**NOISE ANALYSIS REPORT**

# BAHIA RESORT HOTEL RENOVATION AND EXPANSION

## San Diego, CA

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# 1.0 INTRODUCTION AND SUMMARY

The Bahia Resort Hotel Expansion and Renovation project is the redevelopment of the majority of the existing hotel on Bahia Point north of West Mission Bay Drive in the City of San Diego. This report estimates potential noise impacts associated with the proposed project.

The primary noise source in the vicinity of the project is vehicular traffic on West Mission Bay Drive. Noise from San Diego International Airport (SDIA) is audible onsite, but is not a substantial factor at the project site.

Future exterior noise levels at the hotel outdoor usable space would comply with the City of San Diego traffic noise significance threshold of 65 dBA CNEL. The project would result in no exterior noise impact. No exterior noise mitigation is necessary.

Future noise levels within habitable rooms could exceed 45 dBA CNEL. Upon application for the hotel building permit, an interior noise analysis would be required to identify sound transmission loss requirements for building façade elements (windows, walls, doors, and exterior wall assemblies) necessary to limit interior noise in habitable rooms to 45 dBA CNEL or below. With the implementation of the findings of the interior noise analysis, the interior noise levels in habitable rooms would be 45 dBA CNEL or below and comply with the City of San Diego General Plan Noise Compatibility Guidelines requirement. The noise impact is less than significant with mitigation incorporated.

Noise from new heating / ventilation / air-conditioning (HVAC) equipment would comply with the property line noise level limits in Section 59.5.401 of the City of San Diego Municipal Code. The project would result in no noise impact from operations. No mitigation is necessary.

Noise from project vehicular traffic at offsite land uses would increase by less than 0.5 dBA. Sound level variances of less than 3.0 dBA are not detectable by the typical human ear. The project would result in no noise impact from offsite project vehicular traffic. No mitigation is necessary.

Construction of the project would comply with the 75 dBA Leq (12 hour) noise limit at residential zones in Section 59.5.404 of the City of San Diego Municipal Code. The project would result in no noise impact from construction. No mitigation is necessary.


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*FIGURE 1*
*Vicinity Map*

## 1.1 PROJECT DESCRIPTION

The Bahia Resort Hotel is an existing hotel located at 998 West Mission Bay Drive, San Diego, and is currently developed with 315 rooms. The site is situated north of West Mission Bay Drive on a peninsula (Bahia Point) that separates Santa Barbara Cove and Ventura Cove in the Mission Bay Park Master Plan Area of the City of San Diego. Guest rooms are accommodated in one- and two-story buildings that are located along the east and west sides of the peninsula, as well as a five-story tower at the south end of the peninsula and a four-story tower at the north end of the peninsula.

The proposed Bahia Resort Hotel Renovation and Expansion project involves the demolition of all existing buildings, with the exception of the two tower hotel elements. The north tower, which houses 68 hotel rooms, and the south tower, which houses 76 hotel rooms, would remain. The project would develop up to 456 new hotel rooms within ten new buildings, resulting in a total of 600 hotel rooms, the maximum of hotel rooms permitted by the Mission Bay Park Master Plan for Bahia Point. Additional new facilities within the hotel would include a reception area, conference space, restaurants and retail space, and fitness amenities. Up to 710 parking spaces would be provided to serve the renovated and expanded Bahia Resort Hotel and would be located in a new parking garage located in the southern portion of the project site with three levels above grade and one-half level below grade.

The Bahia Resort Hotel Renovation and Expansion project would also expand public parking and recreational amenities available to the public. The proposed project would provide 273 public parking spaces by reconfiguring, expanding, and creating new areas for public parking. Three public parking lots would be provided off-site. The proposed project would include increasing the amount of grass areas on the west side of Bahia Point accessible to the public, providing a continuous ten-foot wide pedestrian and bicycle access path around Bahia Point, relocation and expansion of restroom facilities to the southeast portion of the peninsula, and expanding the existing boat dock to accommodate additional watercraft.

## 1.2 NOISE BACKGROUND

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies with each area. This is called ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. The average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness; this relation holds true for sounds of any loudness. Sound levels of typical noise sources and environments are provided in Table 1.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

**Table 1. Sound Levels of Typical Noise Sources and Noise Environments**

| Noise Source (at Given Distance) | Noise Environment | A-Weighted Sound Level | Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*) |
|---|---|---|---|
| Military Jet Takeoff with Afterburner (50 ft) | Carrier Flight Deck | 140 Decibels | 128 times as loud |
| Civil Defense Siren (100 ft) | | 130 | 64 times as loud |
| Commercial Jet Take-off (200 ft) | | 120 | 32 times as loud **Threshold of Pain** |
| Pile Driver (50 ft) | Rock Music Concert Inside Subway Station (New York) | 110 | 16 times as loud |
| Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft) | | 100 | 8 times as loud **Very Loud** |
| Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft) | Boiler Room Printing Press Plant | 90 | 4 times as loud |
| Garbage Disposal (3 ft) | Noisy Urban Daytime | 80 | 2 times as loud |
| Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft) | Commercial Areas | 70 | Reference Loudness **Moderately Loud** |
| Normal Speech (5 ft) Air Conditioning Unit (100 ft) | Data Processing Center Department Store | 60 | 1/2 as loud |
| Light Traffic (100 ft) | Large Business Office Quiet Urban Daytime | 50 | 1/4 as loud |
| Bird Calls (distant) | Quiet Urban Nighttime | 40 | 1/8 as loud **Quiet** |
| Soft Whisper (5 ft) | Library and Bedroom at Night Quiet Rural Nighttime | 30 | 1/16 as loud |
| | Broadcast and Recording Studio | 20 | 1/32 as loud Just Audible |
| | | 0 | 1/64 as loud Threshold of Hearing |

Source: Compiled by dBF Associates, Inc.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (Leq) is often used to describe the time-varying character of community noise. The Leq is the energy-averaged A-weighted sound level during a measured time interval, and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the Lmax and Lmin indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The Lmin value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10, 50, and 90 percent of a stated time, respectively. Sound levels associated with L10 typically describe transient or short-term events, whereas levels associated with L90 describe the steady-state (or most prevalent) noise conditions.

Community Noise Equivalent Level (CNEL) is an adjusted average A-weighted sound level for a 24-hour day. It is calculated by adding a 5-dB adjustment to sound levels during evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dB adjustment to sound levels during nighttime hours (10:00 p.m. to 7:00 a.m.). These adjustments compensate for the increased sensitivity to noise during the typically quieter evening and nighttime hours. The CNEL is used by the State of California and the City of San Diego (City) to evaluate land-use compatibility with regard to noise.

Some land uses are considered sensitive to noise. Noise sensitive areas (NSAs) are land uses associated with indoor and/or outdoor activities that may be subject to stress and/or significant interference from noise. NSAs often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries.

# 2.0 APPLICABLE NOISE STANDARDS

## 2.1 CITY OF SAN DIEGO

### 2.1.1 General Plan

The City of San Diego requires new projects to meet noise level standards as established in the Noise Element of the General Plan [City of San Diego 2008, Amended 2015: Policy NE-A.2]. These standards are shown in its Table NE-3: Land Use – Noise Compatibility Guidelines (Table 2 of this report).

In the Visitor Accommodations land use category, noise levels up to 60 dBA CNEL are considered Compatible with outdoor areas of frequent use (patios, balconies, parks, swimming pools, etc.). Noise levels between 60 dBA CNEL and 75 dBA CNEL are considered Conditionally Compatible; the building structure must attenuate exterior noise in occupied areas to 45 dBA CNEL or below, and feasible noise mitigation techniques should be analyzed and incorporated to make the outdoor activities acceptable. Noise levels exceeding 75 dBA CNEL are considered Incompatible.

In the Retail Sales and Commercial Services: Eating & Drinking land use categories, noise levels up to 65 dBA CNEL are considered Compatible with outdoor areas of frequent use. Noise levels between 65 dBA CNEL and 75 dBA CNEL are considered Conditionally Compatible; the building structure must attenuate exterior noise in occupied areas to 50 dBA CNEL or below, feasible noise mitigation techniques should be analyzed and incorporated to make the outdoor activities acceptable. Noise levels exceeding 75 dBA CNEL are considered Incompatible.

## Table 2. City of San Diego Land Use – Noise Compatibility Guidelines

| Land Use Category | Exterior Noise Exposure (dBA CNEL) | | | | |
|---|---|---|---|---|---|
| | 60 | 65 | 70 | 75 | |
| *Parks and Recreational* | | | | | |
| Parks, Active and Passive Recreation | | | | | |
| Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities | | | | | |
| *Agricultural* | | | | | |
| Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables | | | | | |
| *Residential* | | | | | |
| Single Dwelling Units; Mobile Homes | | 45 | | | |
| Multiple Dwelling Units **For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.* | | 45 | 45* | | |
| *Institutional* | | | | | |
| Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12Educational Facilities; Libraries; Museums; Child Care Facilities | | 45 | | | |
| Other Educational Facilities including Vocational/Trade Schools and Colleges and Universities | | 45 | 45 | | |
| Cemeteries | | | | | |
| *Retail Sales* | | | | | |
| Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories | | | 50 | 50 | |
| *Commercial Services* | | | | | |
| Building Services; Business Support; Eating & Drinking; Financial Institutions; Maintenance & Repair; Personal Services; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support | | | 50 | 50 | |
| Visitor Accommodations | | 45 | 45 | 45 | |
| *Offices* | | | | | |
| Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters | | | 50 | 50 | |
| *Vehicle and Vehicular Equipment Sales and Services Use* | | | | | |
| Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking | | | | | |
| *Wholesale, Distribution, Storage Use Category* | | | | | |
| Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution | | | | | |
| *Industrial* | | | | | |
| Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries | | | | | |
| Research & Development | | | | 50 | |

| | | | |
|---|---|---|---|
| | **Compatible** | **Indoor Uses** | Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I. |
| | | **Outdoor Uses** | Activities associated with the land use may be carried out. |
| **45, 50** | **Conditionally Compatible** | **Indoor Uses** | Building structure must attenuate exterior noise to the indoor noise level indicated by the number (45 or 50) for occupied areas. Refer to Section I. |
| | | **Outdoor Uses** | Feasible noise mitigation techniques should be analyzed and incorporated t make the outdoor activities acceptable. Refer to Section I. |
| | **Incompatible** | **Indoor Uses** | New construction should not be undertaken. |
| | | **Outdoor Uses** | Severe noise interference makes outdoor activities unacceptable. |

### 2.1.2 CEQA Significance Thresholds

The Development Services Department's (DSD) California Environmental Quality Act (CEQA) Significance Determination Thresholds [City of San Diego 2011] addresses traffic noise, as specified in Table K-2: Traffic Noise Significance Thresholds (dB(A) CNEL). Relevant portions are reproduced in Table 3.

**Table 3. City of San Diego Traffic Noise Significance Thresholds (dBA CNEL)**

| Structure or Proposed Use that would be impacted by Traffic Noise | Interior Space | Exterior Useable Space† |
|---|---|---|
| Single-family detached | 45 dB | 65 dB |
| Multi-family, schools, libraries, hospitals, day care, hotels, motels, parks, convalescent homes | Development Services Department (DSD) ensures 45 dB pursuant to Title 24 | 65 dB |
| Offices, Churches, Business, Professional Uses | n/a | 70 dB |
| Commercial, Retail, Industrial, Outdoor Spectator Sports Uses | n/a | 75 dB |

† If a project is currently at or exceeds the significance thresholds for traffic noise described above and noise levels would result in less than a 3 dB increase, then the impact is not considered significant.

### 2.1.3 Noise Ordinance

City of San Diego Municipal Code Section 59.5.0401: Sound Level Limits states:

(a) It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit given in the following table [reproduced as Table 5], at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

**Table 4. City of San Diego Applicable Limits**

| Land Use | Time of Day | One-Hour Average Sound Level (decibels) |
|---|---|---|
| 1. Single Family Residential | 7 a.m. to 7 p.m.<br>7 p.m. to 10 p.m.<br>10 p.m. to 7 a.m. | 50<br>45<br>40 |
| 2. Multi-Family Residential (Up to a maximum density of 1/2000) | 7 a.m. to 7 p.m.<br>7 p.m. to 10 p.m.<br>10 p.m. to 7 a.m. | 55<br>50<br>45 |
| 3. All other Residential | 7 a.m. to 7 p.m.<br>7 p.m. to 10 p.m.<br>10 p.m. to 7 a.m. | 60<br>55<br>50 |
| 4. Commercial | 7 a.m. to 7 p.m.<br>7 p.m. to 10 p.m.<br>10 p.m. to 7 a.m. | 65<br>60<br>60 |
| 5. Industrial or Agricultural | any time | 75 |

(b) The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts. Permissible construction noise level limits shall be governed by Section 59.5.0404 of this article.

City of San Diego Municipal Code Section 59.5.0404: Construction Noise (b) states:

> … it shall be unlawful for any person… to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m. [City of San Diego 2010].

Construction is prohibited on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, or on Sundays.

# 3.0 EXISTING NOISE ENVIRONMENT

The project site is on Bahia Point along the north side of West Mission Bay Drive on Bahia Point, between Mission Boulevard and Ingraham Street. The noise sensitive receptors are residences located approximately 350 to 1,000 feet to the west.

The primary noise source in the vicinity of the project is vehicular traffic on West Mission Bay Drive. West Mission Bay Drive is a 4-lane Major Arterial roadway that carries an Average Daily Traffic (ADT) volume of approximately 24,810 vehicles [LLG 2014].

Noise from San Diego International Airport (SDIA) is audible onsite, but the project is located outside of the 60 dBA CNEL noise contour [San Diego County Airport Land Use Commission (SDCALUC) 2010]. Noise from SDIA operations is not a substantial factor at the project site and will not be discussed further in this report.

## 3.1 SOUND LEVEL MEASUREMENTS

Two sound level measurements were conducted during the afternoon peak traffic period to quantify the existing acoustical environment on the project site and to calibrate the noise model. A Rion Model NA-28 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meter (SLM) was used as the data-collection device. The meter was mounted on a tripod roughly 5 feet above ground to simulate the average height of the human ear. The measurements were performed on Thursday, July 17, 2015. The sound level meter was calibrated before the measurement period. Simultaneous traffic counts were conducted during the measurement periods. The measurement results are summarized in Table 5 and correspond to the locations depicted on Figure 2.

**Table 5. Sound Level Measurements (dBA)**

| Location | Time | Leq | Lmin | Lmax | L10 | L50 | L90 | Traffic (C / MT / HT / B) |
|---|---|---|---|---|---|---|---|---|
| ML1 | 3:30 p.m. – 3:50 p.m. | 67.7 | 53.6 | 75.5 | 71.7 | 64.7 | 58.0 | 1,205 / 20 / 0 / 15 / 5 |
| ML2 | 4:00 p.m. – 4:20 p.m. | 66.9 | 54.0 | 75.5 | 70.5 | 64.0 | 58.4 | 1,253 / 20 / 0 / 7 / 7 |

Notes:

Measurements conducted Thursday, July 17, 2015.
C = cars, MT = medium trucks, HT = heavy trucks, B = buses, MC = Motorcycles.
Additional noise sources included periodic aircraft to the north.


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*FIGURE 2*
*Sound Level Measurement Locations*

# 4.0 NOISE ANALYSIS

## 4.1 NOISE AFFECTING THE PROJECT

The noise environment at the project site after redevelopment would continue to be dominated by vehicular traffic on West Mission Bay Drive. The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 was used to estimate traffic noise levels on the project site. The modeling effort considered roadway alignments, estimated average vehicle speed, peak-hour traffic volume, and vehicle mix. Agencies such as the City of San Diego and the United States Department of Housing and Urban Development (HUD) consider the peak-hour sound level to be reasonably equivalent to the CNEL for vehicular traffic.

After project construction, West Mission Bay Drive is estimated to carry 25,021 vehicles (Existing + Project) [LLG 2014]. The vehicle mix was assumed to be 97% cars, 1.6% medium trucks, 0% heavy trucks, 0.8% buses and 0.6% motorcycles. The posted speed limit is 35 miles per hour (mph), but was modeled at an average vehicle speed of 30 mph due to frequent traffic backups at the intersection with Gleason Road.

The model used a default ground type of 'lawn.' The model was calibrated using actual traffic counts and sound level measurements. Measured sound levels varied from projected sound levels by less than 2 dBA. No adjustment factors were added to the model.

Future exterior traffic noise levels on the project site would be as high as 65 dBA CNEL at the building façade closest to West Mission Bay Drive, and would reduce to below 60 dBA CNEL in the areas further from the roadway, as shown on Figure 3.


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*FIGURE 3*
*Future Exterior Noise Levels (CNEL)*

## 4.2 PROJECT-GENERATED NOISE

Rearrangement of the HVAC system to accommodate the new buildings would be the only new onsite noise source as a result of the project. Offsite vehicular traffic noise would also increase as a result of the project.

As stated in Section 2.1, the applicable hourly sound level limits at or beyond the property line of the property producing the noise is a function of the land use and the time of day. The sound level limit at a location on a boundary between two land use districts is the arithmetic mean of the respective limits for the two districts. The project site consists of recreational/commercial land uses. Therefore, the permitted sound level limit is 65 dBA Leq between 7:00 a.m. and 7:00 p.m. and 60 dBA Leq between 7:00 p.m. and 7:00 a.m.

### 4.2.1 HVAC Equipment

The project HVAC equipment and location have not been specified. However, the equipment would be either rooftop- or ground-mounted adjacent to the buildings. According to the project mechanical engineer, a Carrier 30RB chiller or similar has been used on similar projects [McParline & Associates, Inc, 2015). The Carrier 30RB chiller, at 100% load, produces approximately 64 dBA at 3 feet from the chiller according to the manufacturer's specifications.

Acoustical calculations were performed to estimate chiller noise. A chiller is considered an acoustical point source. Point sources attenuate at rate of approximately 6 dB per doubling of distance from the source. This is a logarithmic relationship describing the acoustical spreading of a pure undisturbed spherical wave in the air. The chiller would produce a noise level of 60 dBA Leq at a distance of approximately 6 feet. It was assumed that a chiller could operate on a continuous basis during all hours of the day, evening, and night. Since the distance from all new and existing buildings to the property line is greater than 5 feet, it is expected that noise from the chillers would comply with the City of San Diego Noise Ordinance sound level limits. The project would result in no noise impact from the HVAC equipment.

### 4.2.2 Offsite Vehicular Traffic

An analysis was conducted of the project's effect on traffic noise conditions. Without project traffic, the sound level at 50 feet from the centerline of West Mission Bay Drive current exceeds 65 dBA CNEL. The project would add approximately 211 vehicles to West Mission Bay Drive [LLG 2014]. Assuming a consistent vehicle mix, the addition of project traffic could increase the sound level by less than 0.5 dBA. Since sound level variances of less than 3.0 are not detectable by the typical human ear, there would be no impact from offsite project vehicular traffic.

## 4.3 CONSTRUCTION NOISE

Construction of the project would generate a temporary increase in noise in the project area. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the impact would depend on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the construction phase, acoustical shielding and distance between the noise source and receiver.

Construction of the project is expected to take approximately 2 years. Construction activity and delivery of construction materials and equipment would be limited to daytime hours (between 7:00 a.m. and 7:00 p.m.), Monday through Saturday.

This project would implement conventional construction techniques and equipment. Standard equipment such as scrapers, graders, backhoes, loaders, tractors, cranes, and miscellaneous trucks would be used for construction of most project facilities. Sound levels of typical construction equipment range from approximately 65 dBA to 95 dBA at 50 feet from the source (U.S. Environmental Protection Agency [U.S. EPA] 1971). Worst-case noise levels are typically associated with grading. Noise sources associated with grading of the proposed project, and associated noise levels, are shown in Table 6.

**Table 6. Grading Noise Source Levels**

| Noise Source | Noise Level | Number |
|---|---|---|
| Bulldozer | 85 dBA at 50 feet | 1 |
| Scraper | 85 dBA at 50 feet | 1 |
| Backhoe | 85 dBA at 50 feet | 1 |
| Water Truck | 85 dBA at 50 feet | 1 |
| Roller | 75 dBA at 50 feet | 1 |

Acoustical calculations were performed to estimate worst-case noise from construction activity. Residences are located approximately 350 to 1,000 feet to the west of the project site. It was assumed that one bulldozer, one scraper, one backhoe, one water truck, and one roller would operate continuously throughout the project site. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations. The calculations assumed point source acoustical characteristics. Using standard point source calculations, a combined level of 91 dBA at 50 feet would attenuate to approximately 65 dBA to 74 dBA at residences to the west.

Construction activity would occur during allowable times and generate sound levels below 75 dBA Leq (12 hours). Construction of the project would comply with the 75 dBA Leq (12 hours) noise limit at residential zones in Section 59.5.404 of the City of San Diego Municipal Code. The project would result in no noise impact from construction.

# 5.0 MITIGATION

## 5.1 NOISE AFFECTING THE PROJECT

### 5.1.1 Hotel

#### *5.1.1.1 Exterior*

No impact was identified. No mitigation is necessary.

#### *5.1.1.2 Interior*

Without mitigation, interior noise levels in habitable rooms of the hotel could exceed the City of San Diego General Plan Noise Compatibility Guidelines requirement of 45 dBA CNEL. Upon application for a building permit, an interior noise analysis would be required to be approved by the City's Building Inspection Department. This interior noise analysis must identify the sound transmission loss requirements for building façade elements (windows, walls, doors, and exterior wall assemblies) necessary to limit interior noise in habitable rooms to 45 dBA CNEL or below. Upgraded windows and/or doors with Sound Transmission Class (STC) ratings of 28 or higher may be necessary. If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets California Building Code (CBC) requirements. With the implementation of the findings of the interior noise analysis, the interior noise levels in habitable rooms would be 45 dBA CNEL or below and comply with the City of San Diego General Plan Noise Compatibility Guidelines requirement. The impact is less than significant with mitigation incorporated.

## 5.2 PROJECT-GENERATED NOISE

No impact was identified. No mitigation is necessary.

## 5.3 CONSTRUCTION NOISE

No impact was identified. No mitigation is necessary.

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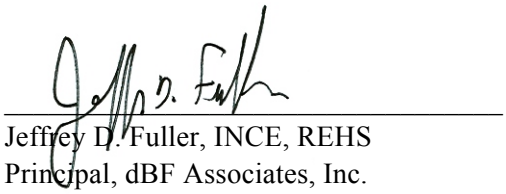
1998. California Building Code, Vol. 1, App. Ch. 12, "Interior Environment," Sections 1208 and 1208A – Sound Transmission Control.

## 7.0 LIST OF PREPARERS



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# APPENDICES

# APPENDIX A
## ROADWAY NOISE MODELING

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **dBF Associates, Inc.** | | | | | **9 November 2016** | | | | | | |
| **JDF** | | | | | **TNM 2.5** | | | | | | |
| | | | | | | | | | | | |
| **INPUT: ROADWAYS** | | | | | | | **Average pavement type shall be used unless** | | | | |
| **PROJECT/CONTRACT:** | **Bahia Resort Hotel** | | | | | | **a State highway agency substantiates the use** | | | | |
| **RUN:** | **Existing** | | | | | | **of a different type with the approval of FHWA** | | | | |
| **Roadway** | | **Points** | | | | | | | | | |
| **Name** | **Width** | **Name** | **No.** | **Coordinates (pavement)** | | | **Flow Control** | | | **Segment** | |
| | | | | **X** | **Y** | **Z** | **Control Device** | **Speed Constraint** | **Percent Vehicles Affected** | **Pvmt Type** | **On Struct?** |
| | ft | | | ft | ft | ft | | mph | % | | |
| Roadway1 | 12.0 | point1 | 1 | 1,000.0 | 0.0 | 0.00 | | | | Average | |
| | | point2 | 2 | -1,000.0 | 0.0 | 0.00 | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| dBF Associates, Inc. | | | | 9 November 2016 | | | | | | | | |
| JDF | | | | TNM 2.5 | | | | | | | | |
| | | | | | | | | | | | | |
| INPUT: TRAFFIC FOR LAeq1h Volumes | | | | | | | | | | | | |
| PROJECT/CONTRACT: | Bahia Resort Hotel | | | | | | | | | | | |
| RUN: | Existing | | | | | | | | | | | |
| Roadway | Points | | | | | | | | | | | |
| Name | Name | No. | Segment | | | | | | | | | |
| | | | Autos | | MTrucks | | HTrucks | | Buses | | Motorcycles | |
| | | | V | S | V | S | V | S | V | S | V | S |
| | | | veh/hr | mph | veh/hr | mph | veh/hr | mph | veh/hr | mph | veh/hr | mph |
| Roadway1 | point1 | 1 | 3904 | 30 | 80 | 30 | 0 | 0 | 32 | 30 | 16 | 30 |
| | point2 | 2 | | | | | | | | | | |

dBF Associates, Inc. 9 November 2016
JDF TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Bahia Resort Hotel
RUN: Existing

| Receiver Name | No. | #DUs | Coordinates (ground) X | Y | Z | Height above Ground | Input Sound Levels and Criteria Existing LAeq1h | Impact Criteria LAeq1h | Impact Criteria Sub'l | NR Goal | Active in Calc. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ft | ft | ft | ft | dBA | dBA | dB | dB | |
| Receiver1 | 1 | 1 | -28.1 | 136.1 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver2 | 2 | 1 | -28.6 | 124.9 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver3 | 3 | 1 | -28.1 | 106.0 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver4 | 4 | 1 | -28.1 | 90.5 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver5 | 5 | 1 | -13.3 | 83.5 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver6 | 6 | 1 | 75.3 | 83.5 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver7 | 7 | 1 | 194.0 | 83.3 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver8 | 8 | 1 | 205.6 | 93.0 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver9 | 9 | 1 | 205.4 | 109.8 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver10 | 10 | 1 | 205.6 | 126.9 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver11 | 11 | 1 | 205.6 | 136.1 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver12 | 12 | 1 | -27.5 | 182.9 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver13 | 13 | 1 | 205.6 | 183.3 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver15 | 15 | 1 | -26.6 | 249.9 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver16 | 16 | 1 | 206.3 | 249.6 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver19 | 19 | 1 | 267.8 | 87.2 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver20 | 20 | 1 | 283.4 | 108.3 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver21 | 21 | 1 | 284.1 | 155.9 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver22 | 22 | 1 | 284.1 | 202.2 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |
| Receiver23 | 23 | 1 | 288.2 | 261.4 | 0.00 | 70.00 | 0.00 | 66 | 10.0 | 8.0 | Y |

dBF Associates, Inc. 9 November 2016
JDF TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Bahia Resort Hotel
RUN: Existing

| Barrier | | | | | | | | | Points | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name | Type | Height | | If Wall | If Berm | | | Add'tnl | Name | No. | Coordinates (bottom) | | | Height | Segment | | | | |
| | | Min | Max | $ per Unit Area | $ per Unit Vol. | Top Width | Run:Rise | $ per Unit Length | | | X | Y | Z | at Point | Seg Ht Incre-ment | Perturbs #Up | #Dn | On Struct? | Important Reflec-tions? |
| | | ft | ft | $/sq ft | $/cu yd | ft | ft:ft | $/ft | | | ft | ft | ft | ft | ft | | | | |
| Parking Garage | W | 0.00 | 99.99 | 0.00 | | | | 0.00 | point1 | 1 | 260.0 | 80.0 | 0.00 | 40.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point2 | 2 | -260.0 | 80.0 | 0.00 | 40.00 | | | | | |
| Building | W | 0.00 | 99.99 | 0.00 | | | | 0.00 | point3 | 3 | -24.7 | 84.9 | 0.00 | 75.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point4 | 4 | 204.1 | 83.2 | 0.00 | 75.00 | | | | | |
| Building R | W | 0.00 | 99.99 | 0.00 | | | | 0.00 | point8 | 8 | 204.1 | 260.0 | 0.00 | 0.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point9 | 9 | 204.1 | 83.2 | 0.00 | 0.00 | | | | | |
| Building L | W | 0.00 | 99.99 | 0.00 | | | | 0.00 | point10 | 10 | -24.7 | 84.9 | 0.00 | 0.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point11 | 11 | -20.8 | 258.2 | 0.00 | 0.00 | | | | | |
| Parking Garage Loc2 | W | 0.00 | 99.99 | 0.00 | | | | 0.00 | point12 | 12 | -260.0 | 80.0 | 0.00 | 40.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point13 | 13 | -260.0 | 48.3 | 0.00 | 40.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point14 | 14 | 260.0 | 48.3 | 0.00 | 40.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point15 | 15 | 260.0 | 80.0 | 0.00 | 40.00 | | | | | |
| Barrier10 | W | 0.00 | 99.99 | 0.00 | | | | 0.00 | point18 | 18 | 247.1 | 89.4 | 0.00 | 70.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point19 | 19 | 242.9 | 269.3 | 0.00 | 70.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point20 | 20 | 282.8 | 268.7 | 0.00 | 70.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point21 | 21 | 279.2 | 92.4 | 0.00 | 70.00 | 0.00 | 0 | 0 | | |
| | | | | | | | | | point22 | 22 | 247.1 | 89.4 | 0.00 | 70.00 | | | | | |

dBF Associates, Inc. 9 November 2016
JDF TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Bahia Resort Hotel
RUN: Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

| Receiver Name | No. | #DUs | Existing LAeq1h | No Barrier LAeq1h Calculated | Crit'n | Increase over existing Calculated | Crit'n Sub'l Inc | Type Impact | With Barrier Calculated LAeq1h | Noise Reduction Calculated | Goal | Calculated minus Goal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | dBA | dBA | dBA | dB | dB | | dBA | dB | dB | dB |
| Receiver1 | 1 | 1 | 0.0 | 52.5 | 66 | 52.5 | 10 | ---- | 52.5 | 0.0 | 8 | -8.0 |
| Receiver2 | 2 | 1 | 0.0 | 52.5 | 66 | 52.5 | 10 | ---- | 52.5 | 0.0 | 8 | -8.0 |
| Receiver3 | 3 | 1 | 0.0 | 52.3 | 66 | 52.3 | 10 | ---- | 52.3 | 0.0 | 8 | -8.0 |
| Receiver4 | 4 | 1 | 0.0 | 56.8 | 66 | 56.8 | 10 | ---- | 56.8 | 0.0 | 8 | -8.0 |
| Receiver5 | 5 | 1 | 0.0 | 65.1 | 66 | 65.1 | 10 | ---- | 65.1 | 0.0 | 8 | -8.0 |
| Receiver6 | 6 | 1 | 0.0 | 65.0 | 66 | 65.0 | 10 | ---- | 65.0 | 0.0 | 8 | -8.0 |
| Receiver7 | 7 | 1 | 0.0 | 65.0 | 66 | 65.0 | 10 | ---- | 65.0 | 0.0 | 8 | -8.0 |
| Receiver8 | 8 | 1 | 0.0 | 58.7 | 66 | 58.7 | 10 | ---- | 58.7 | 0.0 | 8 | -8.0 |
| Receiver9 | 9 | 1 | 0.0 | 55.3 | 66 | 55.3 | 10 | ---- | 55.3 | 0.0 | 8 | -8.0 |
| Receiver10 | 10 | 1 | 0.0 | 51.1 | 66 | 51.1 | 10 | ---- | 51.1 | 0.0 | 8 | -8.0 |
| Receiver11 | 11 | 1 | 0.0 | 49.4 | 66 | 49.4 | 10 | ---- | 49.4 | 0.0 | 8 | -8.0 |
| Receiver12 | 12 | 1 | 0.0 | 51.7 | 66 | 51.7 | 10 | ---- | 51.7 | 0.0 | 8 | -8.0 |
| Receiver13 | 13 | 1 | 0.0 | 46.5 | 66 | 46.5 | 10 | ---- | 46.5 | 0.0 | 8 | -8.0 |
| Receiver15 | 15 | 1 | 0.0 | 52.0 | 66 | 52.0 | 10 | ---- | 52.0 | 0.0 | 8 | -8.0 |
| Receiver16 | 16 | 1 | 0.0 | 47.6 | 66 | 47.6 | 10 | ---- | 47.6 | 0.0 | 8 | -8.0 |
| Receiver19 | 19 | 1 | 0.0 | 63.8 | 66 | 63.8 | 10 | ---- | 63.8 | 0.0 | 8 | -8.0 |
| Receiver20 | 20 | 1 | 0.0 | 61.8 | 66 | 61.8 | 10 | ---- | 61.8 | 0.0 | 8 | -8.0 |
| Receiver21 | 21 | 1 | 0.0 | 59.5 | 66 | 59.5 | 10 | ---- | 59.5 | 0.0 | 8 | -8.0 |
| Receiver22 | 22 | 1 | 0.0 | 58.2 | 66 | 58.2 | 10 | ---- | 58.2 | 0.0 | 8 | -8.0 |
| Receiver23 | 23 | 1 | 0.0 | 56.9 | 66 | 56.9 | 10 | ---- | 56.9 | 0.0 | 8 | -8.0 |

| Dwelling Units | # DUs | Noise Reduction Min | Avg | Max |
|---|---|---|---|---|
| | | dB | dB | dB |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All Selected | | 20 | 0.0 | 0.0 | 0.0 | | | | | | | |
| All Impacted | | 0 | 0.0 | 0.0 | 0.0 | | | | | | | |
| All that meet NR Goal | | 0 | 0.0 | 0.0 | 0.0 | | | | | | | |