

Appendix G

Exterior Noise Analysis Report

EXTERIOR NOISE ANALYSIS REPORT

1122 FOURTH AVENUE

San Diego, CA

April 4, 2015

Prepared for:
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1.0 INTRODUCTION

This report estimates the exterior noise environment at outdoor usable areas of the proposed “1122 Fourth Avenue” mixed-use commercial / multi-family residential condominium project in the Core-Columbia neighborhood of downtown San Diego, California (Figure 1). The project site is situated between Third Avenue and Fourth Avenue, north of C Street and the Metropolitan Transit System (MTS) San Diego Trolley Blue Line / Orange Line light rail route, and is currently developed with the California Theatre. The project would consist of a single 40-story building with retail spaces on the ground floor, three levels of below-grade parking, four levels of above-grade parking, and multi-family residential units on the levels above.

Surrounding land uses include a parking lot and the Fourth and B single-story building to the north, the Wells Fargo office tower building to the northeast, retail and restaurant buildings to the east and southeast, the U.S. Grant Hotel building to the south, the Westgate Hotel building to the southwest, and the Civic Theater to the west. The primary noise sources affecting the project site are vehicular traffic on the adjacent streets and light rail traffic on the adjacent route.

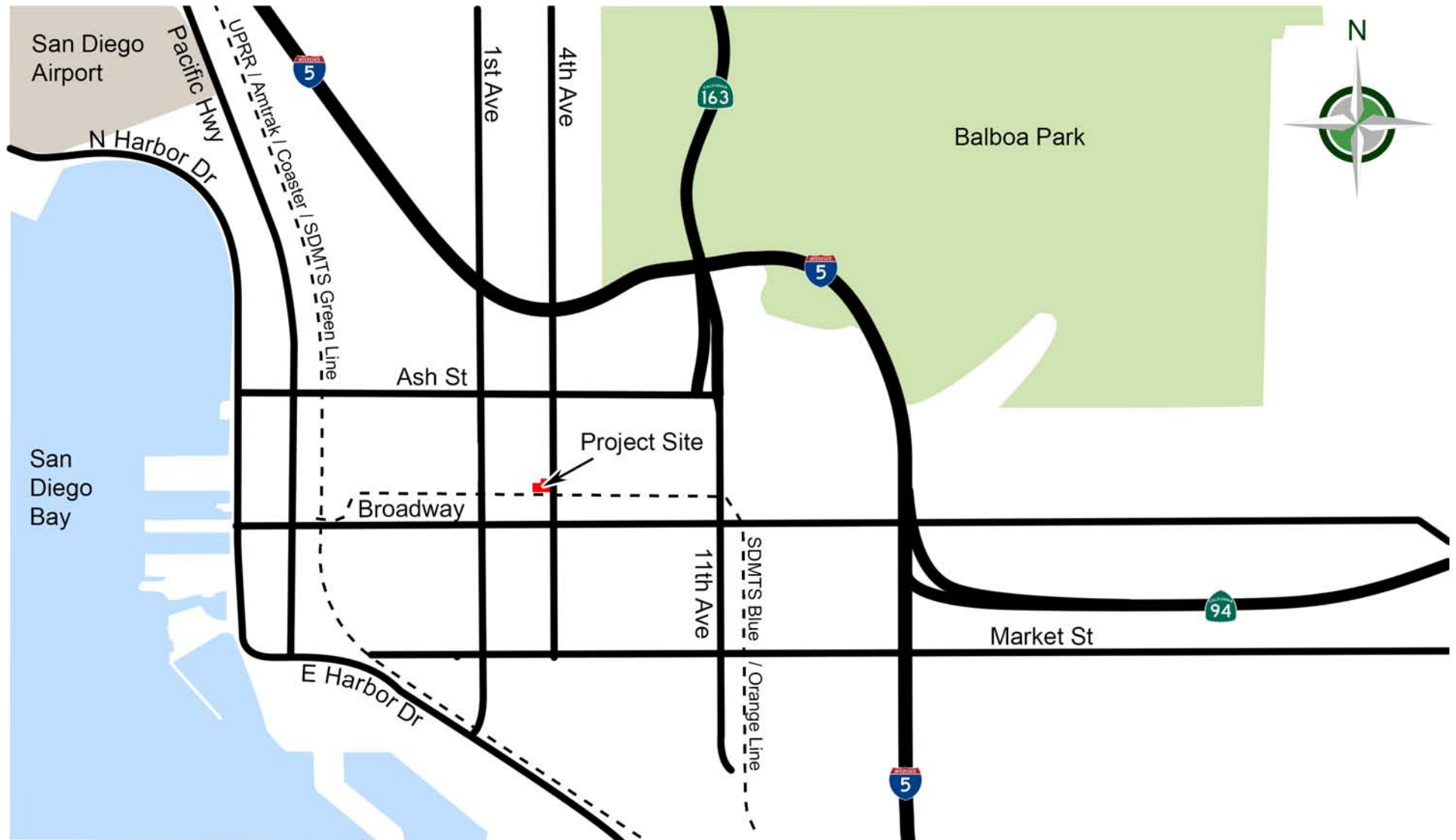
Future exterior composite transportation traffic noise levels on the project site would range from below 45 dBA CNEL on the rooftop deck to approximately 71 dBA CNEL at the southeast project building corner as designed. Future exterior roadway traffic noise levels at project outdoor usable areas would range from below 45 dBA CNEL on the rooftop deck to approximately 57 dBA on the podium level terraces as designed. Traffic noise levels at project outdoor usable space would comply with the City of San Diego traffic noise significance threshold of 65 dBA CNEL.

Because future exterior transportation noise levels would exceed 60 dBA CNEL at the project building façades, interior noise levels in habitable rooms could exceed the California Code of Regulations, Title 24: Noise Insulation Standard and City of San Diego General Plan Noise Compatibility Guidelines requirement of 45 dBA CNEL. To avoid a potential land use impact, as a condition of project approval, an interior noise analysis would be required to be approved by the City’s Building Inspection Department upon application for a building permit.

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 30 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. Worst-case noise levels, either existing or future, must be used.

With the implementation of the findings of the interior noise analysis, interior noise levels in habitable rooms would be 45 dBA CNEL or below and comply with the California Code of Regulations, Title 24: Noise Insulation Standard City of San Diego General Plan Noise Compatibility Guidelines requirement. The project would result in a less than significant interior noise impact with project features incorporated in accordance with the interior noise analysis.

1122 Fourth Ave - Exterior Noise Analysis Report



1.1 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, $60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB}$, and $80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$.

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.

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.

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. The averaging time period used in this report is one hour unless otherwise specified.

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.

Another sound measure known as the 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 to evaluate land-use compatibility with regard to noise.

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 exterior noise level standards as established in the Noise Element of the General Plan [City of San Diego 2008: Policy NE-A.2]. The Noise Compatibility Guidelines are presented in Table 2.

Sound levels up to 60 dBA CNEL are considered Compatible with outdoor areas of frequent use (patios, balconies, parks, swimming pools, etc.) in the Multiple Units land use category; sound levels up to 70 dBA CNEL are considered Conditionally Compatible.

Table 2. Noise Compatibility Guidelines

Land Use Category		Exterior Noise Exposure (dBA CNEL)			
		60	65	70	75
<i>Open Space and Parks and Recreational</i>					
Community & Neighborhood Parks, Passive Recreation					
Regional Parks, Outdoor Spectator Sports, Golf Courses, Athletic Fields, Outdoor Spectator Sports, Water Recreational Facilities, Horse Stables, Park Maint. Facilities					
<i>Agricultural</i>					
Crop Raising & Farming, Aquaculture, Dairies, Horticulture Nurseries & Greenhouses, Animal Raising, Maintain & Keeping, Commercial Stables					
<i>Residential</i>					
Single Units, Mobile Homes, Senior Housing		45			
Multiple Units, Mixed-Use Commercial/Residential, Live Work, Group Living Accommodations *For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.		45	45*		
<i>Institutional</i>					
Hospitals, Nursing Facilities, Intermediate Care Facilities, Kindergarten through Grade 12 Educational Facilities, Libraries, Museums, Places of Worship, Child Care Facilities		45			
Vocational or Professional Educational Facilities, Higher Education Institution Facilities (Community or Junior Colleges, Colleges, or Universities)		45	45		
Cemeteries					
<i>Sales</i>					
Building Supplies/Equipment, Food, Beverages & Groceries, Pets & Pet Supplies, Sundries, Pharmaceutical, & Convenience Sales, Wearing Apparel & Accessories			50	50	
<i>Commercial Services</i>					
Building Services, Business Support, Eating & Drinking, Financial Institutions, Assembly & Entertainment, Radio & Television Studios, Golf Course Support			50	50	
Visitor Accommodations		45	45	45	
<i>Offices</i>					
Business & Professional, Government, Medical, Dental & Health Practitioner, Regional & Corporate Headquarters			50	50	
<i>Vehicle and Vehicular Equipment Sales and Services Use</i>					
Commercial or Personal Vehicle Repair & Maintenance, Commercial or Personal Vehicle Sales & Rentals, Vehicle Equipment & Supplies Sales & Rentals, Vehicle Parking					
<i>Wholesale, Distribution, Storage Use Category</i>					
Equipment & Materials Storage Yards, Moving & Storage Facilities, Warehouse, Wholesale Distribution					
<i>Industrial</i>					
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.		
	Conditionally Compatible	Indoor Uses	Building structure must attenuate exterior noise to the indoor noise level indicated by the number for occupied areas. Refer to Section I.		
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated 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 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.

3.0 EXTERIOR NOISE ENVIRONMENT

The project site is situated between Third Avenue and Fourth Avenue, north of C Street and the MTS San Diego Trolley Blue Line / Orange Line light rail route. The primary noise sources affecting the project site area are vehicular traffic on the adjacent streets, and light rail traffic on the adjacent route. C Street does not carry vehicular traffic between Second Avenue and Sixth Avenue. The project site and adjacent roadways are generally topographically flat.

The project site is exposed to aircraft noise levels less than 60 dBA CNEL from operations associated with the San Diego International Airport (SDIA) [SDCRAA 2009].

3.1 ROADWAY TRAFFIC

Third Avenue carries an existing (year 2010) Average Daily Traffic (ADT) volume of 4,200 vehicles between B Street and C Street [SANDAG 2014]. The posted speed limit on Third Avenue is 25 miles per hour (mph). Near the project site, Third Avenue is generally a two-lane two-way Local Collector roadway with parallel parking along both sides.

Fourth Avenue carries an existing (year 2010) ADT volume of 9,000 vehicles between A Street and Broadway [SANDAG 2014]. The posted speed limit on Fourth Avenue is 35 mph. Near the project site, Fourth Avenue is a three-lane one-way southbound Major Arterial roadway with parallel parking along both sides.

Based on vehicle classification counts conducted during the site visit, the estimated average existing vehicle mix on roadways in the project area is approximately 92 / 4.5 / 1 / 1 / 1.5 (% cars / medium trucks / heavy trucks / buses / motorcycles).

3.1.1 Sound Level Measurements

Short-term (20-minute) sound level measurements were conducted during the afternoon peak traffic period of Wednesday, March 25, 2015 to quantify the existing on-site acoustical environment. Agencies such as the City of San Diego and the U.S. Department of Housing and Urban Development (HUD) consider the peak-hour Leq to be reasonably equivalent to the CNEL for vehicular traffic.

The noise environment on the project site was contaminated with a heavy pedestrian concentration, nearby construction activity, regular trolley passbys, and idling vehicles; therefore, measurements were conducted at acoustically-equivalent offsite locations.

A Larson Davis Model 820 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 approximately five feet above ground level to simulate the average height of the human ear. The sound level meter was calibrated before and after the measurement period.

The measurement results are summarized in Table 4 and correspond to the locations depicted on Figure 2. A review of the table shows that the measured sound level ranged from approximately 66 dBA Leq at Measurement Location 2 (ML2) to approximately 67 dBA Leq at ML1.

The primary noise sources observed during the site visit were vehicular traffic on Third Avenue and Fourth Avenue, and trolley traffic on the MTS San Diego Trolley Blue Line / Orange Line light rail route. Simultaneous vehicular traffic counts were conducted during the measurement periods as applicable. Other observed noise sources included pedestrians and occasional distant aircraft overflights.

Table 4. Sound Level Measurements (dBA)

Measurement	Location	Time	Leq	Lmin	Lmax	L10	L50	L90	Traffic
ML1	Fourth Avenue	15:20 – 15:40	67.1	51.0	78.2	69.1	61.5	59.2	146 / 8 / 1 / 2 / 3
ML2	Third Avenue	15:50 – 16:10	66.1	52.2	81.9	69.1	59.9	58.7	129 / 5 / 2 / 1 / 1

Notes:

Measurements conducted on Wednesday, March 25, 2015.

Traffic reported in terms of cars / medium trucks / heavy trucks / buses / motorcycles.

3.2 LIGHT RAIL

The project site is between the Civic Center Station and the Fifth Avenue Station along the San Diego Trolley Blue Line and Orange Line routes. The centerlines of the westbound and eastbound tracks are approximately 35 and 42 feet, respectively, from the south project property line. The existing total bidirectional weekday San Diego Trolley volume near the project site is 221 daytime trolleys (average 14.73 per hour) and 68 nighttime trolleys (average 7.56 per hour) [MTDB 2014]. The average trolley was assumed to consist of three cars, operating at 15 mph. Refer to Appendix B for details.



4.0 FUTURE NOISE ENVIRONMENT

The primary noise source affecting the project site area in the future would continue to be vehicular traffic on Third Avenue and Fourth Avenue, and light rail traffic on the MTS San Diego Trolley Blue Line / Orange Line light rail route.

No future noise level projections are available for SDIA; therefore, it was assumed that the project site would remain outside of the 60-dBA CNEL noise contour. However, noise associated with SDIA operations may be periodically audible on the project site or within the project building. Aircraft noise was not included in this analysis, and will not be further discussed in this document.

4.1 ROADWAY TRAFFIC

Third Avenue is projected to carry a future buildout ADT volume of 8,000 vehicles between B Street and C Street [CCDC 2006]. Fourth Avenue is projected to carry a future buildout ADT volume of 19,000 vehicles between B Street and C Street [CCDC 2006]. The existing speeds and traffic mixes were assumed to remain constant in the future. The peak-hour traffic volume was assumed to be 10% of the ADT volume.

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 was used to calculate traffic noise levels. TNM is required by the FHWA and the California Department of Transportation (Caltrans) for roadway noise modeling. The modeling effort considered roadway alignments, project buildings, intervening topography, peak-hour traffic volume, estimated average vehicle speed, and estimated vehicle mix (i.e., percentage of cars, medium trucks, heavy trucks, buses, and motorcycles). The default ground type used in the model was “hard soil.”

The model was calibrated using actual traffic counts and sound level measurements. The measured sound levels were approximately 4-5 dBA higher than the modeled sound levels due to general urban ambient noise sources such as pedestrians, occasional distant aircraft, rooftop HVAC units, distant construction, etc. The model was considered to be accurately representative of the traffic noise conditions; no calibration correction was made.

Future exterior roadway traffic noise levels on the project site would range from below 45 dBA CNEL on the rooftop deck to approximately 70 dBA CNEL at the southeast project building corner as designed. Future exterior roadway traffic noise levels at project outdoor usable areas would range from below 45 dBA CNEL on the rooftop deck to approximately 57 dBA on the podium level terraces as designed. The vehicular traffic calculations are summarized in Appendix A.

4.2 LIGHT RAIL

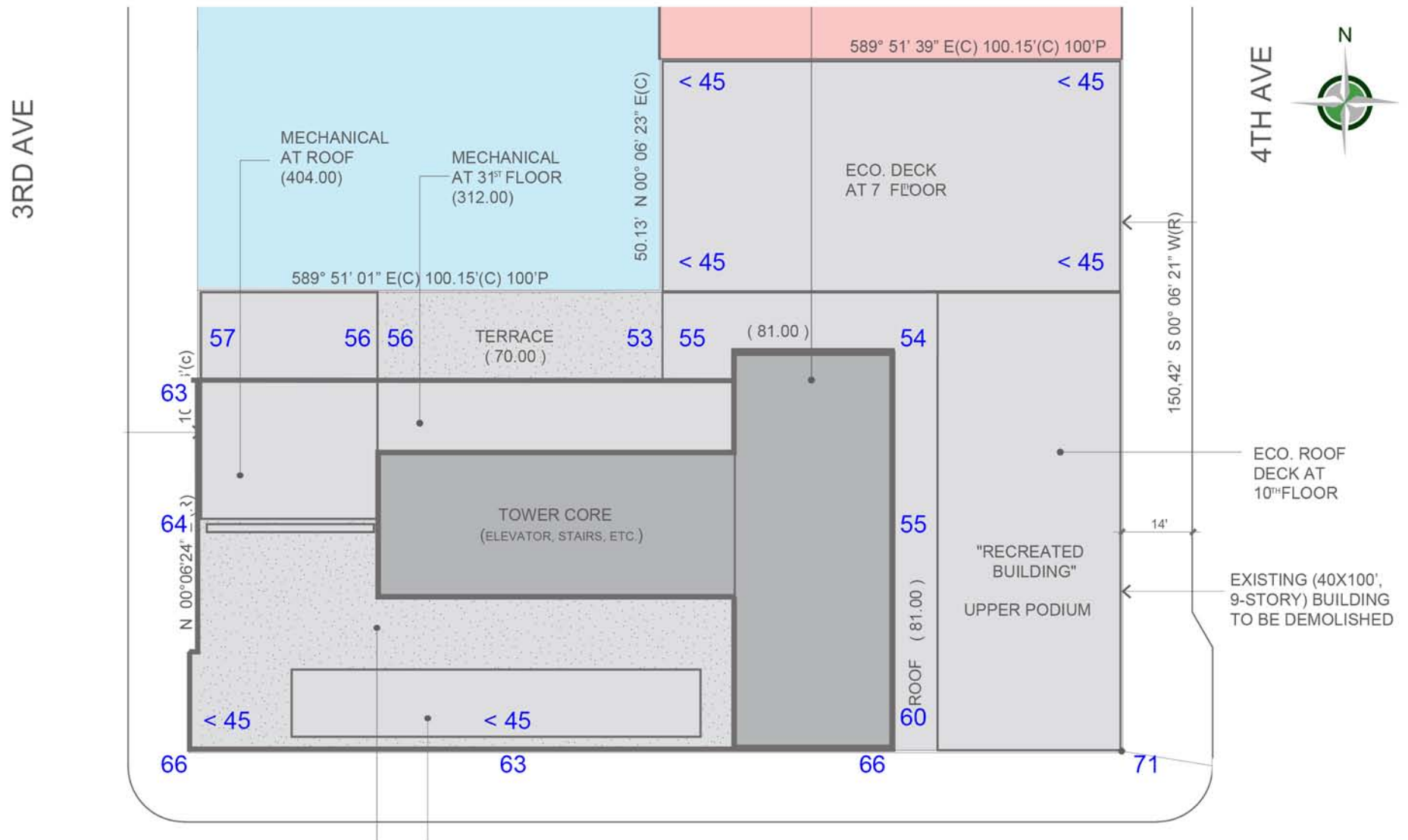
The Federal Transit Administration (FTA) General Transit Noise Assessment methodology [FTA 2006] was used to estimate rail Day-Night Level (Ldn) noise levels. For purposes of this analysis, Ldn was considered interchangeable with CNEL. The rail calculations are summarized in Appendix B.

No projections are available for San Diego Trolley operations; therefore, in the future, existing operational parameters were expected to continue. A light rail volume of 289 trolleys per day (221 during daytime hours and 68 during nighttime hours) at 15 mph is projected to generate a noise level of approximately 61 dBA Ldn / CNEL at 38.5 feet, the average distance from the eastbound/westbound tracks to the south ground-level project building façade.

4.3 COMPOSITE TRANSPORTATION

The predicted future exterior roadway traffic noise levels were added to the projected future exterior light rail noise levels. The resultant future exterior composite transportation noise levels would range from below 45 dBA CNEL on the rooftop deck to approximately 71dBA CNEL at the southeast project building corner, as shown on Figure 3.

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5.0 FINDINGS AND MITIGATION

This section discusses the possible mitigation measures that can be implemented to either reduce or mitigate impacts to the proposed project or impacts generated by the proposed project.

5.1 EXTERIOR TRAFFIC NOISE

As designed, traffic noise levels at project outdoor areas of frequent use would not exceed the City of San Diego traffic noise significance threshold of 65 dBA CNEL.

5.2 INTERIOR TRANSPORTATION NOISE

Because future exterior composite transportation noise levels would exceed 60 dBA CNEL at the project building façades, interior noise levels in habitable rooms could exceed the California Code of Regulations, Title 24: Noise Insulation Standard and City of San Diego General Plan Noise Compatibility Guidelines requirement of 45 dBA CNEL. To avoid a potential land use impact, as a condition of project approval, an interior noise analysis would be required to be approved by the City's Building Inspection Department upon application for a building permit.

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 30 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. Worst-case noise levels, either existing or future, must be used.

With the implementation of the findings of the interior noise analysis, interior noise levels in habitable rooms would be 45 dBA CNEL or below and comply with the California Code of Regulations, Title 24: Noise Insulation Standard City of San Diego General Plan Noise Compatibility Guidelines requirement. The project would result in a less than significant interior noise impact with project features incorporated in accordance with the interior noise analysis.

6.0 REFERENCES

Centre City Development Corporation (CCDC). 2006. CCDC Downtown Community Plan.

City of San Diego. 2008. General Plan. Noise Element. March.

2011. Development Services Department CEQA Significance Determination Thresholds.
January.

Federal Highway Administration (FHWA). 2004. Traffic Noise Model, Version 2.5. February.

Harris, Cyril M. 1998. Handbook of Acoustical Measurements and Noise Control, Third Edition.
Acoustical Society of America. Woodbury, NY.

International Organization for Standardization (ISO). 1996a. ISO 1996/1. Acoustics – Description and
Measurement of Environmental Noise – Part 1: Basic Quantities and Procedures.

1996b. ISO 1996-2. Acoustics – Description and Measurement of Environmental Noise – Part 2:
Acquisition of Data Pertinent to Land Use.

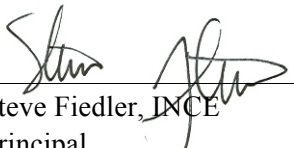
1996c. ISO 1996-3. Acoustics – Description and Measurement of Environmental Noise – Part 3:
Application to Noise Limits.

San Diego Association of Governments (SANDAG). 2014. City of San Diego Average Weekday Traffic
Volumes.

State of California. 1988. California Noise Insulation Standards, State Building Code, Part 2, Title 24,
California Code of Regulations, Appendix Chapter 35 Sound Transmission Control. California
Department of Health Services, Sacramento, CA.

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

7.0 LIST OF PREPARERS



Steve Fiedler, INCE
Principal

INPUT: ROADWAYS
1122 Fourth Avenue

dBF Associates, Inc.					4 April 2015						
SPF					TNM 2.5						
INPUT: ROADWAYS					Average pavement type shall be used unless						
PROJECT/CONTRACT:					a State highway agency substantiates the use						
RUN:					of a different type with the approval of FHWA						
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)		Flow Control				Segment	
				X	Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Type	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Third Avenue	35.0	point1	1	6,668.0	-2,241.3	0.00				Average	
		point2	2	6,668.0	-1,935.3	0.00				Average	
		point26	26	6,668.0	-1,898.3	0.00				Average	
		point3	3	6,668.0	-1,861.3	0.00				Average	
		point4	4	6,668.0	-1,175.3	0.00					
Fourth Avenue	40.0	point10	10	6,948.0	-1,175.3	0.00				Average	
		point9	9	6,948.0	-1,481.3	0.00				Average	
		point21	21	6,948.0	-1,518.3	0.00				Average	
		point8	8	6,948.0	-1,555.3	0.00				Average	
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		point27	27	6,948.0	-1,898.3	0.00				Average	
		point6	6	6,948.0	-1,935.3	0.00				Average	
		point5	5	6,948.0	-2,241.3	0.00					
C Street	12.0	point15	15	7,208.7	-1,898.3	0.00				Average	
		point16	16	6,985.0	-1,898.3	0.00				Average	
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		point17	17	6,911.0	-1,898.3	0.00				Average	
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B Street	35.0	point11	11	7,208.7	-1,518.3	0.00				Average	
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		point23	23	6,948.0	-1,518.3	0.00				Average	
		point13	13	6,911.0	-1,518.3	0.00				Average	

INPUT: ROADWAYS

1122 Fourth Avenue

		point14	14	6,705.0	-1,518.3	0.00					
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INPUT: TRAFFIC FOR LAeq1h Volumes
1122 Fourth Avenue

dBF Associates, Inc.			4 April 2015									
SPF			TNM 2.5									
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	1122 Fourth Avenue											
RUN:	Calibration											
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
Third Avenue	point1	1	387	25	15	25	6	25	3	25	3	25
	point2	2	387	25	15	25	6	25	3	25	3	25
	point26	26	387	25	15	25	6	25	3	25	3	25
	point3	3	387	25	15	25	6	25	3	25	3	25
	point4	4										
Fourth Avenue	point10	10	438	35	24	35	3	35	6	35	9	35
	point9	9	438	35	24	35	3	35	6	35	9	35
	point21	21	438	35	24	35	3	35	6	35	9	35
	point8	8	438	35	24	35	3	35	6	35	9	35
	point7	7	438	35	24	35	3	35	6	35	9	35
	point27	27	438	35	24	35	3	35	6	35	9	35
	point6	6	438	35	24	35	3	35	6	35	9	35
	point5	5										
C Street	point15	15	0	0	1	15	0	0	0	0	0	0
	point16	16	0	0	1	15	0	0	0	0	0	0
	point25	25	0	0	1	15	0	0	0	0	0	0
	point17	17	0	0	1	15	0	0	0	0	0	0
	point18	18	0	0	1	15	0	0	0	0	0	0
	point24	24	0	0	1	15	0	0	0	0	0	0
	point19	19	0	0	1	15	0	0	0	0	0	0
	point20	20										
B Street	point11	11	1	25	0	0	0	0	0	0	0	0
	point22	22	1	25	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

1122 Fourth Avenue

	point23	23	1	25	0	0	0	0	0	0	0	0
	point13	13	1	25	0	0	0	0	0	0	0	0
	point14	14										

INPUT: RECEIVERS
1122 Fourth Avenue

dBF Associates, Inc.						4 April 2015					
SPF						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	1122 Fourth Avenue										
RUN:	Calibration										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ML1	23	1	6,908.0	-1,300.0	0.00	4.92	67.10	66	10.0	8.0	Y
ML2	24	1	6,703.0	-1,675.0	0.00	4.92	66.10	66	10.0	8.0	Y

INPUT: BARRIERS

1122 Fourth Avenue

dBF Associates, Inc.					4 April 2015														
SPF					TNM 2.5														
INPUT: BARRIERS																			
PROJECT/CONTRACT:	1122 Fourth Avenue																		
RUN:	Calibration																		
Barrier	Points																		
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	\$ per Unit	\$ per Unit	Top Width	Run:Rise	\$ per Unit			X	Y	Z	at Point	Seg Ht	Perturbs	On	Important	
				Area	Vol.			Length							ment	#Up	#Dn	Struct?	Reflec-tions?
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				
California Theatre	W	0.00	99.99	0.00				0.00	point61	61	6,708.5	-1,758.8	0.00	70.00	0.00	0	0		
									point62	62	6,708.5	-1,857.8	0.00	70.00	0.00	0	0		
									point63	63	6,907.5	-1,857.8	0.00	70.00	0.00	0	0		
									point64	64	6,907.5	-1,758.8	0.00	70.00	0.00	0	0		
									point65	65	6,708.5	-1,758.8	0.00	70.00					
4th & B	W	0.00	99.99	0.00				0.00	point54	54	6,838.0	-1,708.3	0.00	25.00	0.00	0	0		
									point55	55	6,838.0	-1,558.3	0.00	25.00	0.00	0	0		
									point56	56	6,908.0	-1,558.3	0.00	25.00	0.00	0	0		
									point66	66	6,907.5	-1,708.8	0.00	25.00	0.00	0	0		
									point67	67	6,838.0	-1,708.3	0.00	25.00					

INPUT: GROUND ZONES**1122 Fourth Avenue**

dBF Associates, Inc.				4 April 2015	
SPF				TNM 2.5	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	1122 Fourth Avenue				
RUN:	Calibration				
Ground Zone			Points		
Name	Type	Flow	No.	Coordinates	
		Resistivity		X	Y
		cgs rayls		ft	ft
Ground Zone2	Pavement	20000	7	6,708.5	-1,758.8
			8	6,708.5	-1,558.3
			9	6,838.0	-1,558.3
			10	6,838.0	-1,708.3
			11	6,808.0	-1,708.3
			12	6,808.5	-1,758.8

RESULTS: SOUND LEVELS
1122 Fourth Avenue

dBF Associates, Inc.												
SPF												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:												
RUN:												
BARRIER DESIGN:												
ATMOSPHERICS:												
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ML1	23	1	67.1	63.1	66	-4.0	10	----	63.1	0.0	8	-8.0
ML2	24	1	66.1	60.7	66	-5.4	10	----	60.7	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		2	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							

INPUT: TRAFFIC FOR LAeq1h Volumes
1122 Fourth Avenue

dBF Associates, Inc.			4 April 2015									
SPF			TNM 2.5									
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	1122 Fourth Avenue											
RUN:	Future											
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
Third Avenue	point1	1	1141	25	56	25	12	25	12	25	19	25
	point30	30	1141	25	56	25	12	25	12	25	19	25
	point2	2	1141	25	56	25	12	25	12	25	19	25
	point26	26	552	25	27	25	6	25	6	25	9	25
	point3	3	552	25	27	25	6	25	6	25	9	25
	point29	29	736	25	36	25	8	25	8	25	12	25
	point28	28	1104	25	54	25	12	25	12	25	18	25
	point4	4										
Fourth Avenue	point10	10	1656	35	81	35	18	35	18	35	27	35
	point9	9	1656	35	81	35	18	35	18	35	27	35
	point21	21	1747	35	86	35	19	35	19	35	29	35
	point8	8	1747	35	86	35	19	35	19	35	29	35
	point7	7	1747	35	86	35	19	35	19	35	29	35
	point27	27	1840	35	90	35	20	35	20	35	30	35
	point6	6	1840	35	90	35	20	35	20	35	30	35
	point5	5										
C Street	point15	15	0	0	1	15	0	0	0	0	0	0
	point16	16	0	0	1	15	0	0	0	0	0	0
	point25	25	0	0	1	15	0	0	0	0	0	0
	point17	17	0	0	1	15	0	0	0	0	0	0
	point18	18	0	0	1	15	0	0	0	0	0	0
	point24	24	0	0	1	15	0	0	0	0	0	0
	point19	19	0	0	1	15	0	0	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes**1122 Fourth Avenue**

	point20	20										
B Street	point11	11	1011	25	50	25	11	25	11	25	17	25
	point22	22	1011	25	50	25	11	25	11	25	17	25
	point23	23	1011	25	50	25	11	25	11	25	17	25
	point13	13	1011	25	50	25	11	25	11	25	17	25
	point31	31	827	25	41	25	9	25	9	25	14	25
	point14	14										

INPUT: RECEIVERS
1122 Fourth Avenue

dBF Associates, Inc.											
SPF											
INPUT: RECEIVERS											
PROJECT/CONTRACT:	1122 Fourth Avenue										
RUN:	Future										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
SW	1	1	6,706.5	-1,861.4	0.00	5.00	0.00	66	10.0	8.0	Y
S	2	1	6,781.1	-1,861.4	0.00	5.00	0.00	66	10.0	8.0	Y
SE	3	1	6,860.0	-1,861.4	0.00	5.00	0.00	66	10.0	8.0	Y
ES	4	1	6,862.1	-1,850.0	0.00	86.00	0.00	66	10.0	8.0	Y
E	5	1	6,862.7	-1,811.9	0.00	86.00	0.00	66	10.0	8.0	Y
NE	6	1	6,863.2	-1,768.9	0.00	86.00	0.00	66	10.0	8.0	Y
ENE	7	1	6,818.1	-1,765.6	0.00	86.00	0.00	66	10.0	8.0	Y
NNE	8	1	6,795.8	-1,767.8	0.00	75.00	0.00	66	10.0	8.0	Y
NNW	9	1	6,760.4	-1,767.3	0.00	75.00	0.00	66	10.0	8.0	Y
WNW	10	1	6,737.5	-1,766.7	0.00	86.00	0.00	66	10.0	8.0	Y
NW	11	1	6,715.2	-1,766.7	0.00	86.00	0.00	66	10.0	8.0	Y
WN	12	1	6,704.3	-1,774.3	0.00	5.00	0.00	66	10.0	8.0	Y
W	13	1	6,704.3	-1,813.5	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck NW	15	1	6,816.9	-1,719.1	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck SW	16	1	6,819.2	-1,747.4	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck SE	17	1	6,896.3	-1,752.1	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck NE	18	1	6,896.3	-1,719.6	0.00	5.00	0.00	66	10.0	8.0	Y
Roof Terrace SW	19	1	6,717.1	-1,850.8	0.00	5.00	0.00	66	10.0	8.0	Y
Roof Terrace S	20	1	6,801.6	-1,846.7	0.00	5.00	0.00	66	10.0	8.0	Y
SE @ 4th & C	23	1	6,909.6	-1,860.9	0.00	5.00	0.00	66	10.0	8.0	Y

INPUT: BARRIERS

1122 Fourth Avenue

dBF Associates, Inc.					4 April 2015														
SPF					TNM 2.5														
INPUT: BARRIERS																			
PROJECT/CONTRACT:	1122 Fourth Avenue																		
RUN:	Future																		
Barrier																			
Name	Type	Height		If Wall	If Berm			Add'tnl	Points										
		Min	Max	\$ per Unit	\$ per Unit	Top Width	Run:Rise	\$ per Unit	Name	No.	Coordinates (bottom)		Height	Segment					
				Area	Vol.			Length			X	Y	Z	at Point	Seg Ht	Perturbs	On	Important	
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				
Project Building Tower	W	0.00	500.00	0.00				0.00	point5	5	6,708.5	-1,773.8	0.00	415.00	0.00	0	0		
									point6	6	6,708.5	-1,857.8	0.00	415.00	0.00	0	0		
									point7	7	6,858.0	-1,857.8	0.00	415.00	0.00	0	0		
									point8	8	6,858.0	-1,772.3	0.00	415.00	0.00	0	0		
									point9	9	6,824.2	-1,772.3	0.00	415.00	0.00	0	0		
									point12	12	6,808.5	-1,777.8	0.00	415.00	0.00	0	0		
									point13	13	6,766.2	-1,777.8	0.00	415.00	0.00	0	0		
									point18	18	6,746.2	-1,773.8	0.00	415.00	0.00	0	0		
									point23	23	6,708.5	-1,773.8	0.00	415.00					
Existing Building	W	0.00	99.99	0.00				0.00	point25	25	6,868.0	-1,857.8	0.00	80.00	0.00	0	0		
									point26	26	6,907.5	-1,857.8	0.00	80.00	0.00	0	0		
									point27	27	6,907.5	-1,758.8	0.00	80.00	0.00	0	0		
									point28	28	6,868.0	-1,758.8	0.00	80.00					
NW	W	0.00	99.99	0.00				0.00	point34	34	6,746.2	-1,773.8	0.00	81.00	0.00	0	0		
									point35	35	6,746.2	-1,758.8	0.00	81.00	0.00	0	0		
									point36	36	6,708.5	-1,758.8	0.00	81.00	0.00	0	0		
									point37	37	6,708.5	-1,773.8	0.00	81.00					
E / NE	W	0.00	99.99	0.00				0.00	point38	38	6,858.0	-1,857.8	0.00	81.00	0.00	0	0		
									point39	39	6,868.0	-1,857.8	0.00	81.00	0.00	0	0		
									point40	40	6,868.0	-1,758.8	0.00	81.00	0.00	0	0		
									point41	41	6,808.5	-1,758.8	0.00	81.00	0.00	0	0		
									point42	42	6,808.5	-1,777.8	0.00	81.00					
Green Roof	W	0.00	99.99	0.00				0.00	point50	50	6,808.5	-1,758.8	0.00	70.00	0.00	0	0		
									point51	51	6,808.0	-1,708.3	0.00	70.00	0.00	0	0		
									point60	60	6,838.0	-1,708.3	0.00	70.00	0.00	0	0		
									point52	52	6,907.5	-1,708.8	0.00	70.00	0.00	0	0		
									point53	53	6,907.5	-1,758.8	0.00	70.00					
4th & B	W	0.00	99.99	0.00				0.00	point54	54	6,838.0	-1,708.3	0.00	25.00	0.00	0	0		
									point55	55	6,838.0	-1,558.3	0.00	25.00	0.00	0	0		
									point56	56	6,908.0	-1,558.3	0.00	25.00	0.00	0	0		
									point57	57	6,907.5	-1,708.8	0.00	25.00					
N	W	0.00	99.99	0.00				0.00	point58	58	6,746.2	-1,758.8	0.00	70.00	0.00	0	0		
									point59	59	6,808.5	-1,758.8	0.00	70.00					

RESULTS: SOUND LEVELS

1122 Fourth Avenue

dBF Associates, Inc.												
SPF												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:												
RUN:												
BARRIER DESIGN:												
ATMOSPHERICS:												
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h					Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SW	1	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
S	2	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
SE	3	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
ES	4	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
E	5	1	0.0	47.9	66	47.9	10	----	47.9	0.0	8	-8.0
NE	6	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
ENE	7	1	0.0	55.3	66	55.3	10	----	55.3	0.0	8	-8.0
NNE	8	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
NNW	9	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
WNW	10	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
NW	11	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
WN	12	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
W	13	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
Eco Deck NW	15	1	0.0	35.0	66	35.0	10	----	35.0	0.0	8	-8.0
Eco Deck SW	16	1	0.0	36.0	66	36.0	10	----	36.0	0.0	8	-8.0
Eco Deck SE	17	1	0.0	36.5	66	36.5	10	----	36.5	0.0	8	-8.0
Eco Deck NE	18	1	0.0	36.8	66	36.8	10	----	36.8	0.0	8	-8.0
Roof Terrace SW	19	1	0.0	18.0	66	18.0	10	----	18.0	0.0	8	-8.0
Roof Terrace S	20	1	0.0	18.0	66	18.0	10	----	18.0	0.0	8	-8.0
SE @ 4th & C	23	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							

RESULTS: SOUND LEVELS

1122 Fourth Avenue

All Selected		20	0.0	0.0	0.0							
All Impacted		1	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS			
Noise Source	Ldn (dB)	Leq - daytime (dB)	Leq - nighttime (dB)
All Sources	61	57	54
Freight Locomotives	61	57	54
Freight Cars	0	0	0
Amtrak + NCTD COASTER Locomotives	0	0	0
Amtrak + NCTD COASTER Cars	0	0	0
San Diego Trolley	0	0	0
Source 6	0	0	0
Source 7	0	0	0
Source 8	0	0	0

Enter noise receiver land use category below.

LAND USE CATEGORY	
Noise receiver land use category (1, 2 or 3)	2

Enter data for up to 8 noise sources below - see reference list for source numbers.

NOISE SOURCE PARAMETERS					
Parameter	Source 1	Source 2	Source 3		
Source Num.	RRT/LRT	4	0		0
Distance (source to receiver)	distance (ft)	38.5	0		0
Daytime Hours (7 AM - 10 PM)	speed (mph)	15	0		0
	trains/hour	14.73333	0		0
	cars/train	3	0		0
Nighttime Hours (10 PM - 7 AM)	speed (mph)	15	0		0
	trains/hour	7.555556	0		0
	cars/train	3	0		0
Wheel Flats?	% of cars w/ wheel flats	0.00%	0.00%		0.00%
Jointed Track?	Y/N	N	N		N
Embedded Track?	Y/N	N	N		N
Aerial Structure?	Y/N	N	N		N
Barrier Present?	Y/N	N	N		N
Intervening Rows of Buildings	number of rows	0	0		0

SOURCE REFERENCE LIST	
Source	Number
Commuter Electric Locomotive	1
Commuter Diesel Locomotive	2
Commuter Rail Cars	3
RRT/LRT	4
AGT, Steel Wheel	5
AGT, Rubber Tire	6
Monorail	7
Maglev	8
Freight Locomotive	9
Freight Cars	10
Hopper Cars (empty)	11
Hopper Cars (full)	12
Crossover	13
Automobiles	14
City Buses	15
Commuter Buses	16
Rail Yard or Shop	17
Layover Tracks	18
Bus Storage Yard	19
Bus Op. Facility	20
Bus Transit Center	21
Parking Garage	22
Park & Ride Lot	23