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March 7, 2018
Project No. 48-039-3R

Mr. Anil Patel
430 North 4th Street
San Jose, CA 95112

Subject: Third Revised Noise Assessment Study for the Planned “North Hotel”,
1036 North 4th Street, San Jose

Dear Mr. Patel:

This report presents the results of a second revised noise assessment study for the planned “North Hotel” at 1036 North 4th Street in San Jose, as shown on the Site Plan, Ref. (a). The noise exposures at the site were evaluated against the standards of the City of San Jose General Plan Goals and Policies, Ref. (b), and the State of California Code of Regulations, Title 24, Ref. (c). Project-generated equipment noise was evaluated against the standards of the City of San Jose Zoning Ordinance, Ref. (d).

The analysis of the on-site sound level measurements indicates that the existing noise environment is due primarily to traffic on North 4th Street. The results of the study indicate that the noise exposures at the ground floor common area will be within the limits of the standards. Interior noise exposures in the guest space will exceed the limits of the standards. Noise reduction measures for interior guest spaces will be required.

Project-generated traffic noise will not add to the existing noise environment and will be a less-than-significant impact. Noise and vibration from demolition of the existing hotel on the site and the construction of the new hotel will be a temporary significant impact to the residences to the north and east of the site. Noise and vibration mitigation measures will be required.

The roof-top mechanical equipment noise levels will be in compliance with the Zoning Ordinance standards.

Sections I and II of this report contain a summary of our findings and recommendations, respectively. Subsequent sections contain the site, traffic, and project descriptions, analyses, and evaluations. Attached hereto are Appendices A, B, and C, which include the list of references, descriptions of the applicable standards, definitions of terminology, descriptions of the acoustical instrumentation used for the field survey, general building shell controls and the on-site noise measurement data and calculation tables.

I. Summary of Findings

A. Noise Standards, Guidelines and Criteria

City of San Jose General Plan

The noise assessment results presented in the findings were evaluated against the City of San Jose General Plan Goals and Policies that use the Day-Night Level (DNL) 24-hour noise descriptor. For hotel land use, the General Plan defines the “Normally Acceptable” noise environment up to 60 dB DNL, as shown in GP Policy EC-1.1. For new hotel projects, the 60 dB DNL standard is applied to usable outdoor activity and common areas. Some common areas available to all guests shall meet the 60 dB DNL standard. The 60 dB DNL standard is not applicable to aircraft overflight noise or traffic noise from elevated roadways. The General Plan policies also limit the interior noise exposures to 45 dB DNL or lower.

Policy 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.

Policy 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.

Policy 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.

City of San Jose Zoning Ordinance

The City of San Jose Zoning Ordinance limits noise from commercial uses to 55 dBA at residential property boundaries.

State of California Code of Regulations, Title 24

The Title 24 standards also use the DNL descriptor and specify an exterior noise criterion of 60 dB DNL for the requirement of a noise analysis. The analysis must include the measures necessary to limit the interior guest spaces to 45 dB DNL or lower. This standard corresponds to the City of San Jose General Plan Goals and Policies.

The Title 24 standards also specify minimum sound insulation ratings for common partitions separating different guest spaces and guest spaces from common interior spaces. These standards are outlined in greater detail in Appendix B. As design details for the interior partitions of the project were not available at the time of this study, an evaluation of the interior partitions has not been made.

The noise levels shown below are without the application of mitigation measures and represent the noise environment for existing and project site conditions.

A. Exterior Noise Exposures

- The existing exterior noise exposure at the most impacted planned building setback from North 4th Street, 72 ft. from the centerline of the road, is 65 dB DNL. Under future traffic conditions, the noise exposure is predicted to increase to 66 dB DNL. Thus, the noise exposures will be up to 6 dB in excess of the Title 24 criterion.
- The existing noise exposure at the planned ground floor common area at the rear of the site is 40 dB DNL. Under future traffic conditions, the noise exposure is predicted to increase to 41 dB DNL. Thus, the noise exposures will be within the 60 dB DNL limit of the City of San Jose General Plan Goals and Policies.

As shown above, the exterior noise exposures at the common area/courtyard will be in compliance with the standards (Policy EC-1.1). Noise control measures for the courtyard will not be required. .

The exterior noise exposures will exceed the 60 dB DNL criterion of Title 24 at the planned building facades. An acoustical analysis is required by the State Building Code. This study is intended to satisfy that requirement.

B. Interior Noise Exposures

- The interior noise exposures in the most impacted guest spaces closest to North 4th Street will be up to 50 and 51 dB DNL under existing and future conditions, respectively. Thus, the interior noise exposures will be up to 6 dB in excess of the 45 dB DNL limits of the City of San Jose General Plan Goals and Policies and the Title 24 standards.

The entire site is exposed to traffic noise in excess of 60 dB DNL. Thus, all guest spaces with a view to North 4th Street will be noise impacted and will require noise controls. Note that there are no other significant sources of noise affecting the site.

Noise control measures will be required for the noise impacted guest spaces. The recommended noise reduction measures are provided in Section II of this report.

C. Project-Generated Noise and Vibration

Potential noise impacts from the project to the area surrounding the proposed project will be limited to project traffic, roof-top mechanical equipment and demolition/construction of the project. There are also potential vibration impacts from the construction of the project to the residential buildings adjacent to the north and east. There are no other significant outdoor sources of noise that are associated with the project.

Project Traffic

The existing traffic volume on North 4th Street is approximately 11,438 vehicles Average Daily Traffic (ADT). Traffic volume data due to the project is predicted to be 434 daily trips. The combined existing + project traffic volume will be 11,991 vehicles ADT. The increase in the noise exposure due to the project will be 0.21 decibels, which is negligible. As the area builds out and the background traffic increases, the contribution of project traffic to the noise environment will be less. Thus, the project will not add to the existing or future noise environments and will be in compliance with the City of San Jose General Plan Policy EC-1.2.

Roof-top Mechanical Equipment

The noise levels at the nearest residential properties generated by outdoor mechanical equipment at the project were evaluated against the 55 dBA limit of the City of San Jose Zoning Ordinance. The outdoor equipment consists of two air-conditioning units on the roof.

- The roof-top mechanical equipment noise level at the most impacted residential property to the north of the site will be 37 dBA. Thus, the noise level will be within the 55 dBA limit of the City of San Jose Zoning Ordinance.
- The roof-top mechanical equipment noise level at the most impacted residential property to the east of the site will be 41 dBA. Thus, the noise level will be within the 55 dBA limit of the City of San Jose Zoning Ordinance.

Noise control measures for the roof-top mechanical equipment will not be required.

Demolition and Construction

Short-term noise and vibration impacts may be created during demolition of the existing structures on the site and construction of the project. Demolition and construction equipment are typically similar, with the exception of paving equipment and pile drivers (impact hammers). However, pile driving is not expected on this project. The noise levels generated by the two phases will be similar over the course of entire process.

A table from the EPA providing standard construction equipment noise levels at a distance of 50 ft. is provided in Figure 1 on page 8. From the information provided in Table, demolition/construction equipment noise levels range from 68 to 96 dBA at a 50 ft. distance from the source. The residences to the east (house setback) are as close as 30 ft. from the project and the residences to the north (apartment building) are as close as 10 ft. from the project.

The construction of the project is expected to take less than 12 months, Ref. (e).

The hourly average noise levels at the residences to the north will range from 65 to 93 dBA L_{eq} . The hourly average noise levels at the residences to the east range from 46 to 74 dBA L_{eq} with the highest noise levels occurring during grading of the site near the residences. The noise exposures are likely to be up to 90 dB DNL and 71 dB DNL at the residences to the north and east, respectively, on the noisiest days. Typical noise exposures from construction will be 57-85 dB DNL at the residences to the north and 38-66 dB DNL at the residences to the east. This is **a temporary significant impact**.

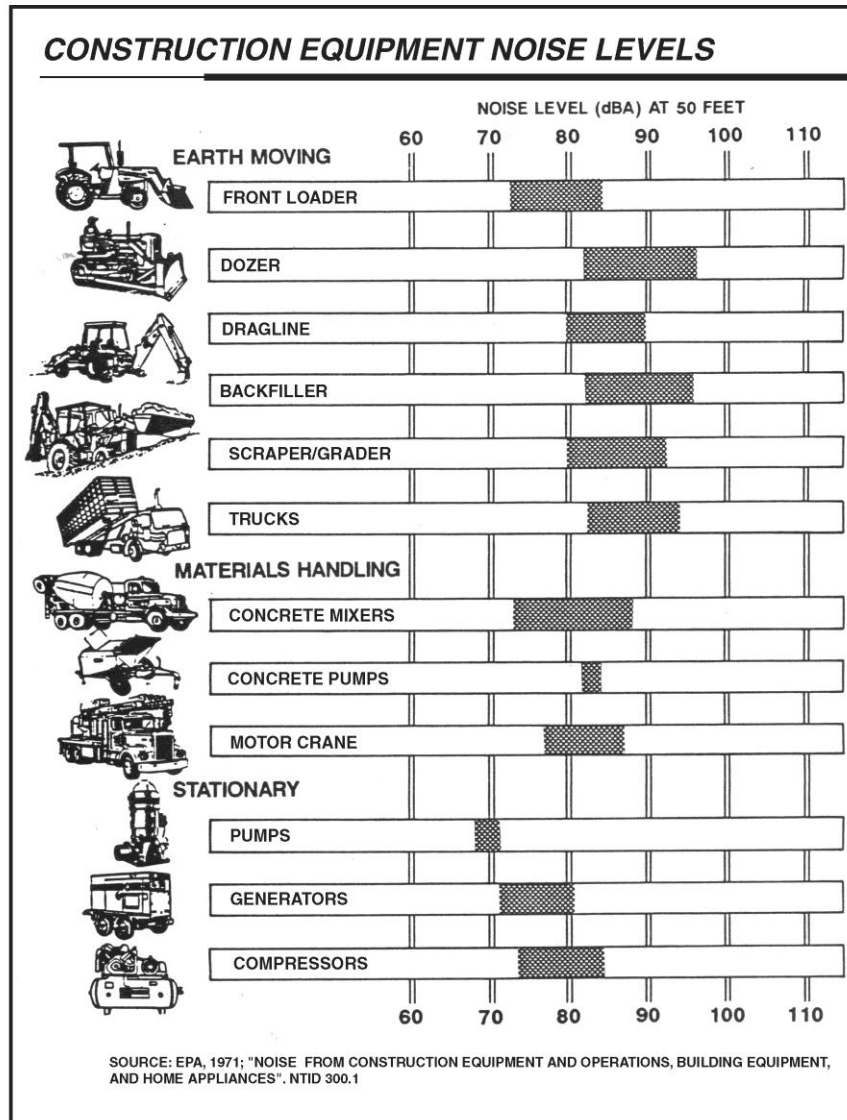


FIGURE 1 – Environmental Protection Agency Equipment Noise Levels

Demolition and construction activities can produce varying amounts of ground-borne vibration, which depend on the type of equipment used and various methods. Vibration is produced by the equipment operation and the vibrational waves travel through the ground/soil that diminish over distance. It is rare that construction vibration is intense enough to cause damage to existing structures. However, due to the close proximity of stucco sided light framed structures in very close proximity to the site, a qualitative analysis of vibration is warranted.

Ground-borne vibration is typically reported in terms of “peak particle velocity” or PPV, and sometimes reported in terms of decibels of vibration, notated as VdB, which is a level of vibration (L_v). The use of PPV is more common for construction equipment and methods.

Table I, below, provides building damage criteria from construction vibration established by the Federal Transit Administration, Ref. (f).

TABLE I		
Construction Vibration Damage Criteria		
Building Category	PPV (in/sec)	Approx. L_v (VdB)
I. Reinforced-concrete, steel or timber (no plaster)	0.50	102
II. Engineered concrete and masonry (no plaster)	0.30	98
III. Non-engineered timber and masonry buildings	0.20	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
** RMS velocity in decibels (VdB) re: 1 micro-inch/second		

The adjacent residential buildings (two-story apartments to the north and two residential garages to the east) are light wood framed, stucco sides structures built on post and beam (or similar) foundations. These structures fall into Building Category III where the vibration limit is 0.20 in/sec PPV. There are no buildings adjacent to or near the site that would fall under Categories I, II or IV.

The contractors used for the demolition of the site and construction of the project have not yet been selected, nor has a construction schedule and list of equipment been developed. Table II, below, provides a list of typical construction equipment, Ref's (f, g), some of which will likely not be used on this project, such as pile driving, their vibration levels at 25 ft. and 100 ft. reference distances, the vibration levels at the building setback of the apartments to the north and at the garage structures to the east. Also shown are the distances each item of equipment must stay away from the respective adjacent structures to limit the vibration levels to no more than 0.20 in/sec at the buildings. As shown in Table II, most of the equipment will generate ground-borne vibration levels in excess of the 0.20 in/sec criterion if operated too closely to the buildings. **This is a temporary significant impact.**

TABLE II Construction Equipment Vibration Levels, in/sec PPV					
Dist. to Apt., ft.	6				
Dist to Garages, ft.	12.5				
EQUIPMENT d =	Reference Vibration at d, ft. 25	Reference Vibration at d, ft. 100	Vibration Level @ Garage	Vibration Level @ Apt	Dist for 0.2 PPV limit
Excavator	0.089	0.011	0.8	0.3	13
Vibratory Roller	0.21	0.026	1.8	0.6	23
Hoe Ram	0.089	0.011	0.8	0.3	13
Large Bulldozer	0.089	0.011	0.8	0.3	13
Loaded Trucks	0.076	0.010	0.6	0.2	12
Jackhammer	0.035	0.004	0.3	0.1	7
Small Bulldozer	0.003	0.000	0.0	0.0	1.5
Backhoe	0.088	0.011	0.7	0.2	15
Compactor	0.240	0.030	2.0	0.7	25
concrete Mixer	0.080	0.010	0.7	0.2	12
Concrete Pump	0.080	0.010	0.7	0.2	12
Crane	0.008	0.001	0.1	0.0	3
Dump Truck	0.080	0.010	0.7	0.2	12
Front End Loader	0.088	0.011	0.7	0.2	13
Grader	0.088	0.011	0.7	0.2	13
Hydra Break Ram*	0.400	0.050	3.4	1.1	35
Impact Pile Driver*	1.600	0.200	13.6	4.5	87
Soil Sampling Rig	0.088	0.011	0.7	0.2	13
Paver	0.080	0.010	0.7	0.2	12
Pickup Truck	0.080	0.010	0.7	0.2	12
Slurry Trenching	0.016	0.002	0.1	0.0	5
Tractor	0.080	0.010	0.7	0.2	12
Tunnel Boring rock	0.046	0.006	0.4	0.1	9
Tunnel Boring soil	0.024	0.003	0.2	0.1	7
Vibratory Pile Driver	1.120	0.140	9.5	3.2	68
Vibratory Roller (lge)	0.472	0.059	4.0	1.3	39
Vibratory Roller (sm)	0.176	0.022	1.5	0.5	20
Blasting*	6.000	0.750	51.0	17.0	209
Clam Shovel*	0.208	0.026	1.8	0.6	23
Rock Drill	0.088	0.011	0.7	0.2	13

* Transient vibration levels

As shown in Table II, smaller equipment, such small bulldozers/skid steers (Bobcats) may be used up to the property lines for excavation and other necessary earth work. Other large equipment could produce excessive ground-borne vibration levels. Therefore, vibration mitigation measures will be required. The recommended measures are described in Section II.

II. Recommendations

A. Interior Noise Controls

To achieve compliance with the 45 dB DNL standards of the City of San Jose General Plan Goals and Policies and Title 24, the following noise control measures will be required:

- Maintain closed at all times all windows and glass doors of guest spaces on the west, north and south façades of the building (a direct or side view to North 4th Street). Install windows and glass doors rated minimum Sound Transmission Class (STC 28).

When windows and doors are specified to be maintained closed for noise control some type of mechanical ventilation must be provided, per the Mechanical Code. The mechanical ventilation system shall not compromise the acoustical integrity of the building shell.

In addition to the required STC ratings, the windows shall be installed in an acoustically-effective manner. To achieve an acoustically-effective window construction, the sliding window panels must form an air-tight seal when in the closed position and the window frames must be caulked to the wall opening around their entire perimeter with a non-hardening caulking compound to prevent sound infiltration.

Please be aware that many dual-pane window and glass door assemblies have inherent noise reduction problems in the traffic noise frequency spectrum due to resonance that occurs within the air space between the glass lites, and the noise reduction capabilities vary from manufacturer to manufacturer. Therefore, the acoustical test report of all sound rated windows and glass doors should be reviewed by a qualified acoustician to ensure that the chosen windows and glass doors will adequately reduce traffic noise to acceptable levels.

The implementation of the above recommended measures will reduce excess noise exposures to achieve compliance with the interior standards of the City of San Jose Goals and Policies and Title 24.

B. Construction Phase Noise

Precise construction scheduling is unknown at this time. Thus, a detailed construction noise logistics plan could not be developed.

Mitigation of the construction phase noise at the site can be accomplished by using quiet or "new technology" equipment. The greatest potential for noise abatement of current equipment should be the quieting of exhaust noises by use of improved mufflers. It is recommended that all internal combustion engines used at the project site be equipped with a type of muffler recommended by the vehicle manufacturer.

In addition, all equipment should be in good mechanical condition so as to minimize noise created by faulty or poorly maintained engine, drive-train and other components. Construction noise can also be mitigated by the following:

- Construction shall be scheduled in accordance with the requirements of the City of San Jose Municipal Code.
- All diesel powered equipment should be located more than 115 ft. from any residence if the equipment is to operate for more than a few hours per day.

- Dirt berming and stockpiling materials whenever possible can also help reduce noise to sensitive receptor locations.
- Place long-term stationary equipment as far away from the residential areas as possible.
- Keep mobile equipment (haul trucks, concrete trucks, etc.) off of local streets near residences as much as possible.
- Earth Removal: Use scrapers as much as possible for earth removal, rather than the noisier loaders and hauling trucks.
- Backfilling: Use a backhoe for backfilling, as it is less costly and quieter than either dozers or loaders.
- Ground Preparation: Use a motor grader rather than a bulldozer for final grading. Wheeled heavy equipment is less noisy than track equipment. Use wheeled equipment rather than track equipment whenever possible.
- Building Construction: Powers saws should be shielded or enclosed where practical to decrease noise emissions. Nail guns should be used where possible as they are less noisy than manual hammering.
- Generators, Compressors and Other Stationary Equipment: Use generators, compressors and other stationary equipment that are housed in acoustical enclosures rather than in weather enclosures or in none at all. These are often available with rented equipment. The equipment shall be placed as far from sensitive receptors as feasible.
- Provide a noise disturbance coordinator with a phone line and voicemail/answering machine. Post signs with information.

- Keep vehicle paths graded smooth as rough roads and paths can cause significant noise and vibration from trucks (particularly empty trucks) rolling over rough surfaces. Loud bangs and ground-borne vibration can occur.
- Limit the use and operation of all demolition and construction equipment to the distances from the apartment building setback to the north and the residential garage structure setbacks to the east.

III. Site, Traffic and Project Descriptions

The proposed development site is located at 1036 North 4th Street between Younger Street and Commercial Street in San Jose. The site is flat and at-grade with the surrounding roadway and land uses, and currently contains the Charles Motel. Surrounding land uses include 2-story apartments adjacent to the north, single-family residences adjacent to the east, a vacant supermarket adjacent to the south and single-story apartments across North 4th Street to the west.

The primary source of noise at the site is traffic on North 4th Street, which carries an existing Average Daily Traffic (ADT) traffic volume of approximately 11,438 vehicles, as reported by the City of San Jose, Ref. (h). The ADT was extrapolated from peak hour data provided by the City using a methodology of the peak hour is 8% of the ADT per the Highway Research Board, Ref. (j).

The planned development includes the demolition of the existing motel on the site and construction of a new 4 story, hotel building with 59 guest spaces. A common area/courtyard will be located on the first floor at the rear of the building. One level of subterranean parking will be below the building. Ingress and egress to the project will be by way of an access driveway off of North 4th Street. The Ground Floor Plan is shown on Figure 2, below.

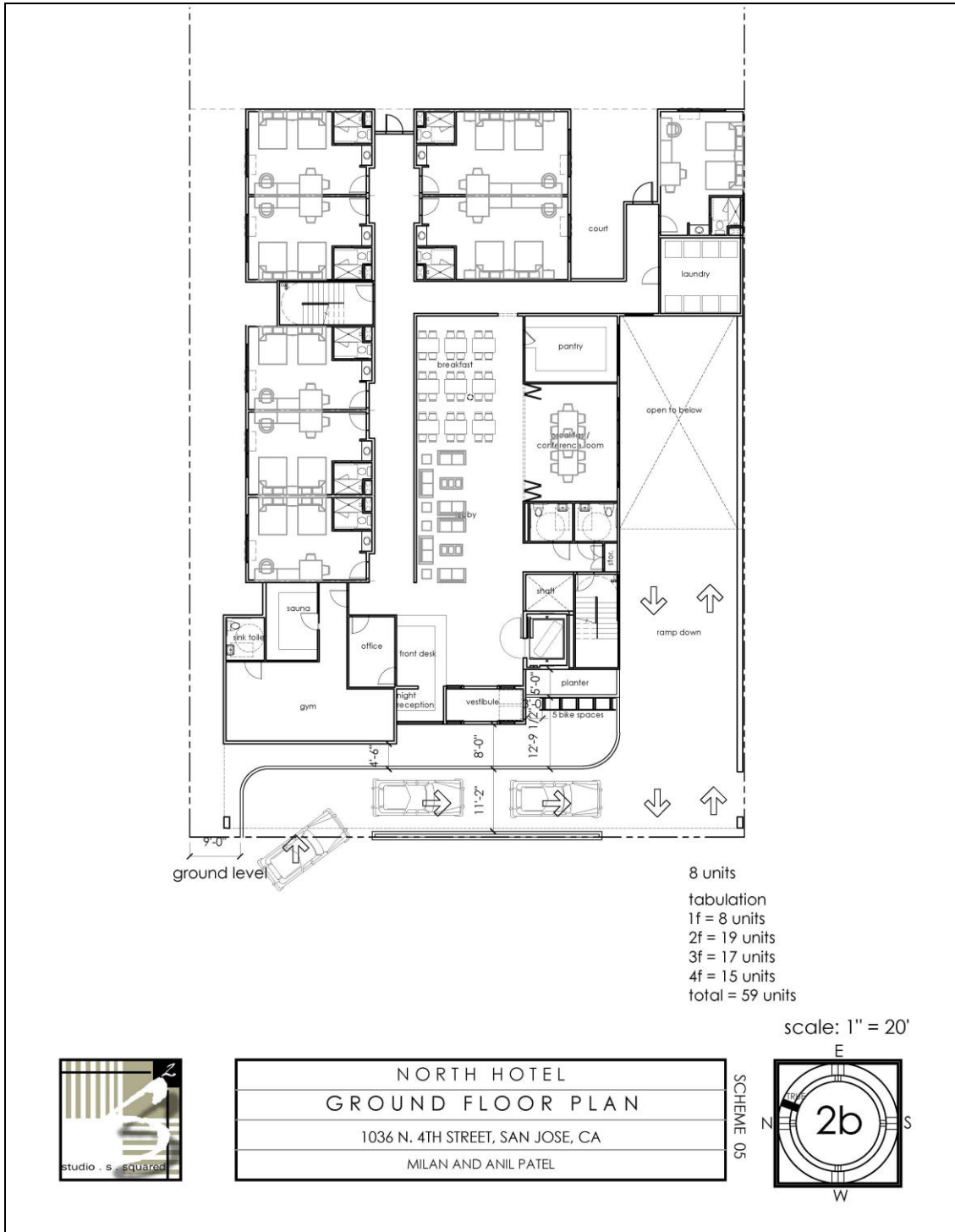


FIGURE 2 – Ground Floor Plan

IV. Analysis of the Noise Levels

A. Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at a location 72 ft. from the centerline of North 4th Street on the roof of the existing motel building. This location corresponds to the minimum planned setback distance of the project building and was also chosen for security of the sound measuring equipment. The measurements were made on July 7-8, 2016 for a continuous period of 24 hours. The measurement location is shown on Figure 3, below.

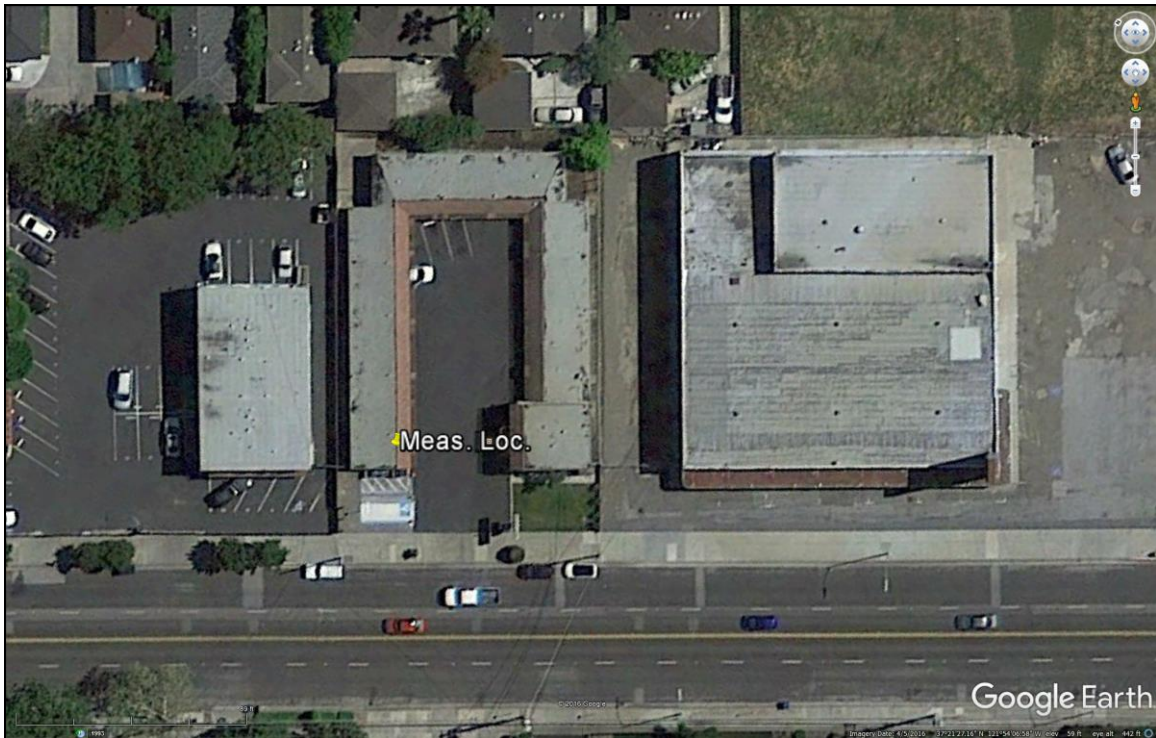


FIGURE 3 – Noise Measurement Location

The noise levels were recorded and processed using a Larson-Davis Model 812 Precision Integrating Sound Level Meter. The meter yields, by direct readout, a series of descriptors of the sound levels versus time, which are commonly used to describe community noise, and are described in Appendix B. The measured descriptors include the L_1 , L_{10} , L_{50} , and L_{90} , i.e., those levels exceeded 1%, 10%, 50% and 90% of the time. Also measured were the maximum and minimum levels and the equivalent-energy levels (L_{eq}), which are used to calculate the DNL. The results of the measurements are shown in the data tables in Appendix C.

The results of the field survey reveal that the L_{eq} 's at the measurement location, 72 ft. from the centerline of North 4th Street, ranged from to 59.0 to 64.1 dBA during the daytime and from 49.9 to 61.9 dBA at night.

Traffic noise dissipates at the rate of 3 to 6 dB for each doubling of the distance from the source. Thus, locations on the site at greater distances or indirect orientations from North 4th Street will have lower noise levels.

Vehicular traffic noise contains a wide spectrum of frequency components (from 100 to 10,000 Hertz), which are associated with engine, tire, drive- train, exhaust and other sources. The frequency components are centered primarily in the 250 and 500 Hz octave bands and were used in determining the noise control measures recommended for this project.

B. Future Noise Levels

The future traffic volume for North 4th Street was determined from information provided by the City of San Jose, Ref. (i). The approved projects in the area are expected to generate a daily traffic volume of 2,980 vehicles. Adding this volume to the existing estimated volume of 11,438 vehicles ADT, the future traffic volume without the project was calculated to be 14,418 vehicles ADT. This increase in traffic volume yields a 1 dB increase in the traffic noise levels. The project is expected to add an additional 436 daily trips, Ref. (h), to the North Fourth Street traffic volume for a total future volume of 14,854 ADT. This remains to be a 1 dB increase over the existing noise levels.

V. Evaluation of the Noise Exposures

A. Exterior Noise Exposures

To evaluate the on-site noise levels against the City of San Jose General Plan Goals and Policies and the Title 24 criterion, the DNL for the survey location was calculated by decibel averaging of the L_{eq} 's as they apply to the daily time periods of the DNL index. The DNL is a 24-hour noise descriptor that uses the measured L_{eq} values to calculate a 24-hour time-weighted average noise exposure. Adjustments were made to the measured traffic noise levels to account for the various setback distances from North 4th Street using methods established by the Highway Research Board, Ref. (j). The formula used to calculate the DNL is described in Appendix B.

The results of the calculations indicate that the exterior noise exposure at the measurement location and planned minimum setback, 72 ft. from the centerline of North 4th Street, is 65 dB DNL. Under future conditions, the noise exposure is estimated to increase to 66 dB DNL. Thus, the noise exposures will be up to 6 dB in excess of the Title 24 criterion.

The ground floor common area will be at least 155 ft. from the centerline of North 4th Street and surrounded on three sides by the five -story building. The common area will be open on the east side toward the residences. The building will provide 20 dB of traffic noise shielding. Thus, the North 4th Street traffic noise exposures will reduce to 40 and 41 dB DNL under existing and future traffic conditions, respectively. The noise exposures in the common area will be within the 60 dB DNL limit of the City of San Jose General Plan Goals and Policies. Noise control measures for the common area will not be required.

B. Interior Noise Exposures

To evaluate the interior noise exposures in project living spaces, against the City of San Jose General Plan Goals and Policies and against the Title 24 standard of 45 dB DNL, a 15 dB reduction was applied to the exterior noise exposures to represent the attenuation provided by the building shell under an *annual-average* condition. The annual-average condition assumes that windows have dual-pane, thermal insulating windows that are kept open 50% of the time for natural ventilation and closed 50% of the time.

The interior noise exposures in the most impacted guest spaces of the project closest to North 4th Street along the west façade of the building will be up to 50 dB DNL under existing conditions and up to 51 dB DNL under future conditions. Thus, the noise exposures will be up to 6 dB in excess of the City of San Jose General Plan Goals and Policies and the Title 24 standards. All guest spaces with a direct or side view of North 4th Street will be noise impacted.

As shown by the above evaluations, interior noise exposure excesses will occur. Noise control measures for the guest spaces will be required. The recommended noise control measures are in described in Section II of this report.

C. Project-Generated Noise

Project traffic will not add significantly to the existing or future traffic noise levels in the vicinity of the site. Noise control measures for project traffic will not be required.

The roof-top mechanical noise levels were calculated using the manufacturer rated sound power levels of 84 dBA PwL for RTU-1 and 76 dBA PwL for RTU-2. RTU-1 is a Carrier 48HDCD20 17.5-ton package unit. RTU-2 is a Carrier 48HCDA04 3-ton package unit. Table III, below, provides the mechanical equipment noise level analysis for the adjacent north and east residential buildings. The receptor location for the residences to the north is the second floor elevation of the apartments. The receptor location for the easterly residences is the ground floor elevation as these homes are single-story. The mechanical roof plan is shown on Figure 4 on page 21.

TABLE III							
Roof-Top Mechanical Equipment Noise Analysis							
Location	Equipment	Make	Model	Rated Sound Level, PwL	Distance to Receptor	Building Reduction	Sound Level @ Receptor
North Residence	RTU-1	Carrier	48HCDD20	84	60	-17	35 dBA
North Residence	RTU-2	Carrier	48HCDA04	76	35	-15	33dBA
						TOTAL	37 dBA
East Residence	RTU-1	Carrier	48HCDD20	84	48	-13	40 dBA
East Residence	RTU-2	Carrier	48HCDA04	76	51	-13	31 dBA
						TOTAL	41 dBA

As shown above, the roof-top mechanical equipment noise levels will be in compliance with the 55 dBA limit of the City of San Jose Zoning Ordinance at the most impacted adjacent residences.

Demolition of the existing buildings on the site and construction of the project will generate short-term significant increases in the existing noise environment and the potential for vibration excesses. Noise and vibration reduction measures to reduce demolition and construction noise and vibration to as low as feasible and for compliance with the FTA criteria are provided in Section II of this report. Precise noise reduction measures for any particular item of equipment or operation cannot be determined at this time as specific demolition and construction details are not available. Vibration excesses can be controlled by limiting the proximity of certain equipment usage to the adjacent residential structures.

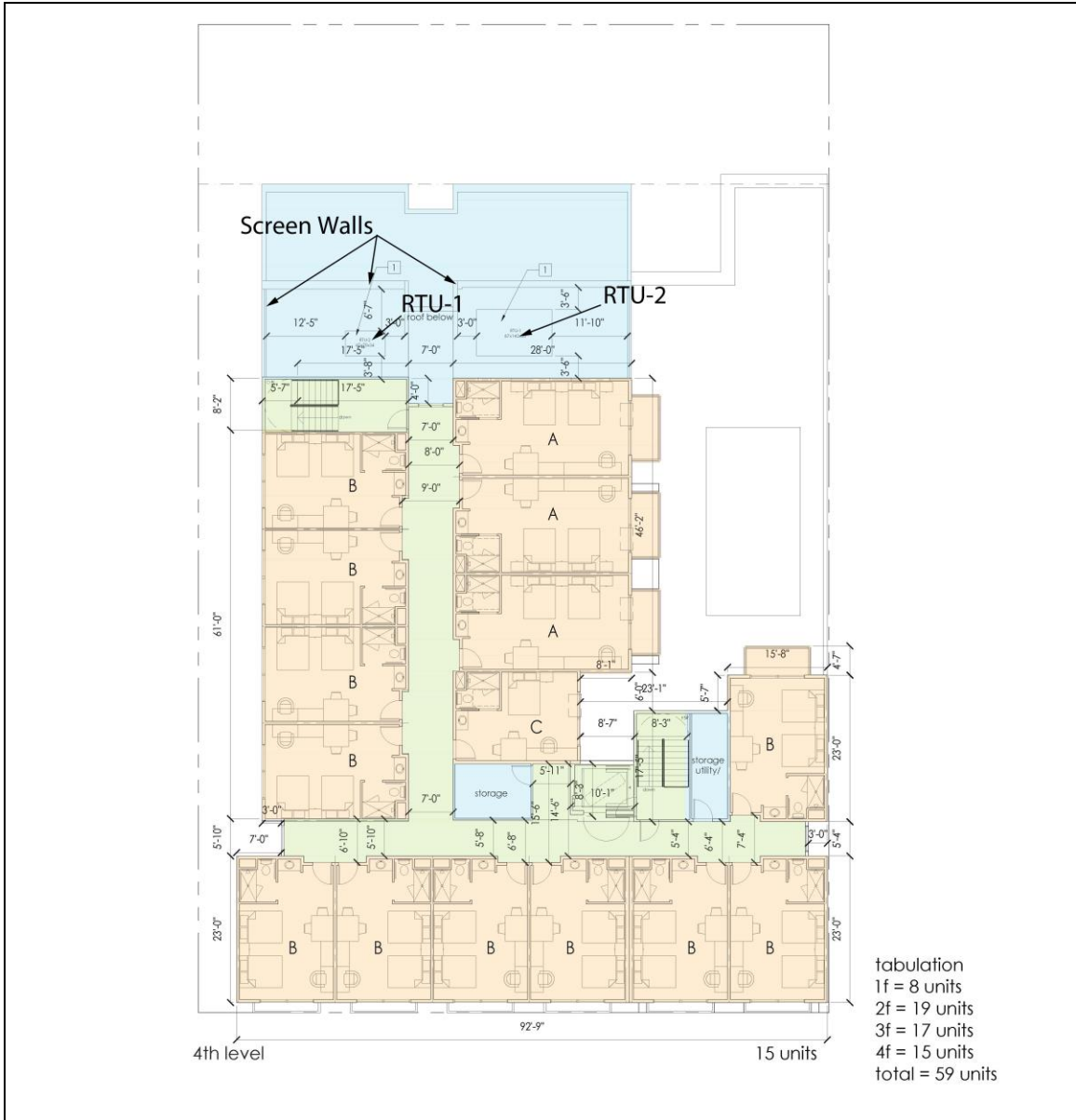


FIGURE 4 – Mechanical Roof Plan

This report presents the results of a noise assessment study for the planned "North Hotel" at 1036 North 4th Street in San Jose. The study findings and recommendations for present conditions are based on field measurements and other data and are correct to the best of our knowledge. Future noise level predictions were based upon information provided by the City of San Jose. However, significant changes in North 4th Street traffic volumes or changes in speed limits, motor vehicle technology, noise regulations, or other future changes beyond our control may produce long range noise results different from our estimates.

If you have any questions or would like an elaboration on this report, please call me.

Sincerely,

EDWARD L. PACK ASSOC., INC.

A handwritten signature in blue ink, reading "Jeffrey K. Pack", is written over a horizontal line.

Jeffrey K. Pack
President

Attachments: Appendices A, B, and C

APPENDIX A

References

- (a) Ground Floor Plan, North Hotel, by Studio S Squared Architects, September 27, 2016
- (b) San Jose General Plan Envision 2040, City of San Jose, Department of City Planning and Building, November 1, 2011
- (c) California Code of Regulations, Title 24, Chapter 2, Section 1207.4 “Sound Transmission”, Revised 2013
- (d) City of San Jose Municipal Code, Title 20, “The Zoning Ordinance”, Part 7, Performance Standards, November 29, 2001
- (e) Information on Construction Duration Provided by Ms. Diana Jarrar, Studio S Squared Architecture, Inc., by email, to Edward L. Pack Associates, Inc., November 21, 2016
- (f) Transit Noise and Vibration Impact Assessment, U.S Department of Transportation, Federal Transit Administration, FTA-VA-90-1003-06, May 2006
- (g) Washington State Department of Transportation SR 520 Bridge Replacement and HOV Program, “Final Construction Noise and Vibration Report SR520, West Connection Bridge Project”, by ATS Consulting, January 28, 2013
- (h) City of San Jose Memorandum (Traffic) from Joe Dyke, Public Works Department to Jennifer Piozet, Planning Department, 1036 North 4th Street, April 27, 2017
- (i) Future North 4th Street Traffic Volume Data Provided by Mr. Wilson Tam, City of San Jose Transportation Department, by email, to Edward L. Pack Associates, Inc., August 3, 2016
- (j) Highway Research Board, “Highway Noise - A Design Guide for Highway Engineers”, Report 117, 1971

APPENDIX B

Noise Standards, Terminology, Instrumentation, General Building Shell Controls

1. Noise Standards

A. City of San Jose General Plan Goals and Policies

The City of San Jose General Plan “Envision San Jose 2040”, adopted November 1, 2011, Chapter 3 “Environmental Leadership” contains noise environment goals and policies.

Goal EC-1 – Community Noise Levels and Land Use Compatibility

Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies.

Policies – Community Noise Levels and Land Use Compatibility

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.

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

Land Use Category	EXTERIOR NOISE EXPOSURE (dB DNL)					
	55	60	65	70	75	80
Residential, Hotels and Motels, Hospitals and Residential Care						
Outdoor Sports and Recreation, Neighborhood Parks, Playgrounds						
Schools, Libraries, Museums, Meeting Halls, Churches						
Office Buildings, Business, Commercial and Professional						
Sports Arenas, Outdoor Spectator Sports						
Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

	Normally Acceptable
	Conditionally Acceptable
	Unacceptable

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.

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-1.4 Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive uses.

EC-1.5 Encourage the State Department of Transportation and County transportation agencies to provide visually pleasing sound attenuation devices on all new and existing freeways and expressways.

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-1.8 Allow commercial drive-through uses only when consistency with the City's exterior noise level guidelines and compatibility with adjacent land uses can be demonstrated.

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.

EC-1.10 Monitor Federal legislative and administrative activity pertaining to aircraft noise for new possibilities for noise-reducing modifications to aircraft engines beyond existing Stage 3 requirements. Encourage the use of quieter aircraft at the San José International Airport.

EC-1.11 Require safe and compatible land uses within the Mineta International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

EC-1.12 Encourage the Federal Aviation Administration to enforce current cruise altitudes that minimize the impact of aircraft noise on land use.

Actions – Community Noise Levels and Land Use Compatibility

EC-1.13 Update noise limits and acoustical descriptors in the Zoning Code to clarify noise standards that apply to land uses throughout the City.

EC-1.14 Require acoustical analyses for proposed sensitive land uses in areas with exterior noise levels exceeding the City's noise and land use compatibility standards to base noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency.

Goal EC-2 - Vibration

Minimize vibration impacts on people, residences, and business operations.

Policies - Vibration

EC-2.1 Near light and heavy rail lines or other sources of ground-borne vibration, minimize vibration impacts on people, residences, and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration. Require new development within 100 feet of rail lines to demonstrate prior to project approval that vibration experienced by residents and vibration sensitive uses would not exceed these guidelines.

EC-2.2 Require new sources of ground-borne vibration, such as transit along fixed rail systems or the operation of impulsive equipment, to minimize vibration impacts on existing sensitive land uses to levels at or below the guidelines of the Federal Transit Administration.

EC-2.3 Require new development to minimize vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, a vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

EC-2.4 Consider the effects of ground-borne vibration in the analysis for potential Land Use / Transportation Diagram changes.

B. Title 24 Noise Standards

The California Code of Regulations, Title 24, Chapter 2, Section 1207, "Sound Transmission", applies to all new multi-family dwellings including condominiums, apartments, hotels, motels and dormitories. The standards, which use either the Day-Night Level (DNL) descriptor or the Community Noise Equivalent Level (CNEL), whichever is consistent with the local jurisdictional standards, specify that interior noise exposures from exterior sources shall not exceed 45 dB DNL/CNEL in any habitable room.

The Title 24 standards also establish minimum sound insulation requirements for interior partitions separating different dwelling units from each other and dwelling units from common spaces such as garages, corridors, equipment rooms, etc. The common interior walls and floor/ceiling assemblies regulated by the California Building Code (apartments, condominiums, hotels, etc.) must achieve a minimum Sound Transmission Class (STC) rating of 50 for airborne noise. Common floor/ceiling assemblies must achieve an Impact Insulation Class (IIC) rating of 50 for impact noise. These ratings are based on laboratory tested partitions. Field tested partitions must achieve ratings of NIC and FIIC 45. Attached dwellings regulated by the California Residential Code (townhouses under 3 stories in height) must achieve minimum STC 45 for the common partition.

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Community Noise Analyzer. Some of the statistical levels used to describe community noise are defined as follows:

- L_1 - A noise level exceeded for 1% of the time.
- L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.
- L_{50} - The noise level exceeded 50% of the time representing an "average" sound level.
- L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.
- L_{eq} - The continuous equivalent-energy level is that level of a steady-state noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels used in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = \left[\left[(10 \log_{10}(10^{\Sigma L_{eq}(7-10)})) \times 15 \right] + \left[\left((10 \log_{10}(10^{\Sigma L_{eq}(10-7)}) + 10) \right) \times 9 \right] \right] / 24$$

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the precision acoustical instruments shown below. The acoustical instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters was provided by a microphone extended to a height of 5 ft. above the ground. The meter conforms to ANSI S1.4 for Type 1 instruments. The "A" weighting network and the "Fast" response setting of the meter were used in conformance with the applicable ISO and IEC standards. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 831 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer

4. Building Shell Controls

The following additional precautionary measures are required to assure the greatest potential for exterior-to-interior noise attenuation by the recommended mitigation measures. These measures apply at those units where closed windows are required:

- Unshielded entry doors having a direct or side orientation toward the primary noise source must be 1-5/8" or 1-3/4" thick, insulated metal or solid-core wood construction with effective weather seals around the full perimeter. Mail slots should not be used in these doors or in the wall of a living space, as a significant noise leakage can occur through them.
- If any penetrations in the building shell are required for vents, piping, conduit, etc., sound leakage around these penetrations can be controlled by sealing all cracks and clearance spaces with a non-hardening caulking compound.
- Ventilation devices shall not compromise the acoustical integrity of the building shell.

APPENDIX C

Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: ANIL PATEL
 FILE: 48-038
 PROJECT: NORTH HOTEL
 DATE: 7/7-8/2016
 SOURCE: N. 4TH ST.

TIME	Leq	$10^{\wedge}Leq/10$		
LOCATION 1 N. 4TH ST.				
Dist. To Source 72 ft.				
7:00 AM	64.0	2511886.4		
8:00 AM	64.1	2570395.8		
9:00 AM	63.3	2137962.1		
10:00 AM	63.0	1995262.3		
11:00 AM	62.7	1862087.1		
12:00 PM	62.0	1584893.2		
1:00 PM	61.5	1412537.5		
2:00 PM	62.1	1621810.1		
3:00 PM	62.7	1862087.1		
4:00 PM	63.7	2344228.8		
5:00 PM	63.3	2137962.1		
6:00 PM	62.7	1862087.1		
7:00 PM	61.7	1479108.4		
8:00 PM	60.3	1071519.3		
9:00 PM	59.0	794328.2	SUM=	27248156
10:00 PM	58.1	645654.2	Ld=	62.6
11:00 PM	56.7	467735.1		
12:00 AM	53.5	223872.1		
1:00 AM	54.5	281838.3		
2:00 AM	51.5	141253.8		
3:00 AM	49.9	97723.7		
4:00 AM	51.4	138038.4		
5:00 AM	58.4	691831.0		
6:00 AM	61.9	1548816.6	SUM=	4236763
			1.0 Ln=	56.7
			1.0	
	Daytime Level=	74.4		
	Nighttime Level=	76.2		
	DNL=	65		
	24-Hour Leq=	61.2		