MINES AVENUE BIKEWAY IMPROVEMENT PROJECT

NOISE STUDY

Prepared for:

VCS Environmental, Inc.
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675

Prepared by:

BIRDSEYE PLANNING GROUP

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PICO RIVERA, CALIFORNIA
Noise Study

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MINES AVENUE BIKEWAY IMPROVEMENT PROJECT PICO RIVERA, CALIFORNIA NOISE STUDY

This report is an analysis of the potential noise impacts associated with the proposed Mines Avenue Bikeway Improvement Project (proposed project) in the City of Pico Rivera, California. This report has been prepared by Birdseye Planning Group (BPG) under contract to VCS Environmental, Inc., to support preparation of the environmental documentation pursuant to the California Environmental Quality Act (CEQA). This study analyzes the potential for noise impacts associated with operation of the proposed project and temporary impacts associated with construction activity within proximity to the construction area.

PROJECT DESCRIPTION

Mines Avenue is a two-lane undivided roadway that functions as a collector facility from the city's western edge to Passons Boulevard where it continues as a local road. Mines Avenue allows for east-west circulation in the north central portion of the city, and functions as an alternative to Washington Boulevard and Whittier Boulevard. A combination of on-street parallel and diagonal parking is provided along the roadway. The majority of land uses within the project area are single family residences that front Mines Avenue. Other sensitive land uses within the project area include; Smith Park , Valencia Elementary School and the Pico Rivera Senior Center.

The Mines Avenue Class 4 Bikeway would be located along the center median of the roadway and would consist of two, six-foot wide bike lanes with a 4 to 6-foot landscape bioswale on both sides of the bikeway. The proposed bioswale would treat surface water runoff and increase water quality and provide aesthetically pleasing landscape corridor. As part of the Construction of the Cass 4 Bikeway, the grade of Mines Avenue would be slightly inverted to convey surface water runoff from the street into the proposed bioswale along the center of the roadway.

The Mines Avenue Class I Bikeway would involve 3 primary construction phases, Mobilization, Roadway Demolition and Reconstruction and Bikeway Construction. The construction activities would occur in 1,000-foot segments and would alternate along the northbound and southbound travel lanes to maintain vehicle and pedestrian access.

Phase 1: Mobilization

Phase 1 would involve the mobilization of construction equipment, the establishment of equipment staging and material laydown areas and placement of traffic controls. Designated truck routes would be used to mobilize construction equipment and bring materials into the project area. The location of construction equipment staging areas and material laydown areas would be coordinated with City staff to ensure public safety.

Phase 2: Roadway Demolition and Reconstruction
Phase 2 would involve the demolition and reconstruction of Mines Avenue. The proposed improvements would occur within the curb to curb right-way and would not require any property acquisitions. The demolition activities would remove approximately 16 inches of existing asphalt and crushed aggregate base. An approximate 4-foot wide excavation of the roadway subgrade would also occur to construct the invert grade of the roadway. Approximately 5,180 cubic yards of asphalt and related debris would be removed for each 1,000-foot roadway segment. The material would either be hauled offsite for disposal or pending on suitability stockpiled for reuse. Approximately 370 daily truck trips would be required to haul away the removed material. Once the material is removed, utilities would be relocated as needed.

Once demolition activities and utility relocations are completed, suitable stockpile material and other material, if needed, would be hauled into the construction site. The material would be compacted and used as backfill to construct inverted roadway grade. Approximately 375 daily trips would be required to haul the material into the construction site. Once the roadway grade is set, crushed aggregate base would be installed and the roadway surface would be paved. Once the paving is completed on one side of the roadway, the demolition and reconstruction activities would occur on the alternate side of the road and traffic would be directed to the newly constructed roadway segment. It is anticipated that each 1,000-foot one-half width roadway segment construction would require 8 construction days.

During construction driveway access and vehicle and pedestrian access would be maintained at all times. A combination of traffic control systems would be implemented to direct traffic and ensure pedestrian safety. During the demolition and reconstruction of each 1,000-foot segment of roadway, it is anticipated that parking would be temporarily displaced. After each 1,000-foot segment of new roadway is constructed, on-street parking would again be permitted. During construction, a temporary parking plan would be implemented to minimize inconveniences associated with the temporary loss of parking.

Phase 3: Construction of Bioswale and Bikeway
Once both sides of the roadway are reconstructed, the bioswale and Class I Bikeway would be constructed. Fill material would be deposited to establish the grade of the bikeway and to construct the bioswale. The bikeway would have a permeable surface that would allow surface water runoff to percolate into the ground. Pending on percolation rates, subdrains could also be constructed. Once the construction bioswale and bikeway are completed, the bike lanes would be striped and landscape material would be installed bioswale planters.

Mines Avenue Bikeway Bridge
The Mines Avenue Bikeway Bridge would be constructed approximately 800 feet downstream of the Whittier Boulevard Crossing over the San Gabriel River. The western end of the bridge would generally be constructed at the location where the San River Spreading Basins Trail and the San Gabriel River Trail meets. The eastern end of the bridge would tie into the existing San

Gabriel River Trail. The closest sensitive receptor would be approximately 125 feet from the construction activities.

The proposed Mines Avenue Bikeway Bridge would have a width of 8 feet and span approximately 350 feet over the San Gabriel River. The bridge would be a prefabricated structure installed in segments. The construction activities for the bikeway bridge would involve 3 primary construction phases, Mobilization, Construction of Bridge Foundations and Installation of Bridge.

Phase 1: Mobilization

Phase 1 involve the mobilization of construction equipment and materials to prepare the site and construct the bridge. A construction equipment staging area and materials laydown area would be coordinate with City staff to ensure if safe and secure. Construction access to the proposed bridge location would occur along the San Gabriel Trail. Temporary access ramps would be constructed along the slopes of the river channel to provide access to the construction area. If water is present in the channel, a temporary sand berm diversion could be needed to divert flows away from the construction area.

Phase 2: Construction Bridge Foundation

Construction of the bridge foundation involves two primary activities, construction of the support piers and bridge abutments. The bridge would have two piers and abutments at each end. The bridge pier columns would be approximately 7 feet in diameter. The locations where the pier columns would be installed would be augured to a required depth and reinforced with rebar and concrete. Once the pier columns are formed, the pier caps would be constructed to support the bridge structure. Concurrently, the abutments at each end of the bridge would be constructed on piles or spread footings.

Phase 3 Installation of Bridge Structure

The proposed bridge structure would be prefabricated and consist of three segments that would fasten to the bridge abutments and pier columns. The bridge segments between the abutments and pier columns would first be installed then followed by the installation of the bridge middle segment.

Dunlap Crossing Road Bikeways

The Dunlap Crossing Road Bikeways improvements involve reconstruction of Dunlap Crossing Road Class 1 Bikeway and Class 2 Bikeway from Norwalk Boulevard to the San Gabriel River Trail. The Dunlap Crossing Road Class 2 Bikeway extends 1,000 feet from Norwalk Boulevard before transitioning into a Class I Bikeway. The roadway has a width of 30 feet with one travel lane in each direction. The Dunlap Crossing Class 1 Bikeway is approximately 600 feet in length with a five-foot width and adjacent dirt shoulder. The majority of land uses long the Dunlap Crossing Class 1 Bikeway and Class 2 Bikeway are residential land uses.

The Dunlap Crossing Road Bikeway improvements would involve 2 primary construction phases, Mobilization and Roadway and Bikeway Demolition and Reconstruction. Along

Dunlap Crossing Road the construction would alternate along the northbound and southbound travel lanes to allow for vehicle and pedestrian access. The Dunlap Crossing Bikeway would be constructed in one construction phase and would remain closed until completion.

Phase 1: Mobilization

Phase 1 would involve the mobilization of construction equipment, the establishment of equipment staging and material laydown areas and placement of traffic controls. Designated truck routes would be used to mobilize construction equipment and bring materials into the project area and the location of construction equipment staging and material laydown areas would be coordinated with City staff.

Phase 2: Roadway and Bikeway Demolition and Reconstruction

Phase 2 would involve the removal approximately 16 inches existing asphalt and crushed aggregate base from a 1,000-foot one-half width Dunlap Crossing Road segment. The material would be hauled from the site to an offsite location. It is estimated that approximately 5,180 cubic yards of material would be removed, and 375 daily truck trips would be required to haul the material away from the construction.

Once the roadway demolition activities are completed and the roadway grade is set, a new crushed aggregate base would be constructed, and the road surface would be subsequently paved with asphalt and stripped with the Class 2 Bike Lane. Once the paving is completed, the roadway demolition and reconstruction activities would occur on the alternate side of the road and traffic would be directed to the newly constructed roadway segment.

Once the Dunlop Crossing roadway and bikeway improvements are completed, reconstruction of the Dunlap Crossing Class 1 Bikeway would begin. The existing trail would be demolished and removed, and a new aggregate base would be constructed. It is anticipated the reconstruction Dunlap Crossing Road and reconstruction of the Dunlap Crossing Bikeway would require 8 construction days.

For the purpose of evaluating air quality impacts, it is assumed construction would begin January 2020 and take approximately 6 months to complete. The project vicinity is shown in Figure 1 – Vicinity Map. The area of project improvements are provided as Figure 2 – Project Site.

SETTING

Overview of Sound Measurement

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). Sound pressure level is measured on a logarithmic scale with the 0 dB level

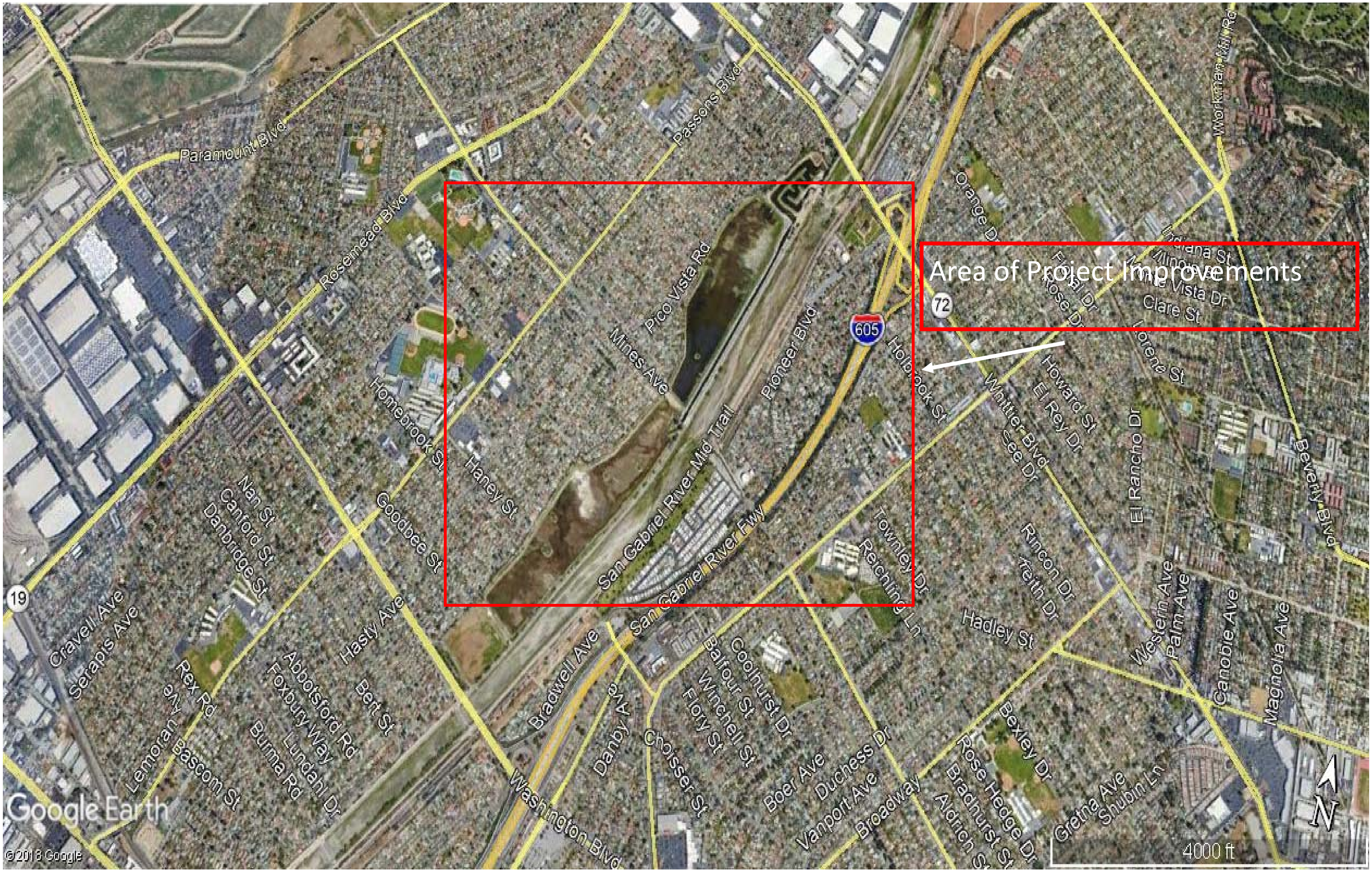


Figure 1— Vicinity Map

Figure 2 — Project Area

based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations. Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (i.e., industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units and office buildings construction to California Energy Code standards is generally 30 dBA or more (Harris, Miller, Miller and Hanson, 2006).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB. Daytime Leq levels are louder than Ldn or CNEL levels; thus, if the Leq meets noise standards, the Ldn and CNEL are also met. Table 1 shows sounds levels of typical noise sources in Leq.

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Urban areas contain a variety of land use and development types that are noise sensitive including residences, schools, churches, hospitals and convalescent care facilities. Nearby sensitive receptors are single-family residences along Mines Avenue. Other sensitive land uses within the project area include Smith Park and the Pico Rivera Senior Center.

Project Site Setting

The project area is located in the urbanized portion of the City of Pico Rivera. Thus, the most common and primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles and trucks) on Mines Avenue and Dunlap Crossing Road. Land use in proximity to the San Gabriel River bridge crossing is primarily open space though residences are located on the east side of the crossing and south of the proposed improvement area. Project-related noise will be generated by construction of the proposed improvements. Operation would not generate vehicle trips or change traffic patterns. Traffic calming may result along Mines Avenue with construction of the proposed improvements which may reduce traffic noise. Thus, noise associated with operation would primarily be pedestrian and bicycling activity. These sources will not noticeably contribute to the ambient noise environment.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level (Decibels)	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud

Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud **Just Audible**
		0	1/64 as loud **Threshold of Hearing**

Source: Compiled by dBF Associates, Inc., 2016

To gather data on the general noise environment at the project site, two weekday morning 15-minute noise measurements were taken on May 1, 2019. Site 1 is located at the Pico Rivera Senior Center parking lot located at 9200 Mines Avenue. Site 2 was along the north side of Mines Avenue near just west of the intersection with Passons Boulevard. These sites represent ambient noise in the project area. Existing noise at this site was measured to establish baseline conditions. The monitoring location is shown in Figure 3. The measurements were taken using an ANSI Type II integrating sound level meter. The predominant noise source was traffic. The temperature during monitoring was 60 degrees Fahrenheit with 70% cloud cover and no perceptible wind.

During monitoring, 120 cars/light trucks, 3 medium (two-axles and six wheels) and zero heavy (18-wheel) trucks passed Site 1. A total of 183 cars/light trucks, 8 medium (two-axles and six wheels) and zero heavy (18-wheel) trucks passed Site 2. Measured noise is representative of noise levels occurring at the project site during a typical daytime scenario. Table 2 identifies the noise measurement locations and measured noise levels. As shown, the Leq was 63.1 dBA at Site 1 and 65.5 dBA at Site 2. Noise levels at Site 2 reflect nearby cross traffic operating on Passons Boulevard as well as accelerating traffic west bound from the intersection on Mines Avenue. The monitoring data sheet is provided as Appendix A.

Regulatory Setting

The Federal Noise Control Act (1972) addressed the issue of noise as a threat to human health and welfare. To implement the Federal Noise Control Act, the U.S. Environmental Protection

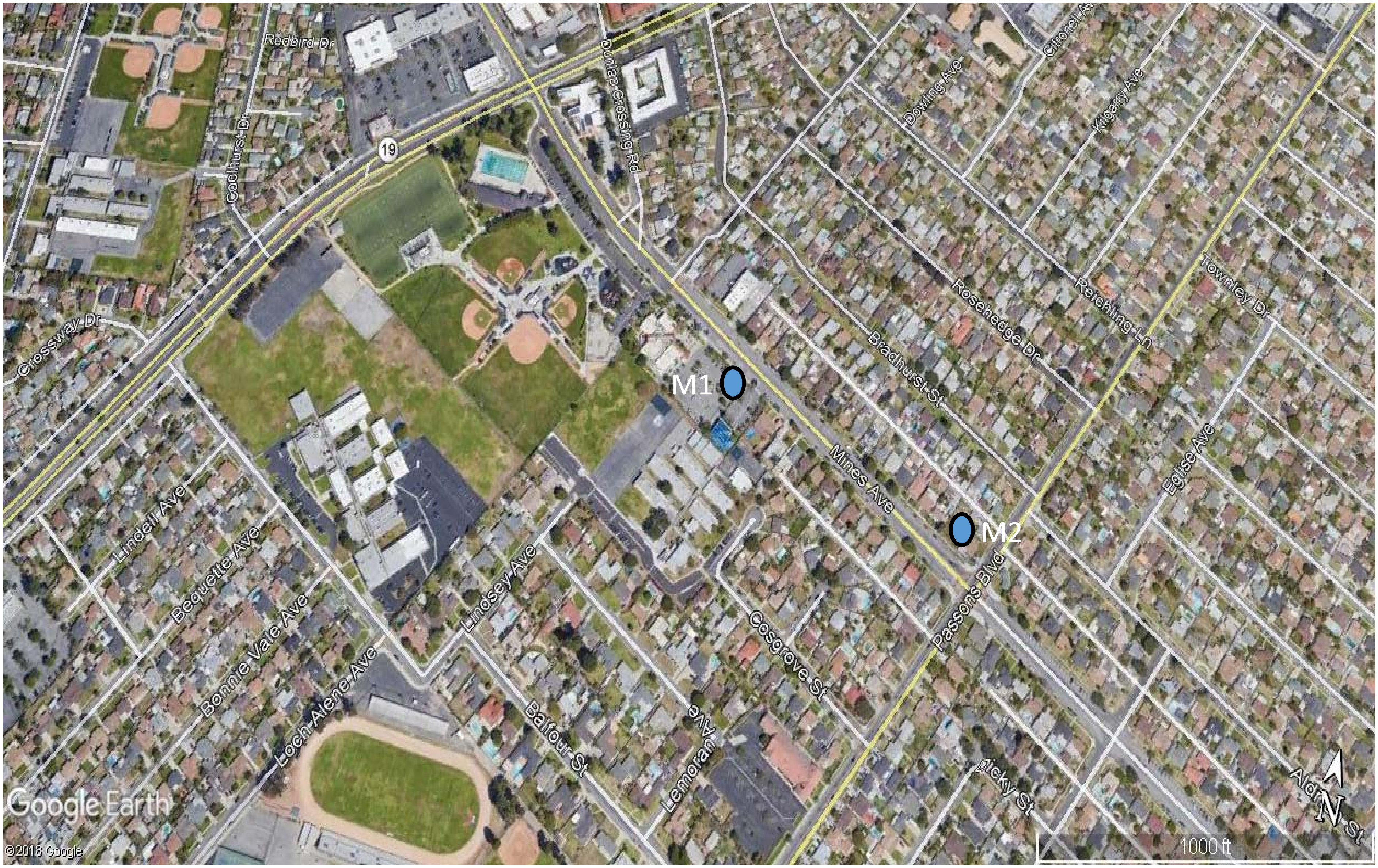


Figure 3 — Monitoring Locations

Table 2
Noise Monitoring Results

Measurement Location	Primary Noise Source	Sample Time	Leq (dBA)
1. Pico Rivera Senior Center parking lot – 9200 Mines Avenue	Traffic and pedestrian activity	Weekday morning	63.1
2. Northwest of Mines Avenue/Passons Boulevard intersection	Traffic and pedestrian activity	Weekday morning	65.5

Source: Field visit using ANSI Type II Integrating sound level meter.

Agency (EPA) undertook a number of studies related to community noise in the 1970s. The EPA found that 24-hour averaged noise levels less than 70 dBA would avoid measurable hearing loss, levels of less than 55 dBA outdoors and 45 dBA indoors would prevent activity interference and annoyance (EPA 1972).

The U.S. Department of Housing and Urban Development (HUD) published a Noise Guidebook for use in implementing the Department's noise policy. In general, HUD's goal is exterior noise levels that are less than or equal to 55 dBA Ldn. The goal for interior noise levels is 45 dBA Ldn. HUD suggests that attenuation be employed to achieve this level, where feasible, with a special focus on sensitive areas of homes, such as bedrooms (HUD 2009).

Title 24 of the California Code of Regulations (CCR) establishes standards governing interior noise levels that apply to all new single-family and multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing Ldn exceeds 60 dBA. Such acoustical studies are required to establish mitigation measures that will limit maximum Ldn levels to 45 dBA in any habitable room. Although there are no generally applicable interior noise standards pertinent to all uses, many communities in California have adopted an Ldn of 45 as an upper limit on interior noise in all residential units.

In addition, the State of California General Plan Guidelines (OPR 2003), provides guidance for noise compatibility. 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.

City of Pico Rivera General Plan Noise Element/CEQA Thresholds

The City of Pico Rivera requires new projects to meet exterior noise level standards as established in the Noise Element of the General Plan [City of Pico Rivera, October 2015: Policy 11.1-1]. Sound levels up to 65 dBA Ldn/CNEL at the property line are considered compatible with residential exterior areas (patios, balconies, yard areas). The building structure must attenuate exterior noise in occupied areas to 45 dBA CNEL or below. General Plan Noise Element Table 11-1: *Maximum Allowable Noise Standards*, is presented as Table 3. For purposes of this analysis, project impacts to neighboring residential structures are evaluated herein.

Table 3
City of Pico Rivera General Plan Noise Standards

Land Use	Hours of Day	
	Exterior Noise Level From Property Line Ldn/CNEL dBA	Interior Noise Level (1) Ldn/CNEL dBA
Residential (Low Density, Multifamily, Mixed-Use	65	45
Transient Lodging (Motels/Hotels)	65	45
Schools, Libraries, Churches, Hospitals/Medical Facilities, Nursing Homes, Museums	70	45
Theatres, Auditoriums	70	N/A
Playgrounds, Parks	75	N/A
Golf Courses, Riding Stables, Water Recreation	75	N/A
Office Buildings, Business Commercial and Professional	70	N/A
Industrial, Manufacturing and Utilities	75	N/A

The noise level standard is the maximum decibel level which may be imposed upon the referenced land use.

Where a proposed use is not specifically listed on this table, the use shall comply with the noise exposure standards for the nearest similar use as determined by the Planning Director.

1) This noise exposure maximum requires window and doors to remain closed to achieve the acceptable interior noise level and will necessitate the use of an air conditioning unit and/or exterior noise level reduction measures such as a block wall and double pane windows.

Construction noise is addressed in Policy 11.3-1 of the General Plan Noise Element. The noise element states that construction-related noise and vibration should be minimized by limiting construction activities within 500 feet of noise-sensitive uses from 7:00 A.M. to 7:00 P.M. seven days a week. Construction occurring outside of these hours should do so with a permit granted by City staff, Planning Commission, or the City Council. The following measures are recommended to further minimize construction noise:

- Require proposed development adjacent to occupied noise sensitive land uses to implement a construction-related noise mitigation plan. This plan would depict the location of construction equipment storage and maintenance areas, and document methods to be employed to minimize noise impacts on adjacent noise sensitive land uses.

- Require that construction equipment utilize noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

- Require that haul truck deliveries be subject to the same hours specified for construction. Additionally, the plan shall denote any construction traffic haul routes where heavy trucks would exceed 100 daily trips (counting those both to and from the construction site). To the extent feasible, the plan shall denote haul routes that do not pass sensitive land uses or residential dwellings.

Vibration Standards

Vibration is a unique form of noise as the energy is transmitted through buildings, structures and the ground whereas audible noise energy is transmitted through the air. Thus, vibration is generally felt rather than heard. The ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB). The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels.

Construction related vibration is addressed in Policy 11.3-2 of the General Plan Noise Element and requires construction projects and new development anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby noise-sensitive uses. The vibration levels are based on Federal Transit Administration (FTA) criteria as shown in Table 4.

Table 4
City of Pico Rivera Vibration Compatibility Guidelines

Land Use Category	Impact Levels (VdB)		
	Frequent Events [a]	Occasional Events [b]	Infrequent Events [c]
Category 1. Buildings where vibration would interfere with interior operations	65[d]	65[d]	65[d]
Category 2. Residences and buildings where people normally sleep	72	75	80
Category 3. Institutional land uses with primarily daytime uses	75	78	83

Vibration levels are measured in or near the vibration-sensitive use.

a. "Frequent Events" is defined as more than 70 vibration events of the same source per day.
b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.
d. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

Construction activities such as blasting, pile driving, demolition, excavation or drilling have the potential to generate ground vibrations near structures. With respect to ground-borne vibration impacts on structures, the FTA states that ground-borne vibration levels in excess of 100 VdB would damage fragile buildings and levels in excess of 95 VdB would damage extremely fragile historic buildings. No historic buildings are located within the project area; thus, 100 VdB is used to quantify potential vibration impacts to neighboring structures. Construction activities referenced above that would generate significant vibration levels are not proposed. However, to provide information for use in completing the CEQA evaluation, construction-related vibration impacts are evaluated using the above referenced criteria.

IMPACT ANALYSIS

Methodology and Significance Thresholds

Construction noise estimates are based upon noise levels for types of construction equipment as reported by the FTA, Office of Planning and Environment, and the distance to nearby sensitive receptors. Reference noise levels were used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation).

The proposed project would be a bikeway with related infrastructure improvements. The project would not generate new trips or otherwise contribute to an increase in noise levels along Mines Avenue or Dunlap Crossing Road. All noise associated with the project would occur during construction. The project may also provide traffic calming which would slow vehicle speeds resulting in noise levels that are lower than baseline ambient conditions. As referenced, baseline conditions in the study area approach but don't exceed the 65-dBA standard. The project would have effect on baseline conditions.

Thus, the focus of this noise study is on construction noise and vibration impacts and project compliance with General Plan Noise Element standards referenced above in Tables 3 and 4.

Temporary Construction Noise

The main sources of noise during construction activities would include heavy machinery used during site preparation (i.e., removing existing pavement and subgrade), as well as equipment used for placing new subgrade material and pavement. Table 5 shows the typical noise levels associated with heavy construction equipment. As shown, average noise levels associated with the use of heavy equipment at construction sites can range from about 81 to 95 dBA at 25 feet from the source, depending upon the types of equipment in operation at any given time and phase of construction.

Table 5
Typical Construction Equipment Noise Levels

Equipment Onsite	Typical Level (dBA) 25 Feet from the Source	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source
Air Compressor	84	78	64
Backhoe	84	78	64
Bobcat Tractor	84	78	64
Concrete Mixer	85	79	73
Bulldozer	88	82	76
Jack Hammer	95	89	83
Pavement Roller	86	80	74
Street Sweeper	88	82	76
Man Lift	81	75	69
Dump Truck	82	76	70
Compactor	88	82	76

Table 5
Typical Construction Equipment Noise Levels

Equipment Onsite	Typical Level (dBA) 25 Feet from the Source	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source
Grader	91	85	79
Paver	95	89	83
Loader	91	85	79
Scarifier	89	83	77

Source: Hanson, Towers and Meister, May 2006

Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1.
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax).
Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.

As referenced above, the City of Pico Rivera doesn't limit the sound level from construction equipment assuming construction occurs during the 12-hour period from 7:00 a.m. to 7:00 p.m. Noise-sensitive uses near the project site are residences located along Mines Avenue and Dunlap Crossing Road. The distance from the center of Mines Avenue to the adjacent residential property line is approximately 50 feet. The distance from the center of Dunlap Crossing Road to the nearest residences is approximately 20 feet. It is assumed site preparation and paving work would require the use of heavy equipment. Equipment would also be required to deliver materials to the project site and work areas.

Based on EPA noise emissions, empirical data and the amount of equipment needed for construction of the proposed project, worst-case noise levels from the construction equipment occur during site preparation/grading and related activities. The use of pavers, rollers and trucks during the paving process can also generate noise levels similar to what is experienced during the site preparation phase. The anticipated equipment used on-site would include a dozer, scarifier/pavement milling machine, backhoe/tractor, loader and a grader. Additionally, trucks would be used to haul material to and from the work area. Due to size of the site (i.e., 0.86 acres) and related physical constraints, the equipment will likely be spread out over each 1,000-foot segment. However, given the level of activity required to complete each segment within an 8-day construction cycle, construction operations are expected occur continuously over the work day within 50 feet of residential receivers located along Mines Avenue and within 20 feet of residences along Dunlap Crossing Road.

Construction Noise Levels

The project site is 0.86 acres in size which as referenced, limits the amount and type of equipment that can operate at any one location at one time. However, for the purpose of estimating noise levels, if during site preparation, a scarifier/pavement milling machine (83 dBA), bulldozer (82 dBA), a loader backhoe (78 dBA) and a dump truck (82 dBA) were working simultaneously in one area over an 8-hour work day, the 8-hour Leq would be approximately 87.6 dBA at 50 feet. Cumulative noise levels at 20 feet would be approximately 94.5 dBA. For reference purposes, noise levels associated with the above construction scenario are shown at varying distances in Table 6.

Table 6
Typical Maximum Construction Noise Levels at Various Distances from Project Construction

Distance from Construction	Maximum Noise Level at Receptor (dBA)
25 feet	94.5
50 feet	87.6
100 feet	81.6
250 feet	73.6
500 feet	67.6
1,000 feet	61.6

Construction noise would be audible at residences located adjacent to the construction area throughout the work day. As referenced, the City of Pico Rivera does not regulate construction noise provided it occurs within a 12-hour period of time between 7:00 AM and 7:00 PM each day. Thus, while temporary construction noise impacts would be **less than significant** from an environmental review perspective, the following measures included in Policy 11.3-1 of the General Plan Noise Element could be implemented to minimize construction-related noise:

- Require proposed development adjacent to occupied noise sensitive land uses to implement a construction-related noise mitigation plan. This plan would depict the location of construction equipment storage and maintenance areas, and document methods to be employed to minimize noise impacts on adjacent noise sensitive land uses.

- Require that construction equipment utilize noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

- Require that haul truck deliveries be subject to the same hours specified for construction. Additionally, the plan shall denote any construction traffic haul routes where heavy trucks would exceed 100 daily trips (counting those both to and from the construction site). To the extent feasible, the plan shall denote haul routes that do not pass sensitive land uses or residential dwellings.

Temporary Construction-Related Vibration

Activities associated with use of the bikeway improvements do not generate vibration. Thus, this discussion focuses on temporary vibration caused by construction. As referenced, the closest residential property lines are located approximately 50 feet from the centerline of Mines Avenue and 20 feet from the centerline of Dunlap Crossing Road. Table 7 shows construction equipment could reach 81 VdB at 50 feet and 87 VdB at 20 feet from the source assuming a large bulldozer is used during site preparation. As referenced, 72 VdB is the threshold for human perception; thus, while construction activities would be temporary, vibration may be perceptible at adjacent receivers depending on the location and type of equipment in operation.

Construction activities such as blasting, pile driving, demolition, excavation or drilling have the potential to generate ground vibrations near structures. With respect to ground-borne vibration impacts on structures, the FTA states that ground-borne vibration levels in excess of 100 VdB would damage fragile buildings and levels in excess of 95 VdB would damage extremely fragile historic buildings. No historic buildings are located within the project area nor are construction activities that would generate significant vibration levels required for the proposed project. Construction would occur during daytime hours which would minimize sleep disturbance. Implementation of the construction noise control measures provided above would also reduce vibration. **Temporary vibration impacts would be less than significant.**

Table 7
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	79	77	75
Loaded Trucks	86	80	78	76	74
Jackhammer	79	73	71	69	67
Small Bulldozer	58	52	50	48	46

Source: Federal Railroad Administration, 1998

Long-Term Operational Noise Exposure

The project would be comprised of bikeway improvements along Mines Avenue, Dunlap Crossing Road and across the San Gabriel River. Long-term operation of the proposed project would not generate traffic or otherwise include activities or the use of equipment that will increase noise levels beyond baseline conditions. As referenced, street improvements may provide traffic calming benefits which will slow overall speeds. A reduction in speed will reduce noise levels associated with vehicle operation which may benefit residents living along Mines Avenue and Dunlap Crossing Road. Use of the bikeway by cyclists and pedestrians would increase the overall level of public activity in the area; however, Overall, long-term impacts associated with the project would be **less than significant.**

Interior Traffic Noise. California Energy Code Title 24 standards specify construction methods and materials that result in energy efficient structures and up to a 30-dBA reduction in exterior noise levels (assuming windows are closed). This includes operation of mechanical ventilation (e.g. heating and air conditioning), in combination with standard building construction and design features that include dual-glazed windows with a minimum Sound Transmission Class (STC) rating of 26 or higher. When windows are open, the insertion loss drops to about 10 dBA. Assuming windows are closed, interior noise levels at residences along Mines Avenue and Dunlap Crossing Road would be approximately 33.1 dBA to 35.5 dBA using a measured exterior baseline noise levels (see Table 2). The 45 dBA interior noise standards referenced in the General Plan Noise Element (see Table 3) would be met with implementation of the project.

CONCLUSION

The proposed project would not have a significant or adverse impact cause by construction noise as the project would be constructed consistent with the General Plan Noise Element. No mitigation would be required; however, measures provided in the Noise Element could be implemented to minimize construction noise. The proposed project does not include activities or use of equipment that would contribute to operational impacts. Assuming a 30-dBA reduction in noise levels between exterior and interior levels, the interior standard would be met at all residential receivers, post-construction. Thus, a **less than significant** noise impact would occur.

REFERENCES

California Office of Planning and Research. *OPR General Plan Guidelines*, 2003.

City of Pico Rivera, General Plan Noise Element, October 2015.

dBF & Associates, Inc., Reference Noise Level Compilation Table, 2016.

Federal Highway Administration. *Roadway Construction Noise Model. 2006.* Users Guide Table 1.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. May 2006.

Federal Rail Administration (FRA) *Guidelines (Report Number 293630-1),* December 1998.

Hanson, Carl E., Towers, David A., and Meister, Lance D. (2006, May). *Transit Noise and Vibration Impact Assessment.* Federal Transit Administration, Office of Planning and Environment. http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf

Harris Miller Miller & Hanson Inc. T*ransit Noise and Vibration Impact Assessment, Final Report*. May 2006.

United States Environmental Protection Agency. *Federal Noise Control Act of 1972, 42 U.S.C. §4901 et seq.*, 1972

United States Department of Housing and Urban Development. *Noise Control Guidebook*, 2009.

Appendix A

Monitoring Data Sheets

FIELD NOISE MEASUREMENT DATA

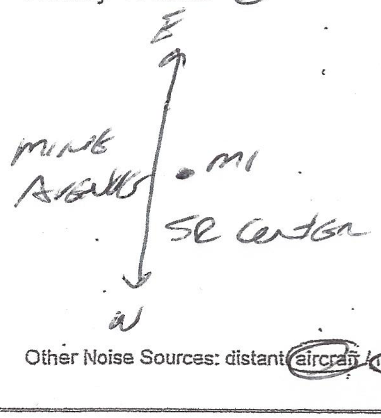
Project Name: MINES AVE Page 1 of
Project #: Day / Date 5/[illegible]/2019 My Name.

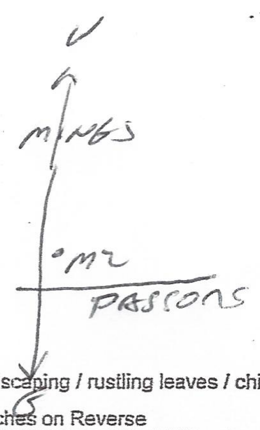
Sound Level Meter	Calibrator	Weather Meter
Model #: PICCOLO II	Model #	Model # Serial #
Serial #	Serial #	
Weighting: (A) / C / Flat	Pre-Test: ____ dBA SPL	Terrain: Hard / Soft / (Mixed)
Response: (Slow) / Fast / Impl	Post-Test: ____ dBA SPL	Topo: (Flat) / Hilly (describe)
Windscreen: (Yes) / No		Wind: Steady / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
1	7:10	7:25	65.1	50.9	72.1	66.2	61.8	53.2	0	60			70%
2	7:40	7:55	65.5						0	60			70%

Roadway Name	MINES AVENUE	
Speed (post/obs)	30	30
Number of Lanes	2	2
Width (pave/row)	80'	80'
1- or 2- way	2	2
Grade	0%	0%
Bus Stops	NO	NO
Stoplights	NO	NO - Stop Sign
Street Parking	YES	YES
Automobiles	120	183
Medium Trucks	3	8
Heavy Trucks	0	8

Location(s) / GPS Reading(s):





Other Noise Sources: distant (aircraft) / (roadway traffic) / trains / landscaping / rustling leaves / children playing / dogs barking / (birds vocalizing)

Notes and Sketches on Reverse

Site 1 - Pico Rivera Senior Center

Start Date	5/1/2019
Start Time	7:09:08 AM
End Time	7:24:07 AM
Duration	00:14:59
Meas Mode	Single
Input Range	Low
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	71.5
LCeq	70.3
LAeq	63.1
LZSmax	83.4
LCSmax	82.1
LASmax	72.1
LZSmin	65.5
LCSmin	63.7
LASmin	50.9
LZE	101.0
LCE	99.8
LAE	92.6
LZpeak	94.5
LCpeak	92.9
LApeak	91.8
1%	69.6
2%	68.7
5%	67.7
8%	67.0
10%	66.7
25%	64.7
50%	61.8
90%	53.0
95%	52.3
99%	51.5

Site 2 - Mines Avenue/Passons Boulevard

Start Date	5/1/2019
Start Time	7:36:39 AM
End Time	7:51:38 AM
Duration	00:14:59
Meas Mode	Single
Input Range	Low
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	76.2
LCeq	75.1
LAeq	65.5
LZSmax	93.1
LCSmax	92.9
LASmax	83.9
LZSmin	66.2
LCSmin	63.4
LASmin	53.7
LZE	105.7
LCE	104.6
LAE	95.0
LZpeak	107.6
LCpeak	106.8
LApeak	99.9
1%	75.2
2%	72.6
5%	70.2
8%	69.0
10%	68.4
25%	65.3
50%	61.9
90%	56.9
95%	56.0
99%	54.6