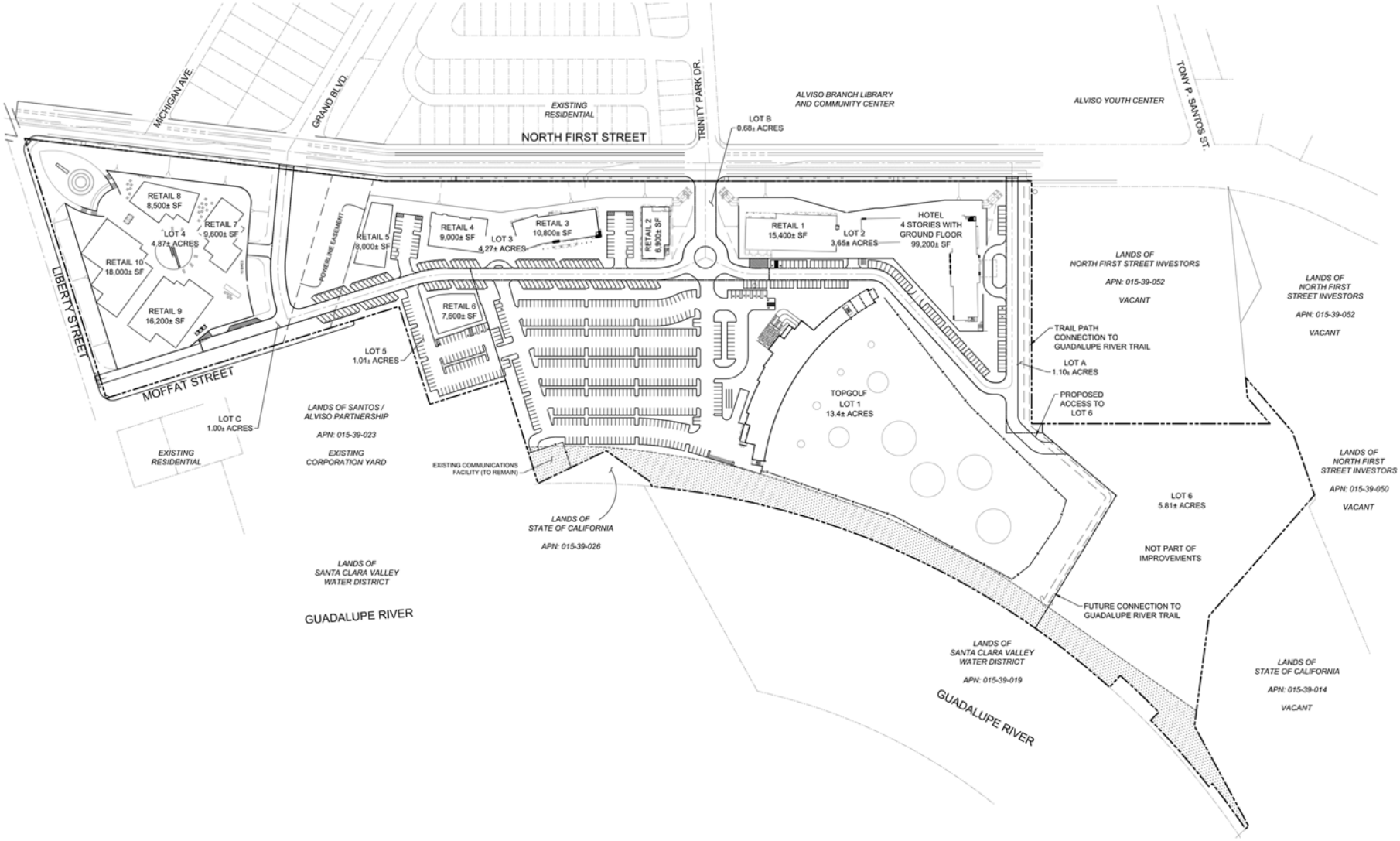
Scale (feet)

0 200 400

Figure 3

Site Plan - Surface Level

Terra-Topgolf Development Project - San Jose, California



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Scale (feet)

0 200 400

Environmental Setting

Acoustical Terminology

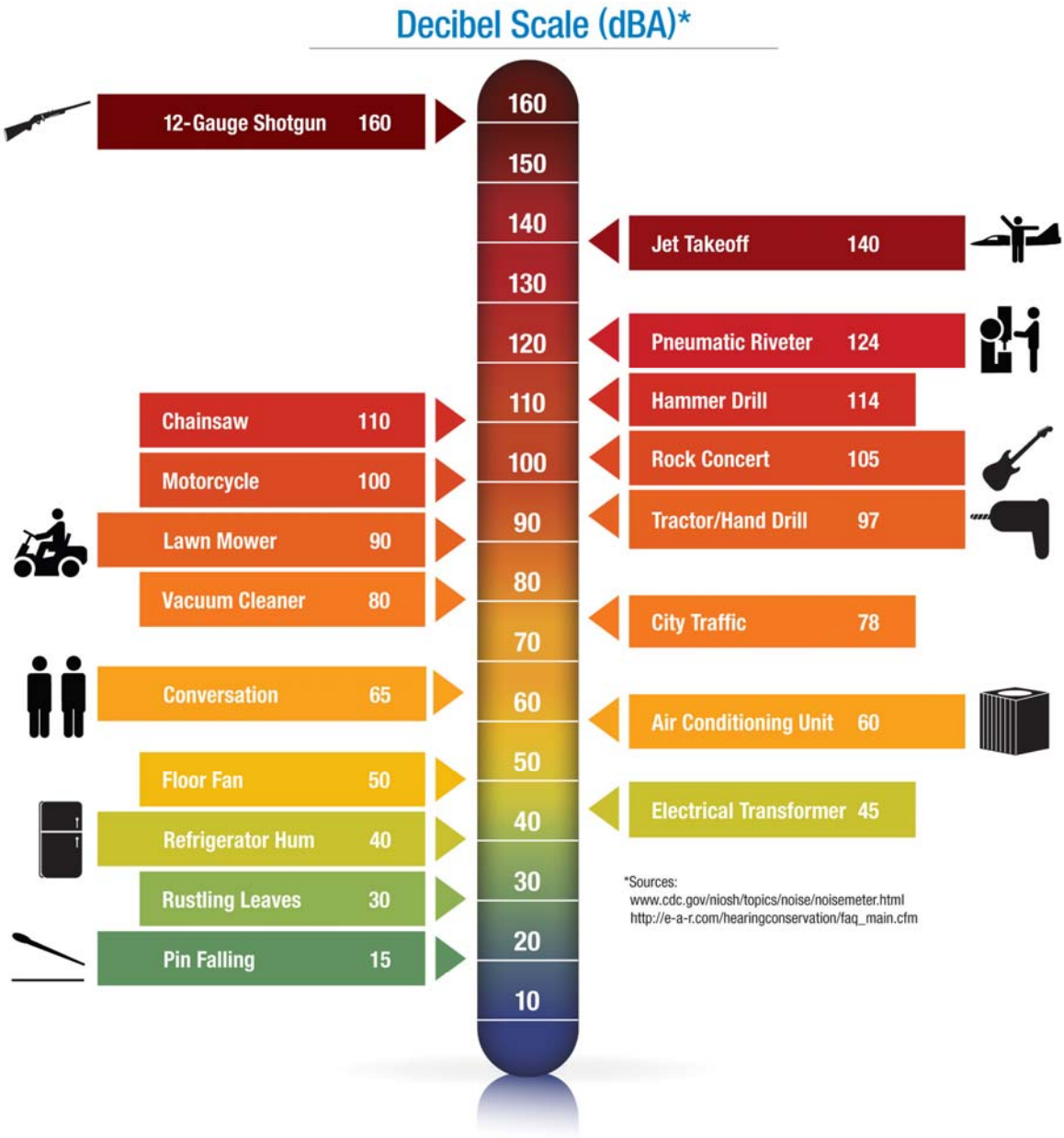
Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are designated as sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or Hertz (Hz). Definitions of acoustical terminology are provided in Appendix A. Figure 4 shows common noise levels associated with various sources.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure) as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by filtering the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}). The L_{eq} is the foundation of the day/night average noise descriptor, L_{dn}, and shows very good correlation with community response to noise. The day/night average sound level (L_{dn} or DNL) is based on the average noise level over a 24-hour day, with a +10 decibel weighting applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours. The nighttime penalty is based on the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. For this reason, the City of San Jose utilizes performance standards for non-transportation noise sources. Specifically, performance standards in terms of instantaneous maximum levels (L_{max}) and hourly average levels (L_{eq}), are used to assess noise generated on the project site.

Figure 4
Noise Levels Associated with Common Noise Sources



Identification of Sensitive Receptors

As noted previously, existing land uses in the project vicinity include a mix of residential, commercial, library/community center, park, open space, school, and light industrial uses. Of these uses, the greatest degree of sensitivity exists at the nearby residential uses (exterior and interior areas), and within the interior spaces of the library/community center and elementary school classrooms. The school playing fields and outdoor play areas of the library are considered noise-generating spaces, not noise-sensitive spaces. As a result, the focus of this analysis is the identification of potential noise impacts at the noise-sensitive interior and exterior spaces described above. Those sensitive areas are identified on Figure 1.

Existing Overall Ambient Noise Environment at Sensitive Receptors

The ambient noise environment in the immediate project vicinity varies depending on proximity to project-area roadways. To generally quantify existing overall ambient noise levels from all sources at the nearest noise-sensitive receptors to the project site, continuous (48-hour) ambient noise surveys were conducted at 3 locations on December 16-17, 2015. The monitoring locations are shown on Figure 1. It is recognized that there are more than three noise-sensitive receptors in the project vicinity. Due to the similar setback from North First Street of receptors represented by Areas 1, 4 and 5, noise measurement Site A represents ambient conditions at all sensitive receptors located along North First Street, including the residences directly opposite the project site (Area 1 on Figure 1), school and library (Area 4), and single residence identified as Area 5.

The ambient noise level monitoring results are summarized in Table 1, with graphs of the detailed hourly average (L_{eq}) and maximum (L_{max}) values shown in Figures 5-10. The ambient noise monitoring results are also tabulated Appendix B.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4).

Table 1
Ambient Noise Monitoring Results[1]
Terra-Topgolf Development Project – San Jose, CA

			Measured Hourly Noise Levels (dB)			
			Daytime (7 AM – 10 PM)		Nighttime (10 PM – 7 AM)	
Site	**Date**	**L_{dn}**	**L_{eq}**	**L_{max}**	**L_{eq}**	**L_{max}**
A	Wednesday, December 16	65	63	74-88	56	71-81
	Thursday, December 17	66	63	75-82	56	71-81
B	Wednesday, December 16	62	58	72-82	52	59-76
	Thursday, December 17	64	60	75-86	53	55-76
C	Wednesday, December 16	62	60	71-80	52	61-78
	Thursday, December 17	62	60	71-80	52	61-75

Notes:
1. Detailed results provided in Appendix B.

Source: Bollard Acoustical Consultants, Inc. (2016)

Figure 5
Hourly Noise Survey Results - Site A
Terra-Topgolf Development Project - San Jose, California
Wednesday, December 16, 2015

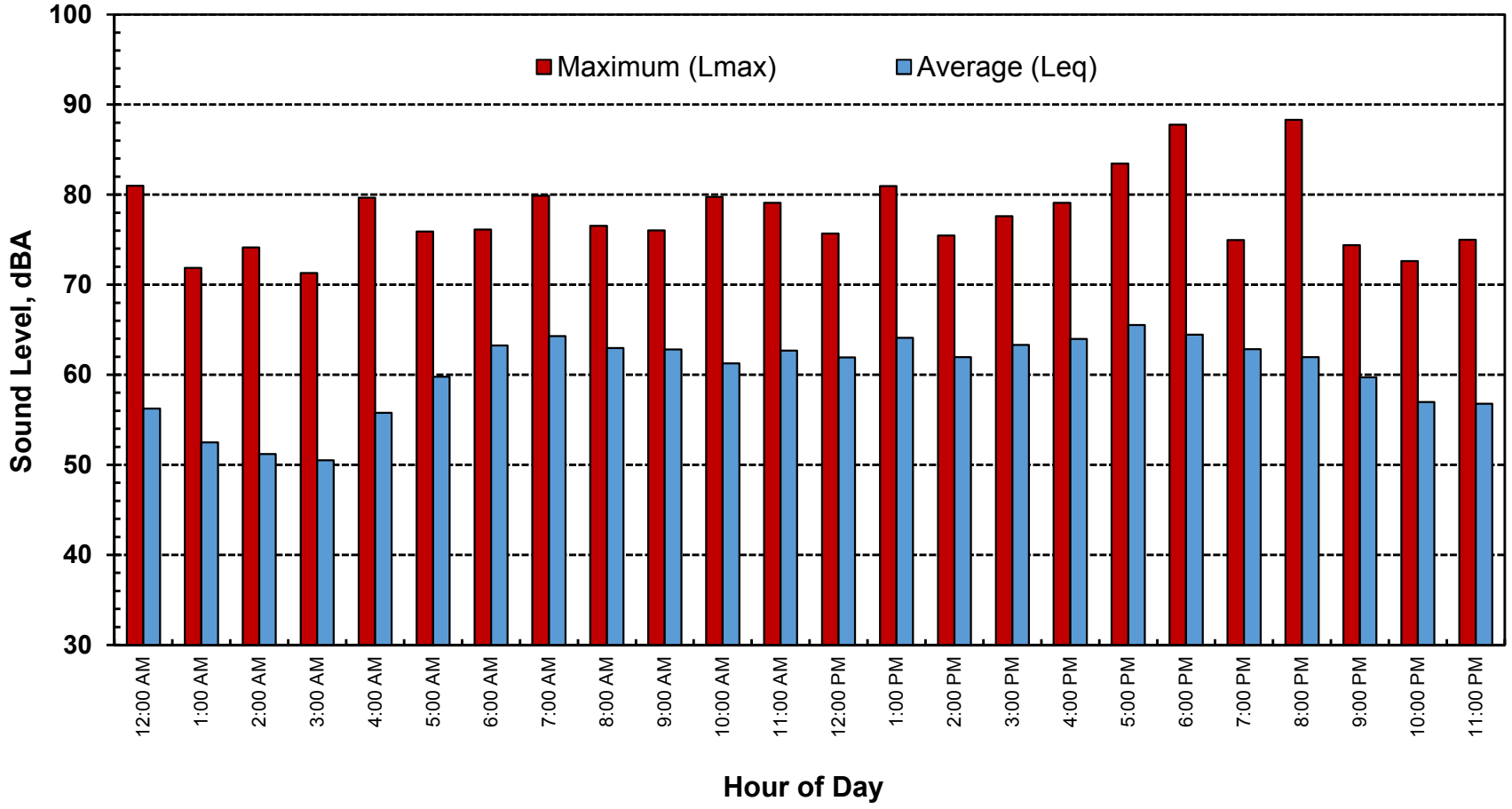


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Figure 6
Hourly Noise Survey Results - Site A
Terra-Topgolf Development Project - San Jose, California
Thursday, December 17, 2015

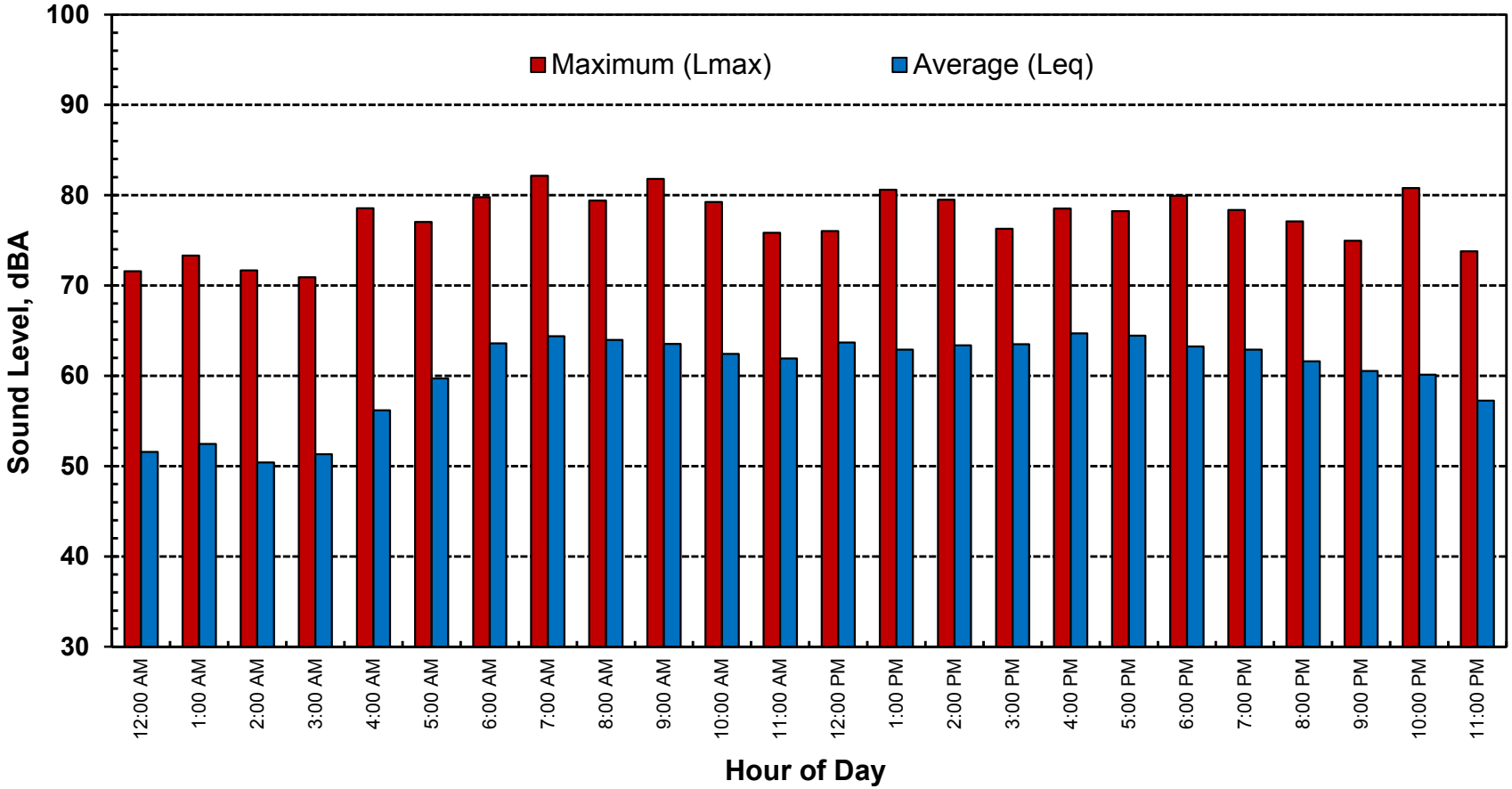

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Figure 7
Hourly Noise Survey Results - Site B
Terra-Topgolf Development Project - San Jose, California
Wednesday, December 16, 2015

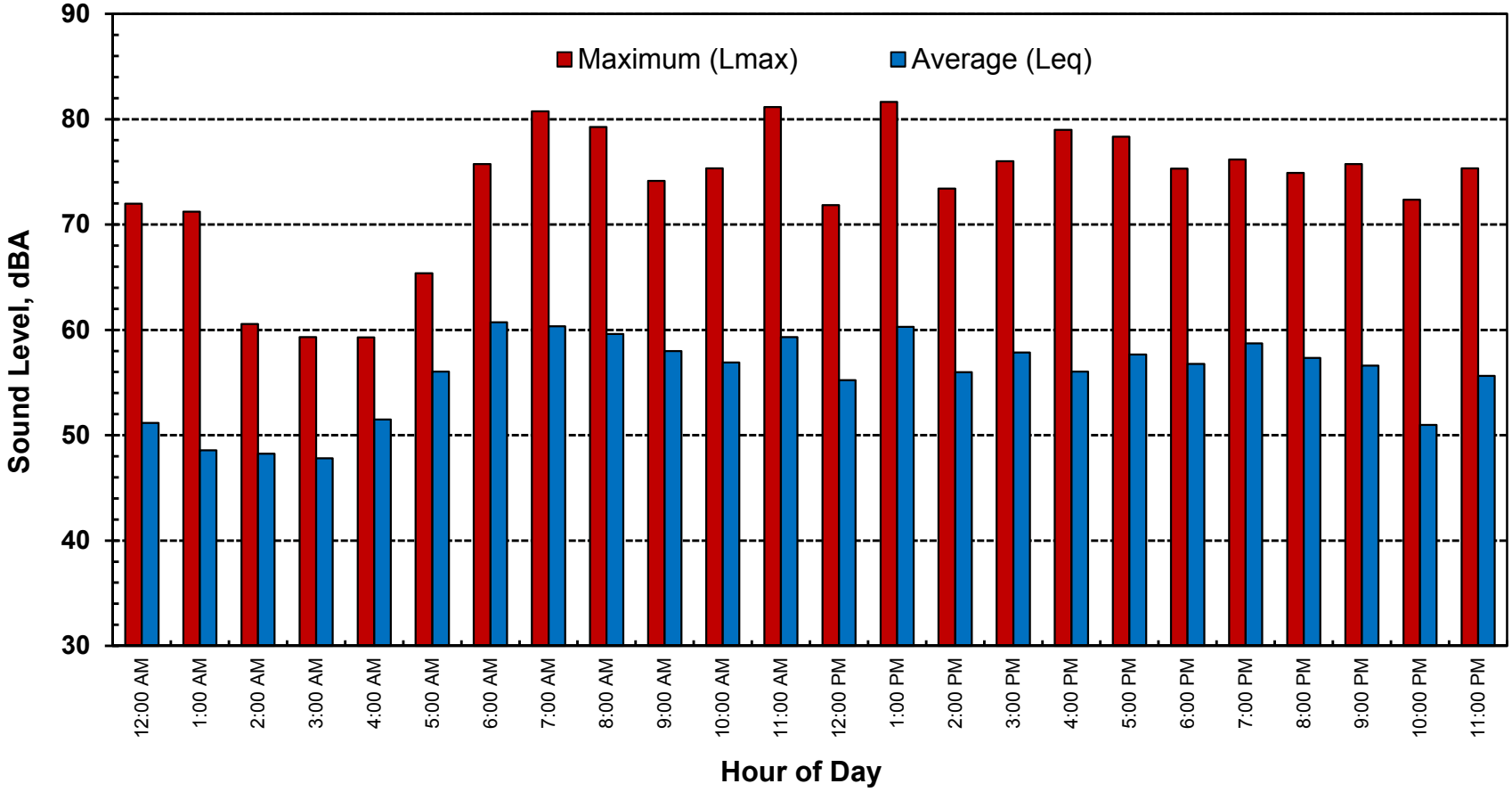

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Figure 8
Hourly Noise Survey Results - Site B
Terra-Topgolf Development Project - San Jose, California
Thursday, December 17, 2015

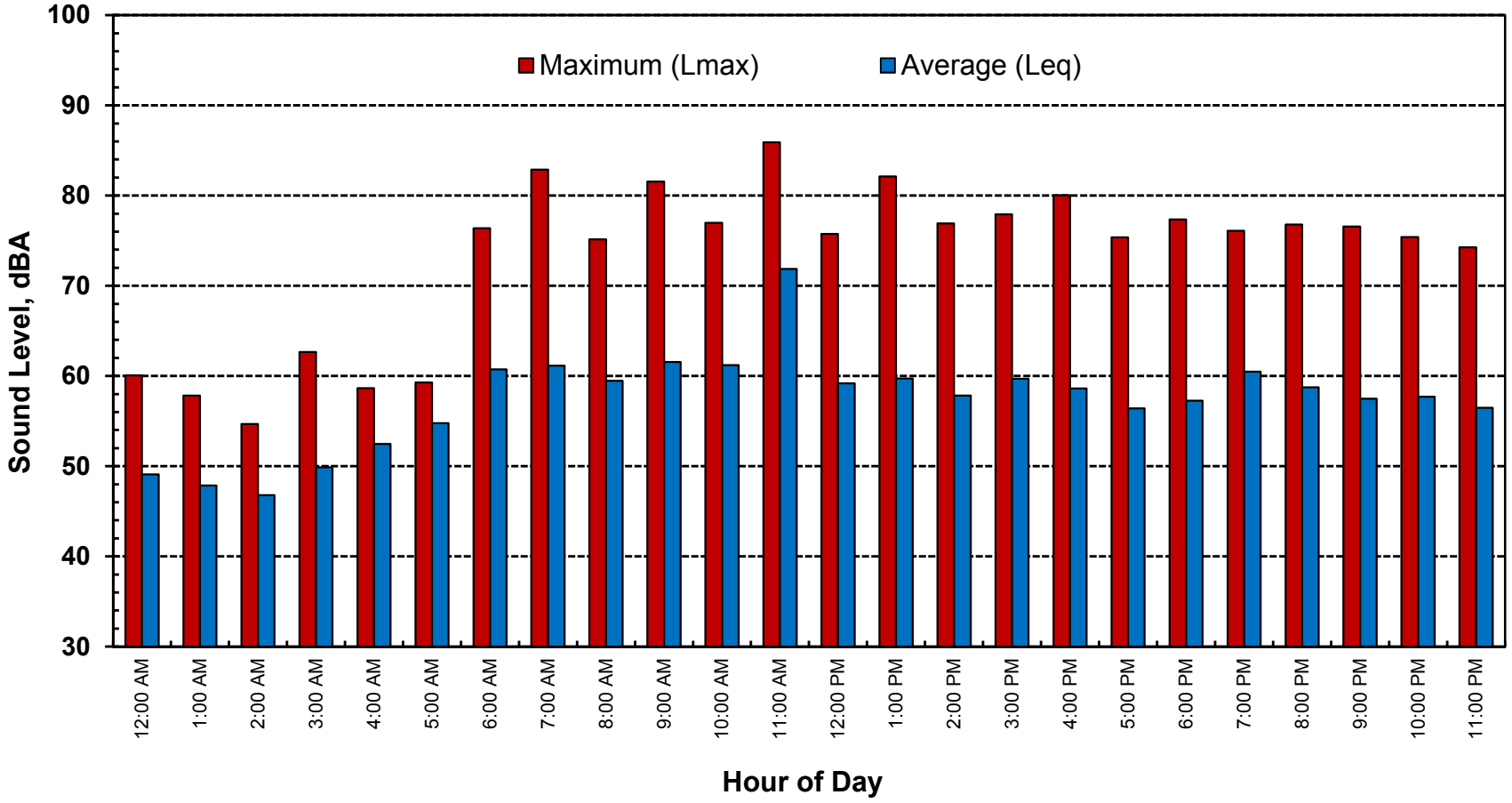

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Figure 9
Hourly Noise Survey Results - Site C
Terra-Topgolf Development Project - San Jose, California
Wednesday, December 16, 2015

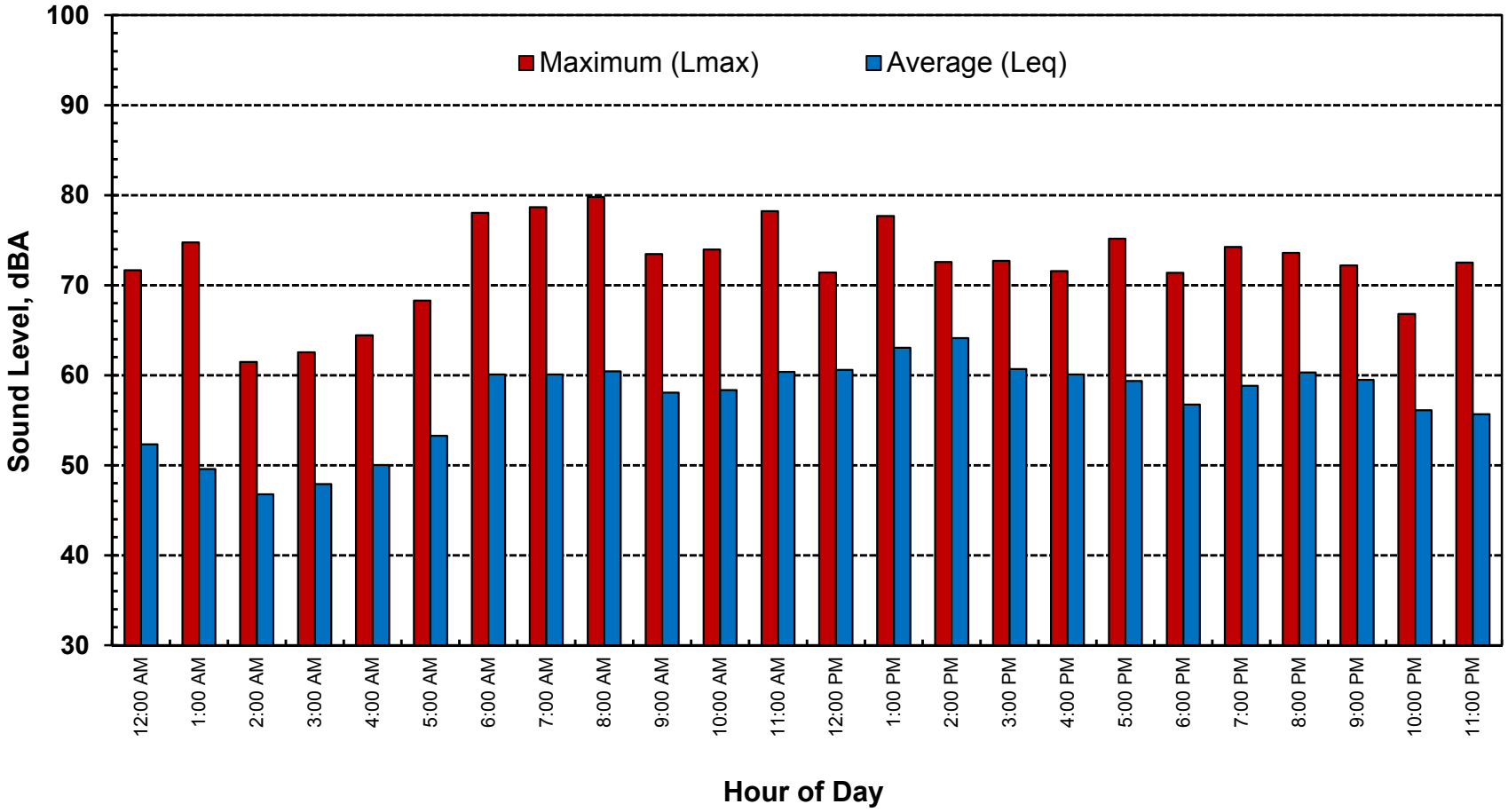

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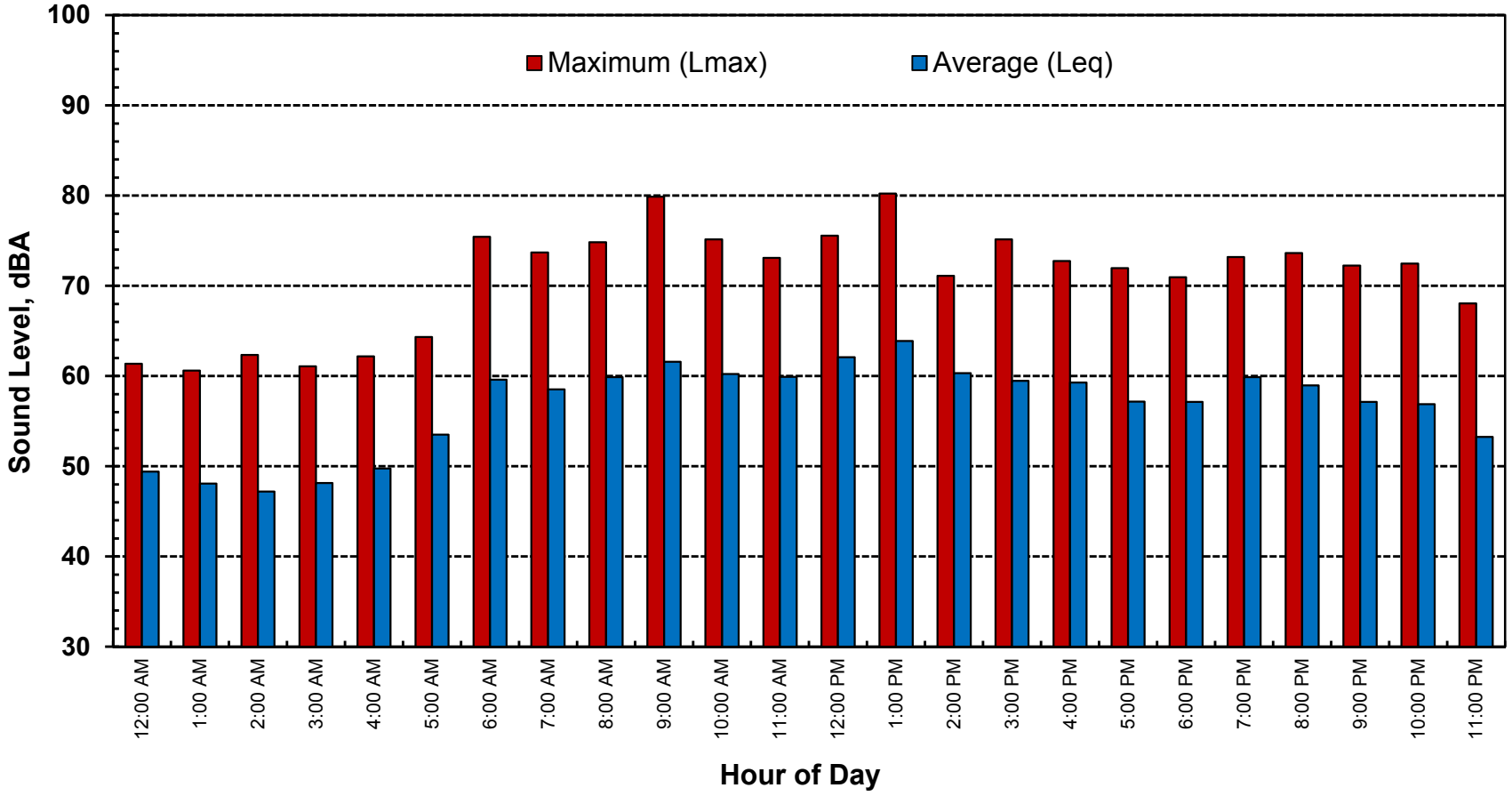
Figure 10
Hourly Noise Survey Results - Site C
Terra-Topgolf Development Project - San Jose, California
Thursday, December 17, 2015



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The hourly noise measurement results presented in Figures 5-10 are important in that they establish baseline conditions at the nearest residential areas against which noise generated by the project can be evaluated. The hour-by-hour data is presented because certain noise-generating aspects of the proposed project would occur during late night and/or early morning periods. For example, the Topgolf project is proposed to operate until 2 a.m. on weekends. Because ambient conditions decrease during these periods due to less traffic on local roadways, and because nighttime hours are more sensitive to noise in general, the identification of specific ambient conditions during these periods is essential to the subsequent evaluation of potential noise impacts due to the project.

Measurement Site A represents noise-sensitive Areas 1 and 5 (see Figure 1), which includes the existing residences located on the opposite side of North First Street from the project site and the lone residence at the corner of Liberty Street and North First Street, respectively. Due to their proximity to North First Street, ambient conditions at both locations are expected to be similar. It should be noted that the residence represented by noise-sensitive Area 5 will be acquired by the applicant prior to the development of the commercial uses in the northern portion of the project site. According to Figures 5 and 6, the lowest measured hourly average (L_{eq}) noise level during the hours of proposed activities at the project site was 52 dB L_{eq} measured during the midnight to 1 a.m. hour. The lowest measured maximum (L_{max}) noise level during the hours of proposed activities at the project site was 74 dB L_{max} measured during the 10-11 p.m. hour.

Measurement Site B represents noise-sensitive Area 2 (see Figure 1), which includes the existing mobile home community of residences located on the opposite side of the Guadalupe River, west of the Project site. According to Figures 7 and 8, the lowest measured hourly average (L_{eq}) noise level during the hours of proposed activities at the project site was 49 dB L_{eq} measured during the midnight to 1 a.m. hour. The lowest measured maximum (L_{max}) noise level during the hours of proposed activities at the project site was 60 dB L_{max} measured during the same midnight to 1 a.m. hour.

Measurement Site C represents noise-sensitive Area 3 (see Figure 1), which includes the existing residences located on the south side of Highway 237. Those residences a screened from view of Highway 237 and the project site by a substantial grade differential and existing sound wall. According to Figures 9 and 10, the lowest measured hourly average (L_{eq}) noise level during the hours of proposed activities at the project site was 50 dB L_{eq} measured during the midnight to 1 a.m. hour. The lowest measured maximum (L_{max}) noise level during the hours of proposed activities at the project site was 62 dB L_{max} measured during the same Midnight to 1 a.m. hour.

Existing Traffic Noise Environment

Traffic Noise Prediction Methodology

The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used with the Calveno vehicle noise emission curves to predict existing traffic noise levels along project-area roadways.

Predicted Existing Traffic Noise Levels

The FHWA Model was used with existing traffic data prepared by Fehr & Peers Associates to predict existing traffic noise levels in the immediate project vicinity. Table 2 shows the predicted existing traffic noise levels at a reference distance of 50 feet from the roadway centerlines, as well as the distances to the unshielded L_{dn} contours. The FHWA Model Inputs for baseline conditions are provided in Appendix C-1.

Table 2
Existing (Baseline) Traffic Noise Levels and Distances to Traffic Noise Contours
Terra-Topgolf Development Project – San Jose, CA

Roadway	Segment	L_{dn}[1]	L_{dn} Contour (feet) 75	70	65
N Taylor Street	Gold Street to Liberty Street	64	9	20	43
N Taylor Street	Liberty Street to Trinity Park Drive	65	11	23	49
N First Street	Trinity Park Drive to Nortech Pkwy	64	9	20	43
N First Street	Nortech Parkway to SR 237 WB Ramps	66	13	28	59
Gold Street	North of Taylor Street	59	4	9	19
Gold Street	South of Taylor Street	65	11	23	49
Gold Street	North of Gold Street Connector	66	13	28	60
Liberty Street	North of Taylor Street	55	2	5	11
Liberty Street	South of Taylor Street	59	4	10	21
Trinity Park Drive	North of N First Street	52	1	3	7
Nortech Parkway	North of N First Street	64	10	21	46

Notes:
1. L_{dn} is computed at a distance of 50 feet from the roadway centerline.

Source: FHWA-RD-77-108 with inputs prepared by Kimley-Horn

Regulatory Setting - Criteria for Acceptable Noise Exposure

City of San Jose General Plan

Chapter 3 of the City of San Jose General Plan pertains to Environmental Leadership, and contains the City's noise-related policies. The specific policies which are applicable to this project are reproduced below.

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects

can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected *Envision General Plan* traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

    - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

    - For single family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as backyards.

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable"; or

- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

Normally Acceptable:

- Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

EC-1.9 Require noise studies for land use proposals where known or suspected loud intermittent noise sources occur which may impact adjacent existing or planned land uses. For new residential

development affected by noise from heavy rail, light rail, BART or other single-event noise sources, implement mitigation so that recurring maximum instantaneous noise levels do not exceed 50 dBA L_{max} in bedrooms and 55 dBA L_{max} in other rooms.

City of San Jose Zoning Code

In addition, the City of San Jose Zoning Code establishes performance standards for commercial uses adjacent to residentially zoned properties. These standards have been reproduced and are shown in Table 3.

20.40.600 Performance standards.

Table 3
City of San Jose Zoning Code Performance Standards
Residential Properties Affected by Commercial Uses

Noise Level Descriptor	Maximum Noise Level in Decibels at Property Line, dB (L_{max})
Commercial or PQP use adjacent to property used for residential purposes	55
Commercial or PQP use adjacent to property used for commercial or other non-residential purposes	60
Source: City of San Jose Code of Ordinances, Code Section 20.40.060, Table 20-105	

Impacts and Mitigation Measures

Standards of Significance Applied to this Project

The following City of San Jose General Plan standards of significance are applied to this project. It should be noted that the City of San Jose relies on the noise policies identified in the General Plan as CEQA thresholds.

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan, or applicable standards of other agencies.

For on-site noise sources affecting nearby noise-sensitive areas, the following standards are applied:

- General Plan (EC-1.1): 45 dB L_{dn} daytime/nighttime interior noise level for noise-sensitive land uses.
- General Plan (EC-1.2): Significant impacts would occur if a project would:
    - Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain “Normally Acceptable”; or

- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where the noise levels would equal or exceed the "Normally Acceptable" level.

- General Plan (EC-1.3): 55 dB L_{dn} daytime/nighttime exterior noise level measured at the property lines of residences (applicable to new non-residential land uses when located adjacent to existing or planned noise-sensitive land uses).
- Zoning Code: 55 dB L_{max} exterior noise level measured at the property lines of residences (Planning Consideration, not a CEQA threshold).

b) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

A significant impact would occur if a project would exceed the noise criteria identified above in General Plan EC-1.2.

c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above level existing without the project.

A significant impact would occur if project construction would exceed the noise criteria identified above in General Plan EC-1.7.

Major Noise Sources Evaluated in this Study

As noted previously, the project proposes a combination of commercial/retail, hotel and outdoor entertainment uses. The major noise-producing components and associated impacts of the proposed Terra-Topgolf project are as follows:

1. Traffic noise impacts at existing residences located in the general project vicinity caused by increased traffic noise resulting from increased project-generated traffic on the local roadway network.

2. Noise impacts at the existing residences located immediately adjacent or near the project site resulting from noise generated by on-site activities associated with the project. Specific on-site noise sources evaluated in this assessment include parking lot movements (vehicles arriving and departing, doors opening and closing, etc.), mechanical equipment (HVAC) operation, operation of the proposed Topgolf entertainment facility (amplified music and patron/crowd noises), and project construction and operations.

Traffic Noise Impacts Due to the Project

With development of the project site, traffic volumes on the local roadway network will increase. Those increases in daily traffic volumes will result in a corresponding increase in traffic noise levels at existing uses located along those roadways. The FHWA Model was used with traffic data provided by the client to predict existing and existing plus, background and background plus, and project traffic noise level increases.

Impact 1: Increases in Existing Traffic Noise Levels due to the Project

Existing versus existing-plus-project traffic noise levels on the local roadway network are shown in Table 4. The following section includes an assessment predicted noise levels relative to the noise criteria identified in City General Plan sections EC-1.1, 1.2 & 1.3.

Table 4
Existing vs. Existing Plus Project Traffic Noise Levels[1]
Terra-Topgolf Development Project – San Jose, CA

Roadway	Segment Description	E	E+ P	Change	Substantial Increase?
N Taylor Street	Gold Street to Liberty Street	63.9	64.9	1.0	No
N Taylor Street	Liberty Street to Trinity Park Drive	64.9	65.7	0.8	No
N First Street	Trinity Park Drive to Nortech Pkwy	64.0	66.8	2.9	No
N First Street	Nortech Parkway to SR 237 WB Ramps	66.1	66.4	0.2	No
Gold Street	North of Taylor Street	58.7	58.7	--	No
Gold Street	South of Taylor Street	64.9	65.7	0.8	No
Gold Street	North of Gold Street Connector	66.2	66.8	0.6	No
Liberty Street	North of Taylor Street	54.9	55.3	0.4	No
Liberty Street	South of Taylor Street	59.2	59.2	--	No
Trinity Park Drive	North of N First Street	51.7	51.7	--	No
Nortech Parkway	North of N First Street	64.4	67.0	2.6	No

Notes:
1. dB Ldn @ 50 feet from roadway centerline

Source: FHWA-RD-77-108 with inputs prepared by Fehr & Peers

Assessment Relative to General Plan Policy EC-1.1

As indicated in Table 4, existing traffic noise levels on 7 of the 11 analyzed roadway segments currently exceed the City's 60 dB L_{dn} standard for residential land uses. However, at the remaining 4 roadway segments, existing traffic volumes satisfy the City's 60 dB L_{dn} standard. In the analysis of existing plus project noise level conditions at these 4 roadway segments, the increase in noise levels as a result of the project has a range of 0 to 0.4 dB, with no exceedances of the City's 60 dB L_{dn} exterior noise level standard resulting from the project. Because these existing plus project traffic noise levels satisfy the City of San Jose General Plan exterior noise level standard of 60 dB L_{dn} for residential land uses, this noise impact is considered ***less than significant***.

As indicated in Table 4, existing plus project exterior noise levels at the analyzed roadway segments range from 52-67 dB L_{dn}. Given this exterior noise level, a building facade noise reduction of at least 22 dB would be required to satisfy the City's 45 dB L_{dn} interior noise level standard for residential land uses. Standard construction (wood or stucco siding, STC-27 windows, door weather-stripping, exterior wall insulation, composition plywood roof), results in an exterior to interior noise reduction of at least 25 dB with windows closed and approximately

15 dB with windows open. After taking into consideration the noise reduction achieved from standard construction, the range of existing plus project traffic noise levels within interior spaces would be 27-42 dB L_{dn}. Because existing plus project traffic noise levels satisfy the City of San Jose General Plan interior noise level standard of 45 dB L_{dn} for residential land uses, this noise impact is considered ***less than significant***.

Assessment Relative to General Plan Policy EC-1.2

Given a baseline exposure between 51.7 and 67.2 dB L_{dn}, the applicable General Plan significance threshold criteria would range from 3 to 5 dB. According to Table 4, the proposed project would not result in any substantial increases in off-site traffic noise impacts relative to existing traffic conditions present without the project. Because the predicted increases in traffic noise levels are below the significance criteria for each roadway segment, this noise impact is considered ***less than significant.***

Assessment Relative to General Plan Policy EC-1.3

As indicated in Table 4, existing traffic noise levels on 9 of the 11 analyzed roadway segments currently exceed the City's 55 dB L_{dn} property line standard. However, traffic noise generated by the project is not predicted to exceed the City's 55 dB L_{dn} standard. Because project traffic noise levels would not exceed the City of San Jose General Plan property line 55 dB L_{dn} noise level standard, this noise impact is considered ***less than significant****.*

Impact 2: Increases in Background Traffic Noise Levels due to the Project

Using the same methodology described above, traffic noise levels were predicted for background and background-plus-project conditions. Table 5 shows the results of the background traffic analysis.

Table 5
Background vs. Background Plus Project Traffic Noise Levels[1]
Terra-Topgolf Development Project – San Jose, CA

Roadway	Segment Description	B	B+P	Change	Substantial Increase?
N Taylor Street	Gold Street to Liberty Street	63.9	64.9	1.0	No
N Taylor Street	Liberty Street to Trinity Park Drive	64.9	65.7	0.8	No
N First Street	Trinity Park Drive to Nortech Pkwy	64.0	66.8	2.9	No
N First Street	Nortech Parkway to SR 237 WB Ramps	67.2	67.4	0.2	No
Gold Street	North of Taylor Street	58.7	58.7	--	No
Gold Street	South of Taylor Street	64.9	65.7	0.8	No
Gold Street	North of Gold Street Connector	67.0	67.5	0.5	No
Liberty Street	North of Taylor Street	54.9	55.3	0.4	No
Liberty Street	South of Taylor Street	59.2	59.2	--	No
Trinity Park Drive	North of N First Street	51.7	51.7	--	No
Nortech Parkway	North of N First Street	64.4	67.0	2.6	No

Notes:
1. dB L_{dn} @ 50 feet from roadway centerline

Source: FHWA-RD-77-108 with inputs prepared by Fehr & Peers

Assessment Relative to General Plan Policy EC-1.1

As indicated in Table 5, background traffic noise levels on 7 of the 11 analyzed roadway segments currently exceed the City's 60 dB L_{dn} standard for residential land uses. However, at the remaining 4 roadway segments, background traffic volumes satisfy the City's 60 dB L_{dn} standard. In the analysis of background plus project noise level conditions at these 4 roadway segments, the increase in noise levels as a result of the project has a range of 0 to 0.4 dB, with no exceedances of the City's 60 dB L_{dn} exterior noise level standard resulting from the project. Because these background plus project traffic noise levels satisfy the City of San Jose General Plan exterior noise level standard of 60 dB L_{dn} for residential land uses, this noise impact is considered ***less than significant***.

As indicated in Table 5, background plus project noise levels at the analyzed roadway segments range from 52-67 dB L_{dn}. Given this exterior noise level, a building facade noise reduction of at least 22 dB would be required to satisfy the City's 45 dB L_{dn} interior noise level standard for residential land uses. After taking into consideration the noise reduction achieved from the aforementioned standard construction practices, the range of background plus project traffic noise levels within interior spaces would be 27-42 dB L_{dn}. Because background plus project traffic noise levels satisfy the City of San Jose General Plan interior noise level standard of 45 dB L_{dn} for residential land uses, this noise impact is considered ***less than significant***.

Assessment Relative to General Plan Policy EC-1.2

Given a baseline exposure between 51.7 and 67.2 dB L_{dn}, the applicable General Plan significance threshold criteria would range from 3 to 5 dB. According to Table 5, the proposed project would not result in any substantial increases in off-site traffic noise impacts relative to background traffic conditions present without the project. Because the predicted increases in traffic noise levels are below the significance criteria for each roadway segment, this noise impact is considered ***less than significant.***

Assessment Relative to General Plan Policy EC-1.3

As indicated in Table 5, existing traffic noise levels on 9 of the 11 analyzed roadway segments currently exceed the City's 55 dB L_{dn} property line standard. However, traffic noise generated by the project is not predicted to exceed the City's 55 dB L_{dn} standard. Because project traffic noise levels would not exceed the City of San Jose General Plan property line 55 dB L_{dn} noise level standard, this noise impact is considered ***less than significant****.*

Noise Impacts Resulting from On-Site Activities within the Project Site

Impact 3: Parking Lot Activity Noise

The project proposes both ground level and lower level parking as indicated in Figures 2 and 3. Lower level parking areas will be depressed relative to the project site and the nearest noise-sensitive receptors located opposite the project site on North First Street. As a result, noise generated by lower-level parking lot activities would be reduced due to shielding provided by intervening topography and structures. As indicated in Figure 3, ground level parking is primarily located northwest of the proposed Topgolf facility.

As a means of predicting the noise generation due to parking lot activities, BAC utilized noise level data collected at various parking lots over the years. That data indicate that a typical maximum noise level associated with parking lot activity did not exceed 65 dB L_{max} at a reference distance of 50 feet. Average (L_{eq}) noise levels were predicted to be 5 dB lower than maximum noise levels. Given the proposed hours of operation, parking lot L_{dn} values computed to 3 dB higher than L_{eq} values, assuming equal level of activity for 12 daytime and 4 nighttime hours. Because it is known that parking lot activity will be lighter during non-peak hours, this assumption is conservative.

Because individual cars entering and leaving the proposed parking areas will result in brief periods of noise generation, impacts associated with parking lot movements are assessed relative to the City's Zoning Code maximum noise level standards (L_{max}) shown in Table 3.

The distance between the nearest proposed lower level parking spaces and the closest existing residences to the north (Area 1 on Figure 1), is approximately 150 feet. At that distance, maximum noise levels generated by the nearest parking lot activities are predicted to be approximately 55 dB L_{max} prior to consideration of shielding provided by the recessed parking area. That shielding is predicted to result in a reduction of approximately 10 dB at the nearest residences, resulting in lower level parking lot noise emissions of 45 dB L_{max} at the nearest

residences in Area 1. Please see Appendix D-1 for computations of parking lot noise levels at the nearest sensitive receptors. This level is considered satisfactory relative to the City's Zoning Code 55 L_{max} exterior noise level standard.

The distance between the nearest proposed ground level parking spaces and the closest existing residence to the north is approximately 250 feet. The residences to the north will be partially screened from view of the ground level parking spaces by intervening commercial buildings. That screening is predicted to result in a minimum 5 dB reduction in parking lot noise levels at those northern residences (Area 1 on Figure 1). Resulting maximum ground level parking lot noise levels at the residences identified within Area 1 would be approximately 46 dB L_{max}. This level is considered satisfactory relative to the City's Zoning Code 55 L_{max} exterior noise level standard.

The residences to the south, on the opposite side of the Guadalupe River (Area 2 on Figure 1), are located approximately 500+ feet from the nearest ground level parking space at the project site. These residences would not be shielded from view of the proposed ground-level parking areas. Maximum ground-level parking lot noise levels at the Area 2 residences are predicted to be approximately 45 dB L_{max}. This level would satisfy the City's Zoning Code 55 L_{max} exterior noise level standard.

The residences represented by Area 3 (see Figure 1) are approximately 1,700 feet from the nearest proposed ground level parking area associated with the project site. Those residences are substantially shielded from view of the project site by a grade differential as well as the masonry sound wall along the southern side of SR-237. Resulting maximum ground level parking lot noise levels at the residences identified within Area 3 would be approximately 19 dB L_{max}. This level is considered satisfactory relative to the City's Zoning Code 55 L_{max} exterior noise level standard.

At sensitive areas 4 and 5, parking lot noise would be substantially screened by intervening structures and attenuated due to the considerable setbacks from these sensitive locations and the nearest parking areas. As a result, maximum ground-level parking lot noise levels at the Area 4 and 5 receptors are predicted to be 34 and 25 dB L_{max}, respectively These levels would satisfy the City's Zoning Code 55 L_{max} exterior noise level standard. Parking lot noise levels within the school classrooms and library within Area 4 would be 20 dB lower due to noise attenuation provided by the building façade.

In addition to lower level and ground level parking lot noise levels satisfying the City's 55 dB L_{max} noise standard at all of the nearest residential areas to the project site, Figures 5-10 indicated the predicted maximum noise levels level are well below the measured existing maximum noise levels at the nearest residences and other nearby noise-sensitive areas. As a result, this impact is considered ***less than significant.***

Impact 4: Mechanical Equipment Noise

The heating, ventilation, and air conditioning (HVAC) systems for maintaining comfortable temperatures within the proposed hotel, commercial/retail, and Topgolf facility office uses will vary. For the commercial buildings, HVAC systems would likely consist of packaged rooftop air conditioning systems. For the proposed hotel use, mechanical equipment could either be located internally within a mechanical equipment room or on the rooftop. The mechanical equipment for the Topgolf facility is located within a mechanical equipment enclosure.

Because mechanical equipment operation typically generates sustained, steady-state, noise levels, impacts of HVAC system usage are assessed in this study relative to the City's General Plan daytime/nighttime 55 L_{dn} exterior and 45 L_{dn} interior noise level standards.

Noise from rooftop HVAC units has been measured by BAC to be approximately 50 dB at a reference distance of 100 feet from the building façades of similar uses. HVAC systems located within dedicated mechanical equipment rooms typically result in even lower noise levels.

At the nearest residence to the site (Area 1), would be located a minimum of 150+ feet from any project-related HVAC equipment, average HVAC exterior noise levels are predicted to be approximately 46 dB L_{eq}/L_{max} and 50 dB L_{dn}, conservatively assuming the mechanical equipment were to operate 12 daytime and 4 nighttime hours per day. Based on more typical operating conditions, predicted HVAC system levels are predicted to be even lower at the nearest residences to the project site (Area 1). Please see Appendix D-2 for computations of parking lot noise levels at the nearest sensitive receptors.

Within the nearest residences, noise levels would be approximately 15 dB lower with windows open, and 25 dB lower with windows closed. Resulting interior noise levels would range from approximately 25-35 dB L_{dn} within the nearest residences.

Predicted HVAC system noise levels at the nearest existing residences would be satisfactory relative to the City's exterior noise level standards of 55 dB L_{max} and 55 L_{dn} , and 45 dB L_{dn} interior noise level standard. In addition, predicted HVAC system noise levels would be well below measured ambient conditions at all of the nearest residences to the project site. As a result, noise impacts resulting from daytime and/or nighttime HVAC system usage within the project area is considered ***less than significant.***

Impact 5: Topgolf Outdoor Entertainment Facility Noise

Topgolf Facility Overview

Topgolf is a proposed golf entertainment complex planned on the 13.5-acre portion of the project site identified on Figures 1 - 3. Topgolf is a three-story driving range facility with 125 climate-controlled hitting bays, with an outdoor outfield enclosed by netting. The Topgolf facility includes a full-service restaurant, bar, lounges and corporate/event meeting spaces, and family entertainment area with games. Players play in individual hitting bays. Each hitting bay can accommodate up to six players at a time but it's not unusual to have one or two players in some bays. Hitting bays include seating, television screens to monitor sporting events and track

Topgolf scoring, and include overhead speakers providing amplified music. Topgolf facilities include the following specific activities:

- **Lower Level**. The lower level features approximately 40 hitting bays including bays designated for golf instruction and team practice. The lower level features a family lounge area. This level is at grade on the tee line.

- **Main Level.** The entrance to the building is on the main level. The main level features approximately 40 hitting bays, a full-service bar/restaurant, a 2,900-square foot corporate and event meeting space and lobby area.

- **Upper Level.** The upper level features approximately 40 hitting bays and an open-air rooftop terrace. The rooftop terrace will be furnished with tables, couches and fire pits. Restaurant food service is available on the roof top terrace. The terrace can accommodate live music for events.

- **Operations.** Proposed operating hours are 9 a.m. to 2 a.m., seven days a week. The project proposes live and DJ-generated music on the outdoor terrace on the third level. On weekdays, the music would start at 6 p.m. and end at midnight. On weekends, the music would start at noon and end at 1 a.m. Security will be provided with on-site indoor and outdoor cameras and on-site staff security during operating hours.

Topgolf Music and Patron Activity Noise Generation

The design of the Topgolf facilities is such that music is played above the individual drive bays, as well as on the third level terrace. In addition to this music, sound is also generated at the Topgolf facilities by patrons conversing, sometimes in raised voices.

To evaluate the noise generation of the proposed facility, BAC staff utilized data from an extensive sound level survey at the Topgolf facility in Gilbert, Arizona. BAC staff conducted surveys from 5 p.m. Friday September 25 to Noon on Sunday, September 27, 2015. The surveys consisted of both short and long-term sound level measurements at 17 locations in and around the Topgolf facility. An aerial image with noise measurement locations at the Gilbert facility is shown in Figure 11. Long-term sound level measurements were conducted at sites A and B shown on Figure 11. Measured sound levels resulting from typical weekend Topgolf activities at the Gilbert facility were plotted and are displayed on Figure 12. The Figure 12 “heat map” highlights the range of noise levels which can be expected throughout the site. According to Topgolf representatives, the noise generation of the proposed Topgolf San Jose facility would be comparable to that of the Gilbert facility where the sound level surveys were conducted.

Predicted Topgolf Noise Levels at the Nearest Residences to the San Jose Facility

The noise exposure data shown in Figure 12 were projected from the proposed facility to the nearest residences assuming a six (6) dB decrease per doubling of distance from the noise source, consistent with accepted sound propagation algorithms.

The Gilbert Topgolf facility measurement sites shown in Figure 11 which are most pertinent to this analysis of potential impacts at the proposed San Jose facility are Sites I, M, and A, as they represent noise exposure in the direction of residential receptor locations 1, 2 and 3, respectively. See Figure 1 for locations of nearest potentially affected residential receptor locations. The noise level data collected at those locations were projected to the nearest residences assuming standard spherical spreading of sound (-6 dB per doubling of distance from the source). The results of the noise assessment at those locations are shown in Table 6.

Table 6
Predicted Topgolf Facility Noise Levels at Nearest Sensitive Uses
Terra-Topgolf Development Project – San Jose, California

Site	Description	Distance from Topgolf Facility (ft)	Predicted Topgolf Noise Levels, dB[1]			Baseline Ldn, dB[4]	Baseline + Project Ldn, dB	Project Related Increase in Ldn, dB
			L_{eq}	L_{max}	L_{dn}[2]			
Area 1	Nearest Residences to North	700	45	53	48	65	65	0
Area 2	Nearest Residences to West	580	47	55	50	63	63	0
Area 3	Nearest Residences to South[3]	1,900	37	44	40	62	62	0
Area 4	Interior of Library and School Classrooms[4]	400	27	40	30	65	65	0
Area 5	Single Residence to Northwest	1,700	37	45	40	65	65	0

Notes:

1. Predicted levels are based on reference levels from BAC file data, and 6 dB per doubling of distance attenuation rate.
2. L_{dn} calculations conservatively assume continuous Topgolf noise generation between 9 am and 2 am.
3. A -10 dB offset was conservatively applied to the residences represented by Area 3 due to shielding provided by the existing grade differential and SR-237 noise barrier.

Interior spaces of library and school classrooms were conservatively estimated to be 20 dB lower than exterior noise levels due to noise reduction provided by the library and school buildings.

4. Baseline noise levels are identified in Table 1.
5. Please see Appendix D-3 for computations of parking lot noise levels at the nearest sensitive receptors.

Source: Bollard Acoustical Consultants, Inc. (2015, 2016)

Table 6 indicates the predicted average (L_{eq}), maximum (L_{max}), and day-night average level (L_{dn}), at each of the nearest noise-sensitive areas to the project site would be satisfactory relative to the project standards of significance. In addition, predicted exterior noise levels are at, or below, measured existing ambient conditions at those nearest sensitive areas. As a result, the project-related increase in Ldn at the nearest sensitive receptors is 0 dB, which is also below the City's thresholds for significance. As a result, noise impacts associated with on-site Topgolf activities, including amplified music and sound generated by facility patrons, is considered ***less than significant.***

Figure 11

Project Area and Noise Measurement Locations
Topgolf Gilbert - Gilbert, Arizona

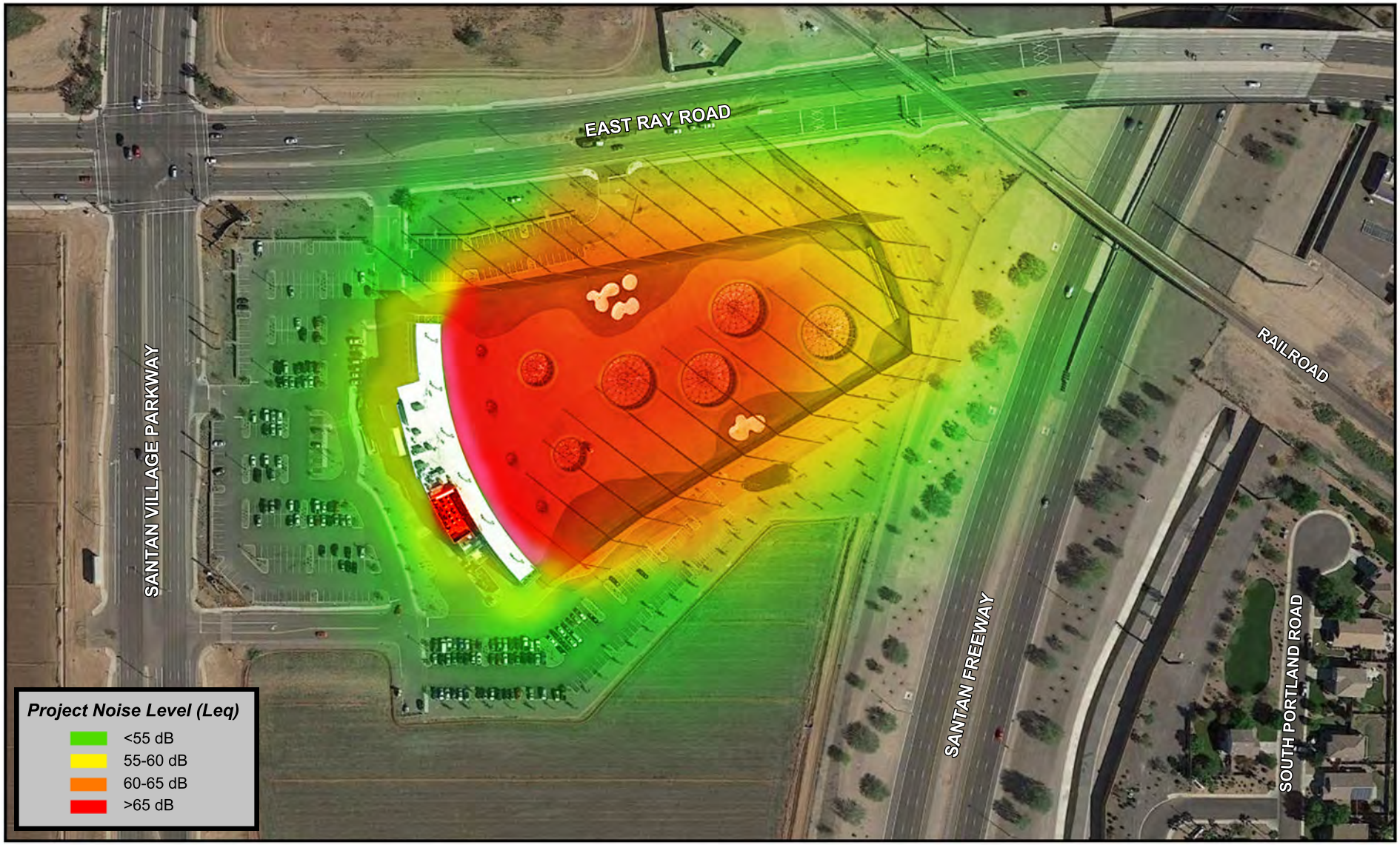
BOLLARD
Acoustical Consultants

Scale (feet)
0 120 240

Figure 12

Project Noise Generation Heat Map

Topgolf Gilbert - Gilbert, Arizona



BOLLARD Acoustical Consultants

Scale (feet)

0 120 240

Impact 6: Project Construction Noise Generation

During the construction phases of the proposed project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in typical construction would generate maximum noise levels, as indicated in Table 7, ranging from 70 to 90 dB at a distance of 50 feet.

Because project construction activities would not include pile driving or other substantial sources of vibration, and because vibration levels dissipate rapidly from earthmoving equipment uses for site grading, no vibration-related impacts are identified at any of the nearest sensitive receptors to the project site.

Table 7
Typical Construction Equipment Noise

Equipment Description	Maximum Noise Level at 50 feet, dBA
Auger drill rig	85
Backhoe	80
Bar bender	80
Boring jack power unit	80
Chain saw	85
Compactor (ground)	80
Compressor (air)	80
Concrete batch plant	83
Concrete mixer truck	85
Concrete pump truck	82
Concrete saw	90
Crane (mobile or stationary)	85
Dozer	85
Dump truck	84
Excavator	85
Flatbed truck	84
Front end loader	80
Generator (25 kilovolt-amperes [kVA] or less)	70
Generator (more than 25 kVA)	82
Grader	85
Jackhammer	85
Paver	85
Pickup truck	55
Pneumatic tools	85
Pumps	77
Rock drill	85
Scraper	85
Soil mix drill rig	80
Tractor	84
Vacuum street sweeper	80
Vibratory concrete mixer	80

Source: Federal Highway Administration 2006.

The nearest existing residences are located between 100 and over 1,000 feet to the required construction areas within the project site. At this range of distances, maximum noise levels would range from approximately 50 to 85 dB L_{max} at the nearest sensitive receptors. Figures 5-10 indicate that daytime maximum noise levels frequently exceeded 80 dB L_{max} at the nearest sensitive receptor location (Areas 1 & 5). Therefore, the predicted range of construction-related noise levels would not likely represent a substantial short-term increase over ambient maximum noise levels, provided construction activities were limited to daytime hours. However, due to the potential for substantial short-term exceedances of ambient noise levels at nearby sensitive areas during project construction, this impact is considered ***potentially significant***.

Mitigation for Impact 6:

MM 6: Implement measures to prevent exposure of sensitive receptors to excessive construction noise

To reduce impacts associated with noise generated during project-related construction activities, the project applicant(s) and their primary contractors for engineering design and construction of all project phases shall ensure that the following requirements are implemented at each work site in any year of project construction to avoid and minimize construction noise effects on sensitive receptors. The project applicant(s) and primary construction contractor(s) shall employ noise-reducing construction practices. Measures that shall be used to limit noise shall include the measures listed below:

- Noise-generating construction operations shall be limited to the hours between 7 a.m. and 7 p.m. Monday through Friday, and between 8 a.m. and 6 p.m. on Saturdays and Sundays.

- All construction equipment and equipment staging areas shall be located as far as possible from nearby noise-sensitive land uses.

- All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

- All motorized construction equipment shall be shut down when not in use to prevent idling.

- The primary contractor shall prepare and implement a construction noise management plan. This plan shall identify specific measures to ensure compliance with the noise control measures specified above. The noise control plan shall be submitted to the City of San Jose before any noise-generating construction activity begins.

Significance after mitigation: ***Less than Significant***

Cumulative Setting, Impacts and Mitigation Measure

The future (cumulative) noise environment at the project site will continue to be dominated by traffic on the local roadway network. A detailed analysis of cumulative traffic noise levels, both with and without the project, is provided in Table 8. The FHWA Model input data used to derive the cumulative data contained in Table 8 is provided in Appendix C.

Cumulative Traffic Noise Impacts

Impact 7: Increase in Cumulative Traffic Noise Levels

Cumulative versus cumulative plus project traffic noise levels on the local roadway network are shown in Table 8. The following section includes an assessment predicted noise levels relative to the noise criteria identified in City General Plan sections EC-1.1, 1.2 & 1.3

Table 8
Cumulative vs. Cumulative Plus Project Traffic Noise Levels[1]
Terra-Topgolf Development Project – San Jose, CA

Roadway	Segment Description	C	C+P	Change	Substantial Increase?
N Taylor Street	Gold Street to Liberty Street	66.4	67.0	0.6	No
N Taylor Street	Liberty Street to Trinity Park Drive	67.0	67.5	0.5	No
N First Street	Trinity Park Drive to Nortech Pkwy	66.1	68.1	1.9	Yes
N First Street	Nortech Parkway to SR 237 WB Ramps	67.4	67.5	0.2	No
Gold Street	North of Taylor Street	58.7	58.7	--	No
Gold Street	South of Taylor Street	67.0	67.5	0.5	No
Gold Street	North of Gold Street Connector	68.7	69.1	0.3	No
Liberty Street	North of Taylor Street	54.9	55.3	0.4	No
Liberty Street	South of Taylor Street	59.2	59.2	--	No
Trinity Park Drive	North of N First Street	53.8	53.8	--	No
Nortech Parkway	North of N First Street	66.4	68.2	1.8	Yes

Notes:
1. dB L_{dn} @ 50 feet from roadway centerline

Source: FHWA-RD-77-108 with inputs prepared by Fehr & Peers

Assessment Relative to General Plan Policy EC-1.1

As indicated in Table 8, cumulative traffic noise levels on 7 of the 11 analyzed roadway segments currently exceed the City's 60 dB L_{dn} standard for residential land uses. However, at the remaining 4 roadway segments, cumulative traffic volumes satisfy the City's 60 dB L_{dn} standard. In the analysis of cumulative plus project noise level conditions at these 4 roadway segments, the increase in noise levels as a result of the project has a range of 0 to 0.4 dB, with no exceedances of the City's 60 dB L_{dn} exterior noise level standard resulting from the project.

Because these cumulative plus project traffic noise levels satisfy the City of San Jose General Plan exterior noise level standard of 60 dB L_{dn} for residential land uses, this noise impact is considered ***less than significant***.

As indicated in Table 8, cumulative plus project noise levels at the analyzed roadway segments range from 54-69 dB L_{dn}. Given this exterior noise level, a building facade noise reduction of at least 24 dB would be required to satisfy the City's 45 dB L_{dn} interior noise level standard for residential land uses. After taking into consideration the noise reduction achieved from the aforementioned standard construction practices, the range of cumulative plus project traffic noise levels within interior spaces would be 29-44 dB L_{dn}. Because cumulative plus project traffic noise levels satisfy the City of San Jose General Plan interior noise level standard of 45 dB L_{dn} for residential land uses, this noise impact is considered ***less than significant***.

Assessment Relative to General Plan Policy EC-1.2

Given a baseline exposure between 53.8 and 68.7 dB L_{dn}, the applicable General Plan significance threshold criteria would range from 3 to 5 dB. According to Table 8, the proposed project would not result in any substantial increases in off-site traffic noise impacts relative to cumulative traffic conditions present without the project. Because the predicted increases in traffic noise levels are below the significance criteria for each roadway segment, this noise impact is considered ***less than significant.***

Assessment Relative to General Plan Policy EC-1.3

As indicated in Table 8, existing traffic noise levels on 9 of the 11 analyzed roadway segments currently exceed the City's 55 dB L_{dn} property line standard. However, traffic noise generated by the project is not predicted to exceed the City's 55 dB L_{dn} standard. Because project traffic noise levels would not exceed the City of San Jose General Plan property line 55 dB L_{dn} noise level standard, this noise impact is considered ***less than significant***.

Impact 8: Cumulative (Future) Traffic Noise Levels within Proposed Hotel

As noted in Table 8, the predicted future (cumulative plus project) traffic noise level at a distance of 50 feet from the centerline of North First Street at the location of the proposed hotel is 68.1 dB L_{dn}. Because the nearest proposed hotel building façade will be 100 feet from that roadway, the future traffic noise exposure at that façade would be 63.6 dB L_{dn} (based on 4.5 dB decrease per doubling of distance from source).

Based on an exterior noise exposure of 63.6 dB L_{dn}, the building façade of the proposed hotel would need to provide at least 19 dB of traffic noise attenuation to achieve compliance with the City of San Jose interior noise exposure standard of 45 dB L_{dn}. Because standard hotel building design provides approximately 30 dB of exterior to interior traffic noise reduction, interior noise levels within the hotel rooms are predicted to be approximately 34 dB L_{dn} or less. Because the predicted interior noise level within the hotel rooms would be satisfactory relative to the City of San Jose noise standard, this noise impact is considered ***less than significant.***

Impact 9: Combined Noise from all On-Site Project Noise Sources

Combined noise levels for each on-site noise source operating concurrently are shown below in Table 9. It should be noted that project construction noise would not occur simultaneously with operational noise. Because the cumulative noise generation of all on-site sources would satisfy the City of San Jose exterior noise criteria applied at the nearest noise-sensitive land uses, and because the increase in Ldn values at those nearest sensitive receptors would be 0 dB as a result of the project, this impact is considered **less than significant.**

Table 9
Predicted Noise Levels at Nearest Receptors from All On-Site Noise Sources Combined
Terra-Topgolf Development Project – San Jose, California

Site	Description	Predicted Project Noise Levels, dB[1]			Baseline Ldn, dB[4]	Baseline + Project Ldn, dB	Project Related Increase in Ldn, dB
		L_{eq}	L_{max}	L_{dn}[2]			
Area 1	Nearest Residences to North	49	54	53	65	65	0
Area 2	Nearest Residences to West	48	55	51	63	63	0
Area 3	Nearest Residences to South[3]	37	44	40	62	62	0
Area 4	Interior of Library and School Classrooms[4]	29	40	32	65	65	0
Area 5	Single Residence to Northwest	45	48	48	65	65	0

Notes:

1. Predicted levels are based on the decibel addition of data reported in previous sections of this report.
2. L_{dn} calculations conservatively assume continuous Topgolf noise generation between 9 am and 2 am.
3. A -10 dB offset was conservatively applied to the residences represented by Area 3 due to shielding provided by the existing grade differential and SR-237 noise barrier.
   Interior spaces of library and school classrooms were conservatively estimated to be 20 dB lower than exterior noise levels due to noise reduction provided by the library and school buildings.
4. Baseline noise levels are identified in Table 1.

Source: Bollard Acoustical Consultants, Inc. (2015, 2016)

Conclusions and Recommendations

There are considerable setbacks between the existing residences in the area and proposed buildings within the Terra-Topgolf development. In addition, existing Highway 237 and local roadway network traffic noise levels will provide masking of project noise generation at those nearest residences. As a result, with the exception of potential impacts during project construction, noise impacts are not identified for this project.

These conclusions are based on the project site plans shown on Figures 2 and 3, and on the data and assumptions cited herein. Any substantive revisions to the project site plans or proposed operations could cause actual noise levels to vary relative to those predicted herein. BAC is not responsible for such revisions.

This concludes BAC's environmental noise analysis for the proposed Terra-Topgolf Development Project. Please contact Paul Bollard at (916) 663-0500 or paulb@bacnoise.com with any questions regarding this assessment.

Appendix A

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

SEL A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Appendix B-1
Ambient Noise Monitoring Results - Site A
Terra-Topgolf Development Project - San Jose, California
Wednesday, December 16, 2015

Hour	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
12:00 AM	56	81	42	66	58	49	47	44
1:00 AM	53	72	41	63	54	48	46	43
2:00 AM	51	74	42	58	52	50	48	45
3:00 AM	51	71	41	56	52	49	48	45
4:00 AM	56	80	43	64	56	54	52	46
5:00 AM	60	76	52	68	63	59	57	55
6:00 AM	63	76	55	71	68	63	59	57
7:00 AM	64	80	54	72	69	65	60	56
8:00 AM	63	77	50	71	68	64	58	52
9:00 AM	63	76	50	70	68	64	58	52
10:00 AM	61	80	44	70	66	61	54	47
11:00 AM	63	79	41	71	67	63	56	45
12:00 PM	62	76	39	69	67	63	57	44
1:00 PM	64	81	41	72	68	65	60	48
2:00 PM	62	75	41	70	67	63	56	45
3:00 PM	63	78	42	71	68	65	58	46
4:00 PM	64	79	43	71	69	65	60	48
5:00 PM	66	83	46	72	69	67	64	53
6:00 PM	64	88	42	70	68	66	62	49
7:00 PM	63	75	43	70	68	64	58	46
8:00 PM	62	88	44	69	66	60	51	46
9:00 PM	60	74	39	69	65	59	49	43
10:00 PM	57	73	38	67	63	53	46	41
11:00 PM	57	75	38	68	62	49	45	41

Daytime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	63	79	44	71	68	64	57	48
High	66	88	55	72	69	67	64	56
Low	60	74	38	69	65	59	49	43

Nighttime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	56	75	44	65	59	53	50	46
High	63	81	55	71	68	63	59	57
Low	51	71	38	56	52	48	45	41

Ldn:	65

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Appendix B-2
Ambient Noise Monitoring Results - Site A
Terra-Topgolf Development Project - San Jose, California
Thursday, December 17, 2015

Hour	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
12:00 AM	52	72	42	61	52	49	47	44
1:00 AM	52	73	41	62	52	49	47	44
2:00 AM	50	72	40	59	51	48	46	43
3:00 AM	51	71	40	58	53	50	48	44
4:00 AM	56	79	45	65	57	55	53	49
5:00 AM	60	77	50	68	62	59	57	54
6:00 AM	64	80	55	72	68	63	59	57
7:00 AM	64	82	56	71	68	64	60	57
8:00 AM	64	79	52	71	69	65	60	55
9:00 AM	64	82	50	72	68	64	56	52
10:00 AM	62	79	42	71	68	62	54	47
11:00 AM	62	76	40	70	67	63	55	44
12:00 PM	64	76	41	71	68	65	59	45
1:00 PM	63	81	39	71	67	64	57	43
2:00 PM	63	80	38	71	68	65	59	43
3:00 PM	64	76	38	71	69	65	58	45
4:00 PM	65	79	41	72	69	66	61	48
5:00 PM	64	78	43	71	69	66	63	51
6:00 PM	63	80	47	70	68	65	60	50
7:00 PM	63	78	47	71	68	64	56	49
8:00 PM	62	77	48	70	67	61	54	51
9:00 PM	61	75	48	69	66	58	55	53
10:00 PM	60	81	46	69	65	57	53	49
11:00 PM	57	74	47	67	61	54	52	49

Daytime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	63	79	45	71	68	64	58	49
High	65	82	56	72	69	66	63	57
Low	61	75	38	69	66	58	54	43

Nighttime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	56	75	45	65	58	54	51	48
High	64	81	55	72	68	63	59	57
Low	50	71	40	58	51	48	46	43

Ldn:	66

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Appendix B-3
Ambient Noise Monitoring Results - Site B
Terra-Topgolf Development Project - San Jose, California
Wednesday, December 16, 2015

Hour	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
12:00 AM	51	72	39	58	54	51	49	44
1:00 AM	49	71	38	54	51	48	46	42
2:00 AM	48	61	38	54	52	49	47	44
3:00 AM	48	59	39	54	51	49	46	43
4:00 AM	51	59	42	56	54	53	51	47
5:00 AM	56	65	49	59	58	57	56	53
6:00 AM	61	76	55	70	64	59	58	56
7:00 AM	60	81	52	69	62	57	55	53
8:00 AM	60	79	47	70	62	54	52	51
9:00 AM	58	74	50	68	60	55	53	52
10:00 AM	57	75	45	67	60	53	51	48
11:00 AM	59	81	41	70	59	50	48	44
12:00 PM	55	72	39	68	57	46	43	41
1:00 PM	60	82	41	70	63	50	45	42
2:00 PM	56	73	43	68	58	50	47	44
3:00 PM	58	76	42	70	61	49	45	43
4:00 PM	56	79	43	66	56	49	47	45
5:00 PM	58	78	44	69	58	50	49	46
6:00 PM	57	75	42	67	60	51	48	45
7:00 PM	59	76	42	70	63	50	47	45
8:00 PM	57	75	43	69	59	49	48	45
9:00 PM	57	76	41	67	58	49	46	43
10:00 PM	51	72	40	60	50	47	45	42
11:00 PM	56	75	41	65	56	52	49	44

Daytime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	58	77	44	68	60	51	48	46
High	60	82	55	70	63	57	55	53
Low	55	72	38	66	56	46	43	41

Nighttime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	52	68	42	59	54	52	50	46
High	61	76	55	70	64	59	58	56
Low	48	59	38	54	50	47	45	42

Ldn:	62

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Appendix B-4
Ambient Noise Monitoring Results - Site B
Terra-Topgolf Development Project - San Jose, California
Thursday, December 17, 2015

Hour	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
12:00 AM	49	60	40	55	52	50	48	44
1:00 AM	48	58	39	54	51	49	46	43
2:00 AM	47	55	40	52	50	48	46	43
3:00 AM	50	63	40	56	53	51	49	44
4:00 AM	52	59	44	56	55	54	52	49
5:00 AM	55	59	50	57	56	56	55	53
6:00 AM	61	76	53	70	64	58	57	55
7:00 AM	61	83	54	69	62	57	56	55
8:00 AM	59	75	51	70	62	56	55	53
9:00 AM	62	82	51	72	63	55	54	52
10:00 AM	61	77	44	72	66	54	52	48
11:00 AM	72	86	40	80	77	73	68	42
12:00 PM	59	76	39	71	63	52	45	41
1:00 PM	60	82	40	70	56	46	44	42
2:00 PM	58	77	39	69	61	51	44	41
3:00 PM	60	78	39	71	63	51	44	41
4:00 PM	59	80	42	71	61	49	47	45
5:00 PM	56	75	44	68	58	49	48	46
6:00 PM	57	77	46	68	60	52	50	48
7:00 PM	60	76	47	71	65	55	53	51
8:00 PM	59	77	48	70	59	54	52	50
9:00 PM	57	77	47	68	57	54	53	51
10:00 PM	58	75	45	69	57	54	52	49
11:00 PM	56	74	46	63	57	55	54	51

Daytime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	60	78	45	71	62	54	51	47
High	72	86	54	80	77	73	68	55
Low	56	75	39	68	56	46	44	41

Nighttime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	53	64	44	59	55	53	51	48
High	61	76	53	70	64	58	57	55
Low	47	55	39	52	50	48	46	43

Ldn:	64

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Appendix B-5
Ambient Noise Monitoring Results - Site C
Terra-Topgolf Development Project - San Jose, California
Wednesday, December 16, 2015

Hour	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
12:00 AM	52	72	39	60	55	52	49	43
1:00 AM	50	75	38	56	52	48	44	41
2:00 AM	47	61	39	54	50	47	44	41
3:00 AM	48	63	40	55	52	48	45	42
4:00 AM	50	64	42	57	53	50	48	44
5:00 AM	53	68	46	58	56	54	52	49
6:00 AM	60	78	49	69	64	58	55	52
7:00 AM	60	79	51	68	62	58	56	54
8:00 AM	60	80	51	69	63	58	56	54
9:00 AM	58	73	48	67	61	56	55	52
10:00 AM	58	74	48	68	62	57	55	52
11:00 AM	60	78	48	70	61	59	57	53
12:00 PM	61	71	49	67	63	61	60	56
1:00 PM	63	78	52	70	66	63	61	58
2:00 PM	64	73	55	69	67	65	63	59
3:00 PM	61	73	53	67	63	61	59	57
4:00 PM	60	72	53	65	63	61	59	56
5:00 PM	59	75	49	67	62	59	57	54
6:00 PM	57	71	48	65	60	56	54	51
7:00 PM	59	74	47	69	63	56	54	51
8:00 PM	60	74	48	69	63	60	58	55
9:00 PM	59	72	47	66	62	60	58	54
10:00 PM	56	67	45	61	59	57	55	50
11:00 PM	56	73	42	63	58	55	53	48

Daytime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	60	74	50	68	63	59	57	54
High	64	80	55	70	67	65	63	59
Low	57	71	38	65	60	56	54	51

Nighttime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	52	69	42	59	56	52	50	46
High	60	78	49	69	64	58	55	52
Low	47	61	38	54	50	47	44	41

Ldn:	62

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Appendix B-6
Ambient Noise Monitoring Results - Site C
Terra-Topgolf Development Project - San Jose, California
Thursday, December 17, 2015

Hour	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
12:00 AM	49	61	40	56	53	51	47	42
1:00 AM	48	61	39	55	52	49	45	41
2:00 AM	47	62	38	54	51	47	44	41
3:00 AM	48	61	39	56	52	48	45	41
4:00 AM	50	62	42	56	53	50	48	45
5:00 AM	54	64	45	59	57	55	52	49
6:00 AM	60	75	49	69	63	58	55	52
7:00 AM	59	74	50	66	62	58	56	54
8:00 AM	60	75	51	69	63	58	56	54
9:00 AM	62	80	50	71	65	57	56	53
10:00 AM	60	75	49	70	64	59	56	53
11:00 AM	60	73	49	65	62	60	59	55
12:00 PM	62	76	51	70	65	62	60	57
1:00 PM	64	80	53	70	66	64	62	59
2:00 PM	60	71	50	66	64	62	58	55
3:00 PM	59	75	49	70	63	57	55	53
4:00 PM	59	73	51	68	62	59	57	55
5:00 PM	57	72	51	65	60	57	55	53
6:00 PM	57	71	50	66	59	55	54	52
7:00 PM	60	73	50	69	65	58	56	53
8:00 PM	59	74	47	68	61	58	57	53
9:00 PM	57	72	46	67	59	56	54	50
10:00 PM	57	72	44	65	59	56	54	50
11:00 PM	53	68	43	62	56	53	51	47

Daytime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	60	74	50	68	63	59	57	54
High	64	80	53	71	66	64	62	59
Low	57	71	38	65	59	55	54	50

Nighttime	Leq	Lmax	Lmin	L02	L08	L25	L50	L90
Average	52	65	42	59	55	52	49	45
High	60	75	49	69	63	58	55	52
Low	47	61	38	54	51	47	44	41

Ldn:	62

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Appendix C-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2015-275 Terra-Topgolf Development Project
Description: Existing
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	N Taylor Street	Gold Street to Liberty Street	5,340	85		15	2	2	40	50	
2	N Taylor Street	Liberty Street to Trinity Park Drive	6,670	85		15	2	2	40	50	
3	N First Street	Trinity Park Drive to Nortech Pkwy	5,370	85		15	2	2	40	50	
4	N First Street	Nortech Pkwy to SR 237 WB Ramps	8,800	85		15	2	2	40	50	
5	Gold Street	North of Taylor Street	1,590	85		15	2	2	40	50	
6	Gold Street	South of Taylor Street	6,600	85		15	2	2	40	50	
7	Gold Street	North of Gold Street Connector	9,000	85		15	2	2	40	50	
8	Liberty Street	North of Taylor Street	670	85		15	2	2	40	50	
9	Liberty Street	South of Taylor Street	1,810	85		15	2	2	40	50	
10	Trinity Park Drive	North of N First Street	320	85		15	2	2	40	50	
11	Nortech Pkwy	North of N First Street	5,980	85		15	2	2	40	50	

Appendix C-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2015-275 Terra-Topgolf Development Project
Description: Existing+Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	N Taylor Street	Gold Street to Liberty Street	6,700	85		15	2	2	40	50	
2	N Taylor Street	Liberty Street to Trinity Park Drive	8,090	85		15	2	2	40	50	
3	N First Street	Trinity Park Drive to Nortech Pkwy	10,380	85		15	2	2	40	50	
4	N First Street	Nortech Pkwy to SR 237 WB Ramps	9,310	85		15	2	2	40	50	
5	Gold Street	North of Taylor Street	1,590	85		15	2	2	40	50	
6	Gold Street	South of Taylor Street	7,960	85		15	2	2	40	50	
7	Gold Street	North of Gold Street Connector	10,300	85		15	2	2	40	50	
8	Liberty Street	North of Taylor Street	730	85		15	2	2	40	50	
9	Liberty Street	South of Taylor Street	1,810	85		15	2	2	40	50	
10	Trinity Park Drive	North of N First Street	320	85		15	2	2	40	50	
11	Nortech Pkwy	North of N First Street	10,820	85		15	2	2	40	50	

Appendix C-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2015-275 Terra-Topgolf Development Project
Description: Background
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	N Taylor Street	Gold Street to Liberty Street	5,340	85		15	2	2	40	50	
2	N Taylor Street	Liberty Street to Trinity Park Drive	6,670	85		15	2	2	40	50	
3	N First Street	Trinity Park Drive to Nortech Pkwy	5,370	85		15	2	2	40	50	
4	N First Street	Nortech Pkwy to SR 237 WB Ramps	11,420	85		15	2	2	40	50	
5	Gold Street	North of Taylor Street	1,590	85		15	2	2	40	50	
6	Gold Street	South of Taylor Street	6,600	85		15	2	2	40	50	
7	Gold Street	North of Gold Street Connector	10,860	85		15	2	2	40	50	
8	Liberty Street	North of Taylor Street	670	85		15	2	2	40	50	
9	Liberty Street	South of Taylor Street	1,810	85		15	2	2	40	50	
10	Trinity Park Drive	North of N First Street	320	85		15	2	2	40	50	
11	Nortech Pkwy	North of N First Street	5,980	85		15	2	2	40	50	

Appendix C-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2015-275 Terra-Topgolf Development Project
Description: Background+Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	N Taylor Street	Gold Street to Liberty Street	6,700	85		15	2	2	40	50	
2	N Taylor Street	Liberty Street to Trinity Park Drive	8,090	85		15	2	2	40	50	
3	N First Street	Trinity Park Drive to Nortech Pkwy	10,380	85		15	2	2	40	50	
4	N First Street	Nortech Pkwy to SR 237 WB Ramps	11,930	85		15	2	2	40	50	
5	Gold Street	North of Taylor Street	1,590	85		15	2	2	40	50	
6	Gold Street	South of Taylor Street	7,960	85		15	2	2	40	50	
7	Gold Street	North of Gold Street Connector	12,160	85		15	2	2	40	50	
8	Liberty Street	North of Taylor Street	730	85		15	2	2	40	50	
9	Liberty Street	South of Taylor Street	1,810	85		15	2	2	40	50	
10	Trinity Park Drive	North of N First Street	320	85		15	2	2	40	50	
11	Nortech Pkwy	North of N First Street	10,820	85		15	2	2	40	50	

Appendix C-5

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2015-275 Terra-Topgolf Development Project
Description: Cumulative
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	N Taylor Street	Gold Street to Liberty Street	9,440	85		15	2	2	40	50	
2	N Taylor Street	Liberty Street to Trinity Park Drive	10,770	85		15	2	2	40	50	
3	N First Street	Trinity Park Drive to Nortech Pkwy	8,870	85		15	2	2	40	50	
4	N First Street	Nortech Pkwy to SR 237 WB Ramps	11,710	85		15	2	2	40	50	
5	Gold Street	North of Taylor Street	1,590	85		15	2	2	40	50	
6	Gold Street	South of Taylor Street	10,700	85		15	2	2	40	50	
7	Gold Street	North of Gold Street Connector	16,060	85		15	2	2	40	50	
8	Liberty Street	North of Taylor Street	670	85		15	2	2	40	50	
9	Liberty Street	South of Taylor Street	1,810	85		15	2	2	40	50	
10	Trinity Park Drive	North of N First Street	520	85		15	2	2	40	50	
11	Nortech Pkwy	North of N First Street	9,480	85		15	2	2	40	50	

Appendix C-6

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2015-275 Terra-Topgolf Development Project
Description: Cumulative+Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	N Taylor Street	Gold Street to Liberty Street	10,800	85		15	2	2	40	50	
2	N Taylor Street	Liberty Street to Trinity Park Drive	12,190	85		15	2	2	40	50	
3	N First Street	Trinity Park Drive to Nortech Pkwy	13,880	85		15	2	2	40	50	
4	N First Street	Nortech Pkwy to SR 237 WB Ramps	12,220	85		15	2	2	40	50	
5	Gold Street	North of Taylor Street	1,590	85		15	2	2	40	50	
6	Gold Street	South of Taylor Street	12,060	85		15	2	2	40	50	
7	Gold Street	North of Gold Street Connector	17,360	85		15	2	2	40	50	
8	Liberty Street	North of Taylor Street	730	85		15	2	2	40	50	
9	Liberty Street	South of Taylor Street	1,810	85		15	2	2	40	50	
10	Trinity Park Drive	North of N First Street	520	85		15	2	2	40	50	
11	Nortech Pkwy	North of N First Street	14,320	85		15	2	2	40	50	

Appendix D-1
Noise Level Calculations - Impact 3: Parking Lot Noise
Terra-Topgolf Development Project

Reference Noise Level Data for Parking Lots		
Source Reference	**Reference Noise Level (dBA Lmax)**	**Reference Distance (feet)**
Parking Lot	65	50

Predicted Noise Levels at the Nearest Noise-Sensitive Receivers				
Nearest Parking Lot to Receiver	**Distance to Source (feet)**	**Distance Attenuation (dBA)**	**Shielding Offset (dBA)**	**Resulting Noise Level (dBA Lmax)**
Lower Level to Area 1	150	-10	-10	45
Ground Level to Area 1	250	-14	-5	46
Ground Level to Area 2	500	-20	0	45
Ground Level to Area 3	1700	-31	-15	19
Ground Level to Area 4*	325	-16	-15	14
Ground Level to Area 5	850	-25	-15	25
Sample Calculation (Lower Level to Area 1)	150	-20*LOG(150/50)=-10	-10	65+(-10)+(-10)=45

Notes

* Interior spaces of library and school classrooms were conservatively estimated to be 20 dB lower than exterior noise levels due to noise reduction provided by the library and school buildings (additional -20 dB offset applied).

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Appendix D-2
Noise Level Calculations - Impact 4: Mechanical Equipment Noise (HVAC)
Terra-Topgolf Development Project

Reference Noise Level Data for HVAC		
Source Reference	Reference Noise Level (dBA Leq/Lmax)	Reference Distance (feet)
HVAC	50	100

Predicted Noise Levels at the Nearest Noise-Sensitive Receiver					
Nearest Receiver	Distance to Lease Area (feet)	Distance Attenuation (dBA)	Resulting Noise Level (dBA Leq/Lmax)	Hours of Operation	Resulting Noise Level (dBA Ldn)
Area 1	150	-4	46	16	50
Area 2	600	-16	34	16	38
Area 3*	1800	-25	25	16	28
Area 4**	200	-6	24	16	27
Area 5	200	-6	44	16	47
Sample Calc (Area 1)	150	-20*LOG(150/100)=-4	45+(-4)=41	16	10*LOG((15*(10^(41/10)) +9*(10^((41+10)/10)))/24) =48

Notes

* Offset due to shielding from the existing wall was not applied to provide a conservative estimate

** Interior spaces of library and school classrooms were conservatively estimated to be 20 dB lower than exterior noise levels due to noise reduction provided by the library and school buildings (additional -20 dB offset applied).

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Appendix D-3
Noise Level Calculations - Impact 5: Topgolf Outdoor Entertainment Facility Noise
Terra-Topgolf Development Project

Reference Noise Level Data for a Topgolf Facility				
Nearest Receiver	Reference Topgolf Gilbert Monitoring Location	Topgolf Gilbert Noise Level (dBA Leq)	Topgolf Gilbert Noise Level (dBA Lmax)	Reference Distance (feet)
Area 1	I	56	64	190
Area 2	K	56	64	200
Area 3	A	61	68	370
Area 4	L	54	67	180
Area 5	I	56	64	190

Predicted Noise Levels at the Nearest Noise-Sensitive Receiver							
Nearest Area	Distance to proposed Topgolf (feet)	Distance Attentuation (dBA)	Offset due to Barrier/Interior (dBA)	Resulting Noise Level (dBA Leq)	Resulting Noise Level (dBA Lmax)	Hours of Operation (9AM - 2AM)	Resulting Noise Level (dBA Ldn)
1	700	-11		45	53	16	48
2	580	-9		47	55	16	50
3	1900	-14	-10	37	44	16	40
4*	400	-7	-20	27	40	16	30
5	1700	-19		37	45	16	40
Sample Calculation (Area 3)		-20*LOG(1900/370) =-14	-10	61+(-14)+(-10) =37	68+(-14)+(-10) =44		10*LOG((12*(10^(37/10)) +4*(10^((37+10)/10)))/24) =40

Notes

* Interior spaces of library and school classrooms were conservatively estimated to be 20 dB lower than exterior noise levels due to noise reduction provided by the library and school buildings (additional -20 dB offset applied).

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Appendix D-4
Noise Level Calculations - Combined Noise Sources
Terra-Topgolf Development Project

Predicted Noise Levels at the Nearest Noise-Sensitive Receivers												
Nearest Receiver	**Parking Lot Activities**			**HVAC Equipment[1]**			**Topgolf Facility**			**Combined**		
	Leq	**Lmax**	**Ldn**	**Leq**	**Lmax**	**Ldn**	**Leq**	**Lmax**	**Ldn**	**Leq**	**Lmax**	**Ldn**
Area 1	41	46	44	46	46	50	45	53	48	49	54	53
Area 2	40	45	43	34	34	38	47	55	50	48	55	51
Area 3	14	19	17	25	25	28	37	44	40	37	44	40
Area 4	9	14	12	24	24	27	27	40	30	29	40	32
Area 5	20	25	23	44	44	47	37	45	40	45	48	48

	Combined		
	Leq	**Lmax**	**Ldn**
Sample Calculation (Area 1)	10*LOG(10^(41/10) +10^(46/10)+10^(45/10)) =49	10*LOG(10^(46/10) +10^(46/10)+10^(53/10)) =54	10*LOG(10^(44/10) +10^(50/10)+10^(48/10)) =53

Notes

1 Because the vacuums were assumed to be in continuous operation for a full hour, hourly average (Leq) and maximum (Lmax) noise levels would be equivalent.

BOLLARD
Acoustical Consultants