Appendix G:
Acoustical Assessment

Acoustical Assessment for the proposed Westport Project in the City of Cupertino, California

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LIST OF ABBREVIATED TERMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
DNL	day-night average
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HVAC	heating, ventilation, and air conditioning
Hz	hertz
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
L_{max}	maximum A-weighted sound level
L_{min}	minimum A-weighted sound level
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
mm	millimeter
mph	miles per hour

1 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential impacts associated with construction and operations of the proposed Westport Project (project), located in the City of Cupertino, California.

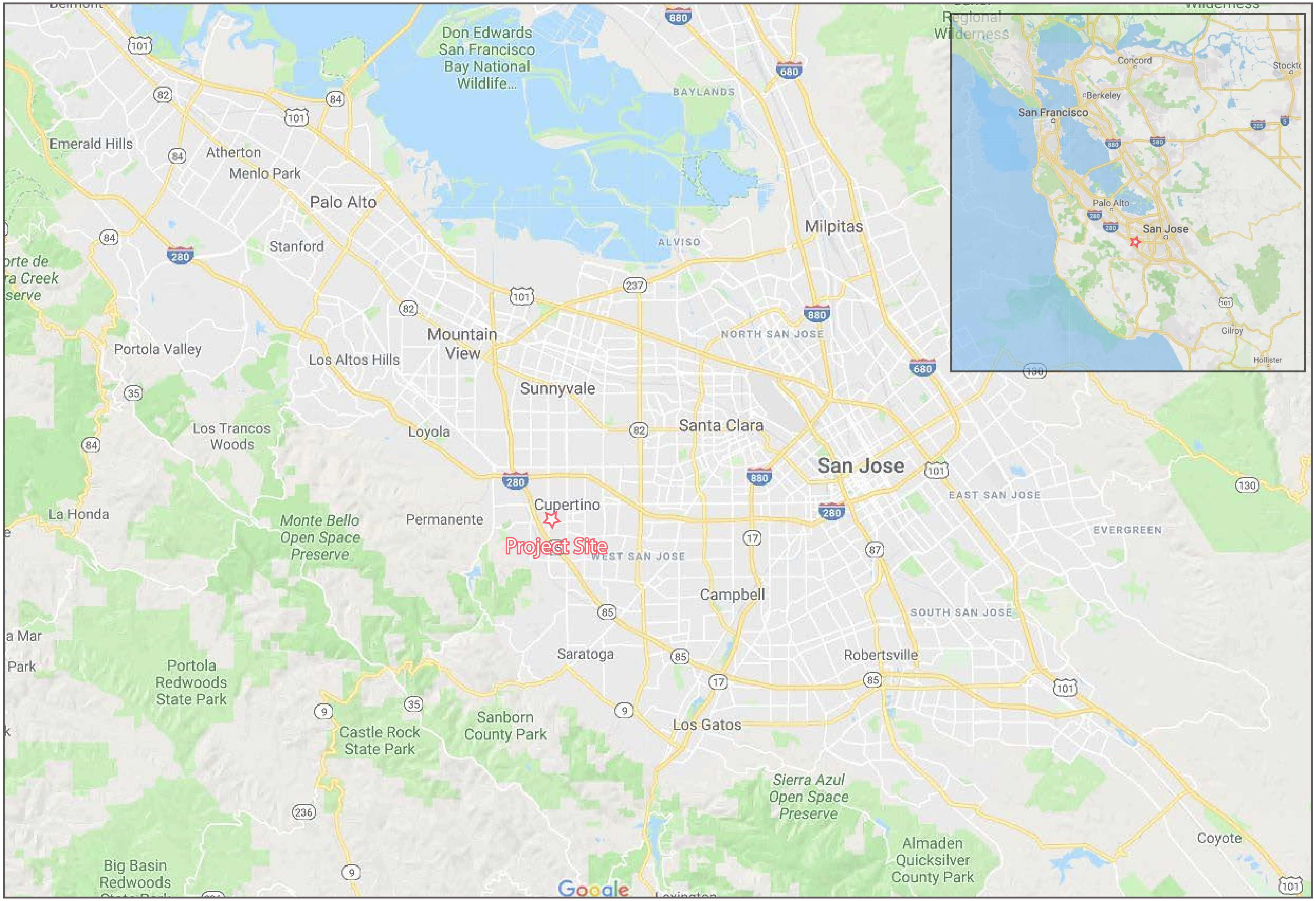
1.1 PROJECT LOCATION

The project site is located in the City of Cupertino, California within the Heart of the City Specific Plan area and is designated as a Priority Housing Site (HE-3) in the adopted Housing Element; refer to Exhibit 1. The project is located adjacent to SR-85 and Stevens Creek Boulevard; refer to Exhibit 2.

1.2 PROJECT DESCRIPTION

The proposed project is the redevelopment of 71,254 square-feet of shopping center on an 8.1-acre site to provide mixed-use urban village with 242 residential units and 20,000 square-feet of retail space. The project would have a six-story building with 115 residential units and 17,700 square-feet of ground-floor retail, a five-story building with 39 senior units and 2,300 ground-floor retail, 69 residential townhouses, 19 residential rowhouses. The project includes a one story- belowground garage with 232 parking spaces, 117 surface parking spaces, and 176 private garage units. The proposed project includes 20 separate buildings. The maximum building height would be 70 feet. The townhouses and rowhomes have attached garages, while the mixed-use buildings use the parking garage or surface parking.

In the Heart of the City Specific Plan the project site is designated as Oaks Gateway, a Mixed Use Planned Development (General Commercial) [P(CG)]. The CG designation allows professional, general, administrative, business offices, dance and music studios, child care centers, as well as other uses that do not involve the direct retailing of goods or services to the general public. However, the mixed use allows residential located behind the primary uses and above the ground level.



Source: Kimley-Horn and Associates, 2018

Figure 1: Regional Location Map
Westport Project

Not to scale

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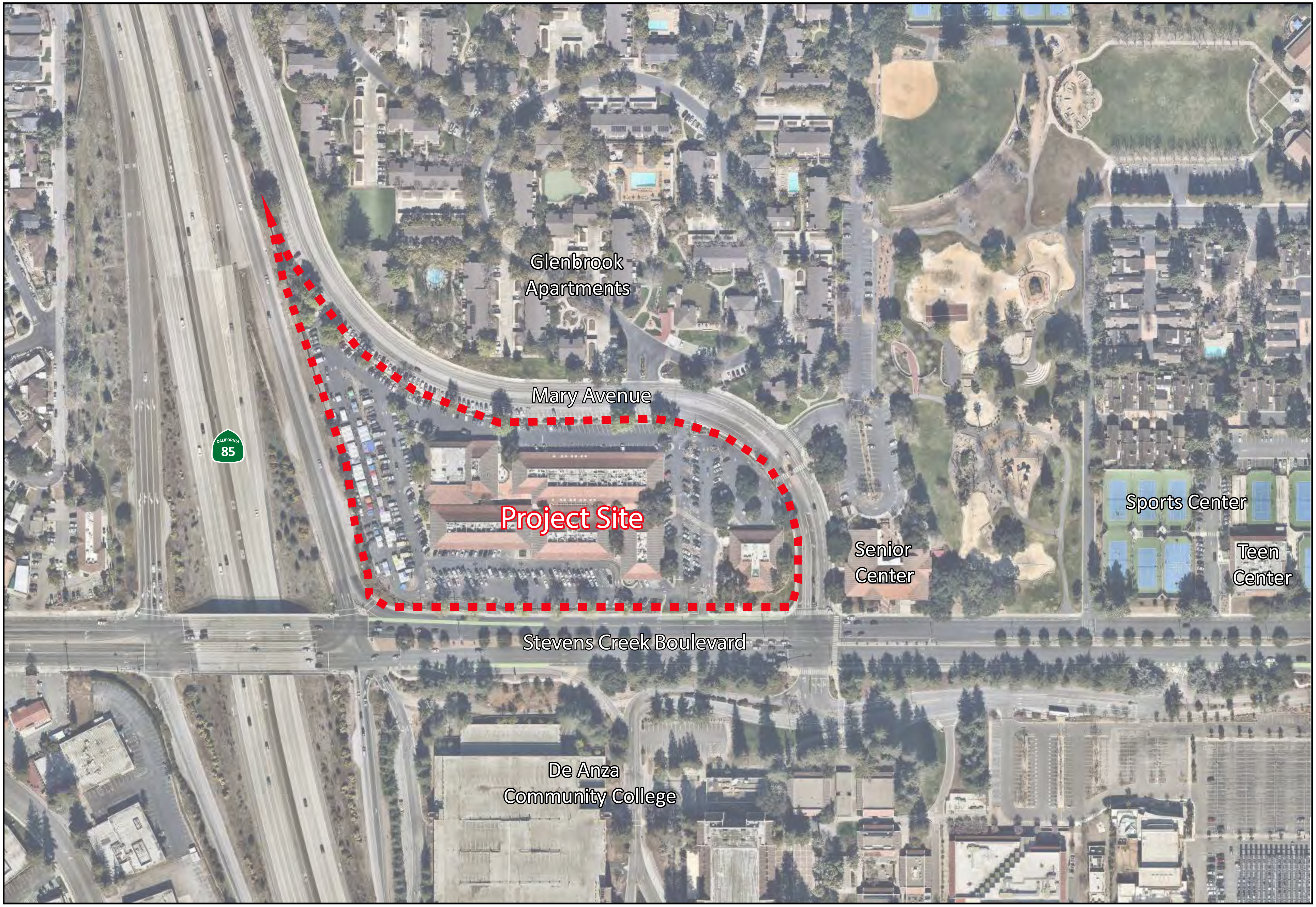

Source: Kimley-Horn and Associates, 2018

Exhibit 2: Site Vicinity
Westport Project

Not to scale

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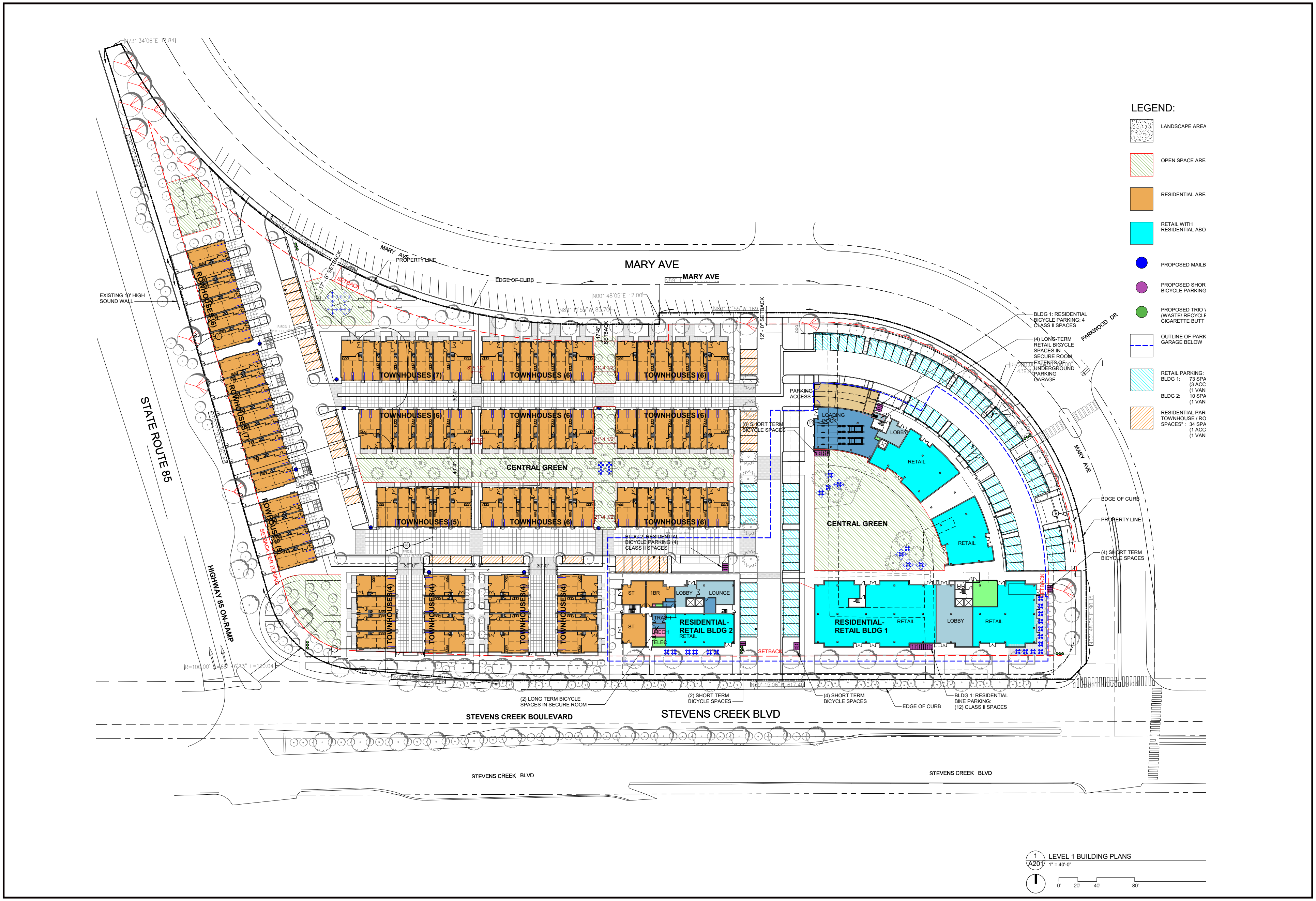

Source: C2K Architecture Inc., 2018

Exhibit 3: Site Plan

Westport Project

Not to scale

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2 FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a sound (or noise) source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determine the sound level and characteristics of the noise perceived by the receptor. Acoustics deals primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness. Table 1, *Typical Noise Levels*, provides typical noise levels associated with common activities.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

dBA = A-weighted decibels; mph = miles per hour

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) is a measure of the average noise level averaged over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of an average level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 2, *Definitions of Acoustical Terms*.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit 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. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	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 frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The A-weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Type 1 sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA.[1] Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The decibel scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound and twice as loud as a 60 dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed

[1] California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10 dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[2]

[2] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the state of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 STATE OF CALIFORNIA

California Government Code

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

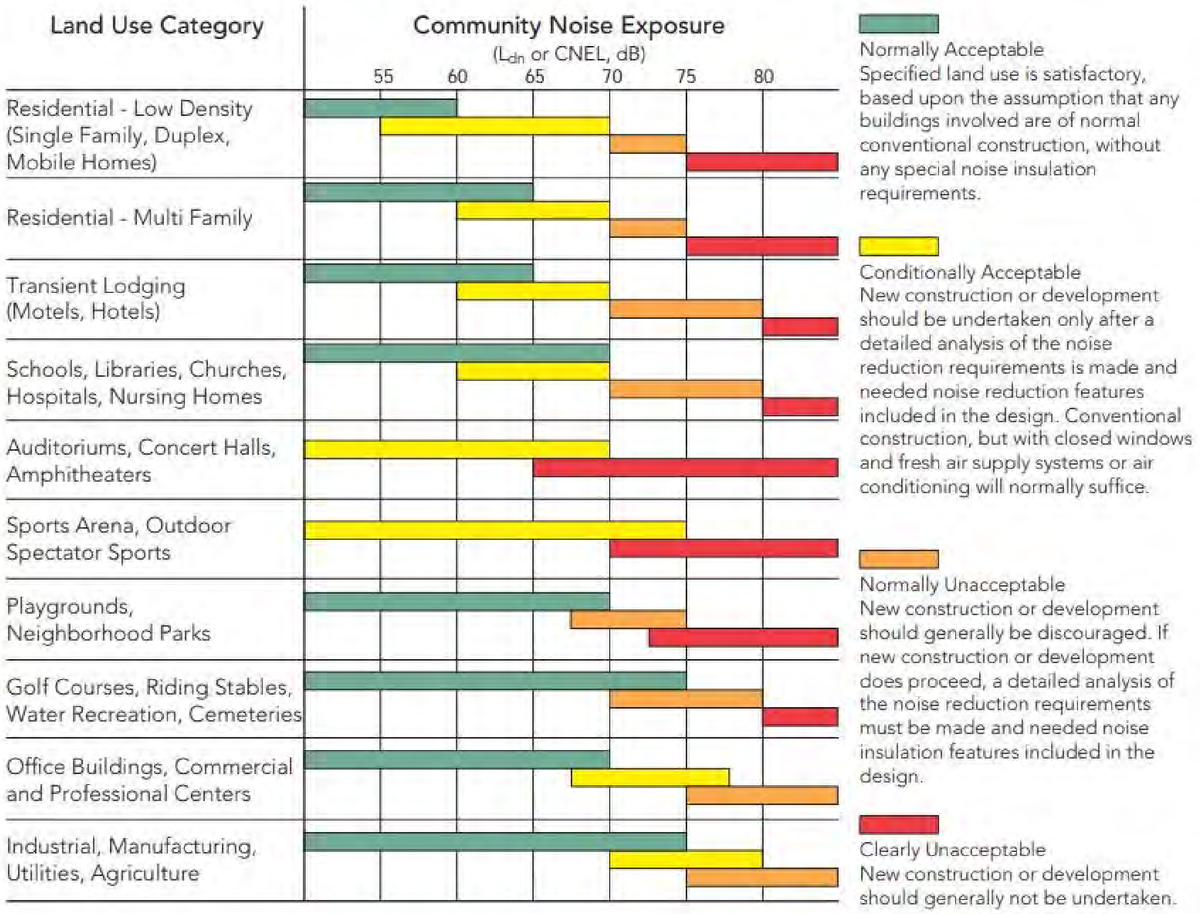
The state's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 CITY OF CUPERTINO

City of Cupertino General Plan

The City of Cupertino General Plan- Community Vision 2015-2040 is a roadmap that encompasses the hopes, aspirations, values and dreams of the Cupertino community. The Health and Safety Element of the General Plan covers the State-mandated Noise Element. The City of Cupertino Municipal Code, Title 10, outlines the maximum noise levels on receiving properties based upon land use types (Figure 1, *Land Use Compatibility for Community Noise Environments*). Noise compatibility can be achieved by avoiding the location of conflicting land uses adjacent to one another, incorporating buffers and noise control techniques including setbacks, landscaping, building transitions, site design, and building construction techniques. Selection of the appropriate noise control technique would vary depending on the level of noise that needs to be reduced as well as the location and intended land use.

Exhibit 4: Land Use Compatibility for Community Noise Environments



Source: City of Cupertino General Plan. 2015.

The following lists applicable noise goals and targets that apply to the proposed project obtained from the General Plan:

Goal LU-13: Ensure a cohesive, landscaped boulevard that supports all modes of transportation, links its distinct and active commercial and mixed-use sub-areas and notes, and create a high-quality, distinct community image and a vibrant heart for Cupertino.

Policy 13-7: Streetscape and Connectivity. Create a walkable and bikeable boulevard with active uses and a distinct image for each subarea.

Strategy LU-13.7.5: Neighborhood Buffers. Consider buffers such as setbacks, landscaping and/or building transitions to buffer abutting single family residential areas from visual and noise impacts.

Goal LU-27: Preserve neighborhood character and enhance connectivity to nearby services to create complete neighborhoods

Policy LU-27.8 Protection. Protect residential neighborhoods from noise, traffic, light, glare, odors and visually intrusive effects from more intense development with landscape buffers, site and building design, setbacks and other appropriate measures.

Goal HS-8: Minimize noise impacts on the community and maintain a compatible noise environment for existing and future land uses.

Policy HS-8.1: Land Use Decision Evaluation. Use the Land Use Compatibility for Community Noise Environments chart, the Future Noise Contour Map (see Figure D-2 in Appendix D) and the City Municipal Code to evaluate land use decisions.

Policy HS-8.2: Building and Site Design. Minimize noise impacts through appropriate building and site design.

> Strategy HS-8.2.1: Commercial Delivery Areas. Locate delivery areas for new commercial and industrial developments away from existing or planned homes.
>
> Strategy HS-8.2.2: Noise Control Techniques. Require analysis and implementation of techniques to control the effects of noise from industrial equipment and processes for projects near low-intensity residential uses.
>
> Strategy HS-8.2.3: Sound Wall Requirements. Exercise discretion in requiring sound walls to be sure that all other measures of noise control have been explored and that the sound wall blends with the neighborhood. Sound walls should be designed and landscaped to fit into the environment.

Policy HS-8.3: Construction and Maintenance Activities. Regulate construction and maintenance activities. Establish and enforce reasonable allowable periods of the day, during weekdays, weekends and holidays for construction activities. Require construction contractors to use the best available technology to minimize excessive noise and vibration from construction equipment such as pile drivers, jack hammers, and vibratory rollers.

Policy HS-8.4: Freeway Design and Neighborhood Noise. Ensure that roads and development along Highway 85 and Interstate 280 are designed and improved in a way that minimizes neighborhood noise.

Policy HS-8.5: Neighborhoods. Review residents' needs for convenience and safety and prioritize them over the convenient movement of commute or through traffic where practical.

Policy HS-8.6: Traffic Calming Solutions to Street Noise. Evaluate solutions to discourage through traffic in neighborhoods through enhanced paving and modified street design.

> Strategy HS-8.6.1: Local Improvement. Modify street design to minimize noise impact to neighbors.

Policy HS-8.7: Reduction of Noise from Trucking Operations. Work to carry out noise mitigation measures to diminish noise along Foothill and Stevens Creek Boulevards from the quarry and cement plant trucking operations. These measures include regulation of truck speed, the volume of truck activity, and trucking activity hours to avoid late evening and early morning. Alternatives to truck transport, specifically rail, are strongly encouraged when feasible.

Strategy HS-8.7.1: Restrictions in the County's Use Permit. Coordinate with the County to restrict the number of trucks, their speed and noise levels along Foothill and Stevens Creek Boulevards, to the extent allowed in the Use Permit. Ensure that restrictions are monitored and enforced by the County.

Strategy HS-8.7.2: Road Improvements to Reduce Truck Impacts. Consider road improvements such as medians, landscaping, noise attenuating asphalt, and other methods to reduce quarry truck impacts.

City of Cupertino Municipal Code

The City of Cupertino Municipal Code Chapter 10.48: Community Noise Control discusses the powers and duties of the Noise Control Officer, exceptions to the noise ordinance, and allowable noise levels for daytime, landscaping, outdoor public events, and construction. Table 3, *Daytime and Nighttime Maximum Noise Levels*, shows the maximum noise levels according to the Municipal Code. Table 3 shows the maximum permissible noise level that may be generated by sources on a nonresidential land use is 55 dBA during nighttime hours and 65 dBA during daytime hours.

Table 3: Daytime and Nighttime Maximum Noise Levels

Land Use at Point of Origin	Maximum Noise Level at Complaint Site of Receiving Property	
	Nighttime	Daytime
Residential	50 dBA	60 dBA
Nonresidential	55 dBA	65 dBA

Source: City of Cupertino Municipal Code Ch. 10.48

Pursuant to Section 10.48.050, during the daytime period only, brief noise incidents exceeding established limits are permitted, providing that the sum of the noise duration in minutes plus the excess noise level does not exceed twenty in a 2-hour period. Table 4, *Maximum Permissible Noise Levels*, shows example combinations of allowable noise level exceedances.

Table 4: Maximum Permissible Noise Levels

Noise Increment Above Normal Standard	Noise Duration in 2-Hour Period
5 dBA	15 minutes
10 dBA	10 minutes
15 dBA	5 minutes
19 dBA	1 minute

Source: City of Cupertino Municipal Code Ch. 10.48

Interior Noise

Interior noise in multi-family dwelling should not produce a noise level exceeding 45 dBA five feet from any wall in an adjoining unit between 7:00 a.m. and 10:00 p.m. or exceeding 40 dBA between 10:00 p.m. and 7:00 a.m. (Ch. 10.48.054).

Landscape Maintenance Activities Noise

The City of Cupertino Municipal Code has Landscape Maintenance Activities (Ch. 10.48.051) which limits the hours of landscape maintenance activities from 8:00 a.m. to 8:00 p.m. on weekdays, and 9:00 a.m. to 6:00 p.m. on weekends and holidays, excluding public facilities which are allowed to begin at 7:00 a.m. During these hours, noise from the use of motorized equipment for landscape maintenance activities is allowed to exceed the maximum permissible noise limits of Section 10.48.040 of the Municipal Code, provided that the equipment is outfitted with appropriate mufflers and is operated over the minimal period necessary.

Grading, Construction, and Demolition Noise

The City of Cupertino has Grading, Construction and Demolition noise requirements (Ch. 10.48.053). Noise from these activities is allowed to exceed the maximum permissible noise limits (Table 4) provided that the equipment utilized is outfitted with high-quality mufflers and abatement devices and is in good condition. In addition, noise-producing construction activities must meet one of the following criteria:

- No individual device produces a noise level of more than 87 dBA as measured at a distance of 25 feet; or
- The operation of such equipment does not produce noise levels that exceed 80 dBA as measured at any nearby property.

Except for emergency work, construction activities including grading, street construction, demolition, or underground utility work are not permitted within 750 feet of a residential area on Saturdays, Sundays, and holidays, and during the nighttime period. Construction activities, other than street construction, are prohibited on holidays. In addition, construction activities, other than street construction, are prohibited during nighttime periods unless they meet the City's nighttime maximum permissible noise level standards.

The City's land use activity and site development regulations in Section 19.60.060 of the Municipal Code address noise standards for new commercial construction that adjoins a residential district. The construction of new buildings on properties adjoining a residential district must include the following noise attenuation features:

- Exterior walls must be designed to attenuate all noise emanating from interior retail space.
- Loading docks and doors must be located away from residential districts. Required fire doors are excluded.
- Air conditioning, exhaust fans, and other mechanical equipment must be acoustically isolated to comply with the noise ordinance.
- A minimum 8-foot-high masonry sound wall must be installed on or adjacent to the common property line, and
- An acoustical engineer must certify that the sound attenuation measures comply with the intent of the regulation and the City's community noise ordinance.

4 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

To determine ambient noise levels in the project area, four 10-minute noise measurements were taken using a 3M SoundPro DL-1 Type I integrating sound level meter between 10:53 a.m. and 11:55 a.m. on May 1, 2018; refer to Appendix A for existing noise measurement data and Exhibit 4: Noise Measurement Locations. Noise Measurement one was taken to represent the ambient noise level north of the project site near the existing apartment complex; Noise Measurement two was taken to represent the ambient noise level east of the project site near the Senior Center; Noise Measurement three was taken to represent the ambient noise level south of the site along Stevens Creek Boulevard; and Noise Measurement four represents the existing ambient noise from the SR 85 west of the project site. The primary noise sources during all four measurements was traffic on Stevens Creek Boulevard, SR-85, and parking lot noises. Table 5, *Noise Measurements*, provides the ambient noise levels measured at these locations.

Table 5: Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Glenbrook Apartment Homes entrance on Mary Avenue	66.9	47.3	88.5	10:53 a.m.
2	Along Mary Avenue next to Senior Center	75.2	48.0	94.4	11:08 a.m.
3	Along Stevens Creek Boulevard, south of project site	77.9	53.7	90.2	11:26 a.m.
4	Parking lot adjacent to SR-85	75.4	60.0	81.2	11:41 a.m.

Source: Noise measurements taken by Kimley-Horn on May 1, 2018.

4.2 SENSITIVE RECEPTORS

Noise exposure standards and guidelines for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Residences, hospitals, schools, guest lodging, libraries, and churches are treated as the most sensitive to noise intrusion and therefore have more stringent noise exposure targets than do other uses, such as manufacturing or agricultural uses that are not subject to impacts such as sleep disturbance. Sensitive receptors near the project site include: residences approximately 90 feet north of the site, 630 feet east of the site, a City of Cupertino Senior Center approximately 80 feet east of the site, and De Anza Community College approximately 140 feet south of the site, across Stevens Creek Boulevard. These distances are from the proposed project site to the sensitive receptor property line. Additionally, the proposed on-site residences would be a sensitive receptor.

4.3 EXISTING NOISE LEVELS

Mobile Sources

Existing roadway noise levels were calculated for the roadway segments in the project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the project traffic impact analysis (Kimley-Horn 2018). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels.[3] The average daily noise levels along roadway segments in proximity to the project site are included in Table 6, *Existing Traffic Noise Levels*.

Table 6: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL at 100 feet from Centerline of Roadway
Stevens Creek Boulevard from SR-85 to Stelling Road	32,220	72.3
Mary Avenue from Parkwood Drive to Stevens Creek Boulevard	7,010	65.3

Notes: ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level.
Data source: Based on traffic data within the Transportation Analysis Memorandum, prepared by Kimley-Horn, 2018. Refer to Appendix B for traffic noise modeling assumptions and results.
Source: Kimley-Horn and Associates, 2018.

As depicted in Table 6, the existing traffic-generated noise level on project-vicinity roadways currently is 72.3 dBA CNEL 100 feet from the centerline of Stevens Creek Boulevard and 65.3 dBA CNEL 100 feet from the centerline of Mary Avenue. As previously described, CNEL is 24-hour average noise level with a 5 dBA “weighting” during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Stationary Sources

The primary sources of stationary noise in the project vicinity are those associated with the operations of adjacent residential uses to the north and east, and public uses south and east of the site. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

[3] California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.

Source: Kimley-Horn and Associates, 2018

Exhibit 5: Noise Measurement Locations

Westport Project

Not to scale

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5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA THRESHOLDS

Based upon the criteria derived from Appendix G of the CEQA Guidelines, a project normally would have a significant effect on the environment if it would:

- Expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive ground borne vibration or ground borne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within 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, expose people residing or working in the project area to excessive noise levels; and
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

5.2 METHODOLOGY

Construction

Construction noise estimates are based upon noise levels from the FHWA *Roadway Construction Noise Model* (FHWA-HEP-05-054, January 2006) as well as the distance to nearby sensitive receptors. Reference noise levels from the FHWA are used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Construction noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

Operational noise issues evaluated in this section include vehicle traffic noise and land use compatibility of potential future uses with the City's Compatibility Guidelines as well as stationary source noise (e.g., mechanical equipment, on-site trucks/loading docks, etc.). Traffic noise modeling was completed using the FHWA RD-77-108 model. Traffic noise level significance is determined by comparing the increase in noise levels (traffic contribution only) to increments recognized by Caltrans as representing a perceptible increase in noise levels. Additionally, it is widely accepted methodology by both FTA and the Federal Interagency Committee on Noise (FICON) that thresholds should be more stringent for environments that are already noise impacted. Consequently, for noise environments where the ambient noise level is 65 dBA DNL or less, the significance threshold applied is an increase of 5 dBA or more, which Caltrans recognizes as a readily perceptible increase. In noise environments where the ambient noise level exceeds 65 dBA DNL, the significance threshold applied is an increase of 3 dBA or more, which Caltrans recognizes as a barely perceptible increase.

Operational noise is evaluated based on the standards within the City's Noise ordinance (Ch. 10.48: Community Noise Control). A significant noise impact would occur if a project results in an exceedance of the noise level standards, or the project will result in an increase in ambient noise levels by more than 3 dB, whichever is greater.

The proposed project would not introduce new operational vibration sources (e.g., impact equipment, streetcar and rail operations, and blasting activities), and therefore, there would be no operational vibration impacts, and operational vibration is not discussed further.

6 POTENTIAL IMPACTS AND MITIGATION

Threshold 6.1 Would the project expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Threshold 6.3 Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Threshold 6.4 Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Construction

There are two types of short-term noise impacts associated with construction, noise generated from equipment and increase in traffic flow on local streets. Construction for the proposed project is expected to last approximately 16 months.

Equipment Noise

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Noise levels typically attenuate (or drop off) at a rate of 6 dB per doubling of distance from point sources, such as industrial machinery.

Grading and excavation phases of project construction tend to be the shortest in duration and create the highest construction noise levels due to the operation of heavy equipment required to complete these activities. It should be noted that only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers. Operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of noise would be shorter-duration incidents, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts, which would last less than one minute. According to the applicant, no pile-driving will be used during construction for the proposed project.

Per Section 10.48.053 of the City's Municipal Code, the City allows heavy construction activities that exceeds the noise standards to occur during the daytime hours, provided that the equipment has high-quality noise muffler and abatement devices installed and in good condition. However, the activity must not produce a noise level more than 87 dBA at a distance of 25 feet or exceed 80 dBA for nearby properties. Construction within 750 feet of a residential area is not allowed over the weekends, holidays, and during the nighttime.

Sensitive receptors near the project site include: residences approximately 90 feet north of the site, 630 feet east of the site, a City of Cupertino Senior Center approximately 80 feet east of the site, and De Anza Community College approximately 140 feet south of the site, across Stevens Creek Boulevard. These distances are from the proposed project site to the sensitive receptor property line. Additionally, the proposed on-site residences would be a sensitive receptor. These sensitive uses may be exposed to elevated noise levels during project construction. As noted above, the City's Municipal Code construction noise standards require that no piece of construction equipment exceed a noise level of 87 dBA at a distance of 25 feet or that construction noise exceeds 80 dBA at any nearby property. The proposed project would adhere to the City's Municipal Code construction noise standards. Table 7, *Project Construction Average Noise Levels,* highlights the estimated exterior construction noise level for the sensitive receptors surrounding the proposed project site.

Table 7: Project Construction Average Noise Levels

Construction Phase/Activity	Receptor Location			Estimated Exterior Construction Noise Level	
	Land Use	Direction	Distance[1]	(dBA L_{eq}) [2]	dBA L_{max}
Demolition	Residential	North	175	73.9	78.7
		East	160	74.6	79.5
	Institutional	South	280	69.8	74.6
Site Preparation	Residential	North	175	74.2	74.1
		East	160	75.0	74.9
	Institutional	South	280	70.1	70.0
Grading	Residential	North	175	75.2	74.1
		East	160	75.9	74.9
	Institutional	South	280	73.0	74.4
Paving	Residential	North	175	74.2	74.1
		East	160	74.2	74.1
	Institutional	South	280	70.6	70.0
Building	Residential	North	175	74.9	74.1
		East	160	75.7	74.9
	Institutional	South	280	71.0	70.0

Notes:
1. Distance is from the property line of the nearest receptor to the main construction zone of the proposed project.
2. Derived from the FHWA *Roadway Construction Noise Model (FHWA-HEP-05-054),* Jan 2006. Refer to Appendix A for noise modeling assumptions and results.

Based on the discussion above, noise levels at the nearest residence during construction activities would be expected to reach the highest levels during grading with exterior noise levels of 74.6 dBA L_{eq} for the Senior Center 160 feet east. The highest dBA L_{max} would be the Senior Center with exterior noise levels of 79.5 dBA. At these distances, composite construction noise would be reduced to the conservatively estimated levels discussed in Table 7 (due to distance attenuation alone).

Construction activities would be limited to daytime hours when people would be out of their houses, would conform to the time-of-day restrictions of the City's Municipal Code, and would not exceed 80 dBA at the nearest residence. Mitigation Measure N-1 is required to ensure that construction noise levels do not exceed the City's standards and that time-of-day restrictions are adhered to. With Implementation of Mitigation Measure N-1, construction noise impacts to nearby receptors would be less than significant.

Construction Traffic Noise

Construction noise may be generated by large trucks moving materials to and from the project site. Large trucks would be necessary to deliver building materials as well as remove dump materials and cut soil. Excavation and cut and fill would be required, resulting in grading of approximately 69,000 net cubic yards to be exported from the site. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for this project, as analyzed in the Project Air Quality Assessment (Kimley Horn 2018), the project would generate the highest number of daily trips during the building construction phase. The model estimates that the project would generate up to 239 worker trips and 52 vendor trips per day. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and vehicle mix do not also change) would result in a noise level increase of 3 dBA. As shown in the existing traffic conditions discussion, Stevens Creek Boulevard between SR 85 and Stelling Road has an average daily trip volume of 32,220 vehicles. Therefore, 291 project construction trips (239 worker trips plus 52 vendor trips) would not double the existing traffic volume of 32,220 vehicles per day. Construction related traffic noise would not be noticeable and would not create a significant noise impact.

The State of California establishes noise limits for vehicles licensed to operate on public roads using a pass-by test procedure. Pass-by noise refers to the noise level produced by an individual vehicle as it travels past a fixed location. The pass-by procedure measures the total noise emissions of a moving vehicle with a microphone. When the vehicle reaches the microphone, the vehicle is at full throttle acceleration at an engine speed calculated for its displacement.

For heavy trucks, the State pass by standard is consistent with the federal limit of 80 dB. The State pass by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. According to the FHWA, dump trucks typically generate noise levels of 77 dBA and flatbed trucks typically generate noise levels of 74 dBA, at a distance of 50 feet from the truck (FHWA, *Roadway Construction Noise Model,* 2006).

Additionally, the City's General Plan Environmental Impact Report (EIR) identified that the General Plan policies and Municipal Code regulations would reduce construction noise impacts to less than significant levels. The proposed project would be consistent with the City's General Plan and the analysis in the General Plan EIR and would not result in any impacts beyond those previously identified.

Operations

Traffic Noise

Implementation of the project would generate increased traffic volumes along study roadway segments. According to the transportation analysis memorandum, the project would result in a net total of 1,988 average daily weekday trips, which would result in noise increases on project area roadways. In general, traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable (Caltrans, 2009). Generally, traffic volumes on project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

Traffic noise levels for roadways primarily affected by the proposed project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the project, based on traffic volumes obtained from the project Traffic Analysis Memorandum (Kimley-Horn 2018). According to Table 8, *Existing and Future With Project Traffic Noise Levels,* the project would not have a significant impact on traffic noise levels. The increase from existing noise levels from Stevens Creek Boulevard near the project site is less than 1 dBA increase. The increase from existing noise levels from Mary Avenue near the project site is slightly greater than 1 dBA increase, however it is less than 3 dBA and therefore barely perceptible to people.

The project would not result in a doubling of traffic on project area roadways. Moreover, project traffic would traverse and disperse over project area roadways, where existing ambient noise levels already exist.

Table 8: Existing and Future With Project Traffic Noise Levels

Roadway Segment	Existing Noise Level (100 feet from Roadway Centerline) (dBA CNEL)	Future With Project Noise Level (100 feet from Roadway Centerline) (dBA CNEL)	Change	Significant Impacts
Stevens Creek Boulevard from SR-85 to Stelling Road	72.3	73.0	0.7	No
Mary Avenue from Parkwood Drive to Stevens Creek Boulevard	65.3	66.4	1.1	No

Notes: ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level.
Noise levels are calculated 100 feet from centerline of the roadway.
Data source: Based on traffic data within the Transportation Analysis Memorandum, prepared by Kimley-Horn, 2018. Refer to Appendix B of the Acoustical Assessment for traffic noise modeling assumptions and results.
Source: Kimley-Horn and Associates, 2018

The City's General Plan EIR identified significant and unavoidable impacts associated with traffic noise despite the implementation of applicable General Plan policies. The proposed project would be consistent with the City's General Plan and the analysis in the General Plan EIR and would not result in any impacts beyond those previously identified. As describe above, the proposed project would not contribute to the significant and unavoidable impact identified in the General Plan EIR.

<u>Stationary Noise Sources</u>

Implementation of the proposed project would create new sources of noise in the project vicinity. The major noise sources associated with the project that would potentially impact existing and future nearby residences include the following:

- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Traffic Noise
- Slow moving delivery/supply trucks on the project site, approaching and leaving the loading areas;
- Activities at the loading areas (i.e., maneuvering and idling trucks, banging and clanging of equipment);
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Landscape maintenance activities.

Residential Areas

Noise that is typical of high-density residential areas includes group conversations, pet noise, vehicle noise (see discussion below) and general maintenance activities. Noise from residential stationary sources would primarily occur during the "daytime" activity hours of 7:00 a.m. to 10:00 p.m. Furthermore, the residences would be required to comply with the noise standards set forth in the City's General Plan and Municipal Code.

Mechanical Equipment

Regarding mechanical equipment, the proposed project would generate stationary-source noise associated with heating, ventilation, and air conditioning (HVAC) units. Such HVAC units typically generate noise levels of approximately 55 dBA at a reference distance of 100 feet from the operating units during maximum heating or air conditioning operations. As stated above, the nearest existing sensitive receptor's property lines are located more than 80 feet from the commercial and mixed-use areas of the project site. However, the mechanical equipment associated with the proposed residences would be similar to the existing uses and would also be buffered by a proposed road and existing and proposed setbacks and would be approximately 100 feet away from the closest residences. Given that existing and project-related sensitive receptors would be located beyond 100 feet from on-site HVAC units, noise generated by HVAC units would not result in a significant impact.

Loading Area Noise

The proposed project includes a mixed-use development with commercial and retail uses that would necessitate occasional truck delivery operations. The proposed project is not anticipated to require a significant number of truck deliveries. The majority of deliveries for the commercial uses would consist of vendor deliveries in vans and would be somewhat infrequent and irregular. Occasional loading noise associated with residential moving trucks would also occur in a loading area adjacent to the proposed commercial buildings. The noise associated with one large truck delivery and smaller cargo vans would not result in a significant number of truck trips to significantly increase noise within the project area. It should be noted that truck deliveries/operations (including trash pickup trucks) currently occur at the project site. Therefore, truck deliveries associated with the proposed project site would not be an intrusive or significant noise source compared to existing conditions. Impacts resulting from truck delivery activities would be less than significant.

Parking Areas

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. Also, noise would primarily remain on the project site and would be intermittent (during peak-events). However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Parking lot noise can also be considered a "stationary" noise source.

The project proposes a one-story subterranean parking structure with 232 parking spaces located in the eastern portion of the site. Noise levels from parking lot activities typically range from approximately 60 to 63 dBA at a distance of 50 feet. However, parking noise is anticipated to be lower as the majority of parking would occur in a structure that would be predominantly enclosed.

Approximately 117 surface parking would be distributed throughout the project site. Noise associated with the surface parking areas would be consistent with the existing parking lot noise that currently occurs on the site. Additionally, surface parking lot noise would be partially masked by background noise from traffic along SR-85 and Stevens Creek Boulevard. Therefore, parking lot noise would not result in substantially greater noise levels than currently exist in the vicinity. Noise impacts would less than significant in this regard.

On-Site Mobile Noise

The California Supreme Court in a December 2015 opinion (*California Building Industry Association v. Bay Area Air Quality Management District,* 62 Cal. 4th 369 [No. S 213478]) confirmed that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, not the effects the existing environment may have on a project. Therefore, the evaluation of the significance of project impacts under CEQA in the following discussion is provided to ensure compliance with City and State Building Code noise standards.

The project proposes a mixed-use development that includes 242 multi-family residential dwelling units on the project site. The future residents of the proposed on-site multi-family residential units could be exposed to elevated noise levels from traffic noise along SR-85 and Stevens Creek Boulevard. Table 8 shows that noise levels from Stevens Creek Boulevard could reach 73.0 dBA at the project site and Figure D-2 in the Noise Element (Future Noise Contours) shows the western portion of the project site located within the 70 dBA CNEL contour while the eastern portion is in the 65 dBA CNEL contour. Therefore, noise levels on the project site would potentially exceed the City's 65 dBA Normally Acceptable exterior standard for multi-family residential uses (per Figure HS-8 of the City's General Plan) and the 45 dBA interior standard per the State Building Code.

Therefore, the project would be required to comply with Mitigation Measure N-2, which require a detailed acoustical study demonstrating that all residential units would meet the City's 65 dBA exterior noise standard for all patios, balconies, and common outdoor living areas through any necessary noise reduction features (barriers, berms, enclosures, etc.). Further, Mitigation Measure N-2 also requires all residential units to be designed to ensure that interior noise levels in habitable rooms from exterior sources (including vehicles on adjacent roadways) shall not exceed 45 dBA, in compliance with Title 24 of the California Code of Regulations. Compliance with Mitigation Measure N-2 would result in a less than significant impact.

Landscape Maintenance Activities

Development and operation of the proposed project would introduce new landscaping requiring periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 70 dBA at a distance of five feet. However, maintenance activities would operate during daytime hours for brief periods of time as allowed by the City Municipal Code and would not permanently increase ambient noise levels in the project vicinity. Therefore, with adherence to the City's Municipal Code, impacts associated with landscape maintenance would be less than significant.

Overall, implementation of MM N-1 through MM N-2 and adherence to Municipal Code requirements, noise impacts associated with traffic, mechanical equipment, deliveries, loading/unloading activities, and parking lot noise would be reduced to a less than significant level. Additionally, the City's General Plan EIR determined that stationary source noise impacts would be less than significant. The proposed project would be consistent with the City's General Plan and the analysis in the General Plan EIR and would not result in any impacts beyond those previously identified.

Mitigation Measures

MM N-1: Construction Noise

Prior to Grading Permit issuance or the start of demolition activities, the Applicant shall demonstrate, to the satisfaction of the City of Cupertino Public Works Director and/or Community Development Director, that the project complies with the following:

- Construction activities shall be limited to day time hours (Municipal Code Section 10.48.010 defines daytime hours as the period from 7:00 a.m. to 8:00 p.m. on weekdays), per Section 10.48.053 of the City's Municipal Code.
- At least 90 days prior to the start of construction activities, all offsite businesses and residents within 300 feet of the project site shall be notified of the planned construction activities. The notification shall include a brief description of the project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification should include the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, which includes permitted construction days and hours, as well as the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.
- During the entire active construction period, equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment re-design, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- During the entire active construction period, stationary noise sources shall be located as far from sensitive receptors as possible, and they shall be muffled and enclosed within temporary sheds, or insulation barriers or other measures shall be incorporated to the extent feasible.
- Haul routes shall be selected to avoid the greatest amount of sensitive use areas.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.
- During the entire active construction period and to the extent feasible, the use of noise producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise

level, or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.

MM N-2: **Noise Attenuation**

Prior to issuance of building permits a detailed acoustical study based on architectural plans shall be prepared by a qualified acoustical consultant and submitted to the Community Development Department to demonstrate that all residential units would meet the City's 65 dBA exterior noise standard for all outdoor use areas. In addition, the acoustical study shall demonstrate that interior noise levels at all residential units at the project site would meet the Title 24 CalGreen (Title 24, Part 11 of the California Code of Regulations) 45 dBA standard. This mitigation measure complies with the applicable sections of Chapter 10.48.054 of the City's Municipal Code and the California Building Code (Title 24 of the California Code of Regulations). The necessary noise reduction may be achieved by implementing noise control measures at the receiver locations. Where closed windows are required to achieve the interior standards, project plans and specifications shall include ventilation as required by the California Building Code. The final grading and building plans shall incorporate any required noise barriers or sound-rated windows. The property owner/developer shall install these barriers and enclosures.

Level of Significance: Less than significant impact with mitigation.

Threshold 6.2 Would the project expose persons to or generate excessive ground borne vibration or ground borne noise levels?

Construction

Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with construction-related activities. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, depending on the building category of the nearest buildings adjacent to the potential pile driving area, the potential construction vibration damage criteria vary. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.50 inch per second (in/sec) peak particle velocity (PPV) is considered safe and would not result in any construction vibration damage. The FTA architectural damage criterion for continuous vibrations for non-engineered timber and masonry buildings (i.e., 0.20 inch/second) appears to be conservative. The types of construction vibration impact include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. According to the applicant, the proposed project does not expect to use pile drivers as construction equipment. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Since there are no established vibration standards in the City of Cupertino, this evaluation uses the Federal Transit Administration (2006) recommended standard of 0.2 inches per second peak particle velocity with respect to the prevention of structural damage for normal buildings. This measurement is also the level at which vibrations may begin to annoy people inside buildings (Caltrans 2013).

Table 9, *Typical Equipment Vibration Levels,* identifies vibration levels feet for typical construction equipment. Based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during project construction would range from 0.003 to 0.210 inch/second PPV at 25 feet from the source of activity. It is also acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure.

Table 9: Typical Construction Equipment Vibration Levels

Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)	Peak Particle Velocity at 82 Feet (inches per second)
Large Bulldozer	0.089	0.015
Caisson Drilling	0.089	0.015
Loaded Trucks	0.076	0.013
Rock Breaker	0.059	0.010
Jackhammer	0.035	0.006
Vibratory Roller	0.210	0.035
Small Bulldozer/Tractor	0.003	0.001

Notes:
1. Calculated using the following formula:
$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$
where: PPV (equip) = the peak particle velocity in inch per second of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in inch per second from Table 12-2 of the FTA Transit Noise and Vibration Impact Assessment Guidelines
D = the distance from the equipment to the receiver

The nearest sensitive receptors would be approximately 82 feet to the north. Based on typical vibration levels, ground vibration generated by heavy-duty equipment could reach levels of 0.035 inches per second peak particle velocity at 82 feet. The use of construction equipment would not result in a groundborne vibration velocity level above the established threshold of 0.2 inches per second PPV. As a result, impacts associated with excessive groundborne vibration during construction would be less than significant.

Operational

The proposed project would not generate groundborne vibration that could be felt at surrounding uses. The project would not involve railroads or substantial heavy truck operations, with the exception of delivery vehicles to the project site once facilities are operational. As a result, impacts from vibration associated with project operation would be less than significant.

The City's General Plan EIR determined that construction and operational vibration impacts would be less than significant. The proposed project would be consistent with the City's General Plan and the analysis in the General Plan EIR and would not result in any impacts beyond those previously identified.

Level of Significance: Less than significant impact.

Threshold 6.5 For a project located within 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?

Threshold 6.6 For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The nearest public airport is the Norman Y. Mineta San Jose International Airport located approximately 6.7 miles east of the site. Other airports near the City of Cupertino are Moffett Federal Airfield, approximately 5.5 miles north of the site, and Palo Alto Airport approximately 9.6 miles north of the site. As such, the project is not located within an airport land use plan nor is it located within two miles of a public airport. Therefore, no impacts would occur. Additionally, there are no private airstrips or airports near the City of Cupertino and the project site. Therefore, no impacts would occur.

Additionally, the City's General Plan EIR notes that no portion of Cupertino is within an airport land use plan for any of the airports located near the City boundary. No portion of Cupertino is within 2 miles of public or public use airport, nor is any portion of the city within an airport's influence area or 55 dBA CNEL noise contour. There are no private airstrips located within Cupertino. The General Plan EIR found that there would be no impact related to excessive noise levels from airports. As described above, the proposed project would be consistent with the City's General Plan and the analysis in the General Plan EIR and would not result in any impacts beyond those previously identified.

Level of Significance: No impact.

CUMULATIVE NOISE IMPACTS

The project's construction activities would result in a substantial temporary increase in ambient noise levels. However, as discussed in Threshold 6.4, these temporary noise levels would not exceed 80 dBA for the surrounding residential units. There would be periodic, temporary, noise impacts that would cease upon completion of construction activities. The project would contribute to and construction noise impacts should other development proximate to the project site occur concurrent with the proposed project.

However, based on the noise analysis above, impacts from the project's noise would be less than significant with mitigation. Based on the fact that noise dissipates as it travels away from its source, noise impacts from on-site activities and other stationary sources would be limited to the project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with project-specific noise impacts, would not be cumulatively significant.

The City's General Plan EIR identified significant and unavoidable impacts associated with cumulative traffic noise despite the implementation of applicable General Plan policies. The proposed project would be consistent with the City's General Plan and the analysis in the General Plan EIR and would not result in any impacts beyond those previously identified. As describe above, the proposed project would not contribute to the significant and unavoidable cumulative impact identified in the General Plan EIR.

7 REFERENCES

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12. U.S. Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.

Appendix A

Existing Ambient Noise Measurements

Noise Measurement Field Data

Project:	Westport	**Job Number:**	_097817002
Site No.:	1	**Date:**	5/1/2018
Analyst:	Noemi Wyss	**Time:**	10:53 AM
Location:	Glenbrook Apartment Homes entrance		
Noise Sources:	Cars on Mary Street entering apartment complex, pedestrians, landscapers		
Comments:	**run ended 11:03 am**		

Results (dBA):

Leq:	66.9	**Lmin:**	47.3	**Lmax:**	88.5	**Peak:**	107.8

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Fast
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	70
Wind (mph):	>5
Sky:	Clear
Bar. Pressure:	29.84
Humidity:	42%

Photo:

Noise Measurement Field Data

Project:	Westport	**Job Number:**	_097817002
Site No.:	2	**Date:**	5/1/2018
Analyst:	Noemi Wyss	**Time:**	11:08 AM
Location:	Next to Senior Center		
Noise Sources:	Stevens Creek Boulevard, pedestrians, Mary Avenue		
Comments:	**run ended 11:19 am**		

Results (dBA):

Leq:	75.2	**Lmin:**	48	**Lmax:**	94.4	**Peak:**	110.1

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Fast
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	70
Wind (mph):	>5
Sky:	Clear
Bar. Pressure:	29.84
Humidity:	42%

Photo:

Noise Measurement Field Data

Project:	Westport	**Job Number:**	_097817002
Site No.:	3	**Date:**	5/1/2018
Analyst:	Noemi Wyss	**Time:**	11:26 AM
Location:	Along Stevens Creek Blvd, south of project site		
Noise Sources:	Stevens Creek Blvd		
Comments:	**Run until 11:37 am**		

Results (dBA):

Leq:	77.9	**Lmin:**	53.7	**Lmax:**	90.2	**Peak:**	105.1

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Fast
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	70
Wind (mph):	>5
Sky:	Clear
Bar. Pressure:	29.84
Humidity:	42%

Photo:

Noise Measurement Field Data

Project:	Westport	**Job Number:**	_097817002
Site No.:	4	**Date:**	5/1/2018
Analyst:	Noemi Wyss	**Time:**	11:41 AM
Location:	Parking lot adjacent to 85 freeway		
Noise Sources:	SR 85, helicopter, car alarm, parking lot, birds, truck idling		
Comments:	**Run ended 11:54 am**		

Results (dBA):

Leq:	75.4	**Lmin:**	60	**Lmax:**	81.2	**Peak:**	93.9

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Fast
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	70
Wind (mph):	>5
Sky:	Clear
Bar. Pressure:	29.84
Humidity:	42%

Photo:

Appendix B

Noise Model Output Files

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/11/2018
Case Description: Demolition

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
North	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	130	0
Excavator	No	40		80.7	130	0
Dozer	No	40		81.7	130	0
Flat Bed Truck	No	40		74.3	130	0

				Results											
		Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		81.3	74.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		66	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	81.3	76.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
South	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	170	0
Excavator	No	40		80.7	170	0
Dozer	No	40		81.7	170	0
Flat Bed Truck	No	40		74.3	170	0

				Results											
		Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		79	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		70.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		71	67.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	79	74.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
East	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	130	0
Excavator	No	40		80.7	130	0
Dozer	No	40		81.7	130	0
Flat Bed Truck	No	40		74.3	130	0

				Results											
		Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		81.3	74.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		66	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	81.3	76.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/11/2018
Case Descripti Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
North	Residential	67	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	130	0
Dozer	No	40		81.7	130	0
Backhoe	No	40		77.6	130	0
Backhoe	No	40		77.6	130	0
All Other Equipment > 5 HI	No	50	85		130	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HI	76.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	76.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
South	Residential	67	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	170	0
Dozer	No	40		81.7	170	0
Backhoe	No	40		77.6	170	0
Backhoe	No	40		77.6	170	0
All Other Equipment > 5 HI	No	50	85		170	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	71	67.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	71	67.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HI	74.4	71.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.4	74.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
East	Residential	67	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	130	0
Dozer	No	40		81.7	130	0
Backhoe	No	40		77.6	130	0
Backhoe	No	40		77.6	130	0
All Other Equipment > 5 HI	No	50	85		130	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq

Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	76.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	76.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/11/2018
Case Descriptio Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
North	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		130	0
Grader	No	40	85		130	0
Backhoe	No	40		77.6	130	0
Excavator	No	40		80.7	130	0
Excavator	No	40		80.7	130	0
Front End Loader	No	40		79.1	130	0

			Results												
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
South	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		170	0
Grader	No	40	85		170	0
Backhoe	No	40		77.6	170	0
Excavator	No	40		80.7	170	0
Excavator	No	40		80.7	170	0
Front End Loader	No	40		79.1	170	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	74.4	70.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	74.4	70.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	70.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	70.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.5	64.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.4	75.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
East	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		130	0
Grader	No	40	85		130	0
Backhoe	No	40		77.6	130	0
Excavator	No	40		80.7	130	0
Excavator	No	40		80.7	130	0
Front End Loader	No	40		79.1	130	0

	Results													
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/11/2018
Case Descriptio Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
North	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	130	0
Roller	No	20		80	130	0
Dozer	No	40		81.7	130	0
Front End Loader	No	40		79.1	130	0
Backhoe	No	40		77.6	130	0
All Other Equipment > 5 HP	No	50	85		130	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	68.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	71.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	76.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
South	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	170	0
Roller	No	20		80	170	0
Dozer	No	40		81.7	170	0
Front End Loader	No	40		79.1	170	0
Backhoe	No	40		77.6	170	0
All Other Equipment > 5 HP	No	50	85		170	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	66.6	63.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	69.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	71	67.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.5	64.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.4	71.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.4	74.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
East	Residential	67	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	130	0
Roller	No	20		80	130	0
Dozer	No	40		81.7	130	0
Front End Loader	No	40		79.1	130	0
Backhoe	No	40		77.6	130	0
All Other Equipment > 5 HP	No	50	85		130	0

			Results												
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night		
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Paver	68.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Roller	71.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
All Other Equipment > 5 HP	76.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total	76.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/11/2018
Case Descripti Building

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
North	Residential	67	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Flat Bed Truck	No	40		74.3	130	0
Crane	No	16		80.6	130	0
All Other Equipment > 5 H	No	50	85		130	0
Generator	No	50		80.6	130	0
Tractor	No	40	84		130	0
Front End Loader	No	40		79.1	130	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Flat Bed Truck	66	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	72.3	64.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 H	76.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	72.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
South	Residential	67	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Flat Bed Truck	No	40		74.3	170	0
Crane	No	16		80.6	170	0
All Other Equipment > 5 H	No	50	85		170	0
Generator	No	50		80.6	170	0
Tractor	No	40	84		170	0
Front End Loader	No	40		79.1	170	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Flat Bed Truck	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	69.9	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 H	74.4	71.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	70	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.5	64.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.4	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
East	Residential	67	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Flat Bed Truck	No	40		74.3	130	0
Crane	No	16		80.6	130	0
All Other Equipment > 5 H	No	50	85		130	0
Generator	No	50		80.6	130	0
Tractor	No	40	84		130	0

Front End Loader	No	40	79.1	130	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Flat Bed Truck	66	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	72.3	64.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 H	76.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	72.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.7	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Westport
Project Number: _097817001
Scenario: Existing
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Stevens Creek Boulevard	SR 85 to Stelling Road	6	17	32,220	35	0	4.6%	12.3%	72.3	170	536	1,696	5,362
2	Mary Avenue	Parkwood Drive to Stevens Creek Boulevard	2	10	7,010	35	0	4.6%	12.3%	65.3	-	108	343	1,083

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Westport
Project Number: _097817001
Scenario: Horizon Year
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Stevens Creek Boulevard	SR 85 to Stelling Road	6	17	35,844	35	0	4.6%	12.3%	72.8	189	596	1,886	5,965
2	Mary Avenue	Parkwood Drive to Stevens Creek Boulevard	2	10	7,799	35	0	4.6%	12.3%	65.8	38	121	381	1,205

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Westport
Project Number: _097817001
Scenario: Horizon Year Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Stevens Creek Boulevard	SR 85 to Stelling Road	6	17	37,628	35	0	4.6%	12.3%	73.0	198	626	1,980	6,262
2	Mary Avenue	Parkwood Street to Stevens Creek Boulevard	2	10	8,884	35	0	4.6%	12.3%	66.4	43	137	434	1,373

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.