ATTACHMENT J

NOISE AND VIBRATION ASSESSMENT

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NOISE AND VIBRATION ASSESSMENT

South Coast Technology Center Project

Santa Ana, California

Prepared By:

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June 14, 2024

JN 199799

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We Make a Difference

MEMORANDUM

To: Jeffrey M. Reese, C.J. Segerstrom & Sons

From: Darshan Shivaiah, Michael Baker International

Date: June 14, 2024

Subject: South Coast Technology Center Project – Noise and Vibration Assessment

PURPOSE

The purpose of this memorandum is to evaluate potential short- and long-term noise and vibration related impacts to surrounding land uses as a result of implementation of the proposed South Coast Technology Center Project (project). As the project is within the scope of buildout defined in the City of Santa Ana (City) General Plan Land Use Plan, which was analyzed in the General Plan Update Program Environmental Impact Report (GPU PEIR), this memorandum compares the project's impacts with the impacts identified in the GPU PEIR.

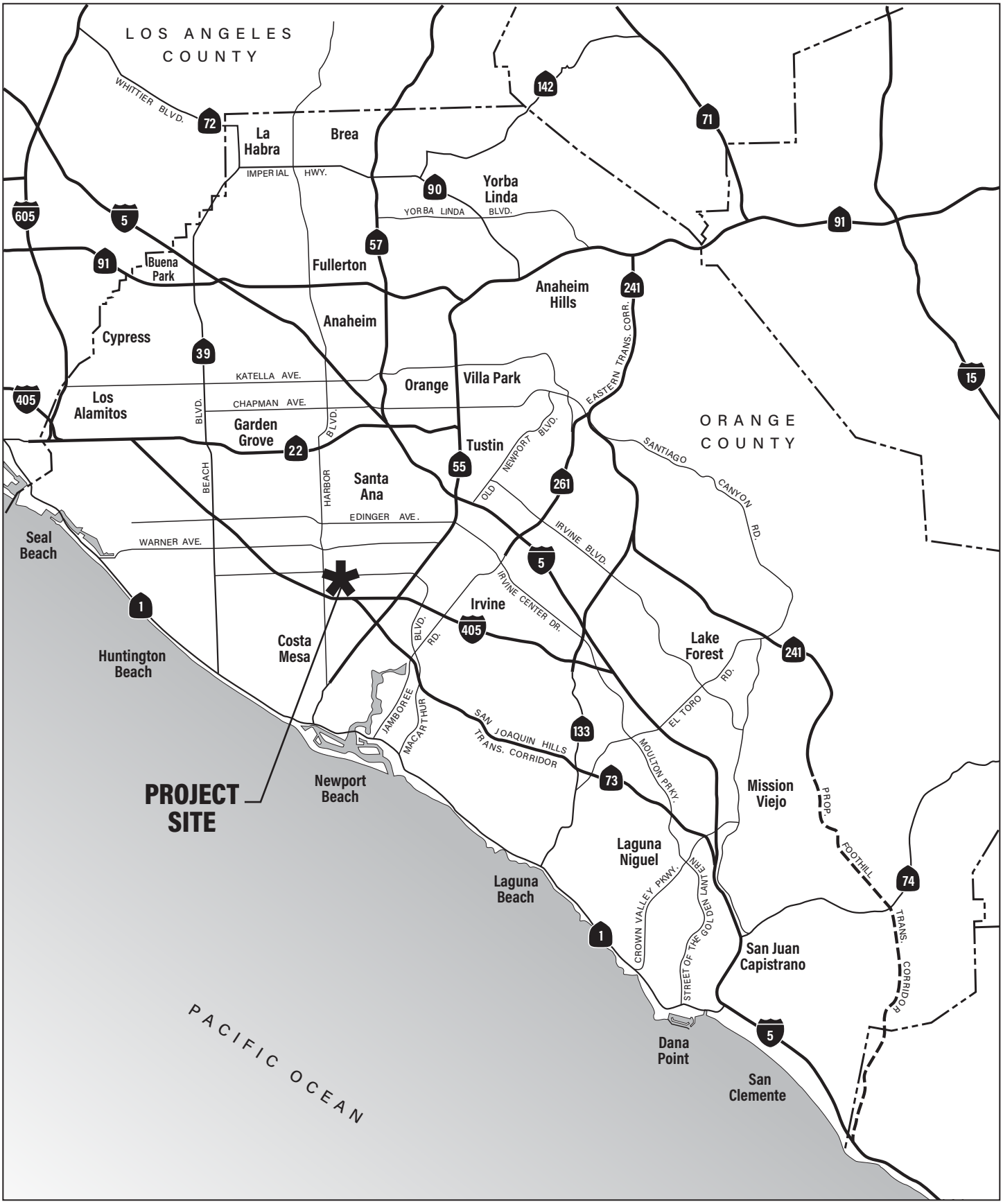
PROJECT LOCATION

The City is in central Orange County (County), generally north of the San Diego Freeway (Interstate 405 [I-405]), south of the Garden Grove Freeway (State Route 22 [SR-22]), and west of the Costa Mesa Freeway (SR-55) and Interstate 5 (I-5). The City is approximately 30 miles southeast of downtown Los Angeles; refer to Exhibit 1, *Regional Vicinity*.

The approximately 15.8-acre project site is located at 3100, 3110, and 3120 Lake Center Drive within the southwestern portion of the City. Regional access to the project site is provided via I-405. Local access to the site is provided via West Lake Center Drive and South Susan Street; refer to Exhibit 2, *Site Vicinity*.

EXISTING SITE CONDITIONS

The project site is in a highly developed and urbanized area of the City. The project site comprises an existing 10.2-acre office park, Lake Center Office Park, and includes an approximately 5.6-acre vacant field west of the existing buildings. The project site is bifurcated by the north-south South Susan Street. The Lake Center Office Park contains three buildings that surround a manmade pond with fountain features, surface parking, a parking structure, a grass lawn, and landscaping.



SOUTH COAST TECHNOLOGY CENTER PROJECT
NOISE ASSESSMENT TECHNICAL MEMORANDUM

Regional Vicinity

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Exhibit 1

Source: Google Earth Pro, April 2024

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NOISE ASSESSMENT TECHNICAL MEMORANDUM

Site Vicinity

Exhibit 2

According to the General Plan Update Land Use Element Figure LU-1*, Land Use Map*, the project site is designated Industrial (IND).[1] The Industrial designation provides space for activities such as light and heavy manufacturing, warehousing, processing, and distribution as well as commercial uses ancillary to industrial activities. Based on the *City of Santa Ana Zoning Map* (Zoning Map), the site is zoned Specific Development No. 58 (SD-58).[2] According to Ordinance No. NS-2089, permitted uses in the SD-58 District are professional and business offices providing personal and professional services including employment agencies, medical insurance, real estate, travel, trade contractors, architects, engineers, finance, research and development, and other similar use.

Surrounding uses adjacent to the project site include office, commercial, and recreational uses. To the north of the project site, across from West Lake Center Drive, is the Calvary Chapel Private School Program support facility and athletic fields. Surface parking and a parking structure bound the project site to the east. To the south of the project site are office buildings, surface parking lots, and a United States Postal Service facility. Freight rail tracks bound the project site to the west.

PROJECT DESCRIPTION

The project proposes to demolish the Lake Center Office Park, including three existing buildings, a parking structure, and parking lots to construct three new Class A industrial buildings for office, manufacturing, and/or warehouse use. The three existing buildings that would be demolished are located on the eastern portion of the project site and total 178,026 square feet. The total site area of 689,310 square feet (15.8 net acres) would be divided into two lot areas containing three buildings. Two new buildings (Buildings 2 and 3) would be constructed to replace the Lake Center Office Park and one new building (Building 1) would be constructed on the undeveloped field located to the west of Susan Street; refer to Exhibit 3, *Conceptual Site Plan*. The three proposed Class A buildings would result in a total building square footage of 313,044 square feet.[3] Each building would have a truck dock and a potential mezzanine located opposite the truck dock. A total of 497 parking stalls would be provided for the project. The characteristics of each building are further detailed below.

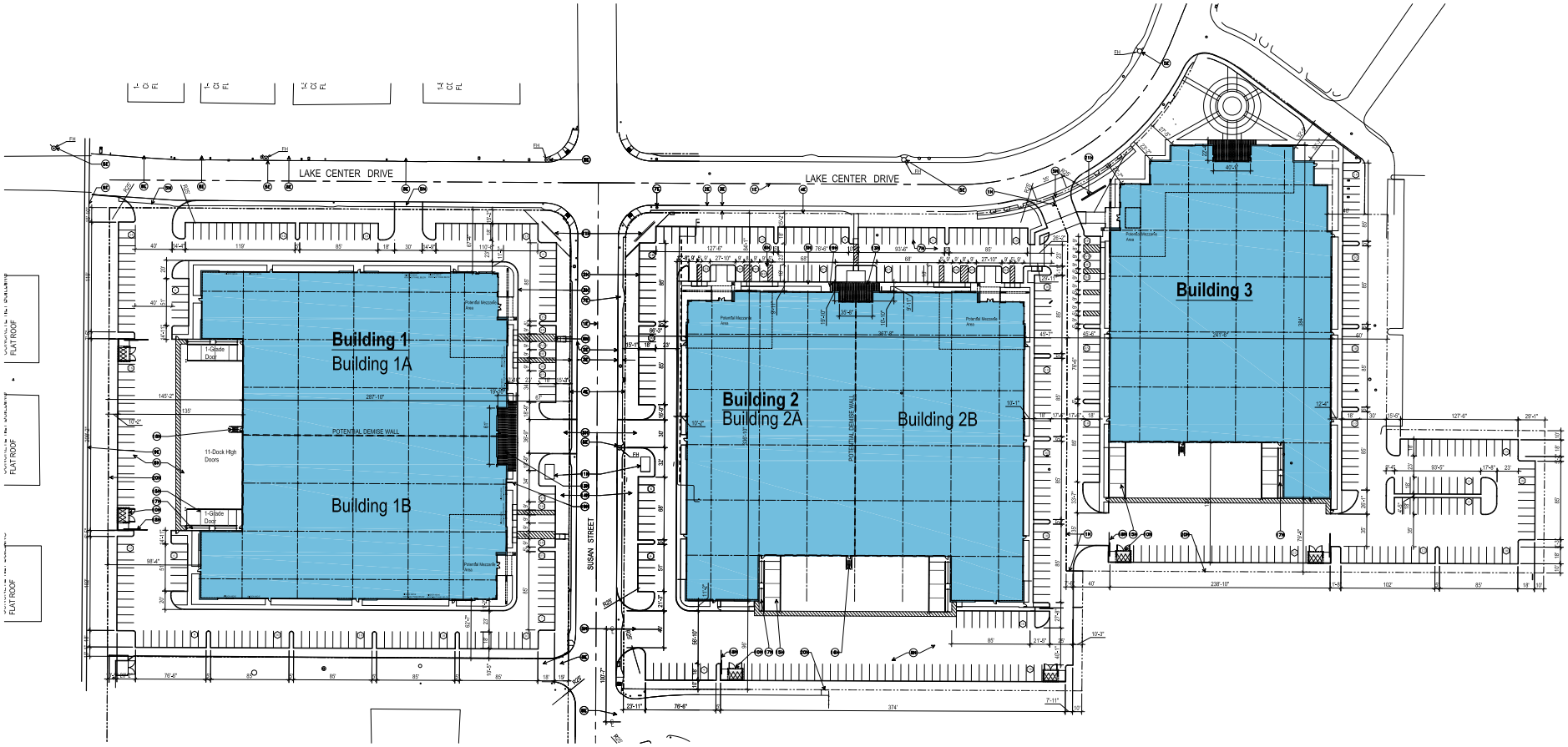
Located on the parcel west of Susan Street, Building 1 would have a total lot area of 243,212 square feet (5.6 net acres) and would consist of a 58,615-square-foot tenant space and a 53,615--square-foot tenant space, for a total building square footage of 112,230 square feet. A truck loading dock with nine dock high doors and two grade doors would be located on the western side of the building, facing the existing railroad. Building 1 would have a maximum exterior height of 48 feet and 4 inches.

Building 2 would be centrally located on the project site on a 446,098-square-foot lot area (10.2 net acres) shared with Building 3. Building 2 would consist of two approximately 60,823-square-foot tenant spaces, for a total building square footage of 121,645 square feet. A truck loading dock with 11 dock high doors and two grade doors would be located on the southern side of the building. Building 2 would have a maximum exterior height of 48 feet and 4 inches.

1 City of Santa Ana, *Golden City Beyond, Santa Ana General Plan Land Use Element, Figure LU-1, Land Use Map*, April 2022.

2 City of Santa Ana, *City of Santa Ana Zoning Map,* February 16, 2023.

3 The following analysis was conducted for a larger project with three industrial buildings totaling 325,044 square feet and is conservative since the total building square footage for the proposed project has been reduced to 313,244 square feet.



Source: DRA Architects, April 2024

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Conceptual Site Plan

Exhibit 3

Building 3 would be located on the eastern portion of the project site on a 446,098-square-foot lot area (10.2 net acres) shared with Building 2. Building 3 would be 79,369 square feet. A truck loading dock with seven dock high doors and one grade door would be located on the southern side of the building. Building 3 would have a maximum exterior height of 44 feet and 5 inches.

Of the 497 parking stalls proposed, 164 parking stalls would be located around Building 1, 178 parking stalls would be located around Building 2, and 155 parking stalls would be located east, south, and west of Building 3. Additionally, the project would include a total of 2,815 square feet of outdoor covered patio area (1,210 square feet for Building 1, 707 square feet for Building 2, and 895 square feet for Building 3).

Ancillary improvements to the project site would include landscaping, monument signage, lighting, and fencing. The proposed project would also include 27 short-term bike parking and 27 long-term bike parking near the building entrances. Similar to existing conditions, the project site would be accessible from Lake Center Drive and South Susan Street. The northern frontage of Building 3 would feature a prominent landscaped entrance to the South Coast Technology Center. Internal drive aisles would provide access to the proposed buildings.

Construction of the proposed project is anticipated to take approximately 16 months to complete, commencing in August 2024 and concluding in December 2025. Construction would occur in a single phase and would consist of the following activities:

- Demolition – 2 months
- Grading – 1+ months
- Building construction – 12 months
- Paving – 0.5 months
- Architectural coating – 1 month

FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air and is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) has been developed. Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner like the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA.

Noise is generally defined as unwanted or excessive sound, which can vary in intensity by over one million times within the range of human hearing; therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity. Noise can be generated by several sources, including mobile sources such as automobiles, trucks, and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates (is reduced) at a rate between 3 dBA and 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. Hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3 dBA per doubling of distance. Soft surfaces, such as

uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance. Noise generated by stationary sources typically attenuates at a rate between 6 dBA and about 7.5 dBA per doubling of distance.

There are several metrics used to characterize community noise exposure, which fluctuate constantly over time. One such metric, the equivalent sound level (L_{eq}), represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound. This is commonly used to describe the "average" noise levels within the environment. Noise exposure over a longer period is often evaluated based on the Day-Night Sound Level (L_{dn}). This is a measure of 24-hour noise levels that incorporates a 10-dBA penalty (or an additional 10 dBA) for sounds occurring between 10:00 p.m. and 7:00 a.m. when sounds seem to be louder. The penalty is intended to reflect the increased human sensitivity to noises occurring during nighttime hours, particularly at times when people are sleeping and there are lower ambient (background) noise conditions. Typical L_{dn} noise levels for light- and medium-density residential areas range from 55 dBA to 65 dBA. Similarly, Community Noise Equivalent Level (CNEL) is a measure of 24-hour noise levels, not an actual sound level heard at any time, that incorporates a 5-dBA penalty for sounds occurring between 7:00 p.m. and 10:00 p.m. and a 10-dBA penalty for sounds occurring between 10:00 p.m. and 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.[4]

FUNDAMENTALS OF ENVIRONMENTAL GROUNDBORNE VIBRATION

Ground vibration consists of oscillatory (i.e., rapidly fluctuating) motions or waves with an average motion of zero (i.e., no net movement of the vibration element). Sources of earth-borne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).
Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); 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 decibels (VdB) is commonly used to measure the RMS vibration velocity level. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.[5]

Table 1, *Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels*, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently 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.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as pile driving and vibratory compacting activities which require the use of heavy-duty earth moving

4 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
5 Ibid.

equipment. For the purposes of this analysis, a PPV descriptor with units of inches per section (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

Table 1
Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels

Peak Particle Velocity (inches/second)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006–0.019	64–74	Range of threshold of perception.	Vibrations unlikely to cause damage of any type.
0.08	87	Vibrations readily perceptible.	Recommended upper level to which ruins and ancient monuments should be subjected.
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities.	Virtually no risk of architectural damage to normal buildings.
0.2	94	Vibrations may begin to annoy people in buildings.	Threshold at which there is a risk of architectural damage to normal dwellings.
0.4–0.6	98–104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges.	Architectural damage and possibly minor structural damage.

Source: California Department of Transportation, *Transportation Related Earthborne Vibrations,* 2002.

ENVIRONMENTAL SETTING

Noise Sensitive Receptors

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

The nearest sensitive receptor to the project site is an existing institutional use (Calvary Chapel High School) located approximately 100 feet to the east of the project site. The nearest existing residential uses are located approximately 800 feet to the south in the City of Costa Mesa and 850 feet to the east within the City of Santa Ana.

Stationary Sources

Land uses in the project area are mostly institutional, office and commercial uses. The primary sources of stationary noise in the project vicinity are urban-related activities (i.e., mechanical equipment and parking areas). The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

Mobile Sources

Most of the existing noise in the project area is generated from traffic along surrounding roadways including MacArthur Boulevard, South Susan Street, and Lake Center Drive.

Existing Ambient Noise Levels

To quantify existing ambient noise levels in the project area, Michael Baker International conducted three short-term noise measurements in the project vicinity on March 12, 2024. The noise measurement locations are shown in Exhibit 4, *Noise Measurement Locations*, and are representative of typical existing noise exposure at the nearest sensitive receptors. The 10-minute measurements were taken between 11:00 a.m. and 12:30 p.m. Short-term (L_{eq}) measurements are considered representative of the noise levels throughout the day. The noise measurements were taken during "off-peak" (9:00 a.m. through 3:00 p.m.) traffic noise hours as this provides a more conservative baseline. During rush hour traffic, vehicle speeds and heavy truck volumes are often low. Free-flowing traffic conditions just before or after rush hour often yield higher noise levels.[6] The noise levels measured near the project site are identified in Table 2, *Noise Measurements*.

Table 2
Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Start Time
1	In front of 3626 South Marine Street multifamily residential use	72.6	51.2	87.0	11:07 a.m.
2	Near 3388 Corte Cassis residential use, approximately 200 feet west of the Fairview Road and Sunflower Avenue intersection	68.2	48.5	86.6	11:39 a.m.
3	In front of Calvary Chapel bookstore, approximately 200 feet east from the Lake Center Drive and Susan Street intersection	60.3	52.3	81.0	12:07 p.m.
Refer to Appendix A, *Noise Data*, for the results of the field measurements.					

Meteorological conditions were clear with cool temperatures (62 degrees Fahrenheit [°F]), and wind speeds of approximately four miles per hour. Measured noise levels ranged from 60.3 to 72.6 dBA L_{eq}. The sources of peak noise include traffic along nearby roadways. Noise monitoring equipment used for the ambient noise survey consisted of a Brüel & Kjær Hand-held Analyzer Type 2250 equipped with a Type 4189 pre-polarized microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. Refer to Appendix A, *Noise Data*, for the results of the field measurements.

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

Source: Google Earth Pro, April 2024

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SOUTH COAST TECHNOLOGY CENTER PROJECT
NOISE ASSESSMENT TECHNICAL MEMORANDUM

Noise Measurement Locations

Exhibit 4

Existing Vibration Sources

Commercial and industrial operations in the City can generate varying degrees of ground vibration, depending on the operational procedures and equipment. Such equipment-generated vibrations spread through the ground and diminish with distance from the source. The result from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. The project area is surrounded by existing commercial, office and institutional uses. Additionally, roadways have the potential to generate vibrations. As previously discussed, most of the existing noise in the project area is generated from traffic along MacArthur Boulevard, South Susan Street, and Lake Center Drive. However, according to the FTA, it is unusual for vibration from sources, such as buses and trucks, to be perceptible, even in locations close to major roads.[7]

REGULATORY SETTING

Environmental noise and vibration are controlled and regulated by federal, state, and local agencies. Federal agencies like the U.S. Environmental Protection Agency (EPA) are responsible for managing major noise sources in commerce including transportation vehicles and equipment, machinery, and appliances under the Noise Control Act of 1972.[8] However, the primary responsibility of addressing noise issues is with the state and local governments.[9]

Federal

Federal Highway Administration

The *2006 Federal Highway Administration Highway Construction Noise Handbook* (Handbook) prepared by the Federal Highway Administration (FHWA) identifies noise levels generated by various construction equipment. The Handbook was prepared to recognize the potential for construction noise impact, determine the extent and type of analysis appropriate for addressing construction noise impact, and evaluating and implementing techniques to mitigate construction noise.

Federal Transit Administration

The Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* provides criteria for acceptable levels of groundborne vibration for various types of buildings, which are shown in Table 3, *Structural Vibration Damage Criteria*.

7 Federal Transit Administration, *Noise and Vibration Impact Assessment Manual, Section 5.2, Sources of Transit Ground-borne Vibration and Noise*, September 2018.

8 U.S. Environmental Protection Agency, *Summary of the Noise Control Act: 42 USC Section 4901 et seq.,* 1972, https://www.epa.gov/laws-regulations/summary-noise-control-act, accessed March 20, 2024.

9 U.S. Environmental Protection Agency, *Clean Air Act Title IV – Noise Pollution*, https://www.epa.gov/clean-air-act-overview/clean-air-act-title-iv-noise-pollution, accessed March 20, 2024.

Table 3
Structural Vibration Damage Criteria

Building Category	Peak Particle Velocity for Continuous Sources (PPV) (inches/second [in/sec])
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineering concrete and masonry (no plaster)	0.3
III. Nonengineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12
Source: FTA, *Transit Noise and Vibration Impact Assessment Manual*, 2018.	

State

State Office of Planning and Research

The State Office of Planning and Research's (OPR) *Noise Element Guidelines* include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The *Noise Element Guidelines* contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 4, *Land Use Compatibility for Community Noise Environments* depicts the range of noise exposure levels overlap between the normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable categories. OPR's *State General Plan Guidelines* note that noise planning policy needs to be rather flexible and dynamic to reflect not only technological advances in noise control, but also economic constraints governing application of noise-control technology and anticipated regional growth and demands of the community. In project specific analyses, each community must decide the level of noise exposure its residents are willing to tolerate within a limited range of values below the known levels of health impairment. Therefore, the City may use their discretion to determine which noise levels are considered acceptable or unacceptable, based on land use, project location, and other project factors.

Table 4
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Low Density, Single-Family, Duplex, Mobile Homes	50 – 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

Notes: NA = not applicable; L_{dn} = day/night average; CNEL = community noise equivalent level; dBA = A-weighted decibels
Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable - New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable - New construction or development should generally not be undertaken.

Source: Office of Planning and Research, *General Plan Guidelines*, 2003.

Local

City of Santa Ana General Plan

The City's goal is to minimize noise problems in areas sensitive to noise. As Santa Ana is almost fully developed, the main focus of the Noise Element is on remedial measures to deal with existing noise problems, prevention of new noise problems through proper arrangement of noise sensitive land uses in relationship to circulation systems, and establishment of appropriate noise emission or insulation standards for the various land uses. The following Noise Element goals and policies are applicable to the project.

Noise Element

- *Goal N-1 Land Use Compatibility*: Ensure that existing and future land uses are compatible with current and projected local and regional noise conditions.
  - *Policy N-1.1 Noise Standards*: Utilize established Citywide Noise Standards and guidelines to inform land use decisions and guide noise management strategies.
  - *Policy N-1.2* Sound Design: Encourage functional and attractive designs to mitigate excessive noise levels.
  - *Policy N-1.4 Sensitive Uses*: Protect noise sensitive land uses from excessive, unsafe, or otherwise disruptive noise levels.

- *Goal N-2 Noise Generators*: Reduce the impact of known sources of noise and vibration.
  - *Policy N-2.1 Transportation Related Noise*: Reduce noise generated from traffic, railroads, transit, and airports to the extent feasible.

  - *Policy N-2.2 Stationary Related Noise*: Minimize noise impacts from commercial and industrial facilities adjacent to residential uses or zones where residential uses are permitted.

  - *Policy N-2.3 Temporary and/or Nuisance Noise*: Minimize the effects of intermittent, short-term, or other nuisance noise sources.

GPU PEIR Regulatory Requirements

The project is required to comply with the following GPU PEIR regulatory requirements related to noise:

- *RR NOI-1*: California Building Code: The California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Interior Environment, Section 1207.11.2, Allowable Interior Noise Levels, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

  The State of California's noise insulation standards for non-residential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (Section 5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA Leq(1hr).

- *RR NOI-2:* Construction Noise Sources: Section 18-314(e) of the Santa Ana Municipal Code prohibits construction activities to the hours of 7:00 AM to 8:00 PM Monday through Saturday.

- *RR NOI-3:* Stationary Noise Sources: Section 18.312 of the Santa Ana Municipal Code establishes standards for stationary noise sources.

City of Santa Ana Municipal Code

Chapter 18, Article VI, Noise Control, of the Santa Ana Municipal Code (SAMC) provides criteria for ambient noise measurements as well as noise standards for residential, school, hospital, and church use. When non-transportation (stationary) noise is the noise source of concern, the City applies performance standards from Section 18.312 of the SAMC to ensure that noise producers do not adversely affect noise-sensitive land uses. Table 5, *Santa Ana Exterior Noise Standards* summarizes the City's exterior noise standards for residential uses.

Table 5
Santa Ana Exterior Noise Standards

Time Period	Noise Levels (dBA)
7:00 a.m. – 10:00 p.m.	55
10:00 p.m. – 7:00 a.m.	50
Note: A 5 dBA penalty shall be applied in the event of an alleged offensive noise such as impact noise, simple tones, speech, music, or any combination of thereof.	
Source: City of Santa Ana Municipal Code	

The SAMC states the following:

(b) It shall be unlawful for any person at any location within the City of Santa Ana to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, to exceed:

1. The noise standard for a cumulative period of more than thirty (30) minutes in any hour; or
2. The noise standard plus five (5) dB(A) for a cumulative period of more than fifteen (15) minutes in any hour; or
3. The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or
4. The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one minute in any hour; or
5. The noise standard plus twenty (20) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Santa Ana Construction Noise Standards

The City of Santa Ana's noise control exempts noise from construction activities that occur during the daytime. No construction is permitted outside of the hours in Section 18-314(e) of the SAMC, which restricts construction activities to the daytime hours of 7:00 a.m. to 8:00 p.m. Monday through Saturday.

City of Costa Mesa Municipal Code

Chapter 8, Noise Control, of the City of Costa Mesa's Municipal Code (CMMC) was created to prohibit unnecessary, excessive, and annoying noise from all potential sources. Table 6, *Costa Mesa Exterior Noise* Standards displays the City of Costa Mesa's exterior noise standards for residential uses.

Table 6
Costa Mesa Exterior Noise Standards

Time Period	Noise Levels (dBA)
7:00 a.m. – 11:00 p.m.	55
11:00 p.m. – 7:00 a.m.	50
Note: A 5 dBA penalty shall be applied in the event of an alleged offensive noise such as impact noise, simple tones, speech, music, or any combination of thereof.	
Source: City of Costa Mesa Municipal Code	

The CMMC also states the following:

(b) It shall be unlawful at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either within or outside the city, to exceed:

1. The noise standard for a cumulative period of more than 30 minutes in any hour;
2. The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour;
3. The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour;
4. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour;
5. The noise standard plus twenty (20) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

CALIFORNIA ENVIRONMENTAL QUALITY ACT THRESHOLDS

In accordance with the *California Environmental Quality Act* (CEQA Guidelines), project impacts are evaluated to determine whether significant adverse environmental impacts would occur. This analysis will focus on the project's potential impacts and provide mitigation measures, if required, to reduce or avoid any potentially significant impacts that are identified. According to Appendix G of the CEQA Guidelines, the proposed project would have a significant impact related to noise and vibration if it would:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement NOI-1);
- Generation of excessive groundborne vibration or groundborne noise levels (refer to Impact Statement NOI-2); and/or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would

the project expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3).

SIGNIFICANCE CRITERIA AND METHODOLOGY

Construction Noise Standards

Neither the City of Santa Ana nor the City of Costa Mesa have a quantitative threshold that applies to noise levels at active construction sites. To evaluate whether the project would generate potentially significant temporary construction noise levels at off-site sensitive receptor locations, a construction-related noise level threshold from the FTA *Transit Noise and Vibration Impact Assessment* criteria will be used. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA L_{eq} averaged over an 8-hour period (L_{eq} (8-hr)); and the nighttime noise threshold is 70 dBA L_{eq} (8-hr). In compliance with the SAMC, construction would not occur during the noise-sensitive nighttime hours. For the purposes of this analysis, the lowest, most conservative construction noise level threshold of 80 dBA L_{eq} was used as an acceptable threshold for construction noise at the nearby sensitive receptor locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 80 dBA L_{eq} over a period of eight hours or more is used to evaluate the potential project-related construction noise level impacts at the nearby sensitive receptor locations. Noise levels from construction equipment and activities were modeled using the Federal Highway Administration's Roadway Construction Noise Model (RCNM).

Construction and Operational Vibration Standards

The FTA *Transit Noise and Vibration Impact Assessment Manual* identifies various vibration damage criteria for different building classes, as shown in Table 3. As the nearest sensitive receptor structures to project site are institutional uses, the architectural damage criterion for continuous vibrations at residential structures of 0.3 inch-per-second PPV for engineered concrete and masonry is applied in the analysis.

On-Site Noise Sources

The nearest sensitive uses are the existing institutional uses, and the City of Santa Ana does not have a quantitative noise threshold for institutional uses. Therefore, conservatively, the residential exterior noise standards have been applied. A project would result in a significant impact if project-related operational (stationary-source) noise levels exceed the daytime exterior 55 dBA L_{eq} and nighttime exterior 50 dBA L_{eq} noise level standard at nearby sensitive receptor locations (based on the exterior noise level standards in Section 18.312 of the SAMC; refer to Table 5 above).

The nearest residential uses to the project site are located within the City of Costa Mesa. The City of Costa Mesa's Noise residential exterior noise standards are shown in Table 6 and are effectively the same as the exterior noise level standards in Section 18.312 of the SAMC, which would be applied when analyzing noise impacts for residential uses. A project would result in a significant impact if project-related operational (stationary-source) noise levels exceed the daytime exterior 55 dBA L_{eq} and nighttime exterior 50 dBA L_{eq} noise level standard at the nearest residential uses.

The SoundPLAN noise model was utilized to predict the anticipated operational noise levels and impacts associated with a worst-case scenario, where all operational activities are assumed to occur simultaneously. SoundPLAN is a three-dimensional noise model that allows computer simulations of noise situations, and creates noise contour maps using reference noise levels, topography, point and area noise sources, mobile noise sources, and intervening structures.

Mobile Noise Sources

The primary source of noise associated with the operation of the proposed project would be from vehicular trips. An off-site traffic noise impact typically occurs when there is a discernable increase in traffic and the resulting noise level exceeds an established noise standard. In community noise considerations, changes in noise levels greater than 3 dB are often identified as discernible, while changes less than 1 dB would not be discernible to local residents. A 5-dB change is generally recognized as a clearly discernable difference. Thus, the project would result in a significant noise impact if a permanent increase in ambient traffic noise levels of 3.0 dB occurs upon project implementation and the resulting noise level at the receiving sensitive receptor exceeds the applicable exterior standard at a noise sensitive use.

IMPACT ANALYSIS

NOI-1 WOULD THE PROJECT RESULT IN GENERATION OF A SUBSTANTIAL TEMPORARY OR PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE VICINITY OF THE PROJECT IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES? [GPU PEIR Impacts 5.12-1 and 5.12-2]

Level of Significance: Less Than Significant Impact.

The GPU PEIR Impact 5.12-1 concludes that implementation of the General Plan Update has the potential to result in significant temporary and permanent increases of noise levels throughout the City from construction activities and land use development projects. Future development under the General Plan Update would generate both short-term and long-term noise level increases that may impact sensitive receptors and since specific project-level information is inherently not available, it would be speculative to quantify the noise impacts at specific sensitive receptors. The General Plan Update included regulations designed to protect new sensitive land uses from excessive noise levels. The GPU PEIR stated that GPU PEIR Mitigation Measure (MM) N-1, which prescribes measures for construction activities, would reduce potential noise impacts during construction to the extent feasible. However, due to the potential for proximity of construction activities to sensitive uses, the number of construction projects occurring simultaneously, and the potential duration of construction activities, the GPU PEIR concluded that construction activities could result in a temporary substantial increase in noise levels above ambient conditions and impacts would remain significant and unavoidable even with mitigation. Nevertheless, the GPU PEIR noted that the identification of this program-level impact does not preclude the finding of less-than-significant impacts for subsequent projects analyzed at the project level.

The GPU PEIR Impact 5.12-2 identified that buildout of the GPU would result in an increase in traffic along local roadways proximate to existing sensitive receptors, and could exceed noise standards on several roadway segments. Although policies identified in the General Plan Update Noise Element and Mobility Element would help to minimize and mitigate traffic noise impacts along several roadway segments, the GPU PEIR conservatively concluded that traffic noise increase on the roadway segments would remain significant. The GPU PEIR considered a number of measures for mitigating or avoiding traffic noise

impacts, including special roadway paving, sound barrier walls, and sound insulation of existing residences and sensitive receptors; however, none of the measures considered were feasible or practical for reducing project-generated traffic noise to less-than-significant levels for existing residences along the affected roadway in all cases. Therefore, the GPU PEIR concluded that impacts would be significant and unavoidable. Nevertheless, the GPU PEIR also noted that the identification of this program-level impact does not preclude the finding of less-than-significant impacts for subsequent projects analyzed at the project level.

Construction

Construction activities generally are temporary and have a short duration, resulting in periodic increases in the ambient noise environment. The project involves construction activities associated with demolition, grading, building construction, paving, and architectural coating applications. The project would be constructed over a duration of approximately 16 months. Ground-borne noise and other types of construction-related noise impacts typically occur during the initial grading phase, which has the potential to create the highest levels of noise. Construction equipment produces maximum noise levels when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on construction sites typically operates under less than full power conditions, or partial power. To more accurately characterize construction-period noise levels, the average (L_{eq}) noise level associated with each construction stage is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage. These noise levels are typically associated with multiple pieces of equipment simultaneously operating at partial power.

The estimated construction noise levels at the nearest noise-sensitive receptors are presented in Table 7, *Noise Levels Generated during Construction Phases*. Construction equipment was based on the *South Coast Technology Center Project – Air Quality Technical Memorandum*, prepared by Michael Baker International, dated June 14, 2024. To present a conservative impact analysis, the estimated noise levels were calculated for a scenario in which all heavy construction equipment were assumed to operate simultaneously (refer to Appendix A, *Noise Data*). Results from RCNM also assume a clear line-of-sight and no other machinery or equipment noise that would mask project construction noise. The shielding of buildings and other barriers that interrupt line-of-sight conditions would help further reduce noise levels than what is shown in Table 7. According to the General Noise Assessment methodology prescribed in the FTA *Transit Noise and Vibration Impact Assessment Manual*, noise can be considered as concentrated at the center of the site. In addition, construction activities would occur across the entire project site and therefore the estimated noise levels were calculated from the center of the project site. The geographic center of the project site is approximately 625 feet from the closest sensitive receptor (institutional use) to the east and approximately 1,000 feet from the nearest residential uses to the south.

Table 7
Noise Levels Generated during Construction Phases

Phase	Estimated Exterior Construction Noise Level at 625 feet (Center of Project Site) (dBA L_{eq})[1]	Estimated Exterior Construction Noise Level at 1,000 feet (Center of Project Site) (dBA L_{eq})[1]
Demolition	64.5	60.4
Grading	66.3	62.2
Building Construction	64.3	60.3
Paving	59.7	55.6
Architectural Coating	51.8	47.7

Notes:
1. These noise levels conservatively assume the simultaneous operation of all heavy construction equipment at the same precise location. Modeled heavy construction equipment includes concrete saws, excavators, and dozers during demolition phase, grader, dozers, and backhoes during the grading phase, forklifts, generator, crane, welders, and backhoes during the building construction phase, pavers, paving equipment, rollers, and backhoes during the paving phase, and air compressor during the architectural coating phase.

Source: Federal Highway Administration, *Roadway Construction Noise Model (RCNM)*, 2006 (see Appendix A).

As shown in Table 7, the nearest receptors to the project site could be exposed to temporary and intermittent construction noise levels ranging from approximately 51.8 to 66.3 dBA L_{eq} at the nearest institutional use to the east and approximately 47.7 to 62.2 dBA L_{eq} at the nearest residential uses to the south. As such, construction noise would not have the potential to exceed the FTA significance of threshold of 80 dBA L_{eq}. In addition, according to Section 18-314(e) of the SAMC, construction activities are exempt from the residential exterior noise control standards upon compliance with the permitted construction hours. As such, construction activities would be required to comply with the construction timings specified in Section 18-314(e) of the SAMC, which restricts construction activities to the daytime hours of 7:00 a.m. to 8:00 p.m. Monday through Saturday.

Compliance with the SAMC would minimize impacts from construction noise, as construction would be limited to the permitted times. In addition, the project is required to implement the regulatory requirements identified above and GPU PEIR MM N-1, which includes limiting construction to the hours specified in Section 18-314(e) of the SAMC, the use of best-available noise control techniques, the use of hydraulic or electrical impact tools whenever possible, locating stationary equipment and stockpiling as far as feasible from sensitive receptors, limiting construction traffic to approved haul routes, and the use of temporary construction noise barriers.

Therefore, construction impacts resulting from the proposed project would be less than significant and would be less than the impacts disclosed in the GPU PEIR, which were determined to be significant and unavoidable despite inclusion of mitigation.

Operation

OFF-SITE MOBILE NOISE

Operation of the proposed project would result in some additional traffic on adjacent roadways, thereby potentially increasing vehicular noise in the vicinity of existing and proposed land uses. The most prominent source of mobile traffic noise in the project vicinity is along Susan Street, Lake Center Drive, and MacArthur Boulevard. According to the California Department of Transportation (Caltrans), a doubling of traffic (100 percent increase) on a roadway would result in a perceptible increase in traffic

noise levels (3 dBA).[10] According to the *Trip Generation Assessment for the Proposed South Coast Technology Center Project, Santa Ana, California,* prepared by Linscott, Law, & Greenspan, Engineers, dated January 2, 2024, the proposed project would generate approximately 386 net fewer total daily trips compared to the existing conditions.[11] As such, as the project generated traffic volumes would not exceed the traffic volumes of the existing condition, no additional analysis is required. Project-related traffic noise impacts would be less than significant.

ON-SITE OPERATIONAL NOISE

The operations of the proposed project would be typical of a warehousing facility. On-site operational noise activities would include noise generated from mechanical equipment and loading dock activities and slow-moving trucks. Although the nearest noise sensitive use (i.e., the institutional use) is located approximately 100 feet to the east when measured from the property line, the distances to the nearest sensitive receptors would be greater when measured from the proposed on-site stationary sources. Operational noise levels are analyzed at the surrounding nearest sensitive receptors to the east and south.

To estimate the future noise levels during typical operational conditions, reference noise levels are input into SoundPLAN and are projected to the nearest sensitive receptor locations. Reference noise levels represent similar noise sources operating under similar conditions as would be found on the project site. Adjusted noise levels are based on the distance of the receptor location relative to the noise source, local topography, and physical barriers including buildings and sound walls. Refer to Appendix A, *Noise Data*, for the SoundPLAN modeling results.

Mechanical Equipment

HVAC units would be installed on the roof of the proposed warehouse buildings. Specifically, approximately 14 rooftop HVAC units are proposed on each of the warehouse buildings. Typically, mechanical equipment, such as HVAC units, generate noise levels of 60 dBA (or 84 dBA in sound power level (L_w)) at 20 feet from the source, which is used in the SoundPLAN modeling.[12]

Loading Dock Activities

Typical noise associated with loading dock activities would include noise from lift gate operation, backup alarms, load drops, forklifts/pallet jacks, and personnel. Loading dock activity would occur at the western side of Building 1 and the southern side of Building 2 and Building 3. Loading dock activities are assessed by using the reference noise levels within the SoundPLAN emissions library. Loading dock activities are

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

[11] Note that the *Trip Generation Assessment* analyzed a project with three industrial buildings totaling 325,044 square feet. However, the total building square footage for the proposed project has been reduced to 313,244 square feet.

[12] Elliot H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 26, 2015.

modeled as a line source within the SoundPLAN and typically can generate a maximum noise level of approximately 80 dBA in L_w per meter.[13]

Slow-Moving Trucks

Another major noise source from a warehousing facility is slow-moving trucks. According to the proposed on-site routes, slow-moving truck activities would occur at the western side of Building 1 and the southern side of Building 2 and Building 3. Slow-moving truck noise is assessed by using the reference noise levels within the SoundPLAN emissions library and is modeled as an area source within the SoundPLAN. Slow-moving trucks typically can generate a maximum noise level of approximately 62 dBA in L_w per square meter.[14]

Combined Operational Noise

Table 8, *Operational Noise Levels*, shows the combined long-term operational noise levels from all noise sources occurring simultaneously at the surrounding sensitive receptors.

Table 8
Operational Noise Levels

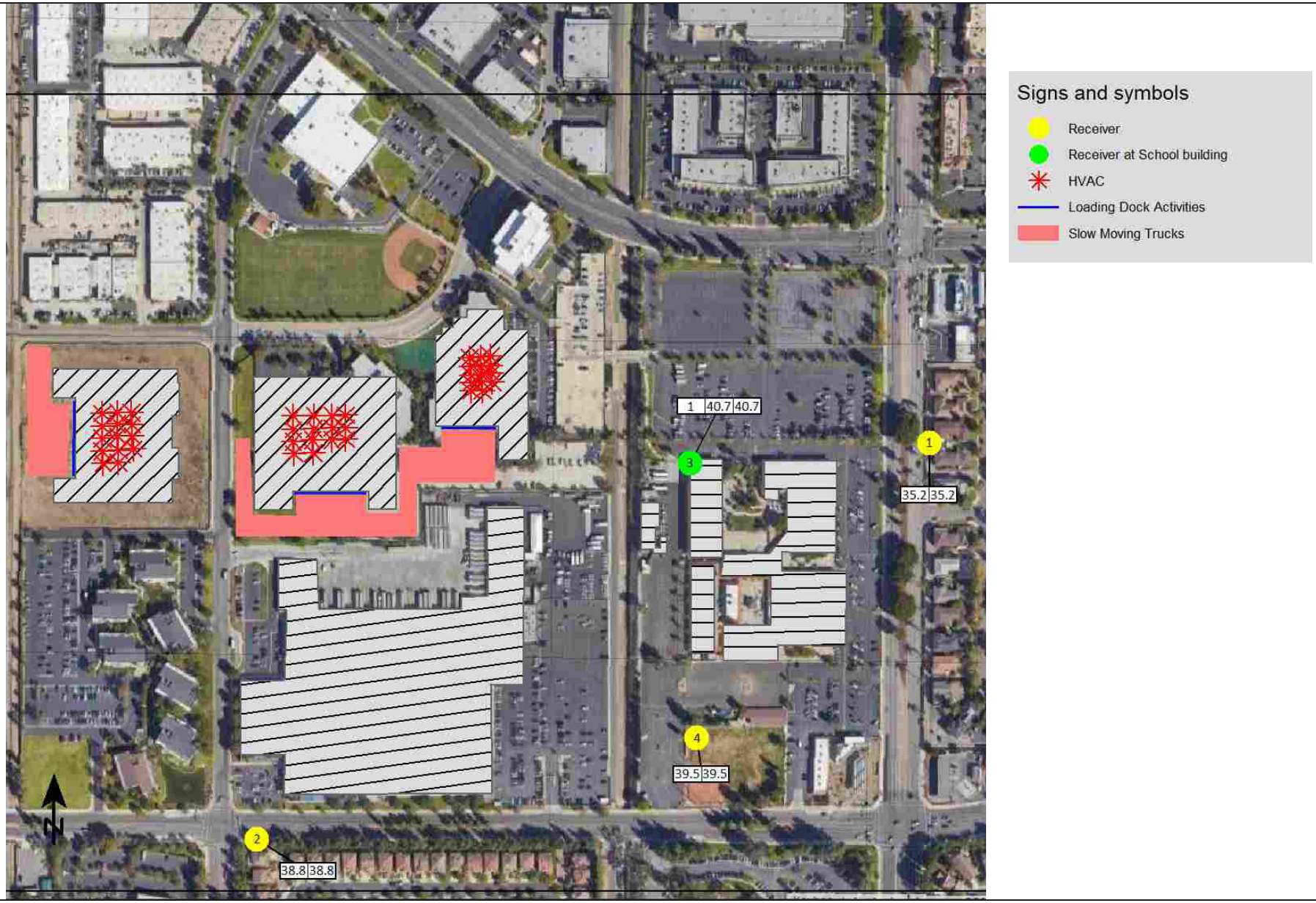
Receptor Land Use	Estimated Project Generated Operational Noise Level (dBA L_{eq})[1]	Noise Level Criteria (dBA L_{eq})[2] (Daytime/Nighttime)	Noise Levels Exceeds Standards (?)
Residential Uses to the East	35.2	55/50	No
Residential Uses to the South	38.8	55/50	No
Institutional Building to the East	40.7	55/50	No
School Playground to the Southeast	39.5	55/50	No

Notes:
1. Operational noise levels conservatively assume the simultaneous operation of all operational activities at the same time.
2. Noise level criteria are based on the SAMC Section 18.312. For informational purposes, noise level criteria for residential uses in the CMMC Chapter 8 are also 55 dBA for daytime (7 am – 11 pm) and 50 dBA for nighttime (11 am – 7 pm).

Source: SoundPLAN Version 5.1 (see Appendix A).

Exhibit 5, *Noise Levels* shows that the nearest institutional use to the east of the project site would experience maximum exterior noise levels of approximately 40.7 dBA from the project's operational activities. Exhibit 6, *Noise Contours* shows the noise contours for operational activities at the project site and would range from 35.2 to 38.8 dBA L_{eq} at the nearest surrounding residential sensitive receptors to the east and south of the project site. As shown in Table 8, the project's operational noise levels at these surrounding sensitive receptors would not exceed the City of Santa Ana's exterior noise thresholds. As shown in Table 2, the existing ambient noise level at the institutional and residential uses to the east is approximately 72.6 dBA L_{eq} and the existing ambient noise level at the residential use to the south is approximately 68.2 dBA L_{eq}, which are higher than the projected operational noise levels at these sensitive receptors. As such, the project's operational noise levels would not be audible above existing ambient noise levels and would not increase the ambient noise levels experienced by these sensitive uses.

[13] SoundPLAN version 5.1.
[14] Ibid



Source: SoundPLAN v5.1

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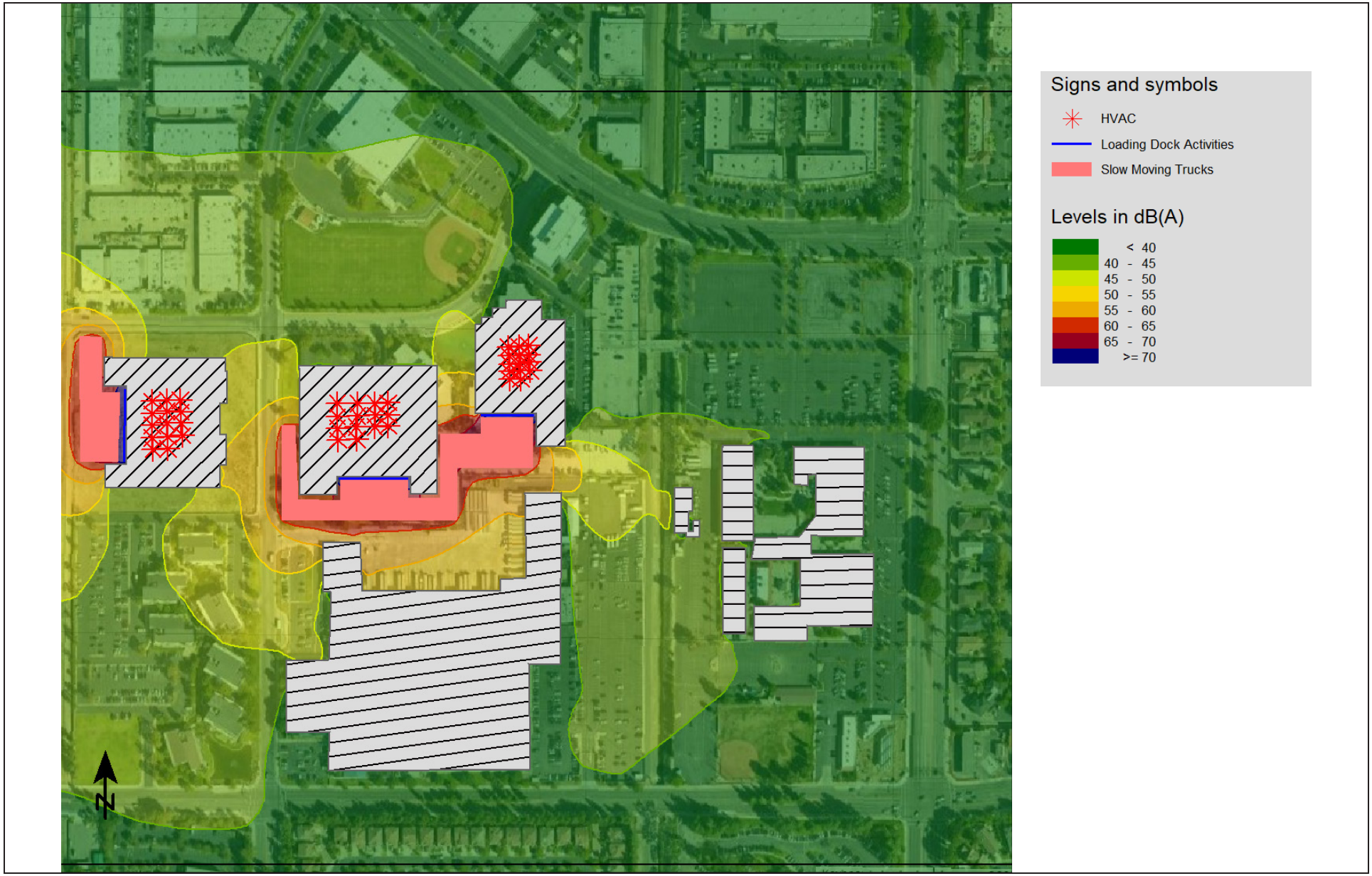
SOUTH COAST TECHNOLOGY CENTER PROJECT
NOISE ASSESSMENT TECHNICAL MEMORANDUM

Operational Noise Levels

Exhibit 5



Source: SoundPLAN v5.1

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SOUTH COAST TECHNOLOGY CENTER PROJECT
NOISE ASSESSMENT TECHNICAL MEMORANDUM

Noise Contours

Exhibit 6

Therefore, the nearest sensitive receptors would not be directly exposed to substantial noise from on-site operational activities and impacts would be less than significant.

Therefore, based on the above, operational impacts resulting from the proposed project would be less than significant and would be less than the impacts disclosed in the GPU PEIR, which concluded that traffic noise impacts during operation be significant and unavoidable, and no feasible or practical mitigation are available to reduce traffic noise impacts.

NOI-1 Impact Summary

In conclusion, the project's construction and operational noise impacts would be less than significant. The project would not result in new significant impacts and no substantial increase in the severity of previously identified impacts disclosed in the GPU PEIR would occur. Likewise, there are no changed circumstances involving new or more severe impacts and no new information of substantial importance requiring new analysis or project specific mitigation measures.

The following GPU PEIR mitigation measure applies to the project:

N-1: Construction contractors shall implement the following measures for construction activities conducted in the City of Santa Ana. Construction plans submitted to the City shall identify these measures on demolition, grading, and construction plans submitted to the City: The City of Santa Ana Planning and Building Agency shall verify that grading, demolition, and/or construction plans submitted to the City include these notations prior to issuance of demolition, grading, and/or building permits.

- Construction activity is limited to the hours: Between 7 AM to 8 PM Monday through Saturday, as prescribed in Municipal Code Section 18-314(e). Construction is prohibited on Sundays.
- During the entire active construction period, equipment and trucks used for project construction shall use the best-available noise control techniques (e.g., improved mufflers, equipment re-design, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Impact tools (e.g., jack hammers and hoe rams) shall be hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stationary equipment, such as generators and air compressors shall be located as far as feasible from nearby noise-sensitive uses.
- Stockpiling shall be located as far as feasible from nearby noise-sensitive receptors.
- Construction traffic shall be limited, to the extent feasible, to approved haul routes established by the City Planning and Building Agency.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.

- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.
- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise level or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.
- Erect temporary noise barriers (at least as high as the exhaust of equipment and breaking line-of-sight between noise sources and sensitive receptors), as necessary and feasible, to maintain construction noise levels at or below the performance standard of 80 dBA Leq. Barriers shall be constructed with a solid material that has a density of at least 4 pounds per square foot with no gaps from the ground to the top of the barrier.

Mitigation Measures: Impacts related to Impact NOI-1 would be less than significant with implementation of GPU PEIR MM N-1. Therefore, no new project-specific mitigation measures are required.

Level of Significance After Mitigation: Impacts related to Impact NOI-1 would be less than significant with implementation of GPU PEIR MM N-1. Therefore, no new project-specific mitigation measures are required or included, and the impact level would remain less than significant.

NOI-2 WOULD THE PROJECT RESULT IN EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS? [GPU PEIR Impact 5.12-3]

Level of Significance: Less Than Significant Impact.

The GPU PEIR Impact 5.12-3 determined that construction activity would generate varying degrees of ground vibration, depending on the construction procedures and equipment, that have the potential to exceed the FTA criteria for architectural damage (e.g., 0.12 inches/second PPV for fragile or historical resources, 0.2 inches/second PPV for non-engineered timber and masonry buildings, and 0.3 inches/second PPV for engineered concrete and masonry). The GPU PEIR determined that implementation GPU PEIR MM N-2, which requires preparation of a noise and vibration analysis for projects requiring pile driving during construction within 135 feet of fragile structures, such as historical resources, 100 feet of non-engineered timber and masonry buildings (e.g., most residential buildings), or within 75 feet of engineered concrete and masonry (no plaster), or use of a vibratory roller within 25 feet of any structure, and adherence to associated performance standards, would reduce impacts to a less-than-significant level.

The GPU PEIR determined that the potential for sensitive receptors within the plan area to be exposed to annoying and/or interfering levels of vibration from commercial or industrial operations and existing railroad lines was not possible to quantify because specific project-level information was not available at the time the GPU PEIR was prepared. However, the GPU PEIR determined that implementation of GPU PEIR MM N-3, which applies to new residential projects located within 200 feet of existing railroad lines and GPU PEIR MM N-4, which applies to industrial developments, would reduce potential vibration impacts during operation to less than significant levels.

Short-Term Construction Vibration Impacts

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels.

Construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. The vibration level at which human annoyance is perceived is 0.2 inch per second PPV; refer to Table 1. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 25 feet from most construction vibration sources. This distance can vary substantially depending on the soil composition and underground geological layer between the vibration source and the receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. Construction activities that may result under the proposed project have the potential to generate ground-borne vibration. This evaluation uses the FTA architectural damage criterion for continuous vibrations of 0.3 in/sec PPV for engineered concrete and masonry (refer to Table 3) because the closest structures to the project site are institutional use buildings. The nearest sensitive receptor building is located approximately 225 feet to the east of the project construction activities. As such, vibration impacts are analyzed at 225 feet to evaluate the architectural building damage criterion. Groundborne vibration decreases rapidly with distance. As a result, vibration velocities from the construction equipment would be barely perceptible at this distance. Typical vibration produced by construction equipment is illustrated in Table 9, *Typical Vibration Levels for Construction Equipment*.

Table 9
Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 25 feet (inch/sec)	Approximate peak particle velocity at 225 feet (inch/sec)[1]
Large bulldozer	0.089	0.0033
Loaded trucks	0.076	0.0028
Small bulldozer	0.003	0.0001

Notes:
1. Calculated using the following formula:
$PPV_{equip} = PPV_{ref} \times (25/D)^{1.1}$
where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, September 2018.

As shown in Table 9, vibration velocities from typical heavy construction equipment operation would range from 0.003 to 0.089 inch/second PPV at 25 feet from the source of activity. The nearest structure to the project site is the existing institutional use building located approximately 225 feet to the east of the project site. Vibration level during the operation of construction equipment would be approximately less than 0.0001 inch/second PPV to 0.0033 inch/second PPV at 225 feet; refer to Table 9. As a result, construction groundborne vibration would not exceed the 0.2 inch per second PPV significance threshold

for human annoyance or 0.3 inch/second PPV significance threshold for building damage at the nearest structures. It should be noted that GPU PEIR MM N-2, which applies to projects utilizing pile driving during construction and GPU PEIR MM N-3, which applies to residential projects located within 200 feet of existing railroad lines, are not applicable to the project since the project would not include pile driving and is not a residential project. Moreover, this Noise and Vibration Assessment prepared for the project satisfies the requirements of GPU PEIR MM N-4, which requires industrial projects subject to CEQA to conduct a noise and vibration analysis. Therefore, vibration impacts would be less than significant impact during construction.

Long-Term Operational Vibration Impacts

The project would involve operation of industrial buildings that do not include uses that would not generate groundborne vibration that could be felt by the nearest sensitive receptors. However, heavy duty trucks associated with operation of the proposed project would occasionally travel through the surrounding roadways. According to the FTA, it is unusual for vibration from sources, such as buses and trucks, to be perceptible, even in locations close to major roads.[15] As such, it can be reasonably inferred that operation of the proposed project would not create perceptible vibration impacts to the nearest sensitive receptors. Therefore, vibration impacts related to human annoyance and building damage during operation would be less than significant.

Conclusion

In conclusion, the project's construction and operational vibration impacts would be less than significant. The project would not result in new significant impacts, and no substantial increase in the severity of previously identified impacts disclosed in the GPU PEIR would occur. Likewise, there are no changed circumstances involving new or more severe impacts and no new information of substantial importance requiring new analysis, or project-specific mitigation measures.

The following GPU PEIR mitigation measure applies to the project:

N-4: During the project-level California Environmental Quality Act (CEQA) process for industrial developments under the General Plan Update or other projects that could generate substantial vibration levels near sensitive uses, a noise and vibration analysis shall be conducted to assess and mitigate potential noise and vibration impacts related to the operations of that individual development. This noise and vibration analysis shall be conducted by a qualified and experienced acoustical consultant or engineer and shall follow the latest CEQA guidelines, practices, and precedents.

Mitigation Measures: Impacts related to Impact NOI-2 would be less than significant with implementation of GPU PEIR MM N-4. The Noise and Vibration Assessment prepared for the project satisfies the requirements of GPU PEIR MM N-4. Therefore, no new project-specific mitigation measures are required.

Level of Significance After Mitigation: Impacts related to Impact NOI-2 would be less than significant with implementation of GPU PEIR MM N-4. Therefore, no new project-specific mitigation measures are required or included, and the impact level would remain less than significant.

[15] Federal Transit Administration, *Noise and Vibration Impact Assessment Manual, Section 5.2, Sources of Transit Ground-borne Vibration and Noise*, September 2018.

NOI-3 FOR A PROJECT LOCATED WITHIN THE VICINITY OF A PRIVATE AIRSTRIP OR AN AIRPORT LAND USE PLAN OR, WHERE SUCH A PLAN HAS NOT BEEN ADOPTED, WITHIN TWO MILES OF A PUBLIC AIRPORT OR PUBLIC USE AIRPORT, WOULD THE PROJECT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS? [GPU PEIR Impact 5.12-4]

Level of Significance: Less Than Significant Impact.

The GPU PEIR Impact 5.12-4 determined that future development of noise-sensitive land uses could be located within areas where airport noise exceeds 60 dBA CNEL. Noise Element policies 3.1, 3.2, and 3.3 would require new development located within the airport's noise contours to be sufficiently mitigated to acceptable interior noise levels. The GPU PEIR concluded that, with implementation of the Noise Element policies listed, impacts would be less than significant.

The nearest airport is the Santa Ana Airport located approximately 2.9 miles southeast of the project site. According to the *Airport Environs Land Use Plan for John Wayne Airport* (AELUP), the project site is located outside of the Airport Impact Zones, AELUP Notification Area, Federal Aviation Regulation Part 77 Notification Area, and Airport Safety Zones.[16] As such, future sensitive uses proposed under the project would be located outside of the 60 dBA CNEL noise contour of the Santa Ana Airport. Additionally, the project site is not located within the vicinity of a private airstrip or related facilities. Therefore, project implementation would not expose people residing or working in the project area to excessive noise levels associated with aircraft. As such, the impacts would be less than significant.

Conclusion

In conclusion, impacts resulting from the airport noise would be less than significant and would be less than the impacts disclosed in the GPU PEIR, which were determined to be less than significant. Therefore, the project would not result in new significant impacts and no substantial increase in the severity of previously identified impacts disclosed in the GPU PEIR would occur. Likewise, there are no changed circumstances involving new or more severe impacts and no new information of substantial importance requiring new analysis, verification, or project-specific mitigation measures.

Mitigation Measures: Impacts related to Impact NOI-3 would be less than significant. Therefore, no mitigation measures are required.

Level of Significance After Mitigation: Impacts related to Impact NOI-3 would be less than significant without mitigation. Therefore, no mitigation measures are required or included, and the impact level would remain less than significant.

[16] Orange County Airport Land Use Commission, Airport Environs Land Use Plan for John Wayne Airport, April 17, 2008.

REFERENCES

Documents

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

2. City of Santa Ana, Golden City Beyond, *Santa Ana General Plan Land Use Element, Figure LU-1, Land Use Map,* April 2022.

3. City of Santa Ana, *City of Santa Ana Zoning Map,* February 16, 2023.

4. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.

5. Environmental Health Perspectives, *Vehicle Motion Alarms: Necessity, Noise Pollution, or Both?* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3018517/, accessed March 20, 2024.

6. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

7. Federal Transit Administration, *Noise and Vibration Impact Assessment Manual, Section 5.2, Sources of Transit Ground-borne Vibration and Noise*, September 2018.

8. Harris, Cyril, *Handbook of Noise Control,* 1979.

9. Linscott, Law, & Greenspan, Engineers, *South Coast Technology Center Project, Santa Ana, California,* January 2, 2024.

10. Michael Baker International, *South Coast Technology Center Project – Air Quality Technical Memorandum*, June 14, 2024.

11. Orange County Airport Land Use Commission, *Airport Environs Land Use Plan for John Wayne Airport*, April 17, 2008.

12. Office of Planning and Research, *State of California General Plan Guidelines*, *Appendix D*, October 2017.

13. State Office of Planning and Research, *State of California General Plan Guidelines*, October 2017.

14. U.S. Environmental Protection Agency, *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*, October 1979 (revised July 1981).

15. U.S. EPA, *Summary of the Noise Control Act: 42 USC Section 4901 et seq.(1972)*, https://www.epa.gov/laws-regulations/summary-noise-control-act, accessed March 20, 2024.

16. U.S. EPA, *Clean Air Act Title IV – Noise Pollution*, https://www.epa.gov/clean-air-act-overview/clean-air-act-title-iv-noise-pollution, accessed March 20, 2024.

Websites / Programs

1. Google Earth, 2024.
2. SoundPLAN Version 5.1.

Appendix A
Noise Data

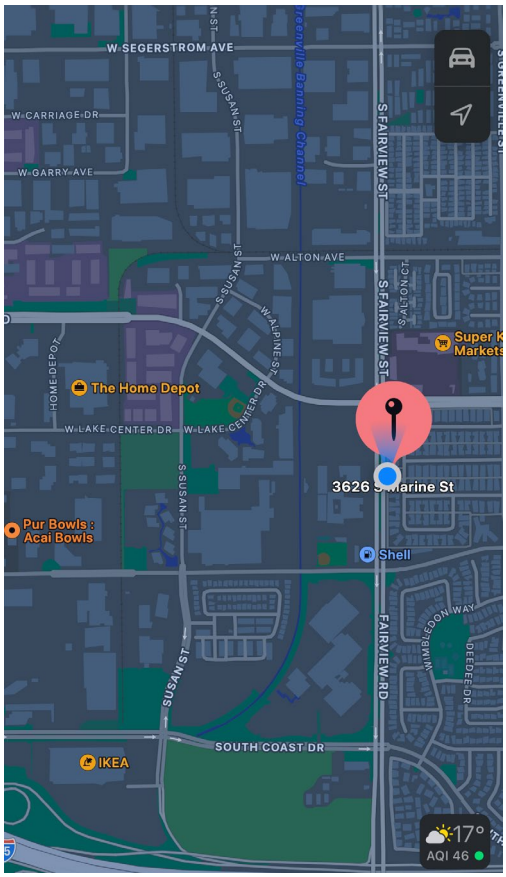
Site Number: NM-1	
Recorded By: Dennis Dinh, Winnie Woo	
Job Number: 199799	
Date: 3/12/2024	
Time: 11:07 a.m.	
Location: Northeast corner of the Fairview Street and Aurora Street intersection	
Source of Ambient Noise: Traffic along Fairview Street	

Noise Data		
L_{eq} (dB)	**L_{max}(dB)**	**L_{min} (dB)**
72.6	87.0	51.2

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**3011133**	**06/04/2023**	
	Microphone	**Brüel & Kjær**	**4189**	**3086765**	**06/04/2023**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**25380**	**06/04/2023**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**06/04/2023**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Sunny
	Note: dBA Offset = -0.03		**Sensor Height (ft):** 5 ft
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (inches)**
	4 mph	62	30.14

Photo of Measurement Location



2250

Instrument:		2250
Application:		BZ7225 Version 4.7.6
Start Time:		03/12/2024 11:07:48
End Time:		03/12/2024 11:17:48
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		142.17

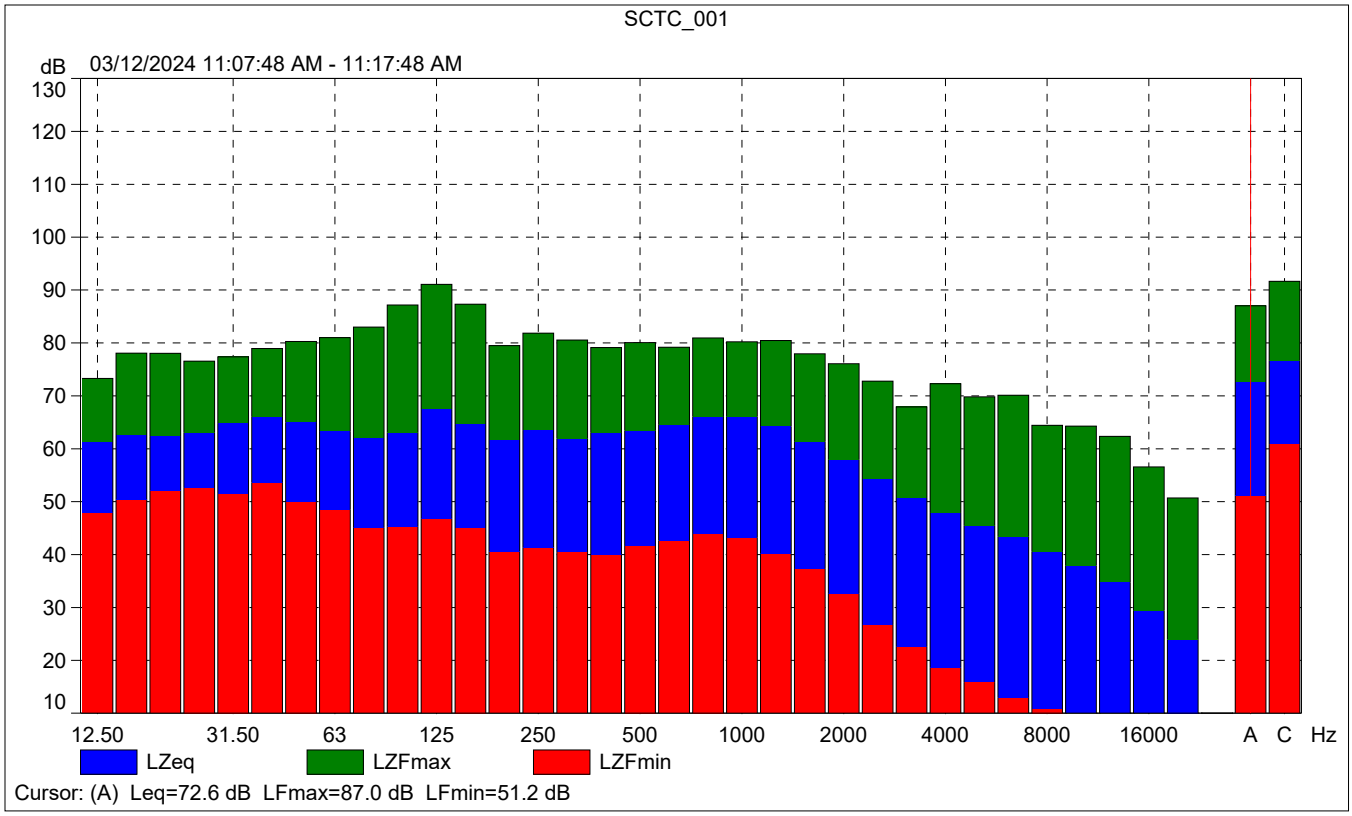
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

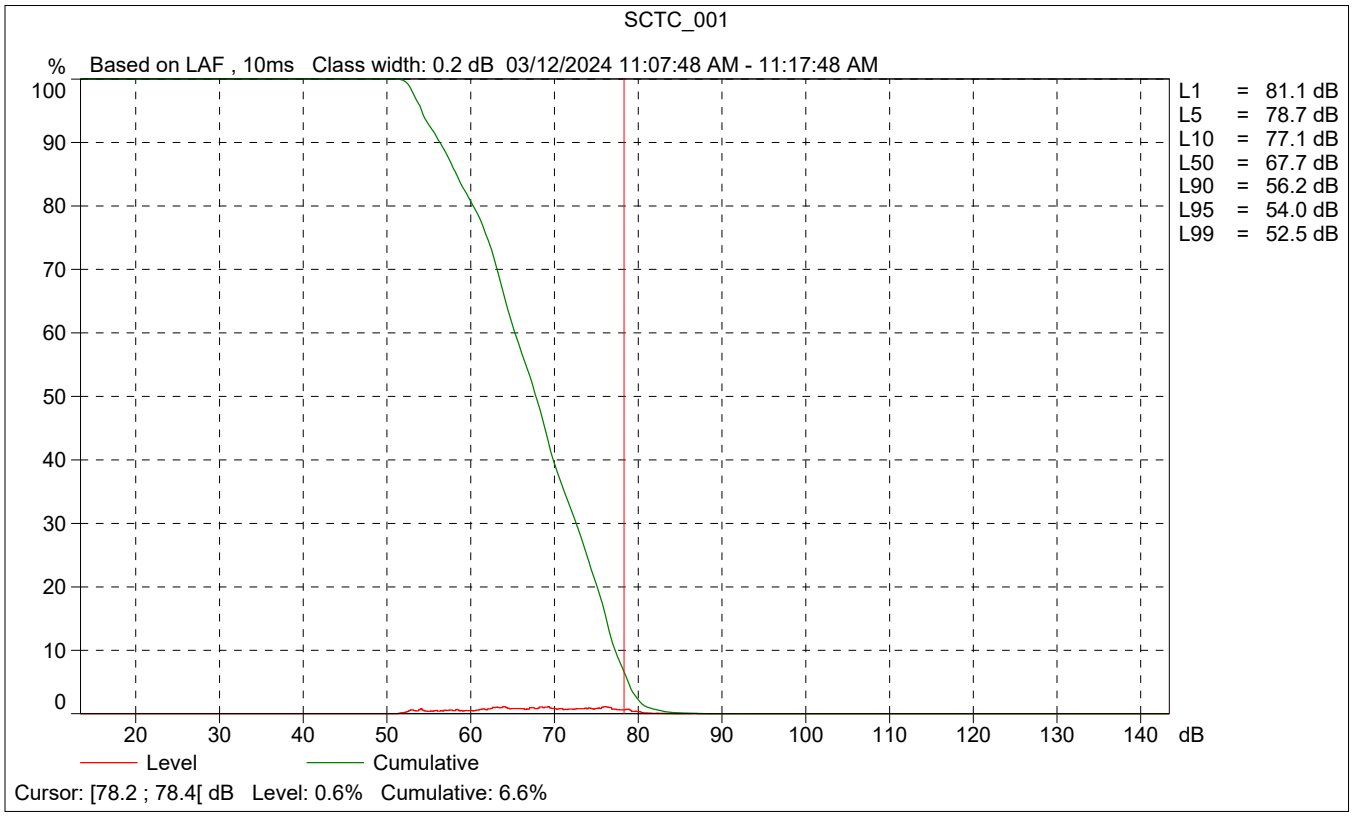
Instrument Serial Number:		3011133
Microphone Serial Number:		3086765
Input:		Top Socket
Windscreen Correction:		UA-1650
Sound Field Correction:		Free-field

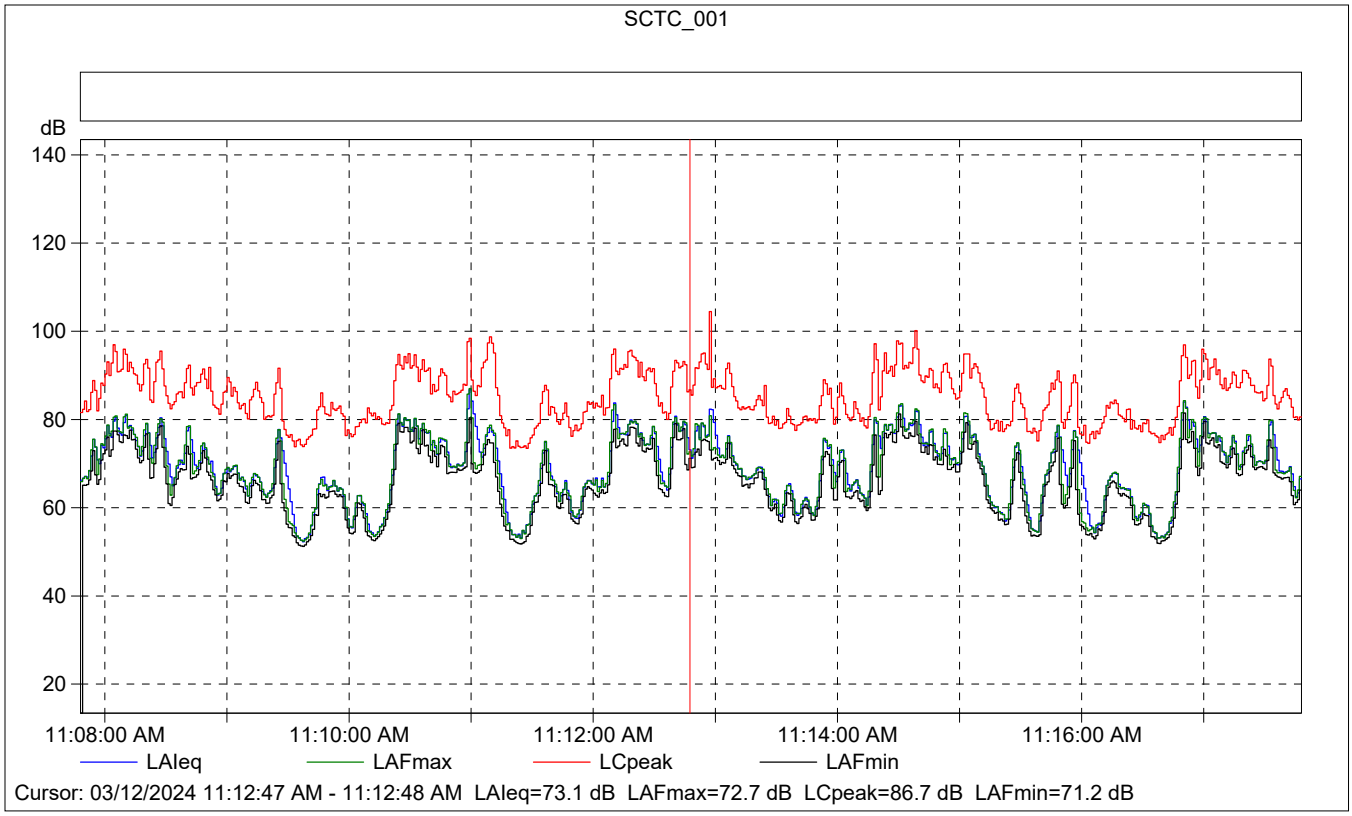
Calibration Time:		03/12/2024 10:59:46
Calibration Type:		External reference
Sensitivity:		43.355081230402 mV/Pa

SCTC_001

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	72.6	87.0	51.2
Time	11:07:48 AM	11:17:48 AM	0:10:00				
Date	03/12/2024	03/12/2024					

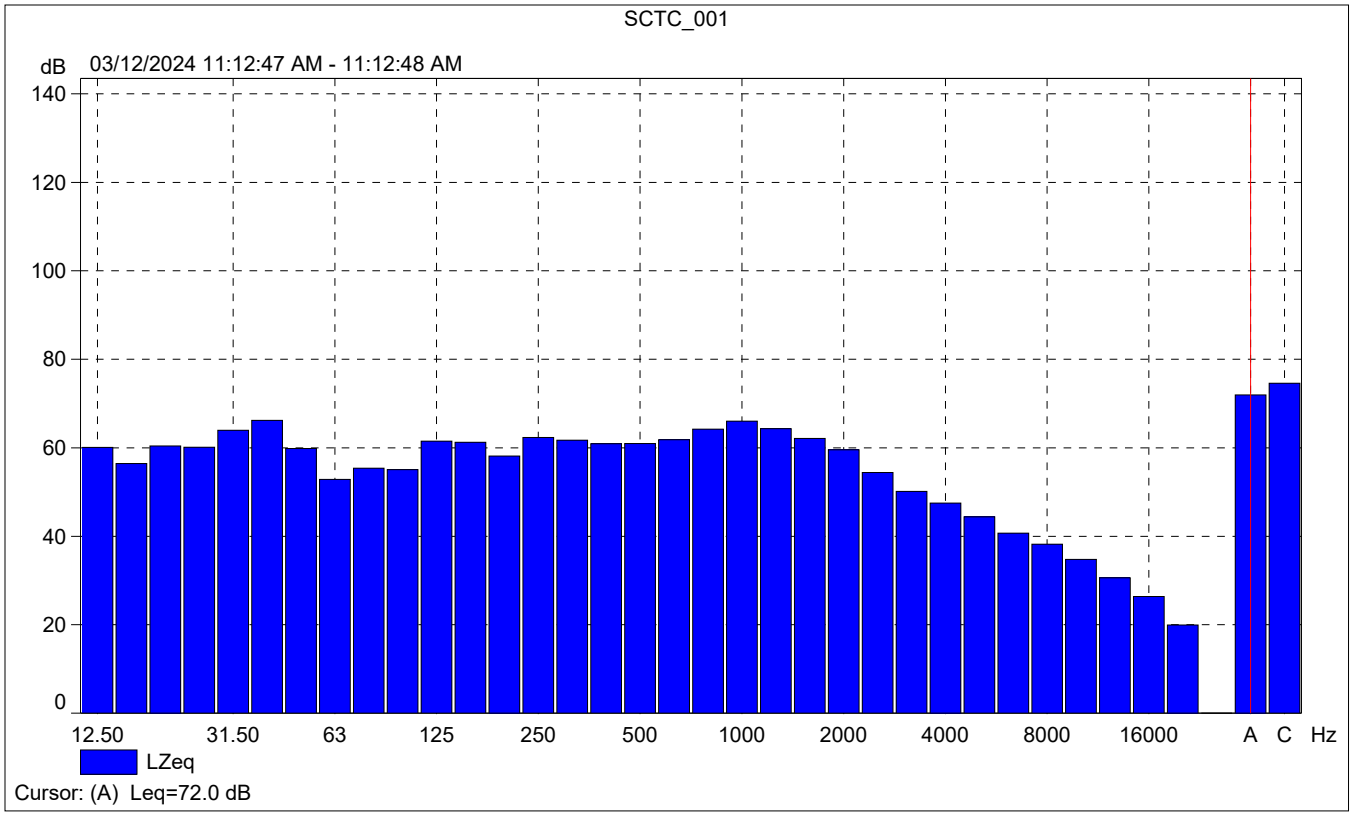

SCTC_001
dB
03/12/2024 11:07:48 AM - 11:17:48 AM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=72.6 dB LFmax=87.0 dB LFmin=51.2 dB

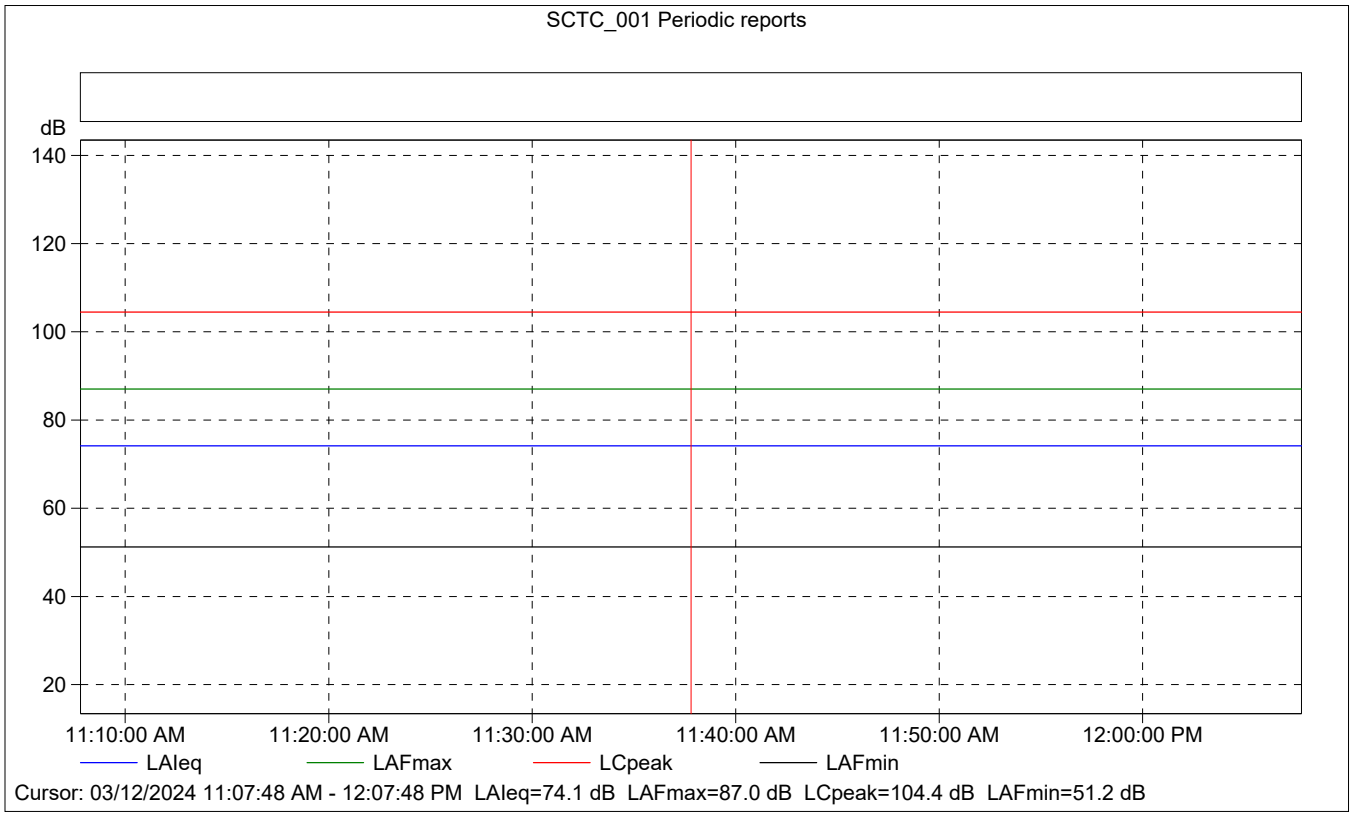

SCTC_001
%
Based on LAF , 10ms Class width: 0.2 dB 03/12/2024 11:07:48 AM - 11:17:48 AM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 81.1 dB
L5 = 78.7 dB
L10 = 77.1 dB
L50 = 67.7 dB
L90 = 56.2 dB
L95 = 54.0 dB
L99 = 52.5 dB
Level
Cumulative
Cursor: [78.2 ; 78.4[dB Level: 0.6% Cumulative: 6.6%



SCTC_001

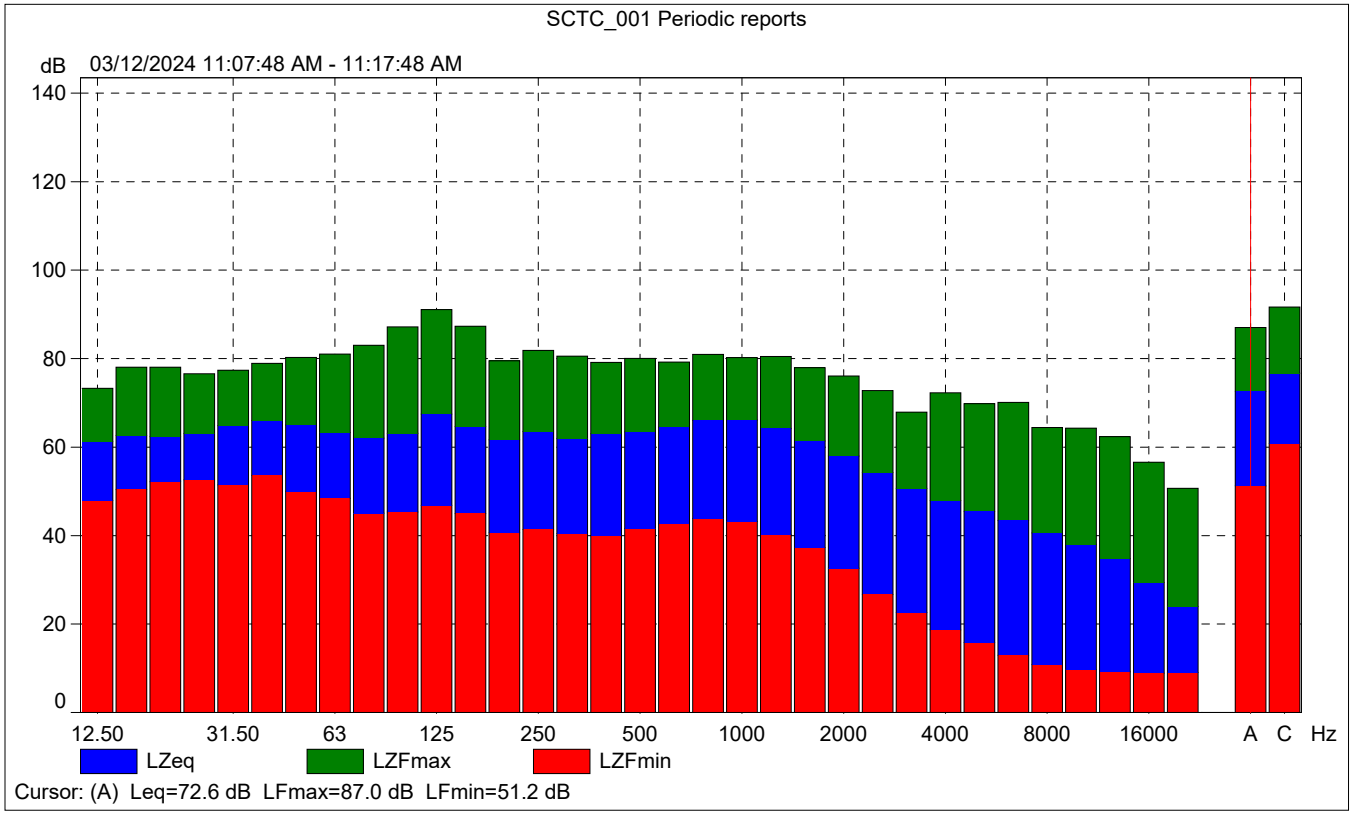
	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	73.1	72.7	71.2
Time	11:12:47 AM	0:00:01				
Date	03/12/2024					

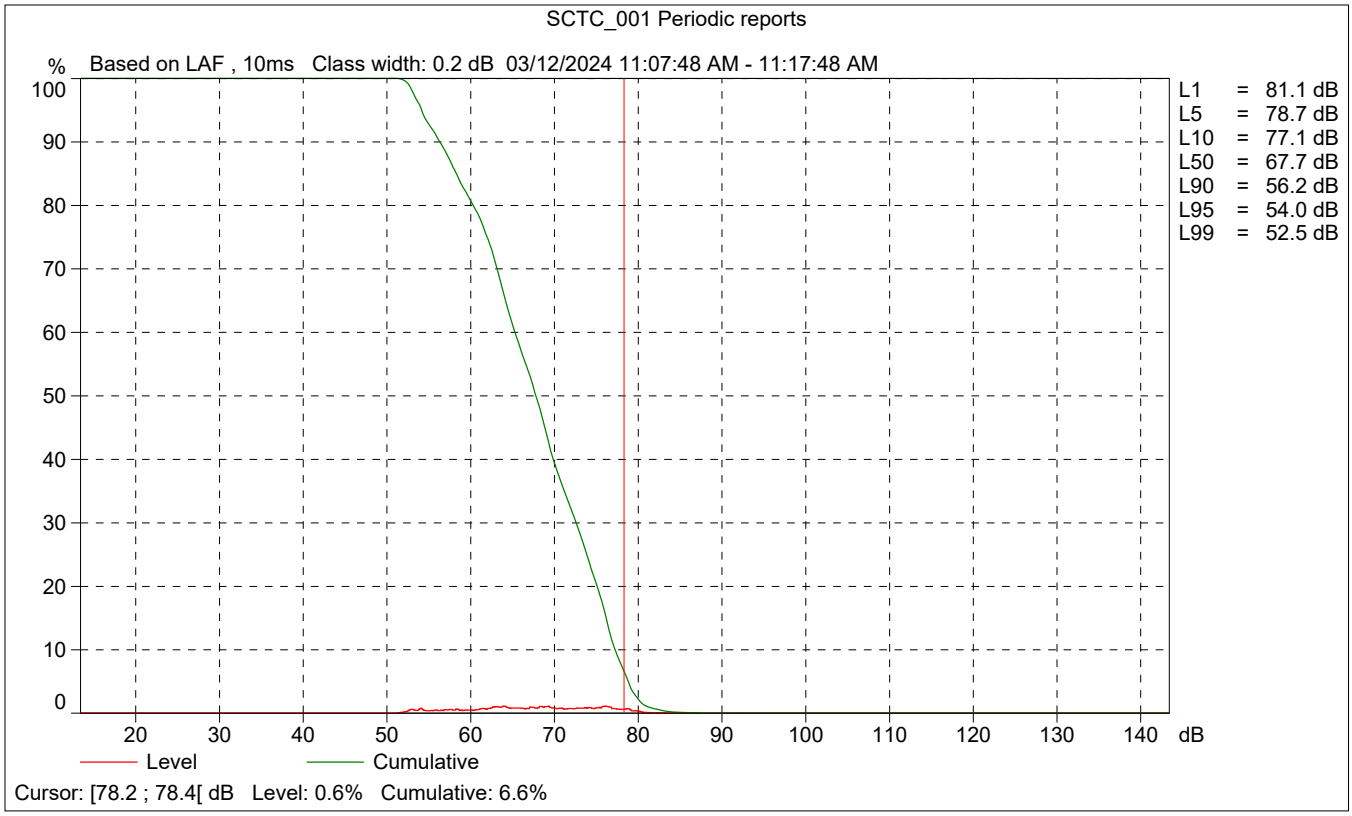

SCTC_001
dB
03/12/2024 11:12:47 AM - 11:12:48 AM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=72.0 dB


SCTC_001 Periodic reports
dB
140
120
100
80
60
40
20
11:10:00 AM
11:20:00 AM
11:30:00 AM
11:40:00 AM
11:50:00 AM
12:00:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 03/12/2024 11:07:48 AM - 12:07:48 PM LAIeq=74.1 dB LAFmax=87.0 dB LCpeak=104.4 dB LAFmin=51.2 dB

SCTC_001 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	74.1	87.0	51.2
Time	11:07:48 AM	0:10:00				
Date	03/12/2024					



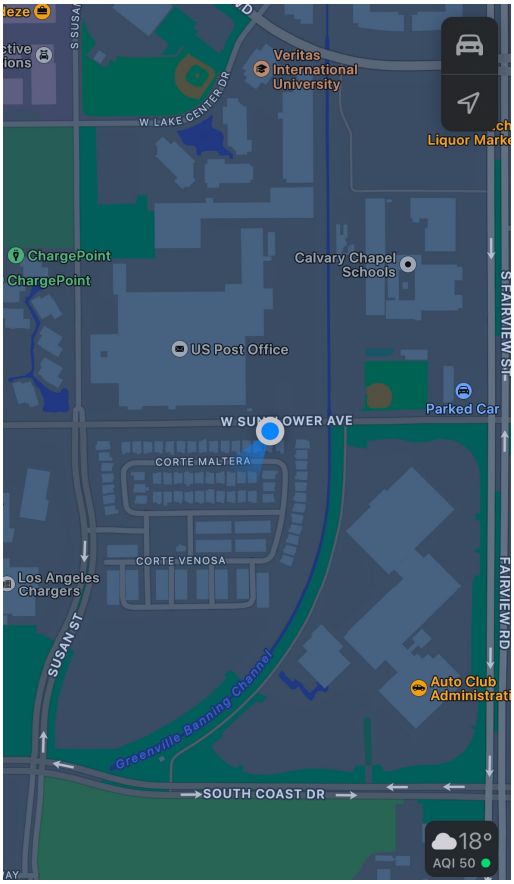

SCTC_001 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 03/12/2024 11:07:48 AM - 11:17:48 AM
100
90
80
70
60
50
40
30
20
10
0
20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 81.1 dB
L5 = 78.7 dB
L10 = 77.1 dB
L50 = 67.7 dB
L90 = 56.2 dB
L95 = 54.0 dB
L99 = 52.5 dB
Level
Cumulative
Cursor: [78.2 ; 78.4[dB Level: 0.6% Cumulative: 6.6%

Site Number: NM-2		
Recorded By: Dennis Dinh, Winnie Woo		
Job Number: 199799		
Date: 3/12/2024		
Time: 11:39 a.m.		
Location: Approximately 200 feet west of the Fairview Road and Sunflower Avenue intersection		
Source of Ambient Noise: Traffic along Sunflower Avenue		
Noise Data		
L_{eq} (dB)	L_{max}(dB)	L_{min} (dB)
68.2	86.6	48.5

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**3011133**	**06/04/2023**	
	Microphone	**Brüel & Kjær**	**4189**	**3086765**	**06/04/2023**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**25380**	**06/04/2023**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**06/04/2023**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Sunny
	Note: dBA Offset = -0.03		**Sensor Height (ft):** 5 ft
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (inches)**
	4 mph	62	30.14

Photo of Measurement Location



2250

Instrument:		2250
Application:		BZ7225 Version 4.7.6
Start Time:		03/12/2024 11:39:57
End Time:		03/12/2024 11:49:57
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		142.17

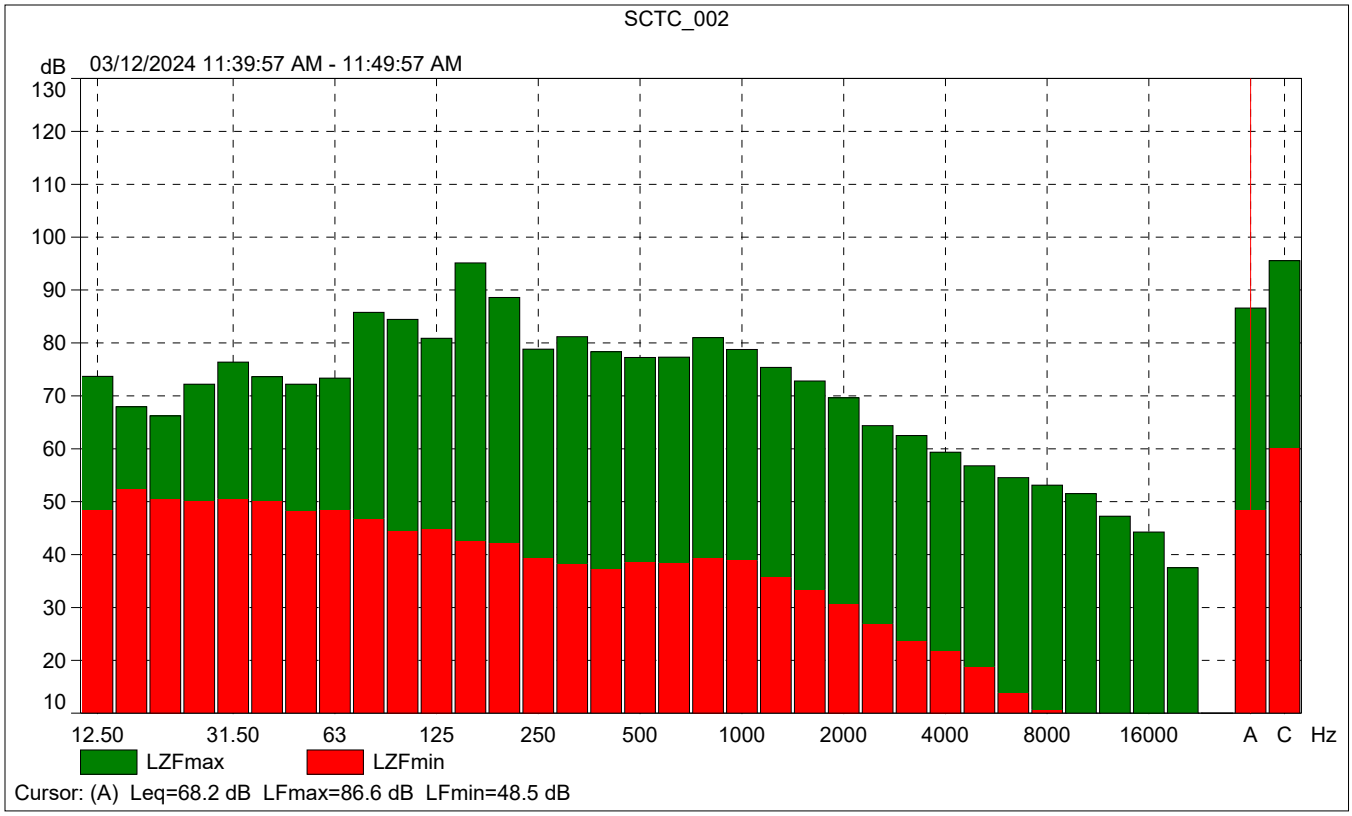
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

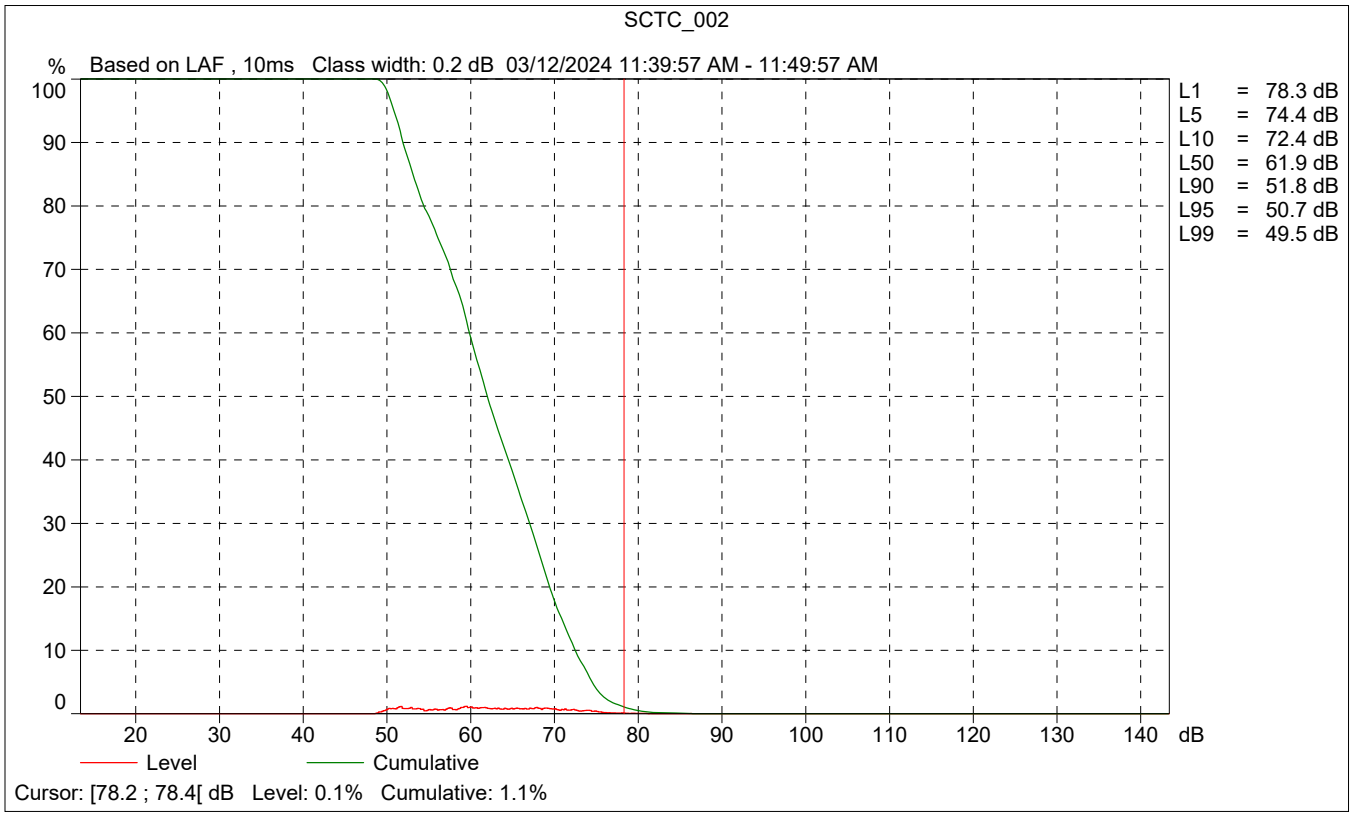
Instrument Serial Number:		3011133
Microphone Serial Number:		3086765
Input:		Top Socket
Windscreen Correction:		UA-1650
Sound Field Correction:		Free-field

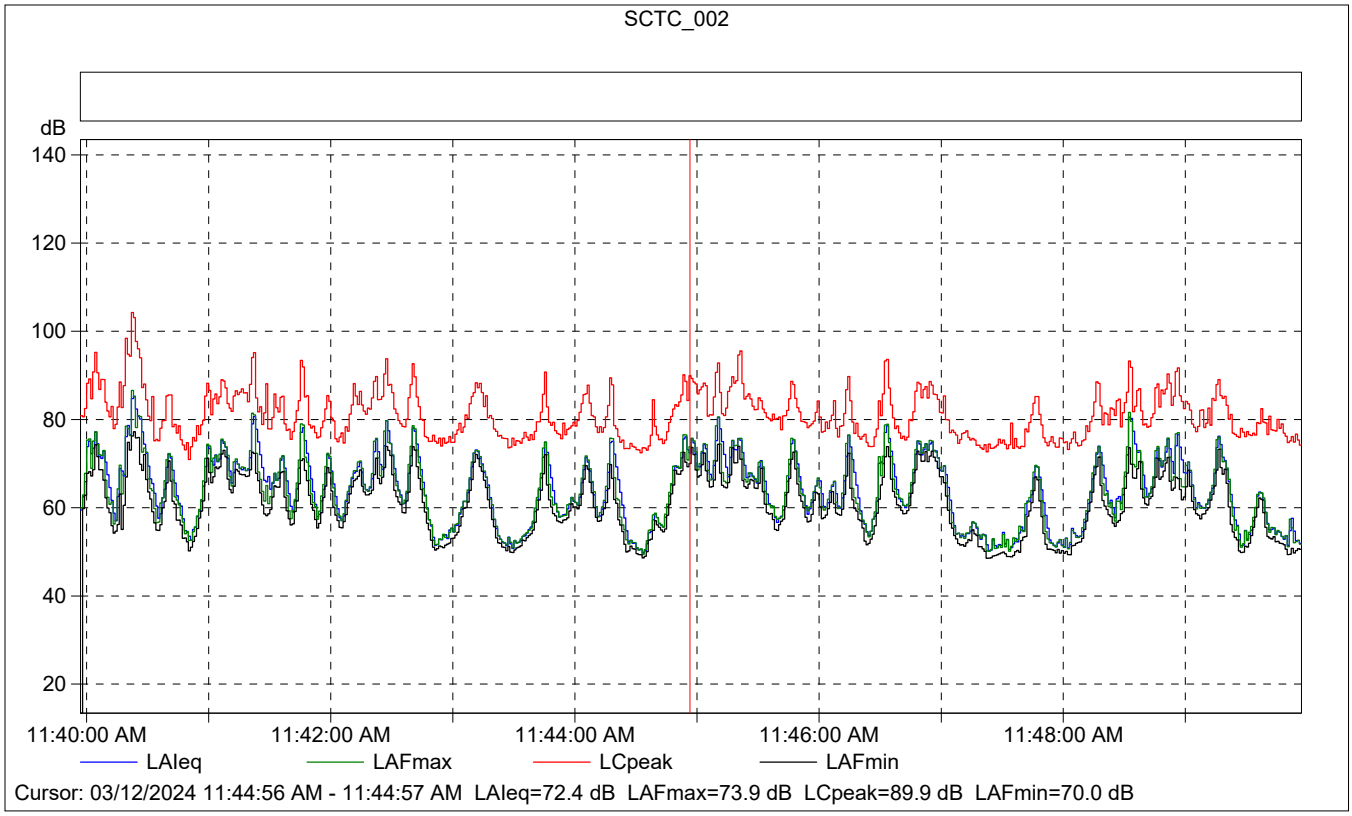
Calibration Time:		03/12/2024 10:59:46
Calibration Type:		External reference
Sensitivity:		43.355081230402 mV/Pa

SCTC_002

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	68.2	86.6	48.5
Time	11:39:57 AM	11:49:57 AM	0:10:00				
Date	03/12/2024	03/12/2024					

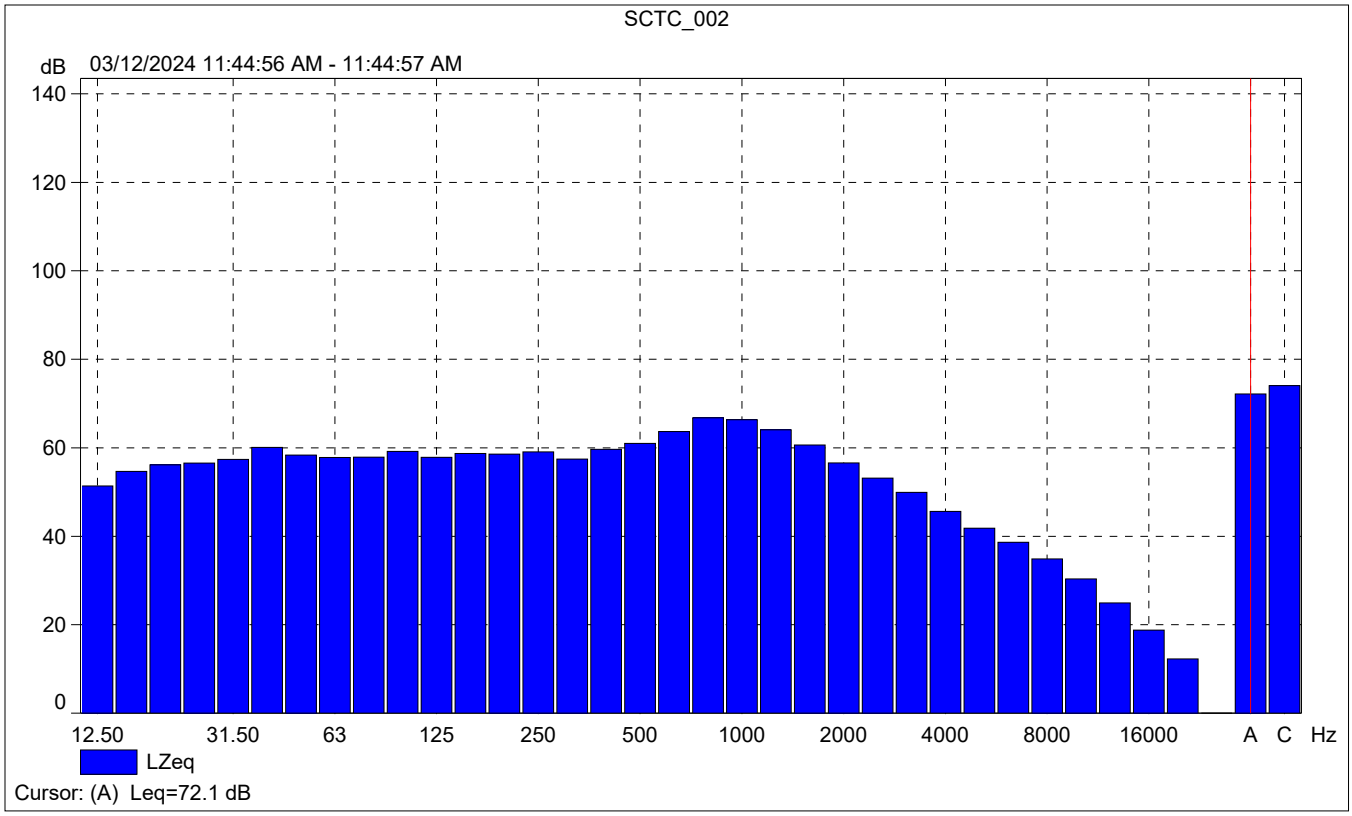

SCTC_002
dB
03/12/2024 11:39:57 AM - 11:49:57 AM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZFmax
LZFmin
Cursor: (A) Leq=68.2 dB LFmax=86.6 dB LFmin=48.5 dB

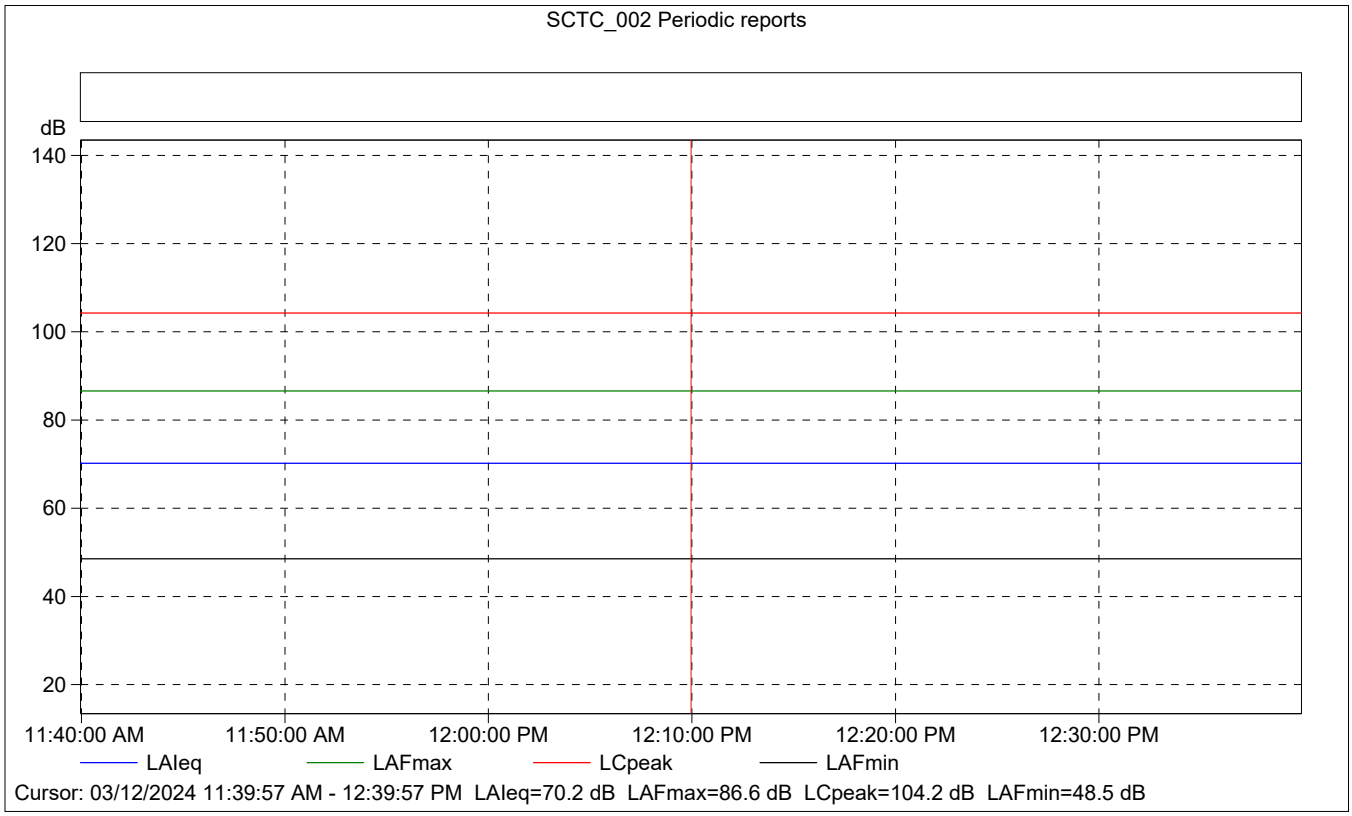

SCTC_002
%
Based on LAF , 10ms Class width: 0.2 dB 03/12/2024 11:39:57 AM - 11:49:57 AM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 78.3 dB
L5 = 74.4 dB
L10 = 72.4 dB
L50 = 61.9 dB
L90 = 51.8 dB
L95 = 50.7 dB
L99 = 49.5 dB
Level
Cumulative
Cursor: [78.2 ; 78.4[dB Level: 0.1% Cumulative: 1.1%



SCTC_002

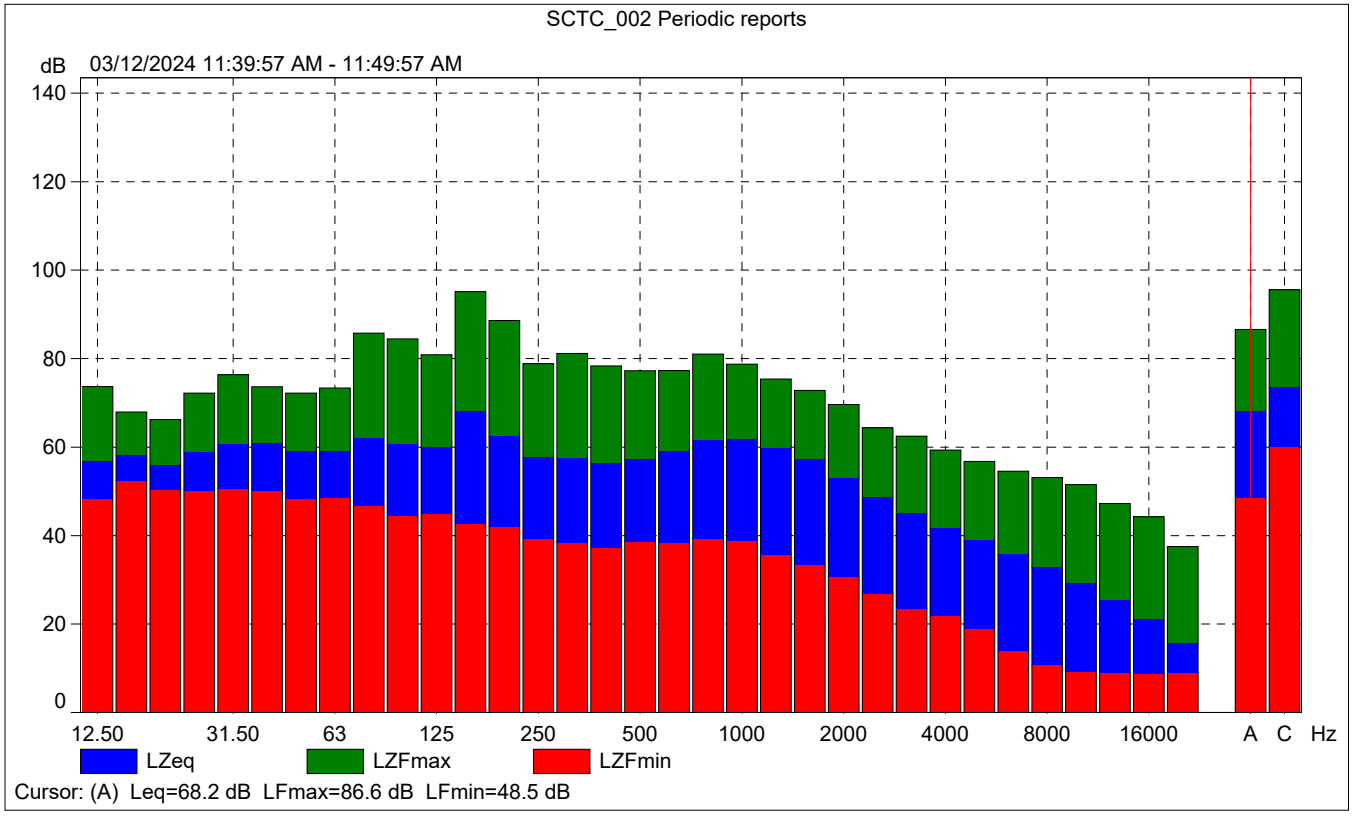
	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	72.4	73.9	70.0
Time	11:44:56 AM	0:00:01				
Date	03/12/2024					

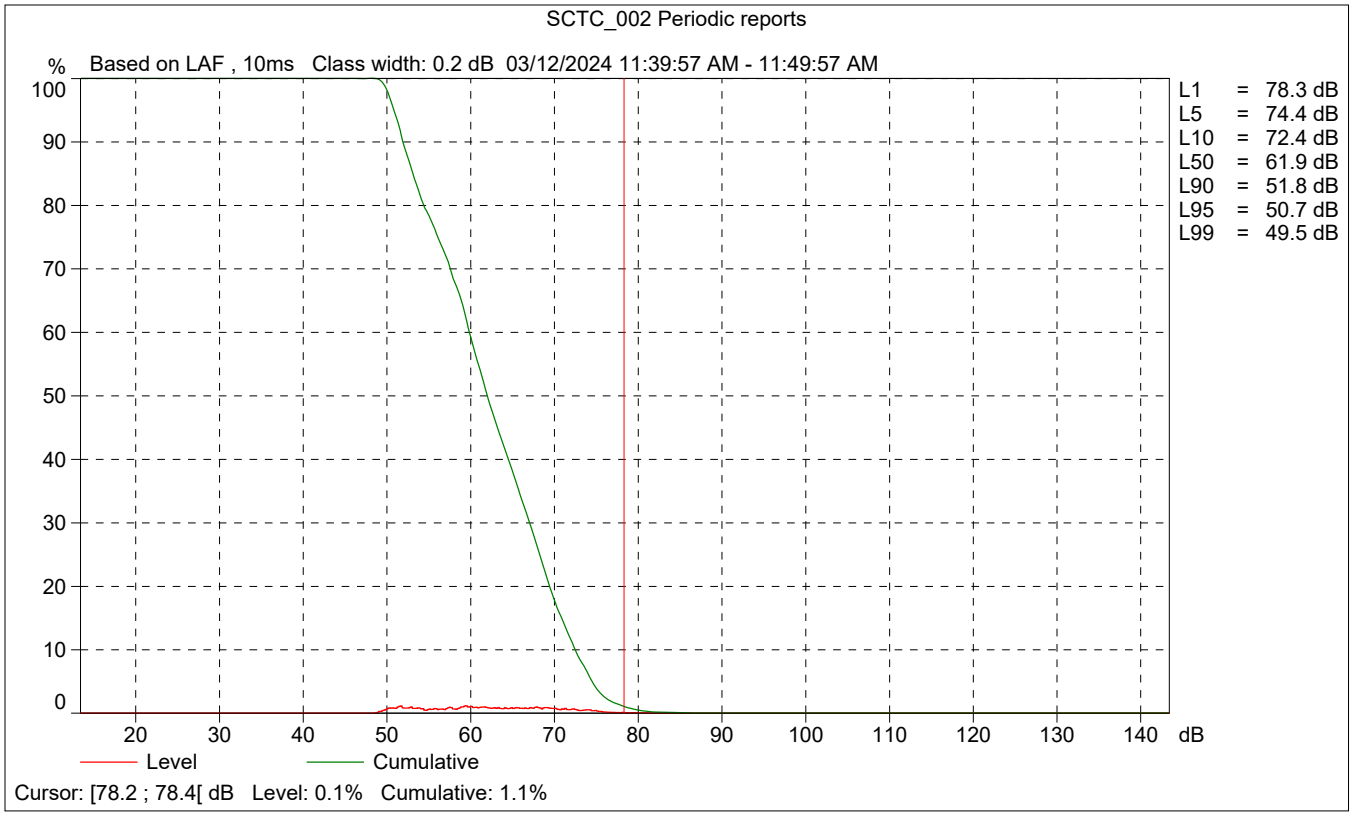

SCTC_002
dB
03/12/2024 11:44:56 AM - 11:44:57 AM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=72.1 dB


SCTC_002 Periodic reports
dB
140
120
100
80
60
40
20
11:40:00 AM
11:50:00 AM
12:00:00 PM
12:10:00 PM
12:20:00 PM
12:30:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 03/12/2024 11:39:57 AM - 12:39:57 PM LAIeq=70.2 dB LAFmax=86.6 dB LCpeak=104.2 dB LAFmin=48.5 dB

SCTC_002 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	70.2	86.6	48.5
Time	11:39:57 AM	0:10:00				
Date	03/12/2024					



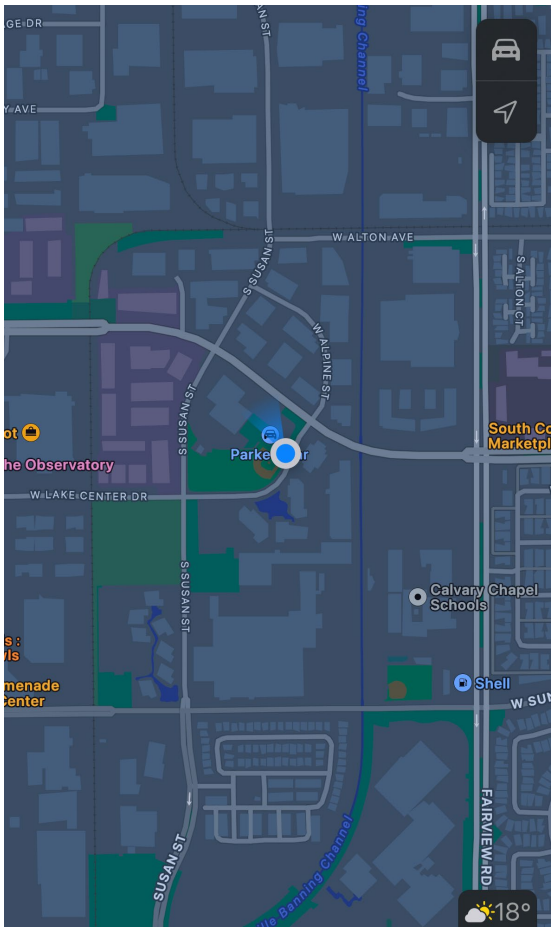

SCTC_002 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 03/12/2024 11:39:57 AM - 11:49:57 AM
100
90
80
70
60
50
40
30
20
10
0
20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 78.3 dB
L5 = 74.4 dB
L10 = 72.4 dB
L50 = 61.9 dB
L90 = 51.8 dB
L95 = 50.7 dB
L99 = 49.5 dB
Level
Cumulative
Cursor: [78.2 ; 78.4[dB Level: 0.1% Cumulative: 1.1%

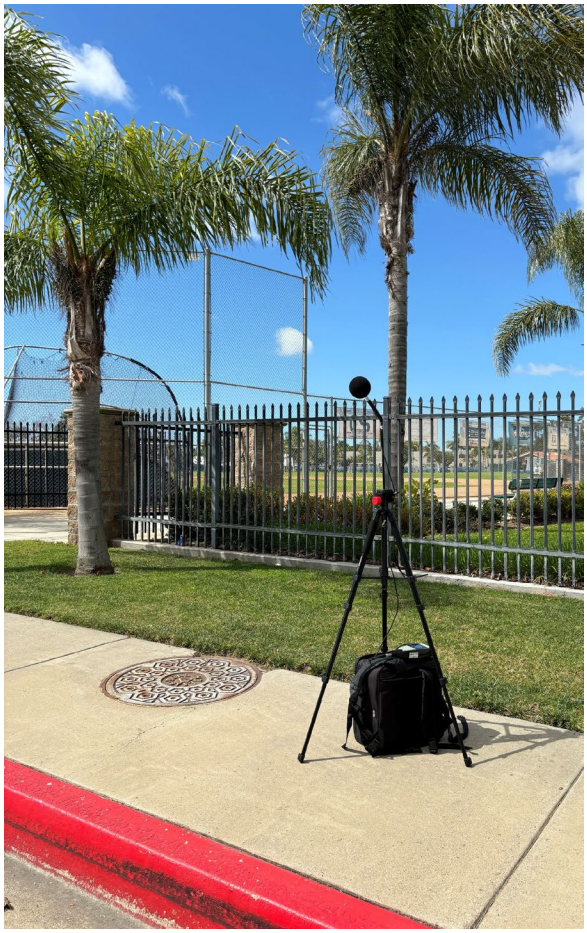
Site Number: NM-3		
Recorded By: Dennis Dinh, Winnie Woo		
Job Number: 199799		
Date: 3/12/2024		
Time: 12:07 a.m.		
Location: Approximately 200 feet east from the Lake Centre Drive and Susan Street intersection		
Source of Ambient Noise: Traffic along Lake Centre Drive		
Noise Data		
L_{eq} (dB)	**L_{max}(dB)**	**L_{min} (dB)**
60.3	81.0	52.3

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**3011133**	**06/04/2023**	
	Microphone	**Brüel & Kjær**	**4189**	**3086765**	**06/04/2023**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**25380**	**06/04/2023**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**06/04/2023**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Sunny
	Note: dBA Offset = -0.03		**Sensor Height (ft):** 5 ft
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (inches)**
	4 mph	62	30.14

Photo of Measurement Location





2250

Instrument:		2250
Application:		BZ7225 Version 4.7.6
Start Time:		03/12/2024 12:07:14
End Time:		03/12/2024 12:17:40
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		142.17

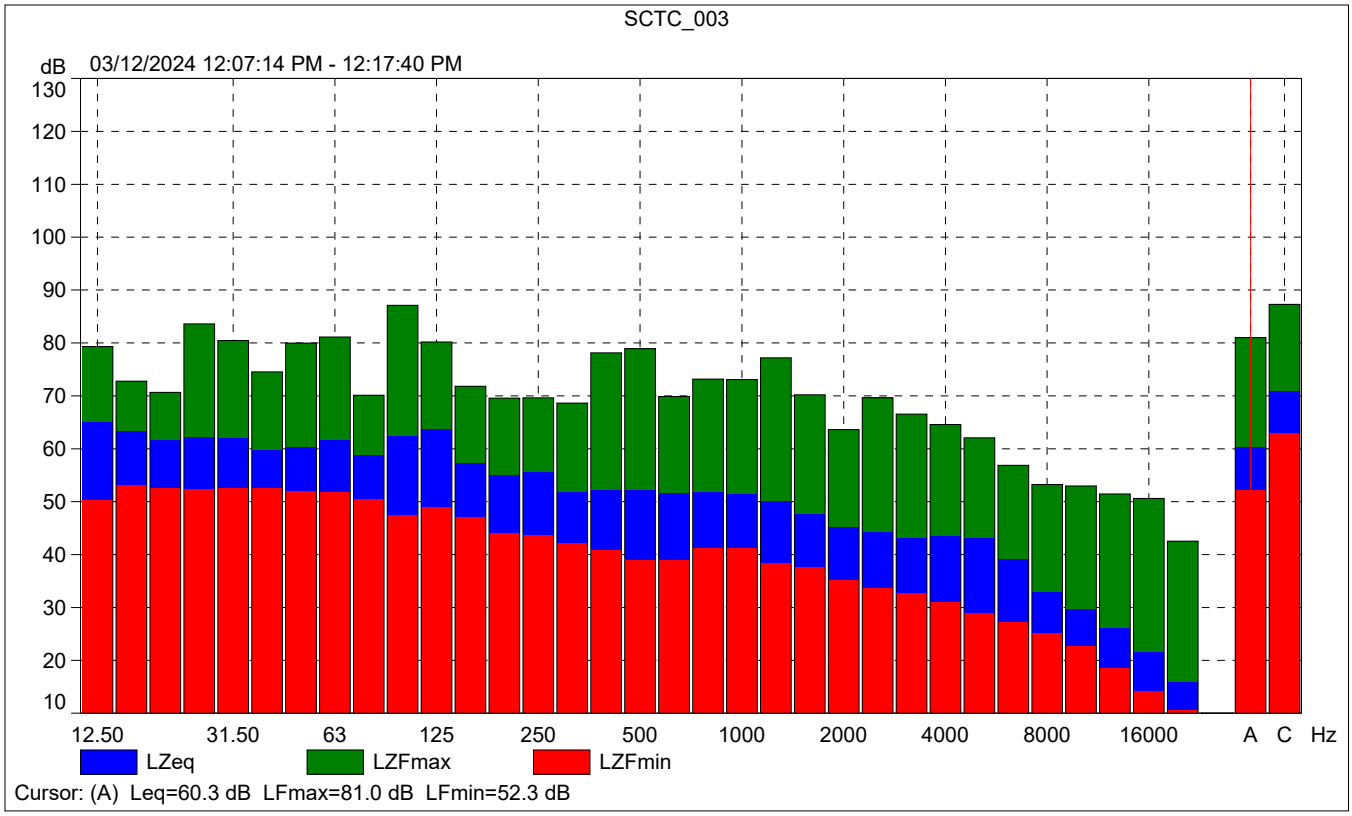
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

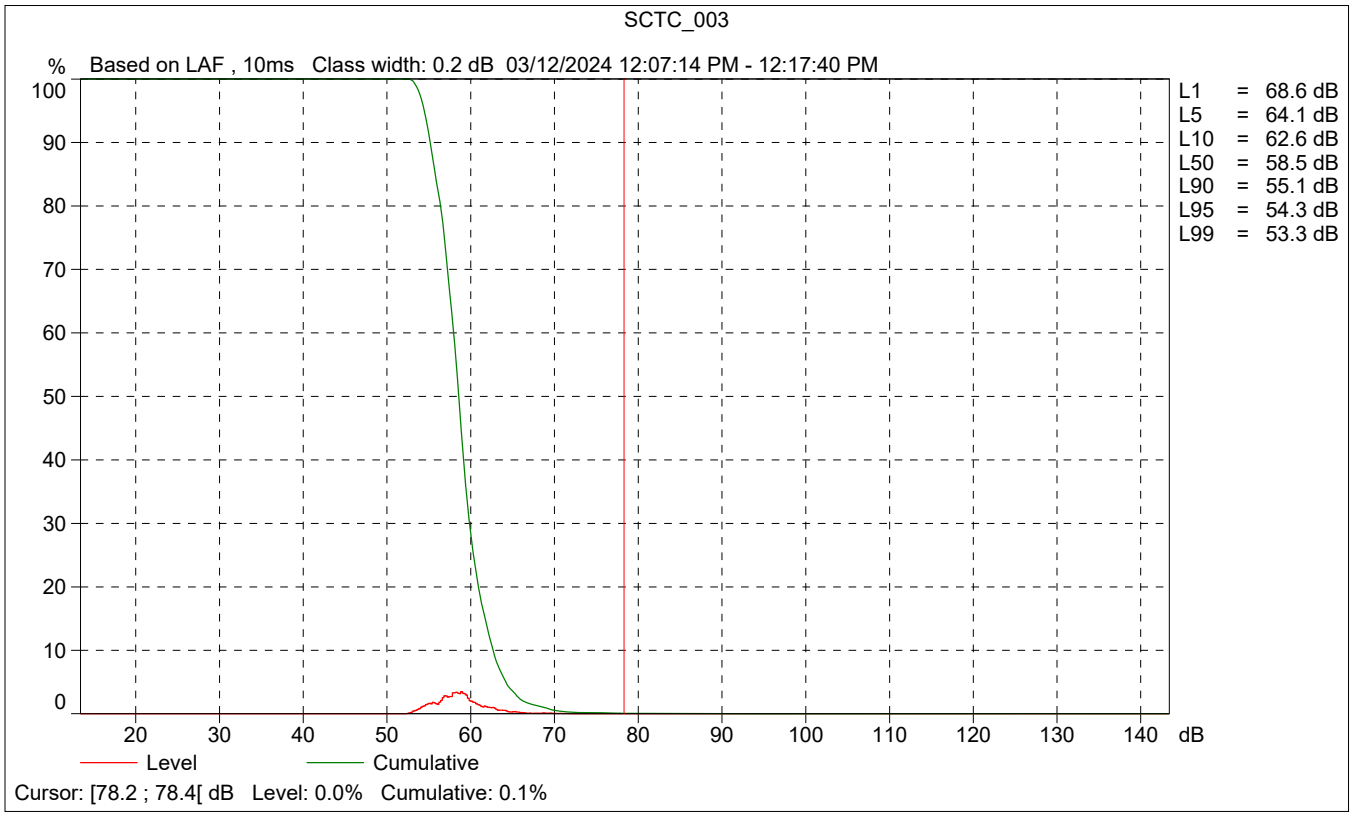
Instrument Serial Number:		3011133
Microphone Serial Number:		3086765
Input:		Top Socket
Windscreen Correction:		UA-1650
Sound Field Correction:		Free-field

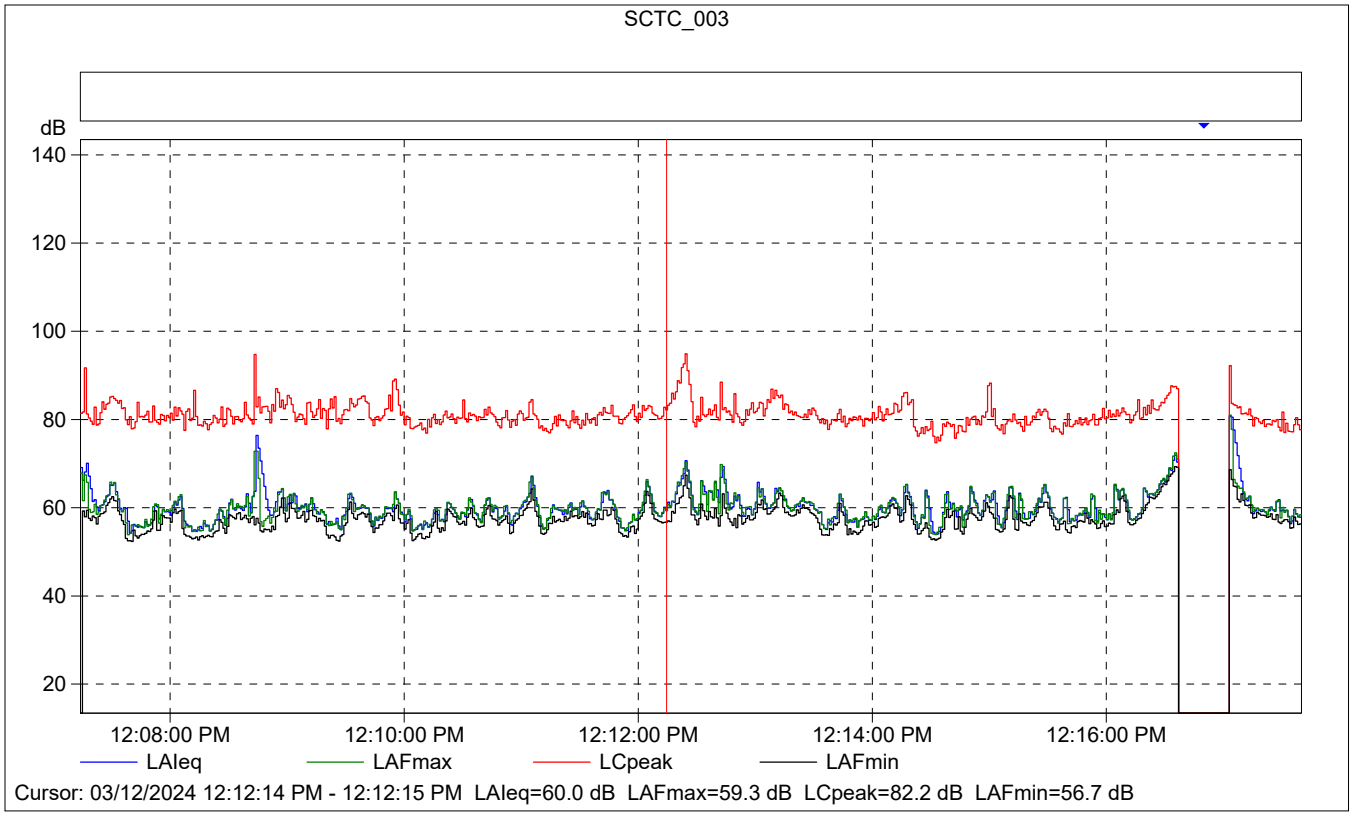
Calibration Time:		03/12/2024 10:59:46
Calibration Type:		External reference
Sensitivity:		43.355081230402 mV/Pa

SCTC_003

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	60.3	81.0	52.3
Time	12:07:14 PM	12:17:40 PM	0:10:00				
Date	03/12/2024	03/12/2024					

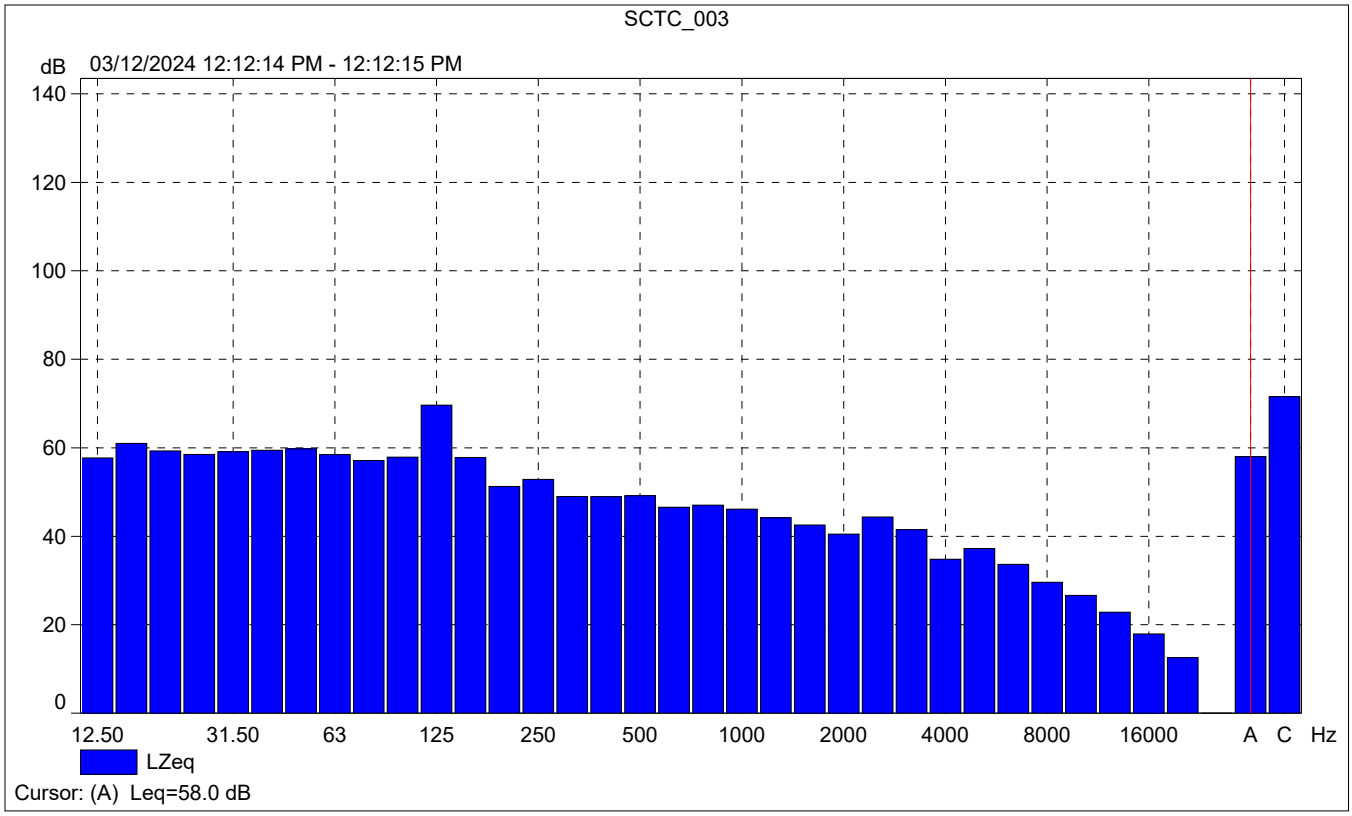

SCTC_003
dB
03/12/2024 12:07:14 PM - 12:17:40 PM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=60.3 dB LFmax=81.0 dB LFmin=52.3 dB

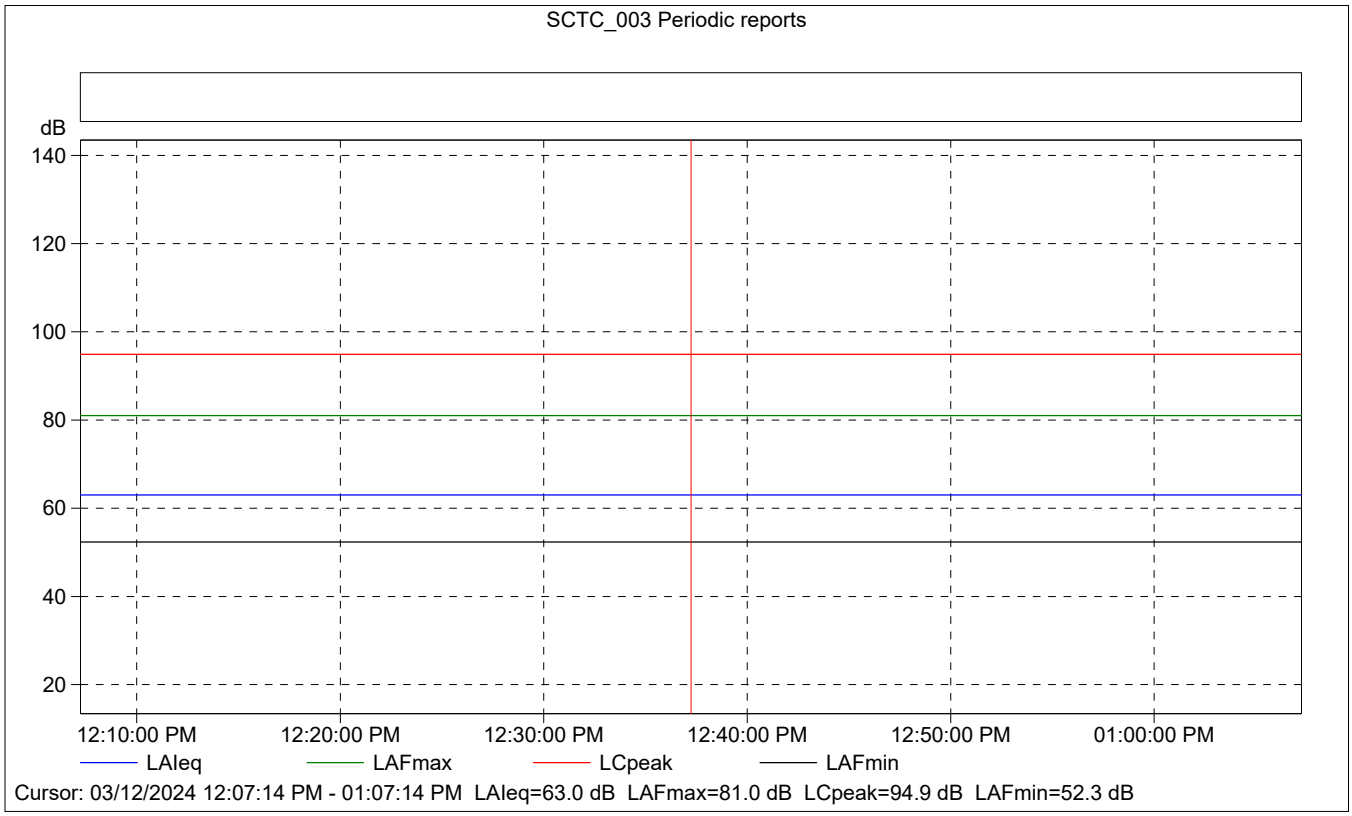

SCTC_003
%
Based on LAF , 10ms Class width: 0.2 dB 03/12/2024 12:07:14 PM - 12:17:40 PM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 68.6 dB
L5 = 64.1 dB
L10 = 62.6 dB
L50 = 58.5 dB
L90 = 55.1 dB
L95 = 54.3 dB
L99 = 53.3 dB
Level
Cumulative
Cursor: [78.2 ; 78.4[dB Level: 0.0% Cumulative: 0.1%



SCTC_003

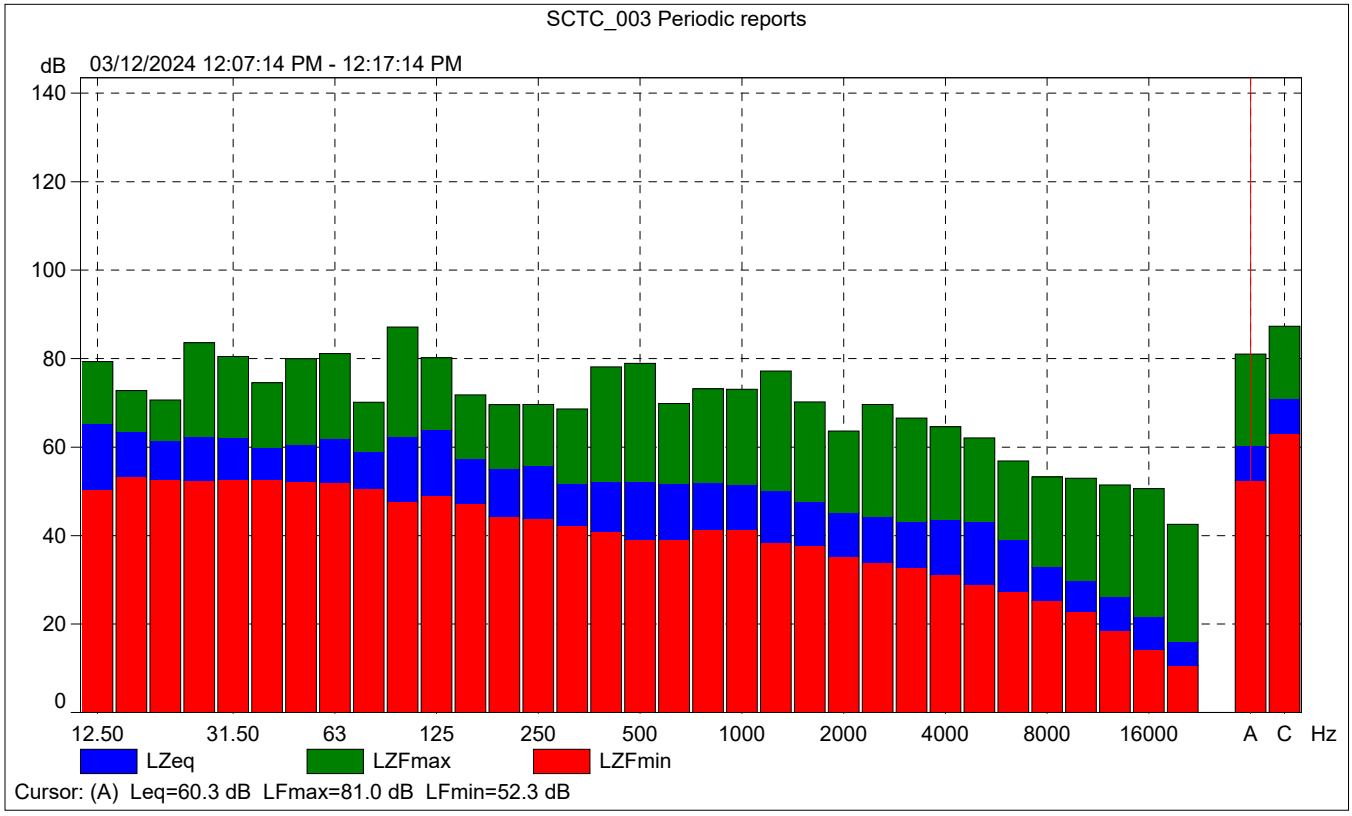
	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	60.0	59.3	56.7
Time	12:12:14 PM	0:00:01				
Date	03/12/2024					


SCTC_003
dB
03/12/2024 12:12:14 PM - 12:12:15 PM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=58.0 dB


SCTC_003 Periodic reports
dB
140
120
100
80
60
40
20
12:10:00 PM
12:20:00 PM
12:30:00 PM
12:40:00 PM
12:50:00 PM
01:00:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 03/12/2024 12:07:14 PM - 01:07:14 PM LAIeq=63.0 dB LAFmax=81.0 dB LCpeak=94.9 dB LAFmin=52.3 dB

SCTC_003 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	63.0	81.0	52.3
Time	12:07:14 PM	0:10:00				
Date	03/12/2024					



Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 4/1/2024
Case Description: South Coast Technology Center

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Demolition	Commercial	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	625	0
Excavator	No	40		80.7	625	0
Excavator	No	40		80.7	625	0
Excavator	No	40		80.7	625	0
Dozer	No	40		81.7	625	0
Dozer	No	40		81.7	625	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Saw	67.6	60.7
Excavator	58.8	54.8
Excavator	58.8	54.8
Excavator	58.8	54.8
Dozer	59.7	55.8
Dozer	59.7	55.8
Total	67.6	64.5

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Demolition	Residential	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	1000	0
Excavator	No	40		80.7	1000	0
Excavator	No	40		80.7	1000	0
Excavator	No	40		80.7	1000	0
Dozer	No	40		81.7	1000	0
Dozer	No	40		81.7	1000	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Saw	63.6	56.6
Excavator	54.7	50.7
Excavator	54.7	50.7
Excavator	54.7	50.7
Dozer	55.6	51.7
Dozer	55.6	51.7
Total	63.6	60.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 4/1/2024
Case Description: South Coast Technology Center

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Grading	Commercial	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	625	0
Excavator	No	40		80.7	625	0
Grader	No	40	85		625	0
Scraper	No	40		83.6	625	0
Dozer	No	40		81.7	625	0
Scraper	No	40		83.6	625	0
Tractor	No	40	84		625	0
Tractor	No	40	84		625	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Excavator	58.8	54.8
Excavator	58.8	54.8
Grader	63.1	59.1
Scraper	61.6	57.7
Dozer	59.7	55.8
Scraper	61.6	57.7
Tractor	62.1	58.1
Tractor	62.1	58.1
Total	63.1	66.3

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Grading	Residential	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	1000	0
Excavator	No	40		80.7	1000	0
Grader	No	40	85		1000	0
Scraper	No	40		83.6	1000	0
Dozer	No	40		81.7	1000	0
Scraper	No	40		83.6	1000	0
Tractor	No	40	84		1000	0
Tractor	No	40	84		1000	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Excavator	54.7	50.7
Excavator	54.7	50.7
Grader	59	55
Scraper	57.6	53.6
Dozer	55.6	51.7
Scraper	57.6	53.6
Tractor	58	54
Tractor	58	54
Total	59	62.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 4/1/2024
Case Description: South Coast Technology Center

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Building Construction	Commercial	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	625	0
Pickup Truck	No	40		75	625	0
Pickup Truck	No	40		75	625	0
Pickup Truck	No	40		75	625	0
Generator	No	50		80.6	625	0
Tractor	No	40	84		625	0
Tractor	No	40	84		625	0
Tractor	No	40	84		625	0
Welder / Torch	No	40		74	625	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Crane	58.6	50.7
Pickup Truck	53.1	49.1
Pickup Truck	53.1	49.1
Pickup Truck	53.1	49.1
Generator	58.7	55.7
Tractor	62.1	58.1
Tractor	62.1	58.1
Tractor	62.1	58.1
Welder / Torch	52.1	48.1
Total	62.1	64.3

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Building Construction	Residential	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	1000	0
Pickup Truck	No	40		75	1000	0
Pickup Truck	No	40		75	1000	0
Pickup Truck	No	40		75	1000	0
Generator	No	50		80.6	1000	0
Tractor	No	40	84		1000	0
Tractor	No	40	84		1000	0
Tractor	No	40	84		1000	0
Welder / Torch	No	40		74	1000	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Crane	54.5	46.6
Pickup Truck	49	45
Pickup Truck	49	45
Pickup Truck	49	45
Generator	54.6	51.6
Tractor	58	54
Tractor	58	54
Tractor	58	54
Welder / Torch	48	44
Total	58	60.3

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 4/1/2024
Case Description: South Coast Technology Center

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Paving	Commercial	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	625	0
Paver	No	50		77.2	625	0
Paver	No	50		77.2	625	0
Paver	No	50		77.2	625	0
Roller	No	20		80	625	0
Roller	No	20		80	625	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Paver		55.3	52.3
Paver		55.3	52.3
Paver		55.3	52.3
Paver		55.3	52.3
Roller		58.1	51.1
Roller		58.1	51.1
	Total	58.1	59.7

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Paving	Residential	85	85	85

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	1000	0
Paver	No	50		77.2	1000	0
Paver	No	50		77.2	1000	0
Paver	No	50		77.2	1000	0
Roller	No	20		80	1000	0
Roller	No	20		80	1000	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Paver		51.2	48.2
Paver		51.2	48.2
Paver		51.2	48.2
Paver		51.2	48.2
Roller		54	47
Roller		54	47
	Total	54	55.6

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 4/1/2024
Case Description: South Coast Technology Center

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Architectural Coating	Commercial	85	85	85

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	625	0

		Results	
		Calculated (dBA)	
Equipment		*Lmax	Leq
Compressor (air)		55.7	51.8
	Total	55.7	51.8

*Calculated Lmax is the Loudest value.

				---- Receptor #2 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Architectuaral Coating	Residential	85	85	85

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	1000	0

		Results	
		Calculated (dBA)	
Equipment		*Lmax	Leq
Compressor (air)		51.6	47.7
	Total	51.6	47.7

*Calculated Lmax is the Loudest value.

Noise emissions of industry sources

Source name	Reference	Level		Frequency spectrum [dB(A)]								Corrections		
				63	125	250	500	1	2	4	8	Cwall	CI	CT
			dB(A)	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	dB	dB	dB
HVAC	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-

Noise emissions of industry sources

Source name	Reference	Level		Frequency spectrum [dB(A)]								Corrections		
			dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Cwall dB	CI dB	CT dB
HVAC		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
	Lw/unit	Day	84.0									-	-	-
		Night	84.0									-	-	-
Slow Moving trucks-2,3	Lw/m²	Day	62.0	43.5	47.6	51.6	54.6	57.6	55.6	50.6	45.6	-	-	-
		Night	62.0	43.5	47.6	51.6	54.6	57.6	55.6	50.6	45.6	-	-	-
Slow moving trucks-1	Lw/m²	Day	62.0	43.5	47.6	51.6	54.6	57.6	55.6	50.6	45.6	-	-	-
		Night	62.0	43.5	47.6	51.6	54.6	57.6	55.6	50.6	45.6	-	-	-
Loading Dock-3	Lw/m	Day	80.0	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	-	-	-
		Night	80.0	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	-	-	-
Loading Dock-2	Lw/m	Day	80.0	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	-	-	-
		Night	80.0	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	-	-	-
Loading Dock-1	Lw/m	Day	80.0	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	-	-	-
		Night	80.0	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	-	-	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP Day	Level w/o NP Night	Level w NP Day	Level w NP Night
		dB(A)		dB(A)	
Residential Uses to the East	GF	35.2	35.2	0.0	0.0
HVAC	-	19.3	19.3	-	-
HVAC	-	19.0	19.0	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.3	19.3	-	-
HVAC	-	19.1	19.1	-	-
HVAC	-	19.1	19.1	-	-
HVAC	-	19.3	19.3	-	-
HVAC	-	19.1	19.1	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.4	19.4	-	-
HVAC	-	19.2	19.2	-	-
HVAC	-	19.6	19.6	-	-
HVAC	-	19.4	19.4	-	-
HVAC	-	16.4	16.4	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	16.7	16.7	-	-
HVAC	-	16.4	16.4	-	-
HVAC	-	16.9	16.9	-	-
HVAC	-	16.7	16.7	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	16.9	16.9	-	-
HVAC	-	16.4	16.4	-	-
HVAC	-	16.9	16.9	-	-
HVAC	-	16.7	16.7	-	-
HVAC	-	16.4	16.4	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	13.5	13.5	-	-
HVAC	-	13.9	13.9	-	-
HVAC	-	13.7	13.7	-	-
HVAC	-	13.5	13.5	-	-
HVAC	-	13.9	13.9	-	-
HVAC	-	13.7	13.7	-	-
HVAC	-	13.5	13.5	-	-
HVAC	-	13.9	13.9	-	-
HVAC	-	13.7	13.7	-	-
HVAC	-	13.7	13.7	-	-
HVAC	-	13.5	13.5	-	-
HVAC	-	13.9	13.9	-	-
HVAC	-	13.7	13.7	-	-
HVAC	-	13.5	13.5	-	-
Loading Dock-1	-	2.5	2.5	-	-
Loading Dock-2	-	7.9	7.9	-	-
Loading Dock-3	-	10.3	10.3	-	-
Slow moving trucks-1	-	10.4	10.4	-	-
Slow Moving trucks-2,3	-	30.6	30.6	-	-
Residential Uses to the South	GF	38.8	38.8	0.0	0.0
HVAC	-	17.0	17.0	-	-
HVAC	-	17.2	17.2	-	-
HVAC	-	16.8	16.8	-	-
HVAC	-	16.8	16.8	-	-
HVAC	-	17.0	17.0	-	-
HVAC	-	17.3	17.3	-	-
HVAC	-	17.3	17.3	-	-
HVAC	-	17.1	17.1	-	-
HVAC	-	19.4	19.4	-	-
HVAC	-	16.9	16.9	-	-
HVAC	-	17.1	17.1	-	-
HVAC	-	17.4	17.4	-	-
HVAC	-	16.9	16.9	-	-
HVAC	-	17.1	17.1	-	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC	-	19.3	19.3	-	-
HVAC	-	19.1	19.1	-	-
HVAC	-	19.4	19.4	-	-
HVAC	-	19.2	19.2	-	-
HVAC	-	19.6	19.6	-	-
HVAC	-	19.2	19.2	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.8	19.8	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.9	19.9	-	-
HVAC	-	19.8	19.8	-	-
HVAC	-	19.9	19.9	-	-
HVAC	-	20.3	20.3	-	-
HVAC	-	20.1	20.1	-	-
HVAC	-	19.3	19.3	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.4	19.4	-	-
HVAC	-	19.6	19.6	-	-
HVAC	-	19.7	19.7	-	-
HVAC	-	19.6	19.6	-	-
HVAC	-	19.8	19.8	-	-
HVAC	-	20.0	20.0	-	-
HVAC	-	19.9	19.9	-	-
HVAC	-	20.2	20.2	-	-
HVAC	-	20.1	20.1	-	-
HVAC	-	20.3	20.3	-	-
HVAC	-	20.4	20.4	-	-
HVAC	-	20.3	20.3	-	-
Loading Dock-1	-	10.3	10.3	-	-
Loading Dock-2	-	30.9	30.9	-	-
Loading Dock-3	-	28.5	28.5	-	-
Slow moving trucks-1	-	19.2	19.2	-	-
Slow Moving trucks-2,3	-	33.5	33.5	-	-
School Building GF		40.7	40.7	0.0	0.0
HVAC	-	24.3	24.3	-	-
HVAC	-	23.7	23.7	-	-
HVAC	-	24.7	24.7	-	-
HVAC	-	24.8	24.8	-	-
HVAC	-	24.4	24.4	-	-
HVAC	-	23.9	23.9	-	-
HVAC	-	23.8	23.8	-	-
HVAC	-	24.4	24.4	-	-
HVAC	-	24.0	24.0	-	-
HVAC	-	25.0	25.0	-	-
HVAC	-	24.6	24.6	-	-
HVAC	-	24.1	24.1	-	-
HVAC	-	25.1	25.1	-	-
HVAC	-	24.7	24.7	-	-
HVAC	-	19.3	19.3	-	-
HVAC	-	18.8	18.8	-	-
HVAC	-	18.9	18.9	-	-
HVAC	-	19.6	19.6	-	-
HVAC	-	19.3	19.3	-	-
HVAC	-	20.0	20.0	-	-
HVAC	-	19.7	19.7	-	-
HVAC	-	18.9	18.9	-	-
HVAC	-	20.0	20.0	-	-
HVAC	-	19.2	19.2	-	-
HVAC	-	20.0	20.0	-	-
HVAC	-	19.7	19.7	-	-
HVAC	-	19.3	19.3	-	-
HVAC	-	18.9	18.9	-	-
HVAC	-	15.9	15.9	-	-
HVAC	-	16.3	16.3	-	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC	-	16.1	16.1	-	-
HVAC	-	15.9	15.9	-	-
HVAC	-	16.3	16.3	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	15.9	15.9	-	-
HVAC	-	16.3	16.3	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	15.9	15.9	-	-
HVAC	-	16.3	16.3	-	-
HVAC	-	17.1	17.1	-	-
HVAC	-	16.8	16.8	-	-
Loading Dock-1	-	6.3	6.3	-	-
Loading Dock-2	-	16.1	16.1	-	-
Loading Dock-3	-	20.6	20.6	-	-
Slow moving trucks-1	-	9.5	9.5	-	-
Slow Moving trucks-2,3	-	37.7	37.7	-	-
School Playground	GF	39.5	39.5	0.0	0.0
HVAC	-	19.6	19.6	-	-
HVAC	-	19.5	19.5	-	-
HVAC	-	19.7	19.7	-	-
HVAC	-	19.9	19.9	-	-
HVAC	-	19.8	19.8	-	-
HVAC	-	19.8	19.8	-	-
HVAC	-	19.7	19.7	-	-
HVAC	-	19.9	19.9	-	-
HVAC	-	20.0	20.0	-	-
HVAC	-	20.0	20.0	-	-
HVAC	-	20.1	20.1	-	-
HVAC	-	20.1	20.1	-	-
HVAC	-	20.2	20.2	-	-
HVAC	-	20.3	20.3	-	-
HVAC	-	18.4	18.4	-	-
HVAC	-	18.1	18.1	-	-
HVAC	-	18.2	18.2	-	-
HVAC	-	18.6	18.6	-	-
HVAC	-	18.5	18.5	-	-
HVAC	-	18.8	18.8	-	-
HVAC	-	18.8	18.8	-	-
HVAC	-	18.4	18.4	-	-
HVAC	-	19.0	19.0	-	-
HVAC	-	18.6	18.6	-	-
HVAC	-	19.2	19.2	-	-
HVAC	-	18.9	18.9	-	-
HVAC	-	18.8	18.8	-	-
HVAC	-	18.5	18.5	-	-
HVAC	-	15.5	15.5	-	-
HVAC	-	15.9	15.9	-	-
HVAC	-	15.7	15.7	-	-
HVAC	-	15.6	15.6	-	-
HVAC	-	16.0	16.0	-	-
HVAC	-	15.8	15.8	-	-
HVAC	-	15.7	15.7	-	-
HVAC	-	16.0	16.0	-	-
HVAC	-	15.8	15.8	-	-
HVAC	-	16.0	16.0	-	-
HVAC	-	15.7	15.7	-	-
HVAC	-	16.1	16.1	-	-
HVAC	-	16.0	16.0	-	-
HVAC	-	15.8	15.8	-	-
Loading Dock-1	-	5.0	5.0	-	-
Loading Dock-2	-	32.0	32.0	-	-
Loading Dock-3	-	30.4	30.4	-	-
Slow moving trucks-1	-	9.4	9.4	-	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
Slow Moving trucks-2,3	-	35.3	35.3	-	-

Receiver list

No.	Receiver name	Building side	Floor	Limit		Level w/o NP		Level w NP		Difference		Conflict	
				Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
				dB(A)		dB(A)		dB(A)		dB		dB	
1	Residential Uses to the East	-	GF	-	-	35.2	35.2	0.0	0.0	-35.2	-35.2	-	-
2	Residential Uses to the South	-	GF	-	-	38.8	38.8	0.0	0.0	-38.8	-38.8	-	-
3	School Building	West	GF	-	-	40.7	40.7	0.0	0.0	-40.7	-40.7	-	-
4	School Playground	-	GF	-	-	39.5	39.5	0.0	0.0	-39.5	-39.5	-	-