4.8 Noise and Vibration

4.8.1 Introduction

Section 4.8, Noise and Vibration, addresses the potential noise and vibration impacts related to the 201 Haskins Way Project (project). This section discusses the noise and land use compatibility of proposed uses, as well as the potential for temporary, periodic, or permanent noise level increases at nearby sensitive receptors attributable to the proposed project. The analysis of construction and operation noise impacts includes the results of a noise impact analysis prepared by RGD Acoustics for the proposed project.[1] Project-specific impacts are presented for the proposed project and mitigation measures, if any, are identified when feasible. A cumulative impact discussion is identified for each subtopic.

4.8.2 Environmental Setting

FUNDAMENTALS OF ENVIRONMENTAL NOISE

Noise is defined as unwanted sound. Sound is a rapid oscillation of air pressure above and below atmospheric pressure. Sound is described by the rate of oscillation of sound waves (or "frequency"), the distance between peaks or valleys in the wave, the speed that wave travels, and the pressure level or energy content of a given sound. Most sounds in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity, with 0 dB corresponding roughly to the threshold of hearing.

Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA.

Except in carefully controlled laboratory experiments, a change of only 1 dBA in sound level cannot be perceived. Outside of the laboratory, a 3-dBA change is considered a perceptible difference. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness.[2] In practice, the

[1] RGD Acoustics, 2018. *Noise Impact Analysis for 201 Haskins Way, South San Francisco, CA*. Prepared August 20, 2018. Available as Appendix E of this EIR.

[2] California Department of Transportation, 2013. Technical Noise Supplement (TeNS) to the Traffic Noise Analysis Protocol pp. 2-44–2-45, September 2013. Available online at: http://www.dot.ca.gov/env/noise/docs/tens-sep2013.pdf. Accessed May 30, 2018.

level of a sound source is measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve.

Noise Descriptors

Although A-weighted noise levels indicate environmental noise at an instant in time, community noise levels vary continuously. Most environmental noise is composed of an accumulation of noise from several sources, which create a relatively steady background noise in which no particular source is identifiable. Variations in noise exposure over time are typically expressed in terms of a steady state energy level (called L_{eq}) that represents the acoustical energy of a given measurement, or alternatively as a statistical description of what sound level is exceeded over some fraction (10, 50, or 90 percent) of a given observation period (i.e., L_{10}, L_{50}, L_{90}). L_{max} is the maximum, instantaneous noise level registered during a measurement period. **Table 4.8.1: Representative Environmental Noise Levels** presents representative noise sources and their corresponding noise levels in dBA at varying distances from the noise sources.

To quantify the noise level over a 24-hour period, the Day/Night Average Sound Level (L_{dn}) or Community Noise Equivalent Level (CNEL) is used. These descriptors are averages like the L_{eq} except they include, by definition, a 10 dBA "penalty" for noises that occur during nighttime hours (10 p.m. to 7 a.m.) to account for people's sensitivity to intrusive noise during these hours. The CNEL also includes a 5 dBA "penalty" during evening hours (7 p.m. to 10 p.m. to account for people's increased sensitivity during these hours).[3]

Noise from Multiple Sources

Since sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. **Table 4.8.2: Rules for Combining Sound Levels by "Decibel Addition"** demonstrates the result of adding noise from multiple sources.

If the difference between two noise sources is 10 dBA or more, the higher noise source will dominate and the resultant noise level will be equal to the noise level of the higher noise source. In general, if the difference between two noise sources is 0 to 1 dBA, the resultant noise level will be 3 dBA higher than the higher noise source, or both sources if they are equal. If the difference between two noise sources is 2 to 3 dBA, the resultant noise level will be 2 dBA above the higher noise source. If the difference between two noise sources is 4 to 10 dBA, the resultant noise level will be 1 dBA higher than the higher noise source.

[3] American National Standards Institute, 1994. ANSI S1.1-1994, Acoustical Terminology.

Table 4.8.1: Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet fly-over at 100 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck going 50 mph at 50 feet		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area during daytime		
Gas lawnmower at 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 area during daytime	50	Dishwasher in next room
Quiet urban area during nighttime	40	Theater, large conference room (background)
Quiet suburban area during nighttime		
	30	Library
Quiet rural area during nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, p. 2-20, September 2013

Table 4.8.2: Rules for Combining Sound Levels by "Decibel Addition"

When two decibel values differ by	Add the following amount to the higher decibel value	Example
0 to 1 dB	3 dB	60 dB + 61 dB = 64 dB
2 to 3 dB	2 dB	60 dB + 63 dB = 65 dB
4 to 9 dB	1 dB	60 dB + 69 dB = 70 dB
10 dB or more	0 dB	60 dB + 75 dB = 75 dB

Note: This methodology provides an estimate of the resulting sound level and is accurate to ±1 decibel.

Source: SWCA Environmental Consultants (2018)

Attenuation of Noise

A receptor's distance from a noise source affects how noise levels attenuate (decrease). Transportation noise sources tend to be arranged linearly such that roadway traffic attenuates at a rate of 3.0 dBA to 4.5 dBA per doubling of distance from the source, depending on the intervening surface (paved or vegetated, respectively). Point sources of noise, such as stationary equipment or construction equipment, typically attenuate at a rate of 6.0 dBA to 7.5 dBA per doubling of distance from the source.[4] For example, a sound level of 80 dBA at 50 feet from the noise source will be reduced to 74 dBA at 100 feet, 68 dBA at 200 feet, and so on. Noise levels can also be attenuated by "shielding" or providing a barrier between the source and the receptor. With respect to interior noise levels, noise attenuation effectiveness depends on whether windows are closed or open. Based on the U.S. Environmental Protection Agency's (U.S. EPA's) national average, closed windows reduce noise levels by approximately 25 dBA, while open windows reduce noise levels by about 15 dBA.[5]

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding health impacts of noise. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA (L_{eq}) or when intermittent interior noise levels reach or exceed 45 dBA (L_{max}), particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria would suggest exterior continuous (ambient) nighttime noise levels should be 45 dBA (L_{eq}) or below, and short-term events should not generate noise in excess of 60 dBA (L_{max}). WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability to fall asleep.[6]

Other potential health effects of noise identified by WHO include decreased performance on complex cognitive tasks, such as reading, attention, problem solving, and memorization; physiological effects, such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, or shorter-term exposure to very high noise levels, for example, exposure several times a year to a concert with noise levels at 100 dBA). Noise can also disrupt speech intelligibility at relatively low levels; for example, in a classroom setting, a noise level as low as 35 dBA can disrupt clear understanding. Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA, or moderately annoyed by activities with noise levels below 50 dBA.

[4] The 1.5-dBA variation in attenuation rate (6 dBA vs. 7.5 dBA) can result from ground-absorption effects, which occur as sound travels over soft surfaces such as soft earth or vegetation (7.5 dBA attenuation rate) versus hard ground such as pavement or very hard-packed earth (6 dBA rate) (U.S. Housing and Urban Development, The Noise Guidebook, 1985, p. 24. Available online at: https://www.hudexchange.info/onecpd/assets/File/Noise-Guidebook-Chapter-4.pdf. Accessed May 30, 2018.

[5] U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, Appendix B, Table B-4, p. B-6, March 1974.

[6] World Health Organization, 1999. Guidelines for Community Noise, Chapter 3, p. 46, April 1999. Available online at: http://www.who.int/docstore/peh/noise/guidelines2.html. Accessed May 30, 2018.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as large vehicle audible warnings, the crashing of material being loaded or unloaded, car doors slamming, and engines revving, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and severe annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels at night can disturb sleep.

FUNDAMENTALS OF GROUNDBORNE VIBRATION

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are typically used to quantify vibration amplitude. One is the Peak Particle Velocity (PPV) and another is the Root Mean Square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. Vibration is typically measured in inches per second (in/sec) or millimeters per second (mm/sec).

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile-driving and vibratory compaction equipment typically generates the highest construction-related groundborne vibration levels. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. In general, such vibration is only an issue when sensitive receptors are located in close proximity. Since rubber tires provide vibration isolation, rubber-tire vehicles rarely create substantial groundborne vibration effects unless there is a discontinuity or bump in the road that causes the vibration.[7] Because of the sudden and impulsive nature of such activities, the use of the PPV descriptor is the most common measure of construction vibration.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with activities or cause annoyance, are evaluated against different vibration limits. The California Department of Transportation (Caltrans) has provided guidance on the evaluation and impact criteria related to groundborne vibration, as documented in the "Transportation and Construction Vibration Guidance Manual".[8] **Table 4.8.3: Vibration Guidelines for Human Annoyance** summarizes the Caltrans manual guidelines to assess the potential for annoyance, which can range from barely perceptible to severe, based on vibration PPV levels, with the potential for annoyance based on whether the vibration is transient (i.e., single, isolated vibration events, such as blasting or a dropped ball) or continuous or frequent (i.e., sources such as impact pile drivers, pogo-stick compactors, vibratory pile drivers, and vibratory compaction equipment). **Table 4.8.4: Vibration Guidelines for Potential Damage to Structures** summarizes the Caltrans manual guidelines to assess the potential for damage to structures,

[7] Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, DTA-VA-90-1003-06, p. 10-6, May 2006, U.S. Department of Transportation. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed May 30, 2018.

[8] California Department of Transportation, 2013. Transportation and Construction Vibration Guidance Manual, p. 38, September 2013. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed May 30, 2018.

based on vibration PPV levels, with the potential for damage based on building types (i.e., the fragility or strength of a building structure) and whether the vibration is transient or continuous or frequent.

Table 4.8.3: Vibration Guidelines for Human Annoyance

Human Response	Maximum Peak Particle Velocity (in/sec, PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Note: in/sec = inches per second; PPV = peak particle velocity

[1] Transient sources create a single, isolated vibration event, such as blasting or drop balls.

[2] Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans, Transportation and Construction Vibration Guidance Manual, September 2013, Table 20, p. 38.

Table 4.8.4: Vibration Guidelines for Potential Damage to Structures

Structure Type and Condition	Maximum Peak Particle Velocity (in/sec, PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.02	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans, Transportation and Construction Vibration Guidance Manual, September 2013, Table 19, p. 38.

With the exception of long-term occupational exposure, vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that can affect concentration or disturb sleep or interfere with activities. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Vibration may be found to be annoying at much lower levels than those shown in Table 4.8.3, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. On the other hand, persons exposed to elevated ambient vibration levels such as people in an urban environment may tolerate a higher vibration level. People may tolerate infrequent, short-duration vibration levels, but human annoyance to vibration becomes more pronounced if the vibration is continuous or occurs frequently.

Low-level vibrations frequently also cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

High levels of vibration can damage fragile buildings or interfere with sensitive equipment. Depending on the age of the structure and type of vibration (transient, continuous, or frequent intermittent sources), vibration levels as low as 0.5 to 2.0 in/sec PPV can damage a structure.[9] Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building.

EXISTING NOISE ENVIRONMENT

Existing Noise-Generating Uses

The major noise sources affecting the East of 101 Area are vehicular traffic, railroad, aircraft, BART, and commercial/industrial activities. Land uses in the area are mostly limited to offices, commercial and light industrial. The project site is generally bounded by East Grand Avenue to the north, Haskins Way to the west, the Bay Trail and shoreline to the south, and adjacent parcels containing a recycling center and portions of the Genentech campus to the east. The project site is served by East Grand Avenue as the primary arterial road, fed by Haskins Way and East Jamie Court. To the south, the existing industrial development meets the Bay shoreline. Haskins Way and East Jamie Court are not thru-roads; therefore, the majority of ambient traffic noise comes from thru traffic on East Grand Avenue.

There are several industrial uses in the project vicinity, including light industrial manufacturing and distribution uses to the west, and the South San Francisco Scavenger Company and Blue Line Transfer waste collection and recycling facility to the east. The majority of the noise generated by these uses comes from trucking and distribution activities. To the north and northwest, the land use shifts from industrial uses to office/R&D uses, specifically the Genentech campus north of East Grand Avenue. The majority of noise generated by these uses comes from thru traffic along East Grand Avenue.

Existing Noise-Sensitive Uses

Some land uses (and associated users) are considered more sensitive to ambient noise levels than others due to the types of activities typically involved with the land use and the amount of noise exposure (in terms of both exposure duration and insulation from noise). In general, occupants of residences, schools, daycare centers, hospitals, places of worship, and nursing homes are considered to be sensitive receptors (e.g., persons who are sensitive to noise based on their specific activities, age, health). The project site is largely surrounded by light industrial and office/R&D uses. There are no residences, nursing homes, hospitals, churches, libraries, or schools within 1 mile of the project site. There are also hotels along

[9] California Department of Transportation, 2013. Transportation and Construction Vibration Guidance Manual, September 2013, Table 9, p. 23. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed on May 30, 2018.

Gateway Boulevard, Forbes Boulevard, Grand Avenue, Mitchell Avenue, Airport Boulevard, and South Airport Boulevard. These hotels are located more than 0.75 mile from the project site.

There are childcare centers and a preschool along Gateway Boulevard and Allerton Avenue. The project site is located approximately 0.25 mile southeast from one existing daycare center, the existing Early Years preschool at 371 Allerton Avenue, and approximately 0.20 mile southeast from one daycare center currently under construction, the Genentech Childcare Facility at 342 Allerton Avenue, as described in Section 4.A, Approach to Environmental Analysis, under "Baseline Setting".

Ambient Noise Measurements

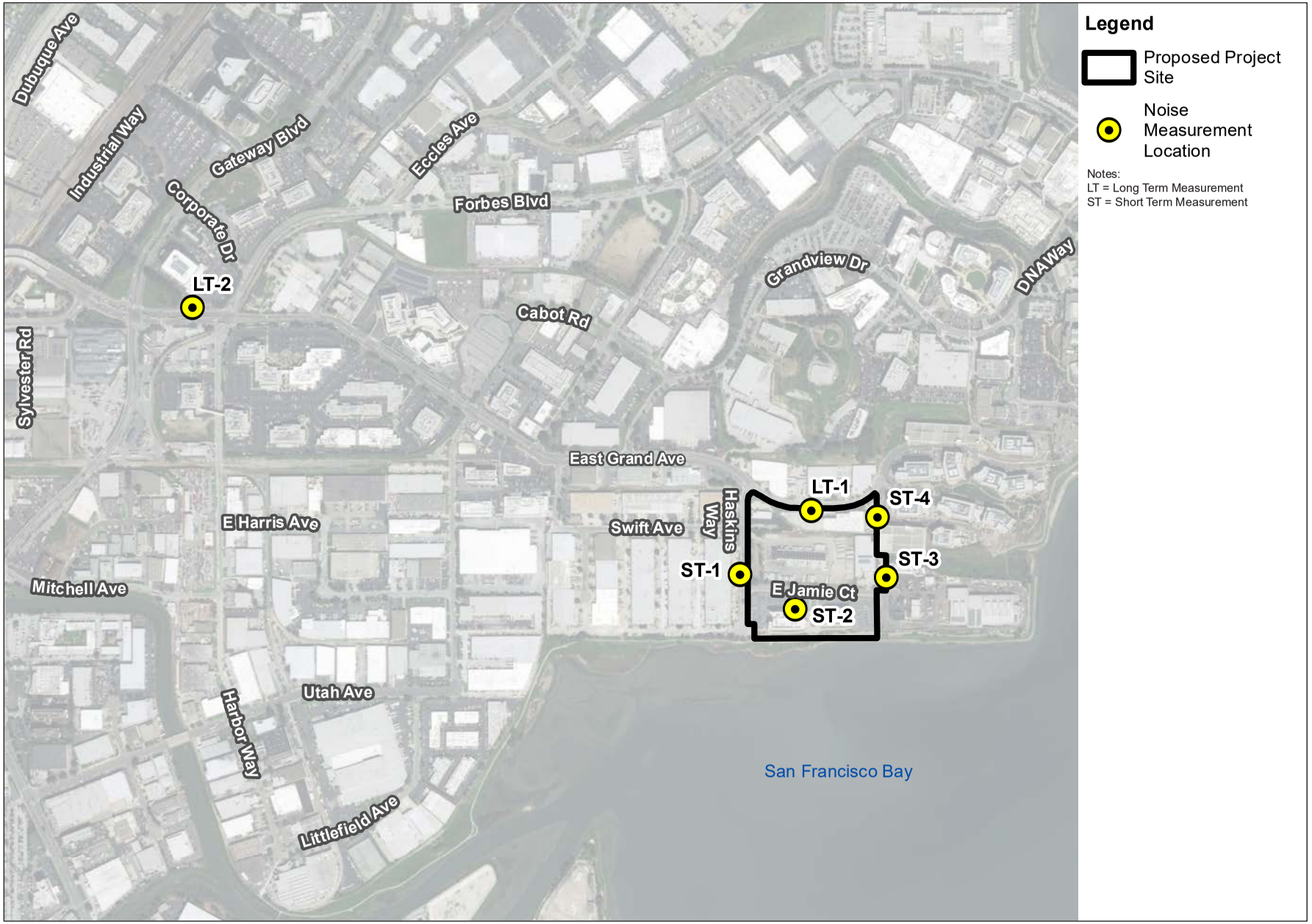
To characterize the background noise environment in the project vicinity, a total of six noise measurements were collected.[10] Two long-term (48 hour) measurements and six short-term (15 minute) measurements (at four short-term measurement locations) were collected in May 2018 in order to determine noise characteristics of the existing ambient environment near the project site and along East Grand Avenue, the nearest and primary arterial road. Measurement locations are indicated on **Figure 4.8.1: Noise Measurement Locations**. Generally, the major noise source at each long-term measurement location was traffic on East Grand Avenue. Aircraft flyovers were also clearly noticeable and contributed to the overall noise level. Noise measurement data are included in Appendix E. A summary of noise measurement data is presented in **Table 4.8.5: Summary of Long-Term (LT) Noise Monitoring on the Project Site and Vicinity (dBA)** and **Table 4.8.6: Summary of Short-Term (ST) Noise Monitoring on the Project Site and Vicinity (dBA)**.

The long-term measurement at Location LT-1 was made on a utility pole near the north edge of the project site at 410 East Grand Avenue. At Location LT-1, in addition to noise associated with local traffic and aircraft flyovers, noise from construction at the nearby Genentech building as well as occasional idling trucks around the site also contributed to the noise levels. At Location ST-4, there is a steel plate covering on the road which generated maximum noise levels up to 85 dBA when vehicles traveled over it.

The long-term measurement at Location LT-2 was made on a light pole on East Grand Avenue between Gateway Boulevard and Forbes Boulevard. The purpose of the measurement at Location LT-2 was to give additional information on noise from traffic on East Grand Avenue and be located farther from construction activities at the Genentech facility near the project site.

The trucking terminal use at 201 Haskins Way was also operating in 2017 but has since closed. Since the trucking use no longer operates on-site, the noise levels measured in May 2018 (when the use was not operating) are considered to reflect the existing ambient noise environment in the project vicinity.

[10] RGD Acoustics, 2018. *Noise Impact Analysis for 201 Haskins Way, South San Francisco, CA*. Prepared June 8, 2018. Available as Appendix E of this EIR.



Source: RGD Acoustics (2018)

201 HASKINS WAY PROJECT

FIGURE 4.8.1: NOISE MEASUREMENT LOCATIONS

Table 4.8.5: Summary of Long-Term (LT) Noise Monitoring on the Project Site and Vicinity (dBA)

Site	Location	Weekday CNEL	Average Noisiest Weekday Hour	
			Time	L_{eq}
LT-1	Northern boundary of the project site on East Grand Avenue between Haskins Way and the Genentech campus	70	8:00 a.m. – 9:00 a.m.	68
LT-2	Northern side of East Grand Avenue between Gateway Boulevard and Forbes Boulevard	75	3:00 p.m. – 4:00 p.m.	73

Source: RGD Acoustics (2018)

Table 4.8.6: Summary of Short-Term (ST) Noise Monitoring on the Project Site and Vicinity (dBA)

Site	Location	Date and Time	L_{eq}	L_{50}	L_{max}
ST-1	Haskins Way at setback of sidewalk between Swift Avenue and East Jamie Court	May 16, 2018 11:20 a.m. – 11:35 a.m.	67	61	Cars: 62 – 72, (64 – 67 typ.) Med Trucks: 70 – 77 Heavy Trucks: 69 – 79 Truck Brakes: 88 Jets: 61 – 62 typ. Backup Beeper at Haskins Way/E. Jamie Ct Intersection: < 57
ST-2	Within the 400-450 East Jamie Court parcel north of the existing 400 East Jamie Court building	May 16, 2018 11:47 a.m. – 12:08 p.m. May 18, 2018 2:47 p.m. – 3:02 p.m.	61 66	59 55	<u>May 16, 2018:</u> Cars: <54, 55 – 57 Med Trucks: 60, 64 Heavy Trucks: 60 Jets: 55 – 70 Construction (steady): 62 Construction (cutting): 64 - 68 Street Sweeper on Haskins: 60 – 62 <u>May 18, 2018:</u> Med Trucks: 54, 57 – 60 typ. Heavy Trucks: 61 - 64 Helicopter: 64, 76, 87 Parking Lot Car: 61
ST-3	451 East Jamie Court near the east property line, adjacent to the South San Francisco Scavenger and Blue Line Transfer facility	May 16, 2018 12:17 p.m. – 12:33 p.m.	63	59	Cars: < 58 Medium Trucks: 62, 65 Heavy Trucks, 76 – 77 Loading activity: 62 – 65 Nearby Truck Idle: 57, 63, 70 Backup Beeper: 75 Jets: 62 – 64
ST-4	Northeastern side of the project site on East Grand Avenue between the 430 East Grand Avenue parcel and the Genentech campus parking structure	May 16, 2018 12:17 p.m. – 12:33 p.m. May 18, 2018 2:39 p.m. – 2:53 p.m.	65 67	57 57	Cars (w/o metal sheet cover): 58 – 62 Steel Plate Cover: 69 – 71 typ., 85 Construction: 55 – 63 Street sweeper: 83

Source: RGD Acoustics (2018)

4.8.3 Baseline Conditions

The analyses in California Environmental Quality Act (CEQA) documents typically present the existing environmental setting as the baseline conditions against which the project conditions are compared to determine whether an impact is significant. However, in the study area, some land development projects are either recently occupied or under construction. Because these projects will be complete by the time the proposed project is operational, the analyses provide baseline conditions that take these conditions into account. Using an existing plus project analysis would not accurately reflect the conditions that will exist at the time the proposed project's impacts would actually occur; therefore, a baseline plus project conditions analysis was used.

Section 4.1, Approach to Environmental Analysis, under "Approach to Baseline Setting," describes the projects that are under construction or will be operational prior to construction of the proposed project. Two projects, the 249 East Grand Avenue project and the Genentech Building B-40 project, involve new office/R&D buildings that are under construction within a 0.5-mile radius of the project site. The project site is also located approximately 0.20 mile southeast from the Genentech Childcare Facility project under construction at 342 Allerton Avenue.

4.8.4 Regulatory Framework

This section provides a summary of the plans and policies of the City of South San Francisco (City), and regional, state, and federal agencies that have policy and regulatory control over the project site.

FEDERAL

U.S. Environmental Protection Agency

In 1972, the Noise Control Act (42 United States Code [USC] section 4901 et seq.) was passed by Congress to promote noise environments in support of public health and welfare. It also established the U.S. EPA Office of Noise Abatement and Control to coordinate federal noise control activities. The agency established guidelines for noise levels that would be considered safe for community exposure without the risk of adverse health or welfare effects. The agency found that to prevent hearing loss over the lifetime of a receptor, the 24-hour average L_{eq} should not exceed 70 dBA, and the L_{dn} should not exceed 55 dBA in outdoor activity areas or 45 dBA indoors to prevent interference and annoyance.[11] In 1982, the agency phased out the office's funding as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments.

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 of the Code of Federal Regulations, Part 205, Subpart B. The federal truck passby noise standard is 80 dBA at 50 feet from the vehicle pathway centerline, under specified test procedures. These requirements are implemented through regulatory controls on truck manufacturers.

[11] U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, p. 3, March 1974.

U.S. Federal Transit Administration

The U.S. Federal Transit Administration (FTA) has established general methodology guidelines and impact criteria for assessment of noise from construction activities in its document, *Transit Noise and Vibration Impact Assessment*. Guidelines are provided for both general assessment and detailed assessments of construction noise.[12]

The general assessment of construction noise impact includes the following major elements:

- Predictions of construction noise are based on the two noisiest pieces of equipment expected to be used during each phase of the four-phase construction program.
- Equipment is assumed to operate at full power for an hour or more.
- Construction equipment is assumed to operate in the center of the construction site.
- Construction noise levels are to be calculated as hourly L_{eq}s.

When using the above method to estimate construction sound levels, the FTA provides guidelines for assessing the potential for adverse community reaction. In general, no substantial adverse reaction would be expected if the calculated hourly L_{eq} were to remain at or below 90 dBA at residential receptors during daytime hours and 80 dBA at night.

STATE

California Government Code Section 65302 requires each local government entity to implement a noise element as part of its general plan.[13] In addition, the California Governor's Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The City has developed guidelines that are described below.

California Department of Transportation

Caltrans has published several documents characterizing assessment procedures and impact criteria related to traffic noise and groundborne vibration. Caltrans published the "Technical Noise Supplement" in September 2013, which describes the measurement, modelling, and noise impact assessment procedures for evaluating noise from traffic. The document states that changes in noise levels are perceived as follows: 3 dBA as barely perceptible, 5 dBA as readily perceptible, and 10 dBA as a doubling or halving of noise."[14]

[12] U.S. Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, pp. 12-1–12-9, May 2006. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed May 30, 2018.

[13] California Government Code, Title 7, Division 1, Chapter 3, Section 65302(f)(1), June 27, 2017. Available online at: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=GOV&division=1.&title=7.&part=&chapter=3.&article=5. Accessed May 30, 2018.

[14] California Department of Transportation, 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol, Table 2-10, p. 2-45, September 2013. Available online at: http://www.dot.ca.gov/env/noise/docs/tens-sep2013.pdf. Accessed May 30, 2018.

Caltrans has also provided guidance on the evaluation and impact criteria related to groundborne vibration, as documented in the "Transportation and Construction Vibration Guidance Manual".[15] Tables 4.8.3 and 4.8.4, p. 4.8.6, summarize the Caltrans manual guidelines to assess the potential for human annoyance and damage to structures.

REGIONAL

Comprehensive Airport Land Use Compatibility Plan

State law requires Airport Land Use Commissions (ALUCs) to prepare and adopt an Airport Land Use Compatibility Plan (ALUCP) for each public use and military airport within their jurisdiction. Further, ALUCs are required to review the plans, regulations, and other actions of local agencies and airport operators within each Commission's jurisdiction. San Francisco International Airport is located 1 mile south of the project site. Based on state law and guidance provided in the *California Airport Land Use Planning Handbook*, the *2012 Comprehensive Airport Land Use Compatibility Plan* prepared for the San Francisco Airport (2012 SFO ALUCP)[16] has one area of concern related to aircraft noise impact reduction, specifically to reduce the potential number of future airport area residents who could be exposed to noise impacts from airport and aircraft operations.

The 2012 SFO ALUCP contains airport/land use compatibility policies and criteria that apply to all land uses except those considered as existing land uses. Airport land use commissions assist local agencies in ensuring compatible land uses in the vicinity of airports, based on safety and noise compatibility considerations; and establish construction standards for new buildings near airports, including sound insulation requirements.

After an ALUC has adopted its ALUCP, affected local governments must update their general plans, specific plans, and land use regulations to be consistent with the ALUCP. Even if the local government has amended its plans to be consistent with the ALUCP, it must still submit proposed new and amended general plans, specific plans, land use ordinances (including rezonings), regulations, and facility master plans to the ALUC for review. The City/County Association of Governments of San Mateo County (C/CAG) ALUC reviews local land use policy actions and administrates consistency review and submits recommendations to the C/CAG Commission.

As identified in the 2012 SFO ALUCP, the project site is not located within an ALUCP noise safety zone.[17]

[15] California Department of Transportation, 2013. Transportation and Construction Vibration Manual, p. 38, September 2013. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed May 30, 2018

[16] City/County Association of Governments of San Mateo County, 2012. *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport* (20120 SFO ALUCP). Available online at: http://ccag.ca.gov/plansreportslibrary/airport-land-use/. Accessed May 10, 2018.

[17] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.

LOCAL

City of South San Francisco General Plan

The Noise Element of the *City of South San Francisco General Plan* (General Plan) addresses noise sources in the community and identifies ways to reduce the impacts of these noise sources. The Noise Element contains policies and programs to achieve and maintain noise levels compatible with various types of land uses. Land uses that are sensitive to noise are identified and future noise-generating land uses are located so that they do not impact those sensitive areas. The following are the guiding and implementation policies contained in the Noise Element of the General Plan.

Policy 9-G-1: Protect public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future.

Policy 9-G-2: Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

Policy 9-I-6: Require that applicants for new noise-sensitive developments in areas subject to noise generators producing noise levels greater than 65 dBA CNEL obtain the services of a professional acoustical engineer to provide a technical analysis and design of mitigation measures.

Policy 9-I-7: Where site conditions permit, require noise buffering for all noise sensitive development subject to noise generators producing noise levels greater than 65 dBA CNEL. This noise attenuation method should avoid the use of visible sound walls, where practical.

Policy 9-I-8: Require the control of noise at source through site design, building design, landscaping, hours of operation, and other techniques for new developments deemed to be noise generators.

Policy 9.I.10: Do not allow new residential or noise sensitive development in 70 dB+ CNEL areas impacted by SFO operations, as required by Airport Land Use Commission infill criteria.

Because aircraft overflight noise is a particularly important issue in the City, the General Plan provides noise and land use compatibility standards in compliance with the San Mateo County ALUC. The standards provide land use development requirements based on the existing and projected noise environment in CNEL, as shown in **Table 4.8.7: General Plan Land Use Criteria for Noise-Impacted Areas**.

East of 101 Area Plan

The *East of 101 Area Plan*, which was adopted prior to the City's General Plan, is primarily used as a design level document for new projects located in the East of 101 Area, with the exception of some land use and conservation element policies still in effect. Therefore, the General Plan policies listed under the Noise Element are the guiding policies and supersede all Noise Element policies set forth in Chapter 9 of the *East of 101 Area Plan*.

Table 4.8.7: General Plan Land Use Criteria for Noise-Impacted Areas

Land Use	CNEL Range	General Land Use Criteria
Residential	Less than 65	Satisfactory; no special insulation requirements
	65 to 70	Development requires analysis of noise reduction requirements and insulation as needed
	Over 70	Development should not be undertaken
Commercial	Less than 70	Satisfactory; no special insulation requirements
	70 to 80	Development requires analysis of noise reduction requirements and insulation as needed
	Over 80	Airport-related development only; special noise insulation should be provided
Industrial	Less than 75	Satisfactory; no special insulation requirements
	75 to 85	Development requires analysis of noise reduction requirements and insulation as needed
	Over 85	Airport-related development only; special noise insulation should be provided
Open	Less than 75	Satisfactory; no special insulation requirements
	Over 75	Avoid uses involving concentrations of people or animals

Source: City of South San Francisco General Plan Noise Element

City of South San Francisco Noise Ordinance

The noise regulations of the City of South San Francisco Municipal Code (Municipal Code) are contained in Chapter 8.32 "Noise Regulations." The quantitative noise limits and construction noise regulations are described below.

Section 8.32.030 of the City's Noise Ordinance specifies maximum permissible sound levels to be generated by any property within the City. The maximum allowable level is determined by the land use category of the receiving property and is measured on any receiving property. These levels are summarized in **Table 4.8.8: City Noise Level Standards**. The levels shown in this table are applicable for noises that occur up to 30 minutes per hour, which is equivalent to an L_{50} noise measurement.[18] Noise levels above the standard are allowed, but for shorter periods of time: plus 5 dB for up to 15 minutes per hour, plus 10 dB for up to 5 minutes per hour, plus 15 dB for up to 1 minute per hour, or the noise level standard or the maximum measured ambient level plus 20 dB for any period of time.

Table 4.8.8: City Noise Level Standards

Land Use Category	Time Period	Noise Level (dB)
R-E, R-1 and R-2 zones or any single-family or duplex residential in a specific plan district	10 p.m.—7 a.m.	50
	7 a.m.—10 p.m.	60
R-3 and D-C zones or any multiple-family residential or mixed residential/commercial in any specific plan district	10 p.m.—7 a.m.	55
	7 a.m.—10 p.m.	60
C-1, P-C, Gateway and Oyster Point Marina specific plan districts or any commercial use in any specific plan district	10 p.m.—7 a.m.	60
	7 a.m.—10 p.m.	65
M-1, P-1	Anytime	70

Source: Table 8.32.030 of the City of South San Francisco Municipal Code

[18] Variations in noise exposure over time are can be expressed in terms of a statistical description of what sound level is exceeded over some fraction (10, 50 or 90 percent) of a given observation period (i.e., L10, L50, L90). A 30-minute duration in an hour would be 50 percent of the observation period, and is called an L50 measurement.

If the measured ambient level for any area is higher than the standard set in Table 4.8.8, then the ambient would be the base noise level standard. In such cases, the noise levels standards shall be increased in 5-dB increments above the ambient. If the measurement location is on a boundary between two different zones, the noise level standard would be that applicable to the lower noise zone plus 5 dB.

Section 20.300.010(F) of the Municipal Code states that no vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks) are exempt from this standard.

Section 8.32.040 of the Municipal Code also prohibits any source of sound, on multi-family residential property or multi-tenant commercial or industrial property, which contributes a noise level more than 10 dB above the level allowed by Section 8.32.030 3 feet from any wall, floor, or ceiling inside any unit on the same property when the windows and doors of the unit are closed, except within the unit in which the noise source or sources is located.

Section 8.32.050 (d) of the Municipal Code identifies a special provision which allows construction activities with a City permit between the hours of 8 a.m. to 8 p.m. on weekdays, 9 a.m. to 8 p.m. on Saturdays, and 10 a.m. to 6 p.m. on Sundays and holidays. Other hours may be authorized by obtaining a permit, provided the construction meets at least one of the following requirements:

1. No individual piece of equipment shall produce a noise level exceeding 90 dB at a distance of 25 feet. If the device is housed within a structure or trailer on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment as possible.

2. The noise level at any point outside of the property plane of the project shall not exceed 90 dB.

4.8.5 Impacts and Mitigation Measures

This section describes the impact analysis related to noise and vibration for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a noise impact is considered significant if project implementation would result in one or more of the following:

a. Exposure of persons to, or generation of, noise levels in excess of standards established in the General Plan or noise ordinance, or applicable standards of other agencies;

b. Exposure of persons to, or generation of, excessive levels of groundborne vibration or noise;

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels; or

f. For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels.

APPROACH TO ANALYSIS

RGD Acoustics performed on-site surveys in May 2018 to document existing noise levels on and around the project site and to identify noise sensitive land uses within the vicinity of the project site. The surveys included two continuous 48-hour noise measurements and six short-term (15-minute) measurements (at four short-term measurement locations). The noise study evaluated the potential for the project to impact adjacent noise-sensitive uses as a result of increased traffic, operational noise, and construction. The study evaluated whether noise generated by construction and operational activities would increase ambient noise levels above those existing without the project. The study also evaluated operational traffic noise generated by the project in relation to future traffic noise levels in the year 2040.

In order to calculate the increase in traffic noise due to the project, the existing and future traffic noise levels were calculated using the Federal Highway Administration's (FHWA's) Traffic Noise Model (TNM 2.5) using traffic volumes from Kittelson & Associates, Inc. (see Appendix B). The model takes into account the vehicle class, speed, road surface, and distance. The TNM model calculates an L_{eq} based on peak-hour traffic data at a distance of 50 feet from the roadway centerline. The CNEL was determined based on the difference between the peak-hour L_{eq} and CNEL measured at the long-term monitoring locations.

Construction noise and vibration modeling was based on construction schedule and equipment information provided by the project sponsor to the extent available, along with published information on typical noise levels. On-site operational noise sources such as mechanical equipment were also provided by the project sponsor to the extent available, along with published information on typical noise levels. Future noise levels were calculated using available traffic projections and operational data for other identifiable sources.

Mitigation measures are identified to address impacts involving noise levels as a result of the proposed project that would exceed applicable City or state standards or increase noise levels significantly at adjacent uses.

The analysis of project impacts is divided into three parts: Phase 1, project buildout, and cumulative noise increases due to traffic from growth in the project vicinity and the East of 101 Area. Based on applicable regulations, ordinances, and policies, the following quantifiable thresholds were used to evaluate the significance of impacts.

Construction

Substantial Temporary Noise from Construction

Construction activities generate temporary noise level increases in the vicinity of project sites. Since noise generated by construction would be short-term and vary considerably day-to-day, construction noise is evaluated differently than operational noise. Prolonged construction activities could cause interference with normal activities at nearby land uses. Prolonged interference is defined as a substantial noise level increase that occurs for more than 1 year.

Chapter 8.32 of the Municipal Code establishes criteria for construction noise based on hours of operation. Therefore, for the purposes of this assessment, construction noise is considered significant if it:

- occurs outside the allowable hours of operation and exceeds the provisions of Municipal Code Section 8.32.050(d) (individual equipment exceeds 90 dB at 25 feet or 90 dB at any point outside the property plane); or
- causes ambient noise levels to increase significantly at nearby noise sensitive receptors.

Substantial Temporary Vibration during Construction

The following criteria are applied in this analysis for identifying potentially significant vibration impacts:

- Generation of construction-related groundborne vibration levels exceeding the "strongly perceptible" level of 0.1 in/sec PPV at off-site sensitive receptors (i.e., annoyance).
- Generation of construction-related groundborne vibration levels exceeding the modern industrial/commercial buildings damage standard of 0.5 in/sec PPV at on-site or off-site structures (i.e., structural damage).

Operation

Land Use Compatibility

AMBIENT NOISE

In the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015,[19] the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's occupants, except where the project would significantly exacerbate an existing environmental condition. Accordingly, the significance criteria above are relevant only to the extent that the proposed project significantly exacerbates the existing noise and vibration environment where noise or vibration already exceeds standards. Thus, the analysis below evaluates whether the proposed project could exacerbate the existing or future noise environment. As such, the existing ambient noise environment's effect on future project occupants is not further discussed below.

[19] *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369. Opinion Filed December 17, 2015.

AIRCRAFT NOISE

Intermittent aircraft noise resulting from operations of San Francisco International Airport would be audible at the project site, but aircraft noise levels would not be considered incompatible with the proposed uses. The General Plan noise contour map shows where the projected 2020 65 dBA CNEL contours are located. According to the data on the contour map, the project site would be located well outside the airport's 65 dBA CNEL noise contour. The exterior noise environment at the project site resulting from aircraft would be considered compatible with proposed uses, which are indoor office/R&D uses. The proposed project is not within the vicinity of any private airstrip. There would be no impacts associated with aircraft noise. This topic is not further discussed below.

Substantial Permanent Increase to Noise Levels

A significant noise impact would be identified where a substantial permanent increase to noise would occur through project-generated traffic or on-site project-related noise-generating sources (i.e., mechanical equipment).

TRAFFIC NOISE

In October 2009, an EIR for the *Gateway Business Park Master Plan* promulgated traffic noise impact thresholds based on the general noticeability of noise increases: an increase 3 dBA is just noticeable, and a change of 5 dBA is clearly noticeable. Therefore, for the purposes of this impact assessment, the following increases in traffic noise, based on the *Gateway Business Park Master Plan EIR*, are considered to be significant:

Project Impact:

- 5 dBA or greater if the future noise level is within the normally acceptable range (CNEL 65 dBA or less for residences and child care; CNEL 70 dBA or less for offices and retail).
- 3 dBA or greater if future noise level is above the normally acceptable range.

Cumulative Impact:

- 5 dBA or greater if the future noise level is within the normally acceptable range (CNEL 65 dBA or less for residences and child care; CNEL 70 dBA or less for offices and retail; CNEL 75 dBA or less for industrial land uses) AND the project's contribution is cumulatively considerable (greater than 1 dBA).
- 3 dBA or greater if future noise level is above the normally acceptable range AND the project's contribution is cumulatively considerable (greater than 1 dBA).

MECHANICAL EQUIPMENT

Mechanical equipment noise that generates an L_{50} at receiving properties that exceeds the limits set forth in Table 8.32.030 of the Municipal Code (see Table 4.8.8, above) is considered a significant impact. As shown in Table 4.8.8, above, Mixed Industrial districts (including those west of the project site) have a standard of 70 dBA. Because Business Technology Park districts are not specified in Table 8.32.030 of the Municipal Code, it is assumed for the purposes of this analysis that the standards for C-1, P-C,

Gateway, and Oyster Point Marina specific plan districts or any commercial use in any specific plan district (60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m.) would be applied to the proposed project, as they are the most similar to an office/R&D designation. As a conservative approach, the City considers the C-1, P-C, Gateway, and Oyster Point Marina specific plan districts standards as the basis for operational mechanical equipment noise analysis for the project site and surrounding land uses. In addition, Section 8.32.040, "Interior Noise Limits," makes it unlawful for any person to operate or cause to be operated any source of sound on multitenant commercial or industrial property, a noise level more than 10 dB above the allowed level specified in Table 8.32.030, when measured 3 feet from any wall, floor, or ceiling inside any unit when the windows and doors of the units are closed. As shown in Table 4.8.6, none of the short-term noise measurements exceed the noise limit L_{50} of 65 dB. The highest existing short-term noise measurement taken in the project vicinity was a daytime L_{50} of 61 dB at Location ST-1.

OPERATIONAL VIBRATION

Operation of the proposed project is not anticipated to generate perceptible levels of vibration. Groundborne vibrations from operation generally occur from the operation of heavy machinery, particularly in an industrial setting, or heavy transit such as rail and aircraft. The proposed project would involve the operation of new office/R&D uses that do not involve the ongoing use of heavy machinery. The proposed uses would involve daily worker commuter trips and occasional use of trucks for deliveries, maintenance, and materials transport. As described in "Fundamentals of Groundborne Vibration," above, such vibration is only an issue when sensitive receptors are located in close proximity. Since rubber tires provide vibration isolation, rubber-tire vehicles rarely create substantial groundborne vibration effects unless there is a discontinuity or bump in the road that causes the vibration.[20] Most traffic anticipated during operation of the project would be rubber-tired and operating on pavement that is in good condition. No major sources of vibration are anticipated within any of the proposed new structures. Garbage collection would occur at off-street locations, or would be completed along existing streets, but would be comparable to existing garbage collection activities, and therefore not a significant vibration source. Furthermore, under Section 20.300.010(F) of the Municipal Code, vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., trucks) are exempt from the City's noise-related performance standards.[21] For these reasons, vibration associated with operation of the proposed project is not further discussed below.

[20] U.S. Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, DTA-VA-90-1003-06, p. 10-6, May 2006, U.S. Department of Transportation. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed May 30, 2018.

[21] City of South San Francisco, 2018. Municipal Code Section 20.300.010(F).) provides that no vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks) are exempt from this standard. Available online at: http://qcode.us/codes/southsanfrancisco/. Accessed August 28, 2018.

IMPACT EVALUATION

Construction

Impact NO-1: Construction activities for the proposed project would not generate noise that would substantially increase temporary noise levels at uses in the vicinity of the site. ***(Less than Significant)***

Project implementation would result in operation of heavy equipment on the project site for demolition of existing structures and construction of new structures. Construction activities would occur intermittently on the project site over the construction duration and would generate a temporary increase in noise levels on the project site and in the project vicinity. To assess potential construction noise impacts, sensitive receptors and their relative exposure were identified and described below.

Phase 1 Development

Phase 1 construction activities would commence in 2019 and last about 18 months. These activities would include the demolition of the existing building at 201 Haskins Way and the construction of a new office building, a surface parking lot, a parking garage, and a new building addition at 400 East Jamie Court.

During Phase 1 development, the extent of work activities, including demolition and construction, would be approximately 164 feet from the industrial buildings to the west across Haskins Way, 290 feet from the office/warehouse buildings to the north across East Grand Avenue, 340 feet from the Genentech office building to the northeast, and 290 feet from the South San Francisco Scavenger office building to the east. The nearest noise sensitive land use is the outdoor area of the Genentech Childcare Facility, which is currently under construction as described in Section 4.A, Approach to Environmental Analysis, and would be more than 1,200 feet northwest of project demolition and construction activities.

Table 4.8.9: Construction Noise Levels at Adjacent Land Uses – Phase 1, shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 1. **Table 4.8.10: Construction Noise Levels at Future Genentech Childcare Facility – Phase 1**, shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment under Phase 1 at the outdoor area of the future Genentech Childcare Facility.

The calculated exterior noise levels are based on the methodology of the FHWA's 2006 Roadway Construction Noise Model and include a factor for acoustical shielding provided by the existing buildings, where appropriate.[22] Standard construction with the windows closed provides a noise reduction of approximately 25 dBA, therefore, the noise levels in Tables 4.8.9 and 4.8.10 would also be attenuated by 25 dBA for persons inside the neighboring buildings.

Construction-related activities would typically occur Monday through Friday, between 8 a.m. and 8 p.m., although some work is anticipated to occur on Saturdays between 9 a.m. and 8 p.m. or on Sundays between 10 a.m. and 6 p.m. According to Municipal Code Section 8.32.050, the City does not place

[22] Federal Highway Administration, 2006. Roadway Construction Noise Model – RCNM. Available online at: https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/. Accessed June 5, 2018

specific restrictions on noise emission during these hours. However, noise from construction activities would be noticeable at times at the neighboring buildings. For example, the measured outdoor ambient L_{eq} along Haskins Way (noise measurement location ST-1, as shown in Figure 4.8.1, above) is 67 dBA while the calculated maximum noise levels from construction activities for industrial buildings west of the project site are generally 3 to 13 dBA higher. The increase in average noise levels will depend on the duration of use of the construction equipment and the number of simultaneous activities.

Table 4.8.9: Construction Noise Levels at Adjacent Land Uses – Phase 1

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities (dBA)			
	Industrial Buildings to the West across Haskins Way	Office/Warehouse Buildings to the North across East Grand Avenue	Genentech Office Building to the Northeast	South San Francisco Scavenger Office Building
Backhoe	68	58	56	56
Compressor	68	58	56	56
Concrete Saw	80	70	68	68
Dozer	72	62	60	60
Dump Truck	66	56	54	54
Gradall	73	63	61	61
Flat Bed Trucks	64	54	52	52
Excavator	71	61	59	59
Vacuum Street Sweeper	72	62	60	60
Tractor	74	64	62	62
Front End Loader	69	59	57	57
Compactor (ground)	73	63	61	61
Scraper	74	64	62	62
Auger Drill Rig	74	64	62	62
Slurry Trenching Machine	70	60	58	58
Gradall	73	63	61	61
Generator	71	61	59	59
Pneumatic Tools	75	65	63	63
Welder	64	54	52	52
Pump	71	61	59	59
Crane	71	61	59	59
Concrete Mixer Truck	69	59	57	57
Man-lift	65	55	53	53
Roller	70	60	58	58
Paver	67	57	55	55

Source: RGD Acoustics (2018)

Table 4.8.10: Construction Noise Levels at Future Genentech Childcare Facility – Phase 1

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities during Phase 1 (dBA)
Backhoe	45
Compressor	45
Concrete Saw	57
Dozer	49
Dump Truck	43
Gradall	50
Flat Bed Trucks	41
Excavator	48
Vacuum Street Sweeper	49
Tractor	51
Front End Loader	46
Compactor (ground)	50
Scraper	51
Auger Drill Rig	51
Slurry Trenching Machine	47
Gradall	50
Generator	48
Pneumatic Tools	52
Welder	41
Pump	48
Crane	48
Concrete Mixer Truck	46
Man-lift	42
Roller	47
Paver	44

Source: RGD Acoustics (2018)

The nearest noise sensitive land use is the outdoor area of the future Genentech Childcare Facility at 342 Allerton Avenue. Based on the existing traffic volumes on East Grand Avenue and the distance between the facility and East Grand Avenue, the exterior noise levels due to traffic at the facility closest to the project site was calculated to be an L_{eq} of 63 dBA. Table 4.8.10 shows that given the distance of at least 1,200 feet from the project site, the noise from project-related construction would generally be less than 55 dBA outdoors. This may be noticeable at times but is less than the noise levels generated by other intermittent ambient noise sources, such as traffic and aircraft.

Since construction activities are allowed by the City's code during regular business hours and construction noise would be less than the noise levels of intermittent ambient noise sources at the nearest noise sensitive land use (future Genentech Childcare Facility), the proposed project would not generate a

substantial temporary or periodic increase in ambient noise levels surrounding noise sensitive land uses above levels existing without the project. This is considered a less-than-significant impact.

There is a potential for noise from construction of Phase 1 to adversely affect existing uses on the project site and neighboring office/warehouse buildings. There is also a potential for noise from construction during Phase 1 to affect existing Phase 2 area buildings (101 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court). Construction activities are allowed by the City's code during regular business hours. As shown in Table 4.8.9, the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 1 would not exceed 75 dBA. Furthermore, these nearest land uses are industrial and office/R&D, and are not considered sensitive land uses. The proposed project would not generate a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. This impact would be less than significant. Improvement Measure IM-NO-1: Construction Noise Minimization and Notification is suggested to further reduce noise emitted by construction equipment and to schedule high noise-producing activities appropriately, and to provide notification of the construction schedule to neighboring land uses through a construction complaint liaison.

Improvement Measure IM-NO-1: Construction Noise Minimization and Notification

In order to minimize disruption and potential annoyance during project construction, the project sponsor shall implement the following construction minimization and notifications measures:

- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) that are in good condition and appropriate for the equipment.
- Maintain all construction equipment to minimize noise emissions.
- Stationary equipment shall be located on the site to maintain the greatest possible distance to the existing office buildings, where feasible.
- Unnecessary idling of internal combustion engines should be strictly prohibited.
- Provide advance notification to surrounding land uses disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period.
- The construction contractor shall provide the name and telephone number an on-site construction liaison. If construction noise is found to be intrusive to the community (complaints are received), the construction liaison shall investigate the source of the noise and require that reasonable measures be implemented to correct the problem.
- Schedule high noise-producing activities during times when they would be least likely to interfere with the noise sensitive activities of the neighboring land uses, when possible.

City decision makers may choose to impose Improvement Measure IM-NO-1 on the proposed project as a condition of project approval.

Phase 2 Development

Project buildout would involve construction over a total of approximately 4 years (18 months during Phase 1 development and 18 months during Phase 2 development). Phase 2 construction would not begin until existing uses are vacated. Construction activities that would occur during Phase 2 development would include the expansion of the Phase 1 parking structure, the demolition of the existing buildings along East Grand Avenue, and the construction of a new office/R&D building and additional, new square footage on the 400-450 East Jamie Court parcel.

During Phase 2 development, the extent of work activities, including demolition and construction, would be approximately 120 feet from the industrial buildings to the west across Haskins Way, 105 feet from the office/warehouse buildings to the north across East Grand Avenue, 200 feet from the Genentech office building to the northeast, and 100 feet from the South San Francisco Scavenger office building to the east. The nearest noise sensitive land use is the outdoor area of the Genentech Childcare Facility, which is currently under construction as described in Section 4.1, Approach to Environmental Analysis, and would be more than 1,000 feet northwest of project demolition and construction activities.

Table 4.8.11: Construction Noise Levels at Adjacent Land Uses – Phase 2, shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 2. **Table 4.8.12: Construction Noise Levels at Future Genentech Childcare Facility – Phase 2** shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment under Phase 2 of the proposed project at the outdoor area of the future Genentech Childcare Facility. A description of the model used to calculate maximum noise levels for typical construction activities is described under "Phase 1 Development," above.

There is a potential for noise from construction of Phase 2 to adversely affect neighboring office/warehouse buildings. Noise from construction during Phase 2 development could also be disruptive to occupants of Phase 1 area buildings. As with Phase 1 development, construction activities would not occur outside the allowable hours of operation under Municipal Code Section 8.32.050(d).[23] Noise from construction activities would be noticeable at times at the neighboring buildings, as these activities would exceed the measured outdoor ambient L_{eq} by 3 to 15 dBA. The increase in average noise levels will depend on the duration of the construction equipment and the number of simultaneous activities. As shown in Table 4.8.11, individual equipment would not exceed 90 dBA at 25 feet or 90 dB at any point outside the project site as required by Section 8.32.050(d)(1) and 8.32.050(d)(2) of the Municipal Code.[24]Table 4.8.12 shows that given the distance of at least 1,000 feet from the project site, the noise from project-related construction at the future Genentech Childcare Facility would generally be less than

[23] Municipal Code Section 8.32.050(d) states that construction activities which are authorized by a valid city permit shall be allowed on weekdays between the hours of 8 a.m. and 8 p.m., on Saturdays between the hours of 9 a.m. and 8 p.m., and on Sundays and holidays between the hours of 10 a.m. and 6 p.m.

[24] Municipal Code Section 8.32.050(d) states that construction activities outside the standard work hours may be authorized by the permit if they meet at least one of the following limitations: (1) No individual piece of equipment shall produce a noise level exceeding 90 dB at a distance of 25 feet. If the device is housed within a structure or trailer on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment as possible. (2) The noise level at any point outside of the property plane of the project shall not exceed 90 dB.

60 dBA outdoors. Based on an existing outdoor L_{eq} of 63 dBA (as described under Phase 1 Development above), construction noise from Phase 2 of the proposed project may be noticeable at times but is less than the noise levels generated by other intermittent ambient noise sources, such as traffic and aircraft. Phase 2 construction activities would not cause ambient noise levels to increase significantly at nearby noise sensitive receptors.

Table 4.8.11: Construction Noise Levels at Adjacent Land Uses – Phase 2

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities (dBA)			
	Industrial Buildings to the West across Haskins Way	Office/Warehouse Buildings to the North across East Grand Avenue	Genentech Office Building to the Northeast	South San Francisco Scavenger Office Building
Backhoe	70	67	66	59
Compressor	70	67	66	59
Concrete Saw	82	79	78	71
Dozer	74	71	70	63
Dump Truck	68	65	64	57
Gradall	75	72	71	64
Flat Bed Trucks	66	63	62	55
Excavator	73	70	69	62
Vacuum Street Sweeper	74	71	70	63
Tractor	76	73	72	65
Front End Loader	71	68	67	60
Compactor (ground)	75	72	71	64
Scraper	76	73	72	65
Auger Drill Rig	72	73	72	65
Slurry Trenching Machine	75	69	68	61
Gradall	75	72	71	64
Generator	73	70	69	62
Pneumatic Tools	77	74	73	66
Welder	66	63	62	55
Pump	73	70	69	62
Crane	73	70	69	62
Concrete Mixer Truck	71	68	67	60
Man-lift	67	64	63	56
Roller	72	69	68	61
Paver	69	66	65	58

Note: These calculations represent outdoor noise levels. For persons inside buildings with closed windows, the noise levels provided in this table would be attenuated by 25 dBA, based on FHWA guidance.

Source: RGD Acoustics (2018), FHWA (2006)

Table 4.8.12: Construction Noise Levels at Future Genentech Childcare Facility – Phase 2

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities during Phase 1 (dBA)
Backhoe	47
Compressor	47
Concrete Saw	59
Dozer	51
Dump Truck	45
Gradall	52
Flat Bed Trucks	43
Excavator	50
Vacuum Street Sweeper	51
Tractor	53
Front End Loader	48
Compactor (ground)	52
Scraper	53
Auger Drill Rig	53
Slurry Trenching Machine	49
Gradall	52
Generator	50
Pneumatic Tools	54
Welder	43
Pump	50
Crane	50
Concrete Mixer Truck	48
Man-lift	44
Roller	49
Paver	46

Note: These calculations represent outdoor noise levels. For persons inside buildings with closed windows, the noise levels provided in this table would be attenuated by 25 dBA, based on FHWA guidance.

Source: RGD Acoustics (2018), FHWA (2006)

Phase 2 of the proposed project would not involve construction outside the allowable hours of operation or exceed the provisions of Municipal Code Section 8.32, nor would it cause ambient noise to increase significantly at nearby noise sensitive receptors. Therefore, this impact would be less than significant. As with Phase 1, implementation of Improvement Measure IM-NO-1, above, would further reduce less-than-significant impacts associated with the potential for annoyance to business operations at the neighboring office/warehouse buildings as well as Phase 1 occupants.

Impact NO-2: Construction of the proposed project would create a substantial temporary increase in groundborne vibration levels in the project vicinity above existing conditions. ***(Less than Significant with Mitigation)***

Groundborne vibrations from construction have the potential to affect the existing offsite receptors nearest to the project site such as the existing industrial and office/R&D uses adjacent to and within the project site. The project would involve construction activities in two development phases. Receptors would include the existing 400-450 East Jamie Court buildings, the existing buildings in the Phase 2 area, as well as the nearest offsite buildings.

Phase 1 Development

The proposed Phase 1 construction duration and the distance to nearby buildings are described in Impact NO-1 under "Phase 1 Development," above. Project-related construction vibration is evaluated using methods identified by Caltrans and the FTA.[25,26] Groundborne vibration generated by construction equipment often is evaluated by the maximum rate or velocity of particle movement, commonly referred to as PPV, typically measured in inches per second (in/sec). Most construction activities typically range from between approximately 0.003 in/sec PPV and 0.21 in/sec PPV, when measured at 25 feet. The site-specific construction equipment necessary at any particular location within the project site is not known at this time. **Table 4.8.13: Typical Construction Equipment Vibration Levels**, provides the distance at which various project construction equipment would exceed to the two relevant thresholds of significance, 0.5 in/sec PPV for building damage and 0.1 in/sec PPV for human annoyance.

As shown in Table 4.8.13, the distance at which typical construction equipment would cause substantial vibration in regard to annoyance would occur would be between approximately 0 to 41 feet. The distance at which typical construction equipment would cause substantial vibration in regard to building damage would occur would be between approximately 0 and 14 feet. In general, light equipment such as a small bulldozer would create the least vibration (0.003 PPV at 25 feet), and heavy equipment such as a clam shovel drop would create the most vibration (0.202 PPV at 25 feet). The proposed project may include deep foundations consisting of augured-cast-in-place piles, or drilled shafts. For the purposes of noise analysis, these activities are considered to be similar to caisson drilling, which would create mid-range vibration levels (0.089 PPV at 25 feet).[27]

[25] California Department of Transportation, 2013. *Transportation and Construction Vibration Manual*, Tables 18, 19, and 20, pp. 37–38, September 2013. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed May 30, 2018

[26] Federal Transit Authority, 2006. *Transit Noise and Vibration Impact Assessment*, pp. 12-10–12-14, May 2006. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed June 5, 2018.

[27] Caisson drilling is a method used to drill a hole and then insert either a temporary or permanent steel casing in the hole to the desired depth. Then a steel rebar cage is set in place and the hole is filled with concrete. Caisson foundations are mostly used when soil conditions are inadequate to support the load of the structure being built. Generally, caisson holes are created by auger drilling to bedrock or to soil suitable to carry the load.

Table 4.8.13: Typical Construction Equipment Vibration Levels

Construction Equipment or Activity	PPV at 25 feet (in/sec)	Distance at which construction equipment or activity exceeds vibration criteria (ft)	
		Annoyance Threshold (0.1 in/sec PPV)	Building Damage Threshold (0.5 in/sec)
Clam shovel drop	0.202	40	14
Vibratory roller	0.210	41	14
Hoe ram	0.089	23	8
Large bulldozer	0.089	23	8
Caisson drilling[1]	0.089	23	8
Loaded trucks	0.076	21	7
Jackhammer	0.035	12	4
Small bulldozer	0.003	2	1

Note: [1] The proposed project may include deep foundations consisting of augured-cast-in-place piles, or drilled shafts. For the purposes of noise analysis, these activities are considered to be similar to caisson drilling.

Source: RGD Acoustics (2018)

There are no sensitive receptors on the project site or within 41 feet of the project site. Vibration levels from construction equipment would not exceed the human annoyance thresholds beyond 41 feet and would not impact off-site land uses. Therefore, no impacts from construction-related groundborne vibration with respect to human annoyance at off-site sensitive land uses would occur under the proposed project during Phase 1 development.

The nearest off-site structures are located between 160 and 340 feet from the Phase 1 area. There are no off-site structures within 14 feet of the project site. Vibration levels from construction equipment would not exceed the building thresholds beyond 14 feet and would not impact off-site land uses. Therefore, no impacts would occur under the proposed project during Phase 1 development from construction-related groundborne vibration with respect to building damage at off-site sensitive land uses.

However, construction would occur adjacent to on-site buildings and occupants, including the existing office/R&D buildings to remain at 400-450 East Jamie Court, and the existing light industrial buildings in the Phase 2 area to remain during Phase 1 (151 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court). Some activities on the outer extent of the 201 Haskins Way parcel may also be within 14 feet of these existing light industrial buildings, which are narrowly set back from the 201 Haskins Way parcel line. Construction activities on the 201 Haskins Way parcel during Phase 1 could expose these existing onsite buildings to levels in excess of the building damage thresholds. Therefore, the impact of construction-related groundborne vibration is considered potentially significant.

Mitigation Measure MM-NO-2: Groundborne Vibration Minimization and Avoidance would involve the study of potential vibration-sensitive buildings and the preparation of a mitigation plan, which would apply to activities exceeding damage threshold at applicable distances.

Mitigation Measure MM-NO-2: Groundborne Vibration Minimization and Avoidance

Prior to issuance of a site permit, the project sponsor shall identify areas of potential building damage from construction vibration and determine the distance at which construction equipment would be used during implementation of the proposed project. For any equipment use that would be located near enough to a building to exceed the Caltrans/FTA building damage threshold of 0.5 in/sec, the project sponsor shall prepare a mitigation plan that provides a procedure for limiting vibration on potentially affected structures based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations. The project sponsor shall also prepare and implement a compliance monitoring program to ensure construction vibrations near buildings do not exceed the threshold of 0.5 in/sec, and identify site-specific control measures in consideration of equipment location and processes including, but not limited to, the following examples.

- Operate earth-moving equipment on the work site as far away from existing buildings and human-occupied sites as possible.
- Avoid simultaneous operation of vibration-causing construction equipment for demolition, earth-moving, or ground-impacting activities within approximately 50 feet existing buildings, where possible.
- Avoid operation of vibratory rollers and packers within approximately 50 feet of existing buildings, where possible.

Implementation of Mitigation Measure MM-NO-2 will involve preparation of a mitigation plan that will be developed and implemented during the final design phases of the project. Potential impacts associated with groundborne vibration would be identified, avoided and minimized. Therefore, with implementation of Mitigation Measure MM-NO-2, this impact would be reduced to a less-than-significant level.

Phase 2 Development

As shown in Table 4.8.4, typical construction equipment would cause substantial vibration in regard to human annoyance at a distance between approximately 0 to 41 feet. The proposed Phase 2 construction duration and the distance to nearby buildings are described in Impact NO-1 under "Phase 2 Development," above. There are no sensitive receptors on the project site or within 41 feet of the project site. Vibration levels from construction equipment would not exceed the human annoyance thresholds beyond 41 feet and would not impact off-site land uses. Therefore, no impacts from construction-related groundborne vibration with respect to human annoyance at off-site sensitive land uses would occur under the proposed project during Phase 2 development.

Typical construction equipment would cause substantial vibration in regard to building damage at a distance between approximately 0 and 14 feet. Offsite structures would generally be located farther from the project site construction activities (between 100 and 250 feet). The nearest off-site structures are located between 160 and 340 feet from the Phase 2 area. There are no off-site structures within 14 feet of the project site. Vibration levels from construction equipment would not exceed the building thresholds beyond 14 feet and would not impact off-site land uses. Therefore, no impacts from construction-related groundborne vibration with respect to building damage at off-site land uses would occur under the proposed project during Phase 2 development.

The closest structure that could be affected by Phase 2 construction-related groundborne vibration would be the existing on-site 400 and 450 East Jamie Court buildings. Potential Phase 2 development on this parcel is not certain at this time, but could include new building additions or new buildings adjacent to these existing structures. Although these office/R&D buildings are newly constructed and modern, the scope of Phase 2 development and the type of project construction activities necessary on this site have not been determined. Therefore, the impact of construction-related groundborne vibration is considered potentially significant.

There are no off-site buildings within 14 feet of the project site. However, the nearest off-site building, the Genentech parking structure at 620 East Grand Avenue, is located approximately 15 feet east of the project site boundary. To be conservative, it is assumed that this structure is within margin of error of the structural damage threshold. Although this parking structure newly constructed and modern, the type of project construction activities necessary adjacent to the project site boundary has not been determined. Therefore, the impact of construction-related groundborne vibration is considered potentially significant.

Mitigation Measure MM-NO-2 would involve the study of potential vibration-sensitive buildings and the preparation of a mitigation plan. Similar to Phase 1, with implementation of Mitigation Measure MM-NO-2, the impact of groundborne vibration during construction would be reduced to a less-than-significant level.

Operation

Mechanical Equipment Noise

Impact NO-3: Operation of the proposed project mechanical equipment would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions. ***(Less than Significant with Mitigation)***

The proposed project buildings under both Phase 1 and Phase 2 (at project buildout) are expected to have mechanical equipment generally associated with building ventilation/air-conditioning units and ventilation fans, but may also include other process-specific equipment and possibly emergency diesel generators. Much of the equipment would likely be located on the rooftops of the proposed buildings, or at-grade next to the buildings. However, at this time, the details and locations of the mechanical equipment are not known and therefore, calculations of specific noise levels at surrounding uses cannot be made.

According to the City's Municipal Code, maximum permissible sound levels from the project are determined by the land use category of the receiving property and the L_{50} noise standards are shown in Table 8.32.030 of the Municipal Code (see Table 4.8.8, above.). As discussed in the "Approach to Analysis" section for mechanical equipment noise, above, it is assumed for the purposes of this analysis that the C-1, P-C, Gateway and Oyster Point Marina specific plan districts' L_{50} standards (60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m.) would be applied to the project site and surrounding land uses when analyzing the proposed project. In addition, Section 8.32.040 "Interior Noise Limits" makes it unlawful for any person to operate or cause to be operated any source of sound on multitenant commercial or industrial property, a noise level more than 10 dB above the allowed level

specified in Table 8.32.030, when measured 3 feet from any wall, floor or ceiling inside any unit when the windows and doors of the units are closed.

As shown in Table 4.8.6, none of the short-term noise measurements exceed a daytime L_{50} of 65 dB. The highest existing short-term noise measurement taken in the project vicinity was a daytime L_{50} of 61 dB at Location ST-1.

The large commercial systems that are often used in this type of building can generate high noise levels and they would have the potential to generate noise levels in excess of the assumed maximum permissible L_{50} sound level of 65 dB. Therefore, noise from mechanical equipment is considered a potentially significant impact at Phase 1 and project buildout. Mitigation Measure MM-NO-3: Mechanical Equipment Noise Requirements would require analysis of mechanical equipment noise, implementation of noise control measures, and submission of a mechanical equipment noise report prior to issuance of a building permit.

> **Mitigation Measure MM-NO-3: Mechanical Equipment Noise Requirements**
>
> Analysis of noise from the project's mechanical equipment shall be conducted to determine if the equipment will exceed the maximum permissible L_{50} sound levels 60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m. when measured at any receiving property as determined by Table 8.32.030 of the Municipal Code forC-1, P-C, Gateway, and Oyster Point Marina specific plan districts and what, if any, noise control measures must be included in the design to meet the City's requirements. Typical noise control measures include barriers, enclosures, silencers and acoustical louvers at vent openings. Prior to issuance of any building permits, the project applicant shall submit a report showing that noise levels calculated for project mechanical equipment will be no greater than maximum permissible sound levels provided in Municipal Code Chapter 8.32 and Table 8.32.030 on receiving properties.

With the implementation of Mitigation Measure MM-NO-3, impacts associated with mechanical equipment noise from the proposed project at Phase 1 or project buildout would be reduced to a less-than-significant level.

Traffic Noise

Impact NO-4: Traffic volumes generated by operation of the proposed project would not create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions. ***(Less than Significant)***

PHASE 1 DEVELOPMENT

Traffic noise levels with and without implementation of Phase 1 of the proposed project are shown in **Table 4.8.14: Traffic Noise Levels under the Proposed Project – Phase 1**, along with the increase in noise due to the project.

Table 4.8.14 shows that the increase in traffic noise would be less than 3 dBA for all roadways in the study area under Phase 1 development. There are childcare centers and a preschool along Gateway Boulevard and Allerton Avenue. The nearest child care center to the project site is the Genentech Childcare Facility currently under construction at 342 Allerton Avenue.

Table 4.8.14: Traffic Noise Levels under the Proposed Project – Phase 1

Roadway		Existing	Existing Plus Phase 1	Increase over Existing
Oyster Point Blvd				
	West of Gateway Blvd	75.2	75.2	0.0
	East of Gateway Blvd	74.1	74.1	0.0
Gateway Blvd				
	Oyster Point Blvd to East Grand Ave	70.4	70.5	0.1
	East Grand Ave to Mitchell Ave	70.2	70.5	0.3
Grand Ave				
	West of Airport Blvd	68.1	68.1	0.0
	Poletti Way to East Grand Ave	69.7	69.9	0.2
East Grand Ave				
	Dubuque Ave to Grand Ave	72.8	73.1	0.3
	Grand Ave to Gateway Blvd	73.6	73.8	0.2
	Gateway Blvd to Forbes Blvd	74.8	75.1	0.3
	Forbes Blvd to Littlefield Ave	73.5	74.0	0.5
	Littlefield Ave to Allerton Ave	74.4	74.9	0.5
	Allerton Ave to Haskins Way	73.3	74.1	0.8
	East of Haskins Way	68.0	68.0	0.0
Haskins Way				
	South of East Grand Ave	68.9	70.8	1.9
Allerton Ave				
	North of East Grand Ave	66.5	66.5	0.0
Littlefield Ave				
	South of East Grand Ave	68.8	69.0	0.2
Forbes Blvd				
	North of East Grand Ave	70.3	70.6	0.3
Harbor Way				
	South of East Grand Ave	70.3	70.3	0.0
Airport Blvd				
	North of Grand Ave	72.5	72.6	0.1
	Grand Ave to San Mateo Ave	73.3	73.3	0.0
South Airport Blvd				
	Michell Ave to U.S. NB Ramp	73.5	73.6	0.1
	U.S. 101 NB Ramp to Utah Ave	71.1	71.1	0.0
	South of Utah Ave	73.4	73.4	0.0
San Mateo Ave				
	West of Airport Blvd	71.4	71.4	0.0
Produce Ave				
	South of San Mateo Ave	73.5	73.6	0.1
Utah Ave				
	East of South Airport Blvd	72.9	73.0	0.1
Mitchell Ave				
	East of Gateway Blvd	71.7	71.7	0.0
U.S. 101 NB Ramps				
	Off-Ramp to East Grand Ave	71.1	71.2	0.1
	Intersecting South Airport Blvd	73.4	73.5	0.1

Note: NB = northbound

Source: RGD Acoustics (2018)

To evaluate impacts on this facility, the nearest applicable noise segments would be East Grand Avenue (between Haskins Way and Allerton Avenue) or Allerton Avenue (north of East Grand Avenue). As shown in Table 4.8.14, these road segments would be exposed to increases which are less than the 3 dBA threshold for a significant increase. Therefore, increase in traffic noise due to the project at Phase 1 development is considered a less-than-significant impact.

PROJECT BUILDOUT

Traffic noise levels with and without implementation of project buildout are shown in **Table 4.8.15: Traffic Noise Levels under the Proposed Project at Project Buildout**, along with the increase in noise due to the project.

Table 4.8.15 shows that the increase in traffic noise would be less than 3 dBA for all roadways in the study area under the project buildout scenario. The nearest child care center to the project site, the future Genentech Childcare Facility located at 342 Allerton Avenue, would be exposed to increases in traffic noise levels less than the 3 dBA threshold for a significant increase in noise levels to sensitive receptors.[28]

Therefore, the increase in traffic noise due to the project at project buildout would be considered a less-than-significant impact.

[28] To evaluate impacts to this facility, the nearest applicable noise segments would be East Grand Avenue (between Haskins Way and Allerton Avenue) or Allerton Avenue (north of East Grand Avenue).

Table 4.8.15: Traffic Noise Levels under the Proposed Project at Project Buildout

Roadway		Existing	Existing Plus Project Buildout	Increase over Existing
Oyster Point Blvd				
	West of Gateway Blvd	75.2	75.3	0.1
	East of Gateway Blvd	74.1	74.1	0.0
Gateway Blvd				
	Oyster Point Blvd to East Grand Ave	70.4	70.5	0.1
	East Grand Ave to Mitchell Ave	70.2	70.6	0.4
Grand Ave				
	West of Airport Blvd	68.1	68.2	0.1
	Poletti Way to East Grand Ave	69.7	70.0	0.3
East Grand Ave				
	Dubuque Ave to Grand Ave	72.8	73.3	0.5
	Grand Ave to Gateway Blvd	73.6	74.0	0.4
	Gateway Blvd to Forbes Blvd	74.8	75.3	0.5
	Forbes Blvd to Littlefield Ave	73.5	74.3	0.8
	Littlefield Ave to Allerton Ave	74.4	75.2	0.8
	Allerton Ave to Haskins Way	73.3	74.6	1.3
	East of Haskins Way	68.0	68.0	0.0
Haskins Way				
	South of East Grand Ave	68.9	71.8	2.9
Allerton Ave				
	North of East Grand Ave	66.5	66.5	0.0
Littlefield Ave				
	South of East Grand Ave	68.8	69.2	0.4
Forbes Blvd				
	North of East Grand Ave	70.3	70.9	0.6
	Harbor Way			
South of East Grand Ave		70.3	70.3	0.0
Airport Blvd				
	North of Grand Ave	72.5	72.7	0.2
	Grand Ave to San Mateo Ave	73.3	73.3	0.0
South Airport Blvd				
	Michell Ave to U.S. NB Ramp	73.5	73.7	0.2
	U.S. 101 NB Ramp to Utah Ave	71.1	71.1	0.0
	South of Utah Ave	73.4	73.5	0.1
San Mateo Ave				
	West of Airport Blvd	71.4	71.4	0.0
Produce Ave				
	South of San Mateo Ave	73.5	73.7	0.2
Utah Ave				
	East of South Airport Blvd	72.9	73.1	0.2
Mitchell Ave				
	East of Gateway Blvd	71.7	71.7	0.0
U.S. 101 NB Ramps				
	Off-Ramp to East Grand Ave	71.1	71.3	0.2
	Intersecting South Airport Blvd	73.4	73.5	0.1

Notes: NB = northbound

Bold means the proposed project at project buildout would generate over 3 dBA of traffic noise at that particular roadway.

Source: RGD Acoustics (2018)

CUMULATIVE IMPACTS

Construction

Impact C-NO-1: Construction of the proposed project would not make a cumulatively considerable contribution to significant cumulative construction noise impacts (i.e. that would substantially increase temporary noise levels at uses in the vicinity of the site). ***(Less than Significant)***

Multiple sources of construction equipment may create a combined noise effect. However, noise is generally limited by the distance noise can travel. Most construction equipment noise sources would attenuate to reasonable background levels at a distance of approximately 1,500 feet. A list of reasonably foreseeable future projects is listed under "Approach to Cumulative Impact Analysis" under Section 4.1, Approach to Environmental Analysis, and a map showing the location of these projects is provided in Figure 4.1.1, Location of Baseline and Cumulative Projects, on p. 4.1.5. Each of these projects would create construction equipment noise to surrounding industrial and office/R&D land uses. The nearest sensitive receptor to the project site, the future Genentech Childcare Facility, is within 1,500 feet of two cumulative projects: the 494 Forbes Boulevard project and the *Genentech Master Plan Update* project.

Similar to the proposed project, both of these projects would involve the demolition of existing structures (paved hardscapes and/or buildings) and the construction of new buildings. These projects would involve a similar array of typical construction equipment. Similar to the proposed project, these reasonably foreseeable future projects would generally involve construction activities during allowable daytime construction hours as defined by the Municipal Code. Noise from construction activities would be noticeable at times at neighboring buildings. The increase in average noise levels will depend on the duration of the construction equipment use and the number of simultaneous activities.

The nearest noise-sensitive land use is the outdoor area of the future Genentech Childcare Facility. In combination with other reasonably foreseeable future projects, including the 494 Forbes Boulevard project and the *Genentech Master Plan Update* project, the exact nature of the overlap in construction durations or equipment types is unknown. The cumulative construction noise among these projects would likely vary from month to month, and from year to year. As with the proposed project, each of these reasonably foreseeable future projects would be required to mitigate potentially significant noise impacts on sensitive receptors such as the future Genentech Childcare Facility to the greatest extent feasible, including the use of mufflers, sound walls, or scheduling. Therefore, the cumulative impact of construction-generated noise would be less than significant.

As stated in Impact NO-1, given the distance of the Genentech Childcare Facility of at least 1,200 feet from the project site, the noise from project-related construction would be less than 50 dBA and, therefore, barely noticeable above the ambient noise. Therefore, the proposed project, would not considerably contribute to a significant cumulative construction noise impact. Implementation of Mitigation Measure MM-NO-1, above, would further reduce cumulatively considerable contributions. No additional mitigation is necessary.

Impact C-NO-2: Construction of the proposed project would make a cumulatively considerable contribution to significant cumulative groundborne vibration impacts (i.e., that would substantially increase temporary vibration at uses in the vicinity of the site). ***(Less than Significant with Mitigation)***

Multiple sources of construction equipment may create a combined vibration effect. However, groundborne vibration is generally limited by the distance vibration can travel. Most sources of groundborne vibration would attenuate to reasonable background levels at a distance of approximately 250 feet. A list of reasonably foreseeable future projects is listed under "Approach to Cumulative Impact Analysis" under Section 4.A, Approach to Environmental Analysis, and a map showing the location of these projects is provided in Figure 4.1.1, Location of Baseline and Cumulative Projects, on p. 4.1.5. Each of these projects would create construction vibration to surrounding industrial and office/R&D land uses. The only cumulative project within 500 feet of the project site is the *Genentech Master Plan Update* project. Given that the proposed project would not generate vibration within 41 feet of the future Genentech Childcare Facility, the proposed project would not generate groundborne vibration to that facility in a manner that would exceed human annoyance thresholds, and no cumulative vibration impact with respect to the human annoyance threshold would occur.

Typical construction equipment would cause substantial vibration in regard to building damage at a distance between approximately 0 and 14 feet. Similar to the proposed project, the *Genentech Master Plan Update* project would involve the demolition of existing structures (paved hardscapes and/or buildings) and the construction of new buildings. These projects would involve a similar array of typical construction equipment. The *Genentech Master Plan Update* project shares a boundary with the eastern boundary of the project site. Given the close proximity of these two project boundaries, any construction activities within this vicinity could generate vibration in excess of the building damage threshold. The increase in vibration levels will depend on the duration of the construction equipment use and the number of simultaneous activities. The exact nature of the overlap in construction durations or equipment types is unknown. The cumulative construction vibration between the proposed project and the *Genentech Master Plan Update* project would likely vary from month to month, and from year to year. Based on the location of each project site, the buildings most likely to be affected would be the existing buildings in the Phase 2 area (particularly 451 East Jamie Court and 430 East Grand Avenue), or adjacent buildings on the Genentech Campus (one parking structure and one office building). However, due to the built-out nature of the Genentech campus at this location, it is unlikely that future development intensification would occur under the *Genentech Master Plan Update* project in this vicinity.

As with the proposed project, the *Genentech Master Plan Update* project would be required to mitigate potentially significant groundborne vibration impacts to the greatest extent feasible. Due to the wide area of sites within the *Genentech Master Plan Update* boundary that may involve new construction, and the site-specific nature of vibration, it is unlikely that construction activities would produce substantial, combined, vibration at any given point. Therefore, with implementation of Mitigation Measure MM-NO-2, above, the cumulative impact of groundborne construction-generated vibration would be less than significant. The proposed project would not considerably contribute to a significant cumulative construction vibration impact.

Operation

Mechanical Equipment Noise

Impact C-NO-3: Operation of the proposed project's mechanical equipment would not make a cumulatively considerable contribution to significant cumulative noise impacts (i.e., noise that would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions). ***(Less than Significant)***

Multiple operational mechanical equipment sources may create a combined noise effect. However, noise is generally limited by the distance noise can travel. Most mechanical equipment noise sources would attenuate to reasonable background levels at a distance of approximately 1,500 feet. A list of reasonably foreseeable future projects is listed under "Approach to Cumulative Impact Analysis" under Section 4.1, Approach to Environmental Analysis, and a map showing the location of these projects is provided in Figure 4.1.1, Location of Baseline and Cumulative Projects, on p. 4.1.5. Each of these projects would create mechanical equipment noise to surrounding industrial and office/R&D land uses. The nearest sensitive receptor to the project site, the future Genentech Childcare Facility, is within 1,500 feet of two cumulative projects: the 494 Forbes Boulevard project and the *Genentech Master Plan Update* project.

Similar to the proposed project, both of these projects involve construction of new buildings and are expected to have mechanical equipment generally associated with building ventilation/air-conditioning units, ventilation fans, other process specific equipment, and emergency diesel generators. Much of the equipment would likely be located on the rooftops of the proposed buildings, or at-grade next to the buildings.

As with the proposed project, these reasonably foreseeable future projects are required to comply with the Municipal Code pertaining to maximum permissible sound levels at receiving properties for C-1, P-C, Gateway, and Oyster Point Marina specific plan districts (see Table 4.8.8, above.). Most of these projects would involve large commercial mechanical systems that can generate high noise levels, and therefore they would have the potential to generate noise levels in excess of the Municipal Code requirement. However, as with the proposed project, these projects would be required to comply with the Municipal Code's noise requirements, and would be required to mitigate any noise impacts resulting from project-specific mechanical systems. Therefore, there would be no significant cumulative impact related to mechanical system equipment noise. As such, the proposed project at Phase 1 or project buildout would not contribute considerably to a significant mechanical equipment noise impact. No mitigation is necessary.

Traffic Noise

Impact C-NO-4: Traffic volumes generated by operation of the proposed project would not make a cumulatively considerable contribution to significant cumulative traffic noise impacts (i.e., traffic noise that would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions). ***(Less than Significant)***

In the future, traffic will increase due to general growth in the East of 101 Area. The future traffic volumes in this area are based on City predictions for traffic in the year 2040. **Table 4.8.16: Traffic**

Noise Levels under the Proposed Project at Phase 1 in Future Year 2040 and **Table 4.8.17: Traffic Noise Levels under the Proposed Project at Project Buildout in Future Year 2040** show the future traffic noise levels for the Future Year 2040 without the proposed project, future with Phase 1 development of the proposed project, and future with project buildout.

The nearest applicable noise segments to the future Genentech Childcare Facility, located at 342 Allerton Avenue, would be East Grand Avenue (between Allerton Avenue and Haskins Way) or Allerton Avenue (north of East Grand Avenue). As shown in Table 4.8.16 and 4.8.17, the increase in traffic noise at these road segments would be less than 3 dBA, and no significant impacts related to cumulative noise levels at this childcare facility would occur.

Tables 4.8.16 and 4.8.17 show that the increase in traffic noise would be greater than 3 dBA but less than 5 dBA for five roadways in the study area: (1) Gateway Boulevard from Oyster Point Boulevard to East Grand Avenue; (2) East Grand Avenue to Mitchell Avenue; (3) East Grand Avenue from Dubuque Avenue to Grand Avenue; (4) Grand Avenue to Gateway Boulevard; and (5) east of Haskins Way. This increase in future noise level would be greater than 3 dBA at these road segments and this would be a significant cumulative impact. However, as shown in Tables 4.8.16 and 4.8.17, the proposed project's contribution to this impact is less than 1 dBA for all road segments. Therefore, the proposed project's future traffic noise contribution would not be cumulatively considerable.

The proposed project, under Phase 1 or project buildout, would not contribute considerably to a significant cumulative operational traffic noise impact. No mitigation is necessary.

Table 4.8.16: Traffic Noise Levels under the Proposed Project at Phase 1 in Future Year 2040

Roadway	Existing	Future Year 2040	Future 2040 Plus Phase 1	Increase to Existing	Project (Phase 1) Contribution to Increase
Oyster Point Blvd					
West of Gateway Blvd	75.2	78.1	78.1	2.9	0.0
East of Gateway Blvd	74.1	76.2	76.2	2.1	0.0
Gateway Blvd					
Oyster Point Blvd to East Grand Ave	**70.4**	**73.5**	**73.6**	**3.2**	**0.1**
East Grand Ave to Mitchell Ave	**70.2**	**73.6**	**73.7**	**3.5**	**0.1**
Grand Ave					
West of Airport Blvd	68.1	70.5	70.5	2.4	0.0
Poletti Way to East Grand Ave	69.7	70.1	70.2	0.5	0.2
East Grand Ave					
Dubuque Ave to Grand Ave	**72.8**	**76.5**	**76.6**	**3.8**	**0.1**
Grand Ave to Gateway Blvd	**73.6**	**77.0**	**77.1**	**3.5**	**0.1**
Gateway Blvd to Forbes Blvd	74.8	76.0	76.2	1.4	0.2
Forbes Blvd to Littlefield Ave	73.5	74.7	75.0	1.5	0.3
Littlefield Ave to Allerton Ave	74.4	75.1	75.4	1.0	0.3
Allerton Ave to Haskins Way	73.3	74.4	74.0	0.7	-0.4
East of Haskins Way	**68.0**	**71.0**	**71.0**	**3.0**	**0.0**
Haskins Way					
South of East Grand Ave	68.9	69.1	70.8	1.9	1.7
Allerton Ave					
North of East Grand Ave	66.5	68.4	68.4	1.9	0.0
Littlefield Ave					
South of East Grand Ave	68.8	70.0	70.1	1.3	0.1
Forbes Blvd					
North of East Grand Ave	70.3	72.0	72.2	1.9	0.2
Harbor Way					
South of East Grand Ave	70.3	71.1	71.1	0.8	0.0
Airport Blvd					
North of Grand Ave	72.5	74.6	74.7	2.2	0.1
Grand Ave to San Mateo Ave	73.3	74.2	74.3	1.0	0.1
South Airport Blvd					
Michell Ave to U.S. NB Ramp	73.5	75.5	75.5	2.0	0.0
U.S. 101 NB Ramp to Utah Ave	71.1	72.2	72.2	1.1	0.0
South of Utah Ave	73.4	74.9	74.9	1.5	0.0
San Mateo Ave					
West of Airport Blvd	71.4	72.4	72.4	1.0	0.0
Produce Ave					
South of San Mateo Ave	73.5	75.5	75.6	2.1	0.1
Utah Ave					
East of South Airport Blvd	72.9	74.6	74.7	1.8	0.1
Mitchell Ave					
East of Gateway Blvd	71.7	73.7	73.7	2.0	0.0
U.S. 101 NB Ramps					
Off-Ramp to East Grand Ave	71.1	71.1	71.2	0.1	0.1
Intersecting South Airport Blvd	73.4	75.7	75.8	2.4	0.1

Note: NB = northbound

Source: RGD Acoustics (2018)

Table 4.8.17: Traffic Noise Levels under the Proposed Project at Project Buildout in Future Year 2040

Roadway	Existing	Future 2040	Future 2040 Plus Project Buildout	Increase to Existing	Project (Project Buildout) Contribution to Increase
Oyster Point Blvd					
West of Gateway Blvd	75.2	78.1	78.1	2.9	0.0
East of Gateway Blvd	74.1	76.2	76.2	2.1	0.0
Gateway Blvd					
Oyster Point Blvd to East Grand Ave	**70.4**	**73.5**	**73.6**	**3.2**	**0.1**
East Grand Ave to Mitchell Ave	**70.2**	**73.6**	**73.8**	**3.6**	**0.2**
Grand Ave					
West of Airport Blvd	68.1	70.5	70.5	2.4	0.0
Poletti Way to East Grand Ave	69.7	70.1	70.3	0.6	0.3
East Grand Ave					
Dubuque Ave to Grand Ave	**72.8**	**76.5**	**76.6**	**3.8**	**0.1**
Grand Ave to Gateway Blvd	**73.6**	**77.0**	**77.2**	**3.6**	**0.2**
Gateway Blvd to Forbes Blvd	74.8	76.0	76.4	1.6	0.4
Forbes Blvd to Littlefield Ave	73.5	74.7	75.3	1.8	0.6
Littlefield Ave to Allerton Ave	74.4	75.1	75.7	1.3	0.6
Allerton Ave to Haskins Way	73.3	74.4	74.4	1.1	0.0
East of Haskins Way	**68.0**	**71.0**	**71.0**	**3.0**	**0.0**
Haskins Way					
South of East Grand Ave	68.9	69.1	71.6	2.7	2.5
Allerton Ave					
North of East Grand Ave	66.5	68.4	68.4	1.9	0.0
Littlefield Ave					
South of East Grand Ave	68.8	70.0	70.3	1.5	0.3
Forbes Blvd					
North of East Grand Ave	70.3	72.0	72.3	2.0	0.3
Harbor Way					
South of East Grand Ave	70.3	71.1	71.1	0.8	0.0
Airport Blvd					
North of Grand Ave	72.5	74.6	74.5	2.0	-0.1
Grand Ave to San Mateo Ave	73.3	74.2	74.3	1.0	0.1
South Airport Blvd					
Michell Ave to U.S. NB Ramp	73.5	75.5	75.6	2.1	0.1
U.S. 101 NB Ramp to Utah Ave	71.1	72.2	72.2	1.1	0.0
South of Utah Ave	73.4	74.9	75.0	1.6	0.1
San Mateo Ave					
West of Airport Blvd	71.4	72.4	72.4	1.0	0.0
Produce Ave					
South of San Mateo Ave	73.5	75.5	75.6	2.1	0.1
Utah Ave					
East of South Airport Blvd	72.9	74.6	74.7	1.8	0.1
Mitchell Ave					
East of Gateway Blvd	71.7	73.7	73.7	2.0	0.0
U.S. 101 NB Ramps					
Off-Ramp to East Grand Ave	71.1	71.1	71.3	0.2	0.2
Intersecting South Airport Blvd	73.4	75.7	75.8	2.4	0.1

Note: NB = northbound

Source: RGD Acoustics (2018)

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