
APPENDIX J

ENVIRONMENTAL NOISE ASSESSMENT

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**972 ELM STREET
SAN JOSE, CALIFORNIA**

WJVA Report No. 21-12

PREPARED FOR

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PREPARED BY

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1. INTRODUCTION

Project Description

The proposed project would consist of the demolition of an existing single-family residence located at 972 Elm Street, in San Jose and the construction of eight (8) detached single-family homes of up to three stories in height. Twenty parking spaces would be provided on-site including 16 covered garage spaces and four guest spaces. The project site plan is provided as Figure 1.

Environmental Noise Assessment

This environmental noise assessment has been prepared to determine if significant noise impacts would be produced by the project and to describe mitigation measures for noise if significant impacts are determined. The environmental noise assessment, prepared by WJV Acoustics, Inc. (WJVA), is based upon the project site plan design and construction package prepared by Fahed Habayeb Planning and Design (dated 11/20) and the findings of on-site noise level measurements conducted on February 9, 2021. Revisions to the site plan or other project-related information available to WJVA at the time the analysis was prepared may require a reevaluation of the findings and/or recommendations of the report.

Appendix A provides definitions of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported in this analysis are A-weighted sound pressure levels in decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighted sound levels, as they correlate well with public reaction to noise. Appendix B provides typical A-weighted sound levels for common noise sources.

In terms of human perception, a 5 dB increase or decrease is considered to be a noticeable change in noise levels. Additionally, a 10 dB increase or decrease is perceived by the human ear as half as loud or twice as loud. In terms of perception, generally speaking the human ear cannot perceive an increase (or decrease) in noise levels less than 3 dB.

2. THRESHOLDS OF SIGNIFICANCE

The CEQA Guidelines apply the following questions for the assessment of significant noise impacts for a project:

- a. Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?
- c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

a. Noise Level Standards

City of San Jose

General Plan

The Environmental Leadership Chapter of the Envision San Jose 2040 General Plan¹ (adopted November 1, 2011) establishes land use compatibility criteria in terms of the Day-Night Average Level (L_{dn} /DNL). The L_{dn} represents the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The L_{dn} represents cumulative exposure to noise over an extended period of time and are therefore calculated based upon *annual average* conditions. The General Plan establishes noise exposure criteria for specific land use types. The Noise level criteria established in the General Plan are provided below.

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.

Although not explicitly stated in the General Plan, exterior noise level standards are typically applied to "outdoor activity areas". Outdoor activity areas are generally considered to be backyards of single-family residential land uses, common use outdoor areas and individual patios and balconies of multi-family residential land uses, and common use outdoor areas for transient lodging land uses.

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

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

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

Normally Acceptable:

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

Conditionally Acceptable:

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

Unacceptable:

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

EC-1.2 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”
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where the noise levels would equal or exceed the “Normally Acceptable” level.

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.

Municipal Code

Section 20.30.700 (Performance Standards) of the City of San Jose Municipal Code provides additional noise standards for stationary noise sources applicable to the project. The Municipal Code states that noise levels associated with the project cannot exceed 55 dB L_{max} (maximum) at adjacent residential property lines.

b. Construction Noise and Vibration

The General Plan provides establishes the following guidelines related to construction activities:

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.

Additionally, section 20.100.450 of the City of San Jose Municipal code provides the following:

- Unless otherwise expressly allowed in a development permit or other planning approval, no applicant or agent of an applicant shall suffer or allow any construction activity on a site located within 500 feet of a residential unit before 7:00 a.m. or after 7:00 p.m., Monday through Friday, or at any time on weekends.

The General Plan also provides some guidance and guidelines associated with vibration.

Goal EC-2 - Vibration

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

EC-2.3

Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous 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 continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to

sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Additional guidance is provided by the Caltrans Transportation and Construction Vibration Guidance Manual³. The Manual provides guidance for determining annoyance potential criteria and damage potential threshold criteria. These criteria are provided below in Table I and Table II, and are presented in terms of peak particle velocity (PPV) in inches per second (in/sec).

TABLE I		
GUIDELINE VIBRATION ANNOYANCE POTENTIAL CRITERIA		
Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.1
Severe	2.0	0.4

Source: Caltrans

TABLE II		
GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA		
Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile, historic buildings, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans

3. SETTING

The project site is located at 972 Elm Street, in San Jose, California, approximately 600 feet southeast of California Interstate 880 Freeway (I-880/Nimitz Freeway). Existing multi-family residential land uses border the project site to the northwest and single-family residential land uses border the project site to the west, south and east. The project site currently consists of one single family residence, which will be demolished as part of the project scope.

a. Background Noise Level Measurements

Existing ambient noise levels in the project vicinity are dominated by vehicle traffic noise associated with I-880 and local roadways adjacent to and in the vicinity of the project site. There is a Caltrain (PCJX) railroad line located approximately 450 feet north of the project site. Additional sources of noise observed during site inspection included aircraft overflights, birds, barking dogs, construction activities and landscaping activities.

Measurements of existing ambient noise levels in the project vicinity were conducted on February 9, 2021. Long-term (24-hour) ambient noise level measurements were conducted at one (1) location (sites LT-1). WJVA conducted short term noise level measurements at several locations within the project site, to determine the loudest portion of the overall project site. Site LT-1 was determined to have the highest ambient noise levels within the overall project site, and was therefore selected as the 24-hour ambient noise monitoring site, and represents the portion of the project site with the highest levels of ambient (traffic) noise levels.

Additionally, short-term (15-minute) ambient noise level measurements were conducted at four (4) locations (Sites ST-1 through ST-4). Two (2) individual measurements were taken at each of the four short-term sites to quantify ambient noise levels in the morning and afternoon hours. The project vicinity and locations of the noise monitoring sites are shown on Figure 2.

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL-820 sound level analyzers equipped with B&K Type 4176 1/2" microphones. The equipment complies with the specifications of the American National Standards Institute (ANSI) for Type I (Precision) sound level meters. The meters were calibrated with a B&K Type 4230 acoustic calibrator to ensure the accuracy of the measurements.

Measured hourly energy average noise levels (L_{eq}) at site LT-1 ranged from a low of 42.8 dB between 1:00 a.m. and 2:00 a.m. to a high of 57.4 dB between 3:00 p.m. and 4:00 p.m. Hourly maximum (L_{max}) noise levels at site LT-1 ranged from 55.1 to 82.1 dB. Residual noise levels at the monitoring site, as defined by the L_{90} statistical descriptor ranged from 36.5 to 54.2 dB. The L_{90} is a statistical descriptor that defines the noise level exceeded 90% of the time during each hour of the sample period. The L_{90} is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft and other local noise sources.

The measured L_{dn} value at site LT-1 during the 24-hour noise measurement period was 56.9 dB L_{dn} . Table III provides the measured hourly noise levels in terms of the L_{eq} and L_{max} . Figure 3 graphically depicts hourly variations in ambient noise levels at the LT-1 long-term monitoring site as well as a site photograph.

TABLE III
SUMMARY OF 24-HOUR AMBIENT NOISE MEASUREMENT DATA
972 ELM STREET, SAN JOSE
FEBRUARY 9, 2021

Time	A-Weighted Decibels, dBA	
	L_{eq}	L_{max}
0:00:00	44.6	57.4
1:00:00	42.8	55.5
2:00:00	47.5	75.4
3:00:00	48.6	70.5
4:00:00	48.8	70.3
5:00:00	50.5	64.2
6:00:00	53.1	62.9
7:00:00	54.2	68.4
8:00:00	53.4	62.3
9:00:00	54.5	68.4
10:00:00	56.6	65.2
11:00:00	56.9	66.2
12:00:00	56.8	74.4
13:00:00	56.9	62.4
14:00:00	54.6	72.3
15:00:00	57.4	82.1
16:00:00	56.0	68.4
17:00:00	55.8	67.6
18:00:00	54.9	66.0
19:00:00	54.4	65.7
20:00:00	50.6	66.6
21:00:00	53.0	72.3
22:00:00	48.0	65.1
23:00:00	45.7	55.1

Source: WJV Acoustics, Inc.

The short-term site noise measurement data included energy average (L_{eq}) maximum (L_{max}) as well as five (5) individual statistical parameters. Observations were made of the dominant noise sources affecting the measurements. The statistical parameters describe the percent of time a noise level was exceeded during the measurement period. Table IV summarizes short-term noise measurement results.

TABLE IV
SUMMARY OF SHORT-TERM NOISE MEASUREMENT DATA
972 ELM STREET RESIDENTIAL DEVELOPMENT
SAN JOSE, CALIFORNIA
FEBRUARY 9 & 10, 2021

Site	Time	A-Weighted Decibels, dBA							Sources
		L _{eq}	L _{max}	L ₂	L ₈	L ₂₅	L ₅₀	L ₉₀	
ST-1	8:40 a.m.	61.0	77.7	71.1	64.3	63.1	60.1	55.1	TR, AC, L
ST-1	4:25 p.m.	59.4	69.2	70.9	63.7	56.8	55.8	54.0	TR, AC
ST-2	9:00 a.m.	53.4	66.5	60.7	55.3	52.1	51.6	47.5	TR, B, C
ST-2	4:40 p.m.	53.0	65.2	60.1	55.5	53.0	52.8	48.1	TR, AC
ST-3	9:25 a.m.	53.2	68.4	62.1	58.7	55.2	53.0	49.1	TR, C, AC
ST-3	5:05 p.m.	54.0	71.4	62.4	56.4	54.9	52.8	47.7	TR, AC
ST-4	9:45 a.m.	57.9	78.4	64.7	58.5	53.7	51.4	48.7	TR, AC
ST-4	5:25 p.m.	58.9	81.4	65.0	59.9	54.8	53.0	49.1	TR, B, V

TR: Traffic AC: Aircraft V: Voices B: Birds R: L: Landscaping Activities C: Construction

Source: WJV Acoustics, Inc.

Short-term noise measurements were conducted for 15-minute periods. All of the four short-term monitoring sites were exposed to noise from traffic sources and aircraft overflights and other sources typical of an urban residential environment (barking dogs, birds, landscaping activities, etc.). The locations of the short-term measurement sites are provided on Figure 2.

4. PROJECT IMPACTS AND MITIGATION MEASURES

a. Noise Impacts from On-Site Noise Sources (No Impact)

Ongoing noise associated with the project would be limited to typical residential activities including vehicle movements, human voices, outdoor human activity, and HVAC equipment. The project site is located in an existing residential neighborhood. Noise levels associated with the development of the project would be typical to those as the surrounding land uses, and would not be expected to exceed any City of San Jose noise standards and would therefore not result in any significant noise impact.

The single-family homes would include individual HVAC units adjacent to each home. The HVAC units would be standard residential type units, and would generate noise levels comparable of existing nearby residential HVAC units. It may be possible that noise levels associated with the operation of HVAC units would produce noise levels that equal or exceed the Municipal Code maximum noise level standard of 55 dB at adjacent property lines; however, it is important to note that existing ambient noise levels in the project area already exceed this noise level standard. Reference to the hourly maximum noise levels provided above in Table III show that hourly maximum noise levels exceeded 55 dB during every hour of the 24-hour measurement period (due to project site proximity to Caltrain and I-880). Therefore, noise levels associated with residential HVAC units at the single-family homes would not result in a noise impact at off-site sensitive receptor locations.

b. Noise From Construction (Less Than Significant With Mitigation)

Policy EC-1.7 of the General Plan requires construction operations within the City 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 twelve 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.

Section 20.100.450 of the City of San Jose Municipal code requires any construction activity on a site located within 500 feet of a residential unit must occur between the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and no construction activities are allowed on weekends.

Construction noise would occur at various locations within and near the project site through the build-out period. The distance from the closest residences to the project site is approximately 25 feet. Table V provides typical construction-related noise levels at distances of 25 feet, 50 feet, and 100 feet.

TABLE V TYPICAL CONSTRUCTION EQUIPMENT MAXIMUM NOISE LEVELS, dBA			
Type of Equipment	25 Ft.	50 Ft.	100 Ft.
Concrete Saw	96	90	84
Crane	87	81	75
Excavator	87	81	75
Front End Loader	85	79	73
Jackhammer	95	89	83
Paver	83	77	71
Pneumatic Tools	91	85	79
Dozer	87	81	76
Rollers	86	80	74
Trucks	92	86	80
Pumps	86	80	74
Scrapers	93	87	81
Portable Generators	87	81	74
Backhoe	92	86	80
Grader	92	86	80

Source: FHWA

Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987

Noise impacts associated with construction activities typically depend on the noise levels generated by the type of equipment in use, the duration of usage of the equipment and the distance at which the equipment is used in respect to nearby sensitive receptors. Noise impacts typically occur when construction activities occur beyond the limited allowable hours of construction. Construction activities will occur within 500 feet of residential land uses. However, according to the project applicant all construction activities will occur in less than twelve months.

Construction noise is typically not considered to be a significant impact if construction is limited to the daytime hours and construction equipment is adequately maintained and muffled. Extraordinary noise-producing activities (e.g., pile driving) are not anticipated. In this case, all project construction activity must be confined to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday. Construction noise impacts could result in annoyance or sleep disruption for nearby residents if nighttime operations were to occur or if equipment is not properly muffled or maintained. If construction activities that involved substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) for a duration greater than twelve months, a substantial impact would occur.

Potential Impact: If the overall duration of construction activities were to occur over a period greater than twelve months, a noise impact would occur, as determined by the City of San Jose Municipal Code.

Mitigation Measure: According to the project applicant, the anticipated duration of project construction (including demolition) is less than twelve months. However, if project construction were to occur for a duration greater than twelve months, the project team must provide 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.

Vibration Impacts (Less Than Significant With Mitigation)

The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. The highest levels of construction-related vibration are typically associated with pile driving and the use of vibratory rollers. While the project would include pavement breaking and demolition activities (jackhammer), project demolition and construction would not require pile driving. It is unlikely that the project would use a vibratory roller, however, vibration levels associated with a vibratory roller would not exceed City of San Jose vibration standard of 20 PPV (in/sec) as long as a distance of thirty (30) feet is maintained between the activity and existing structures (at 30 feet the associated vibratory roller vibration level would be approximately 0.172 PPV).

Vibration from demolition and construction activities could be detected at the closest sensitive land uses, especially during demolition (pavement/concrete breaking), movements by heavy equipment or loaded trucks and during some paving activities (if they were to occur). Typical vibration levels at distances of 25 feet, 100 feet and 300 feet are summarized by Table VI. These levels would not be expected to exceed any significant threshold levels for annoyance or damage, as provided above in Table I and Table II (vibratory roller activities must not occur within 30 feet of existing structures).

TABLE VI			
TYPICAL VIBRATION LEVELS DURING CONSTRUCTION			
Equipment	PPV (in/sec)		
	@ 25'	@ 100'	@ 300'
Bulldozer (Large)	0.089	0.019	0.006
Bulldozer (Small)	0.003	0.0006	0.0002
Loaded Truck	0.076	0.017	0.005
Jackhammer	0.035	0.008	0.002
Vibratory Roller	0.210	0.046	0.013
Caisson Drilling	0.089	0.019	0.006

Source: Caltrans

Project demolition and construction activities would not be expected to produce continuous vibration levels exceeding the City's criterion of 0.20 in/sec PPV at nearby sensitive receptor locations. After full project build out, it is not expected that ongoing operational activities will result in any vibration impacts at nearby sensitive uses. Activities involved in trash bin collection could result in minor on-site vibrations as the bin is placed back onto the ground. Such vibrations would not be expected to be felt at the closest off-site sensitive uses. Additional mitigation is not required.

Potential Impact: If the use of a vibratory roller were to be included in project construction, vibration levels could exceed the City of San Jose vibration standard of 20 PPV at a distance of 25 feet from existing structures.

Mitigation Measure: Should vibratory rollers be used during construction activities; this piece of equipment shall not be used within 30 feet of any existing on-site or off-site structures. Written confirmation of whether or not vibratory rollers will be used shall be provided to the Director of Planning, Building, and Code Enforcement or Director's designee prior to issuance of a grading or building permit.

e. Noise Impacts from Nearby Airports or Airstrips (No Impact)

Norman Y. Mineta San Jose International Airport (SJC) is located approximately 0.5 miles north of the project site. WJVA reviewed the airport noise contours provided in the San Jose International Airport Comprehensive Land Use Plan⁴ (dated 11/16/16). The project site is not located within the 65 dB CNEL noise level contour, and therefore does not result in a noise impact associated with airport activities. The SJC Airport noise contours and the location of the project site are provided as Figure 4.

f. Noise Impacts to On-Site Proposed Noise-Sensitive Uses (Less Than Significant)

The General Plan establishes an exterior noise level standard of 60 dB L_{dn} for residential land uses. The exterior noise level standard applies to usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. The General Plan also establishes an interior noise level standard of 45 dB L_{dn} (attributable to exterior noise sources) within residential land uses.

Exterior Noise

Based upon exterior noise level measurements conducted by WJVA at the location of highest exterior noise levels within the project site, exterior noise levels at the project site were measured to be approximately 57 dB L_{dn} . Such levels are below the applicable City of San Jose exterior noise level standard of 60 dB L_{dn} . Additional mitigation measures are therefore not required.

Interior Noise

The City's interior noise level standard is 45 dB L_{dn} . The measured 24-hour noise exposure level at noise monitoring site LT-1 was approximately 57 dB L_{dn} . This means that the proposed residential construction must be capable of providing a minimum outdoor-to-indoor noise level reduction (NLR) of approximately 57 dB (57-45=12).

A specific analysis of interior noise levels was not performed. However, it may be assumed that residential construction methods complying with current building code requirements will reduce exterior noise levels by a minimum of 25 dB if windows and doors are closed. This will be sufficient for compliance with the City's 45 dB L_{dn} interior standard at all proposed residential units. Requiring that it be possible for windows and doors to remain closed for sound insulation means that air conditioning or mechanical ventilation will be required.

5. IMPACT SUMMARY

Ongoing noise associated with the project would be limited to typical residential activities including vehicle movements, human voices, outdoor human activity, and HVAC equipment. The project site is located in an existing residential neighborhood. Noise levels associated with the development of the project would be typical to those as the surrounding land uses, and would not be expected to exceed any City of San Jose noise standards and would therefore not result in any significant noise impact.

Operational noise associated with the project itself would not be expected to exceed 60 dB L_{dn} or result in an increase of 3-5 dB as stipulated in the General Plan (EC 1.2). Measured project site ambient noise levels (provided above in Table III) indicate that existing maximum noise levels already exceed the 55 dB L_{max} standard provided in the Municipal Code. Reference to Table III shows that hourly maximum noise levels exceed 55 dB during each hour of the 24-hour measurement period, due to the project site's proximity to both Caltrain and I-880. Noise levels associated with HVAC units at each single-family residence would not be expected to exceed existing ambient noise levels at any adjacent property lines.

This impact summary addresses only the noise impacts determined to be "potentially significant" and summarizes the mitigation measures that would be required to reduce noise levels to a "less than significant" level. Project-related noise levels resulting from the proposed residential development project are not expected to exceed any applicable City of San Jose noise level standards if proper mitigation measures are incorporated into project construction operations. Potential impacts and correlating mitigation measures are described in detail above, and summarized below.

Potential Impact: If the overall duration of construction activities were to occur over a period greater than twelve months, a noise impact would occur, as determined by the City of San Jose Municipal Code.

Mitigation Measure: The anticipated duration of project construction (including demolition) is less than twelve months. However, if project construction were to occur for a duration greater than twelve months, the project team must provide 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.

Potential Impact: If the use of a vibratory roller were to be included in project construction, vibration levels could exceed the City of San Jose vibration standard of 20 PPV at a distance of 25 feet from existing structures.

Mitigation Measure: Should vibratory rollers be used during construction activities; this piece of equipment shall not be used within 30 feet of any existing on-site or off-site structures. Written confirmation of whether or not vibratory rollers will be used shall be provided to the Director of Planning, Building, and Code Enforcement or Director's designee prior to issuance of a grading or building permit.

6. SOURCES CONSULTED

1. Envision San Jose 2040 General Plan, November 2011.
2. San Jose Municipal Code, 2000.
3. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, September 2013.
4. San Jose International Airport Comprehensive Land Use Plan November 16, 2016.

FIGURE 1: PROJECT SITE PLAN



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SAN JOSE, CA. 95126

NO.	DATE	ISSUE
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FIGURE 2: PROJECT VICINITY AND AMBIENT NOISE MONITORING SITES



FIGURE 3: HOURLY NOISE LEVELS AT LONG-TERM MONITORING SITE LT-1

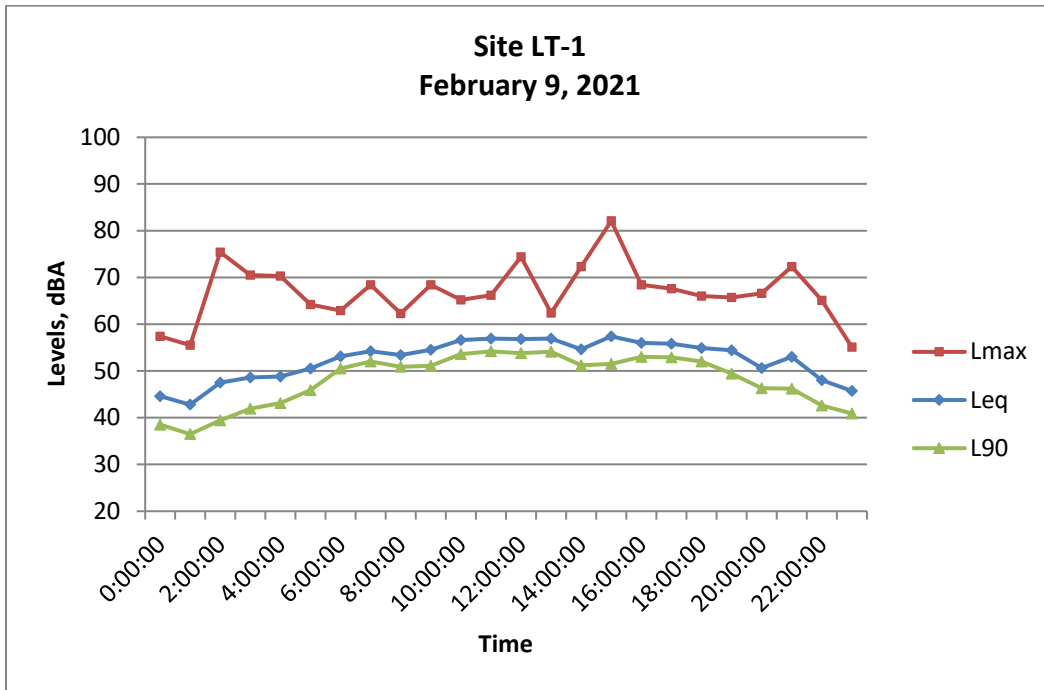
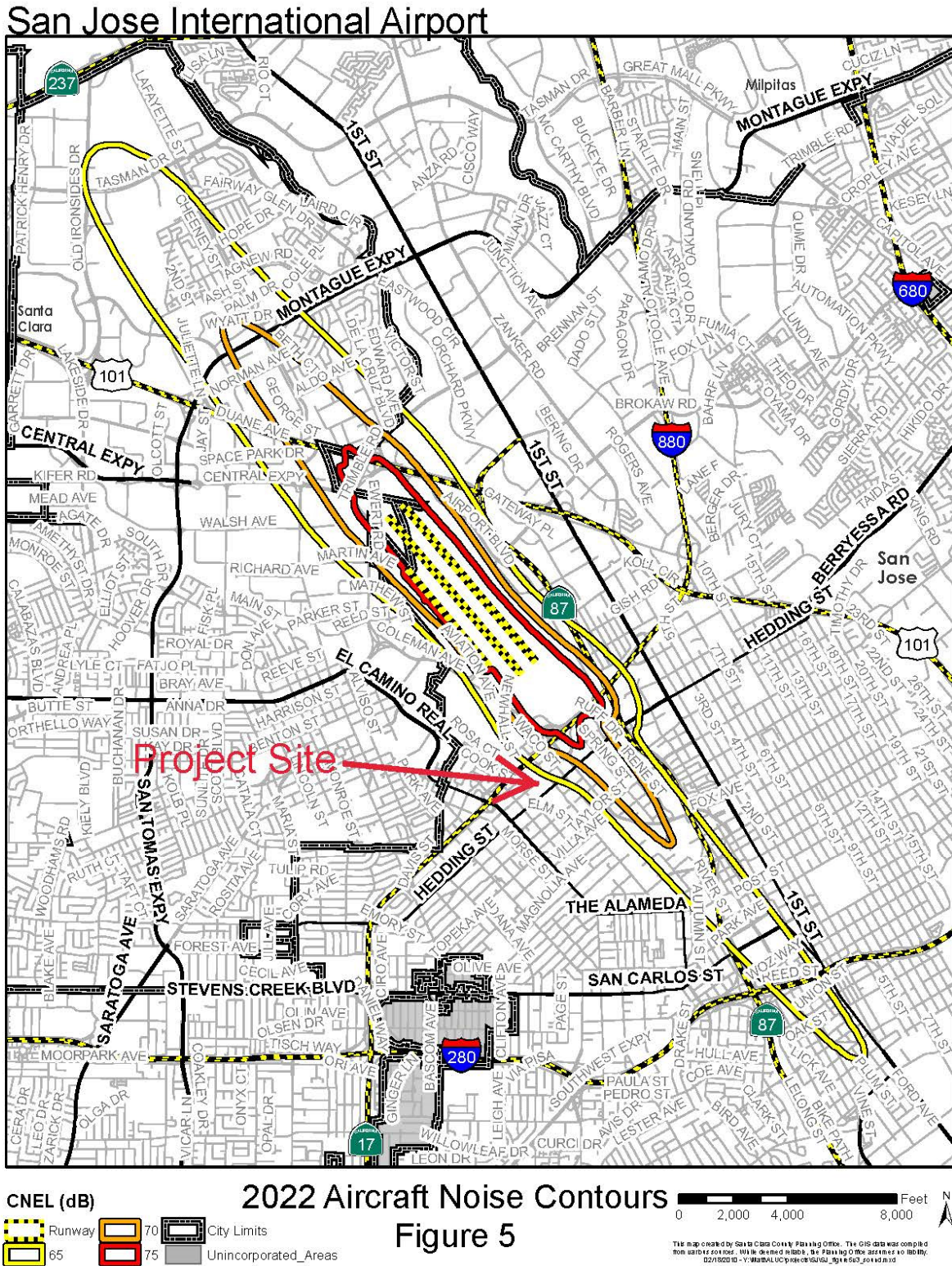


FIGURE 4: SAN JOSE INTERNATIONAL AIRPORT NOISE CONTOURS AND PROJECT SITE LOCATION



APPENDIX A-1

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL:	The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.
CNEL:	Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.
DECIBEL, dB:	A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
DNL/L_{dn}:	Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.
L_{eq}:	Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L _{eq} is typically computed over 1, 8 and 24-hour sample periods.
NOTE:	The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L _{eq} represents the average noise exposure for a shorter time period, typically one hour.
L_{max}:	The maximum noise level recorded during a noise event.
L_n:	The sound level exceeded "n" percent of the time during a sample interval (L ₉₀ , L ₅₀ , L ₁₀ , etc.). For example, L ₁₀ equals the level exceeded 10 percent of the time.

A-2

ACOUSTICAL TERMINOLOGY

**NOISE EXPOSURE
CONTOURS:**

Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

**NOISE LEVEL
REDUCTION (NLR):**

The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL:

Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL:

The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

**SOUND TRANSMISSION
CLASS (STC):**

The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B
EXAMPLES OF SOUND LEVELS

