DRAFT NOISE STUDY REPORT

MISSION TRAIL APARTMENTS

LAKE ELSINORE, CALIFORNIA

PREPARED FOR

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February 17, 2017

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1. INTRODUCTION

The proposed Mission Trail Apartments is a proposed affordable housing project consisting of the construction of 81 apartment dwelling units located in the City of Lake Elsinore, California. The Project site is located on the west side of Mission Trail, south of Hidden Trail in Lake Elsinore (see Figure 1). The proposed Project is expected to be completed and occupied by Year 2019.

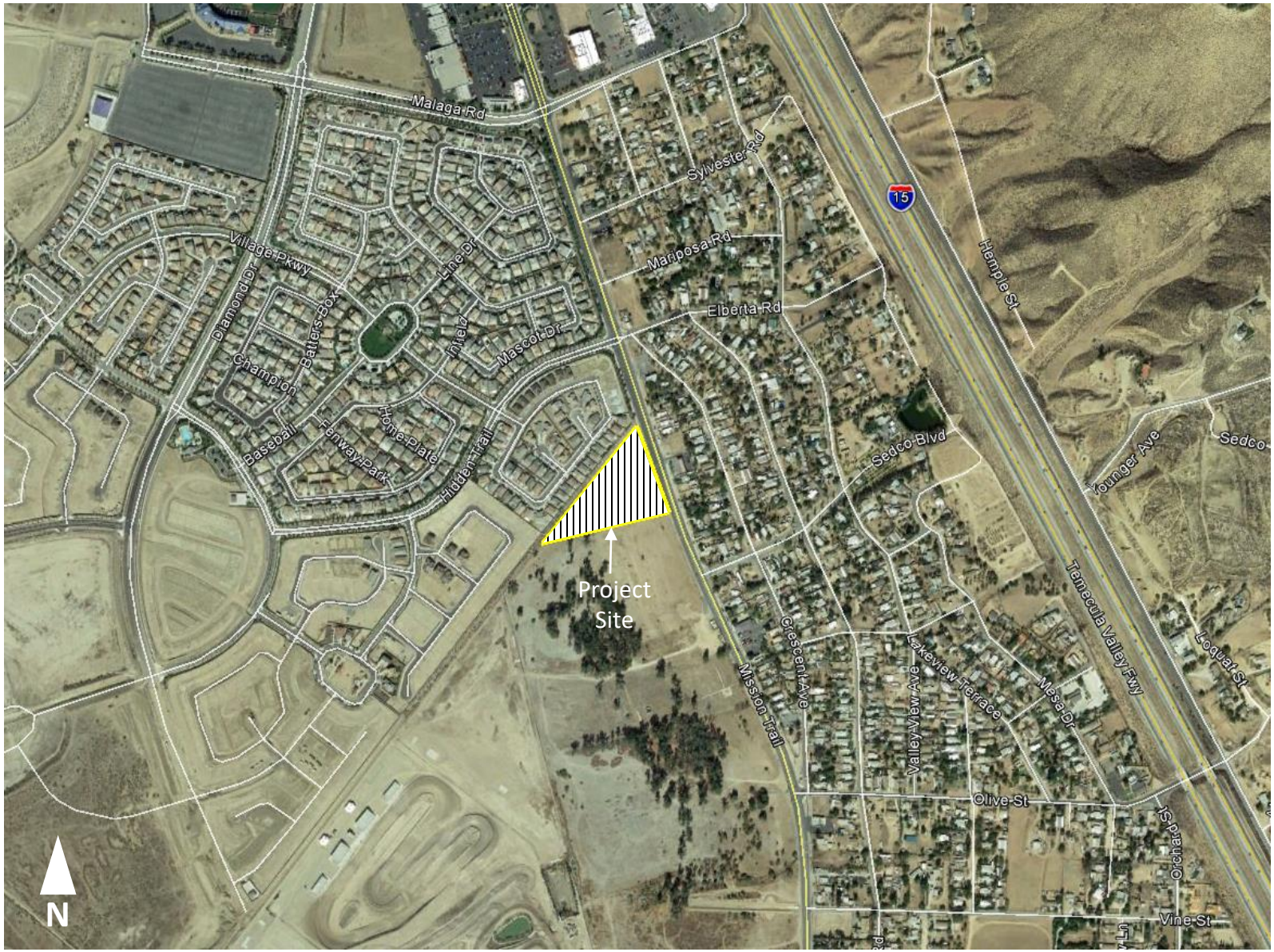
Since the proposed project site is adjoining existing noise-sensitive land uses and primarily consists of noise sensitive uses that are subject to noise from existing traffic and commercial noise sources, a noise study has been prepared to quantify the existing noise environment in the vicinity of the project site, to determine whether noise levels from construction and future use of the project cause a significant impact in the noise environment or exceed acceptable limits as defined by the City of Lake Elsinore (City) noise regulations, to evaluate cumulative impacts due to future growth in the project area, and to provide recommendations for noise mitigation as may be required.

2. FUNDAMENTALS OF NOISE

Sound pressure can be measured in units of micro Newtons per square meter ($\mu N/m^2$) called micro Pascals (µPa). One µPa is approximately one-hundred-billionth of the normal atmospheric pressure. The pressure of a very loud sound may be 200,000,000 µPa, or 10,000,000 times the pressure of the weakest audible sound (20 µPa). Expressing sound levels in terms of µPa would be cumbersome because of this wide range. As such, sound pressure levels (SPL) are described in logarithmic units of ratios of actual sound pressures to a reference pressure squared. These units are called bels, named after Alexander G. Bell. To provide a finer resolution, a bel is subdivided into decibels (deci- or tenth of a bel), abbreviated dB.

Appendix A provides a description of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported are A-weighted sound pressure levels in decibels (dBA). The A-weighting approximates how humans actually hear sounds by de-emphasizing lower-frequency sounds below 1,000 hertz (1 kilohertz [kHz]) and higher-frequency sounds above 4 kHz, and emphasizing sounds between 1 kHz and 4 kHz. A-weighting is the measure most commonly used for traffic and environmental noise throughout the world. Most community noise standards utilize A-weighting because it accurately reflects human hearing and thereby provides for a high degree of correlation with human annoyance and health effects.

Figure 1
Project Location



TECH

Table 1 shows the noise levels of common sounds measured in the environment and in industry and their effects.

TABLE 1

TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT

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

Source: Caltrans, 2013

The actual impact of noise is not a function of loudness alone. The time of day noise occurs and duration of the noise are also important. In addition, frequency content (pitch) of the noise, and its onset rate (i.e., whether it is impulsive) affect people's reactions to the noise. Higher pitch sounds are typically more easily audible to an average human, and therefore, tend to be more annoying. A pure tone sound can be perceived more easily by humans than a variable-pitch sound of the same intensity. Furthermore, an impulsive noise with a very quick onset rate, such as a hammer drop or pile driving noise, can be more disturbing than a regular noise because of its startle effect.

Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors, such as L_{eq}, L_{min}, L_{max}, L_n, and L_{dn}, are used to quantify noise levels. While the existing background noise measurements conducted in and around the project area have been conducted in term of various metrics, the primary noise descriptors used for this study are the average noise level (L_{eq}) and the Day-Night Noise Level (L_{dn}) (or Community Noise Equivalent Level (CNEL)).

The L_{eq} is the equivalent steady-state sound level that, within a stated period of time, would contain the same acoustical energy as the time-varying sound level during the same period. The L_{eq} (h) is the energy-average of the A-weighted sound levels, occurring during a 1-hour period, in decibels (i.e., a 1-hour L_{eq}). L_{dn} is the average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.

From the source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases.

The manner in which noise decreases with distance depends on:

- Geometric spreading from point and line sources
- Ground absorption
- Atmospheric effects and refraction
- Shielding by natural and man-made features, noise barriers, diffraction, and reflection

Sounds from a small localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level decreases or drops-off at a rate of 6 dBA for each doubling of the distance (6 dBA/DD). However, highway traffic noise is not a single, stationary point source of sound. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval.

Changes in noise levels are typically perceived by the human ear as follows:

- A 3-dBA change is barely perceptible.
- A 5-dBA change is readily perceptible.
- A 10-dBA change is perceived as a doubling or halving of noise.

For determination of significance of noise impacts in a given environment, noise level changes brought about by a specific project (or set of projects) are often evaluated in the context of preexisting noise conditions in that environment. For quieter existing noise environments, as opposed to already noisy environments, project-induced noise level changes are allowed to be higher before the project causes a significant impact.

3. APPLICABLE NOISE CRITERIA

3.1 City of Lake Elsinore

The City's General Plan (City of Lake Elsinore, 2011) in its Chapter 3.7, Noise, establishes land use compatibility criteria in terms of the Day-Night Noise Level (L_{dn}) for various developments, including residential uses. The City has adopted a land use compatibility threshold of 60 dB L_{dn} as "clearly compatible" with exterior areas of noise-sensitive land uses, including residential developments (see Table 2 below).

Table 2

City of Lake Elsinore Noise and Land Use Compatibility Matrix

Land Use Categories		**Day-Night Noise Level (L_{dn})**						
Categories	**Uses**	**<55**	**55-60**	**60-65**	**65-70**	**70-75**	**75-80**	**>80**
Residential	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
	Mobile Home	A	A	B	C	C	D	D
Commercial Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
Commercial, Industrial, Institutional	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
Commercial Recreation Institutional Civic Center	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's Amusement Park, Miniature Golf, Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
Commercial General, Special Industrial, Institutional	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B

Table 2

City of Lake Elsinore Noise and Land Use Compatibility Matrix

Land Use Categories		Day-Night Noise Level (L_{dn})						
Categories	**Uses**	**<55**	**55-60**	**60-65**	**65-70**	**70-75**	**75-80**	**>80**
Institutional General	Hospital, Church, Library, Schools' Classroom, Day Care	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
Agriculture	Agriculture	A	A	A	A	A	A	A

Source: City of Lake Elsinore General Plan, Table 3-1

INTERPRETATION:
Zone A Clearly Compatible: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any noise insulation requirements.

Zone B Normally Compatible: New construction or development should be undertaken only after detailed noise analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Zone C Normally Incompatible: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

Zone D Clearly Incompatible: New construction or development should generally not be undertaken.

The City also requires noise mitigation for residential and noise-sensitive commercial or institutional uses where projected interior and exterior noise levels exceed those shown in Table 3 below.

Table 3

City of Lake Elsinore
Interior and Exterior Noise Standards

Land Use Categories		Energy Average L_{dn} (dB)	
Categories	**Uses**	**Interior**	**Exterior**
Residential	Single Family, Duplex, Multiple Family	45[3,5]	60
	Mobile Homes	-	60[4]

Table 3

City of Lake Elsinore
Interior and Exterior Noise Standards

Land Use Categories		Energy Average L_{dn} (dB)	
Categories	**Uses**	**Interior**	**Exterior**
Commercial, Institutional	Hotel, Motel, Transient Lodging	45[5]	-
	Hospital, School's Classroom	45	-
	Church, Library	45	-

Source: City of Lake Elsinore General Plan, Table 3-2

Interpretation

1. Indoor environment excluding: Bathrooms, toilets, closets, corridors.
2. Outdoor environment limited to: Private yard of single family, multi-family private patio or balcony which is served by a means of exit from inside, Mobile Home Park.
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
5. As per California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Section T25-28.

The City of Lake Elsinore General Plan noise standards focus on defining appropriate locations for various land uses (residential in this case), while the noise standards in the Municipal Code focus on control of noise generators. Chapter 17.176 of the City of Lake Elsinore Municipal Code pertains to noise control within the City's boundaries. The purpose of this chapter of the Municipal Code is that "in order to control unnecessary, excessive and annoying noise and vibration in the City, it is hereby declared to be the policy of the City to prohibit such noise and vibration generated from or by all sources as specified in this chapter. It shall be the policy of the City to maintain quiet in those areas which exhibit low noise levels and to implement programs aimed at reducing noise in those areas within the City where noise levels are above acceptable values."

The City's Municipal Code Section 17.176.080 pertains specifically to prohibited acts that would be contrary to the City policy. Subsection 17.176.080.F relates to construction/demolition activities. This provision of the City's Municipal Code states that:

1. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the City.

2. Noise Restrictions at Affected Properties. Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected residential properties will not exceed those listed in the following schedule:

Mobile Equipment

Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	Type I Areas Single-Family Residential	Type II Areas Multifamily Residential	Type III Areas Semi-Residential/Commercial
Daily, except Sundays and Legal Holidays 7:00 a.m. to 7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and Legal Holidays	60 dBA	65 dBA	70 dBA

Stationary Equipment

Maximum noise levels for repetitively scheduled and relatively long-term operation (period of 10 days or more) of stationary equipment:

	Type I Areas Single-Family Residential	Type II Areas Multifamily Residential	Type III Areas Semi-Residential/Commercial
Daily, except Sundays and Legal Holidays 7:00 a.m. to 7:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and Legal Holidays	50 dBA	55 dBA	60 dBA

In summary, the City of Lake Elsinore applies an exterior noise level limit of 75 dB to mobile construction equipment operating for durations of 10 days or more.

3.2 City of Wildomar

Chapter 9 of the City of Wildomar General Plan, Noise Element, establishes a land use compatibility criterion of 65 dB CNEL for exterior activity areas of residential land uses.

Chapter 9.48, Noise Regulation, of the City of Wildomar Municipal Code establishes a daytime (7 a.m. to 10 p.m.) noise level standard of 55 dB for exterior areas of residential uses. However, Provision I of Section 9.48.020, Exemptions, of the Municipal Code exempts private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that:

1. Construction does not occur between the hours of 6:00 p.m. and 6:00 a.m. during the months of June through September, and
2. Construction does not occur between the hours of 6:00 p.m. and 7:00 a.m. during the months of October through May.

4. METHODOLOGY

To quantify the existing noise environment in the vicinity of the project site, a noise measurement survey consisting of long-term (24-hour) and short-term (15-minute) noise measurements was conducted at five locations within and in the vicinity of the project site (see Figure 2). The noise measurements consisted of 24-hour measurements at one of the five monitoring sites (located near the south tip of the project site), and short-term measurements at two sites representing future apartment locations nearest to traffic on Mission Trail (Sites ST-1 and ST-2) and two sites representing existing single-family homes in Summerly (Site ST-4) and existing residences along Crescent Avenue in Wildomar (Site ST-3). The purpose of the 24-hour measurements was to capture variations in background noise levels during the day and night hours and L_{dn} value typical of the adjoining existing homes in the area. The short-term noise levels were conducted in order to quantify existing background noise levels at representative noise-sensitive locations around the project site during the daytime hours when future construction activities would occur.

Characteristic noise sources are typically identified with land use intensification such as that proposed for the development of the proposed project. Construction activities, especially construction heavy equipment and traffic, will create short-term noise increases near the project site. Such impacts would be important for nearby noise-sensitive receptors, such as any existing residential uses. Upon completion of project construction, project-related traffic may cause an incremental increase in area-wide noise levels throughout the project area. Traffic noise impacts are analyzed to confirm that the project does not adversely impact the acoustic environment of the surrounding community.

For assessment of potential future noise impacts due to the proposed project, temporary noise exposure during the construction phase and permanent noise effects due to existing and projected future traffic on area roadways and additional traffic generated by the project are evaluated. In addition, noise levels from

traffic on Mission Trail and the U Wash car wash at locations of the nearest future proposed homes to these sources are evaluated through utilization of future traffic noise prediction and the measured existing noise levels from the car wash.

Noise levels due to construction of the proposed project are estimated based upon available reference noise level data from construction equipment (FHWA, 2006), distance between construction activities and nearest representative noise-sensitive receiver locations, and shielding effects of local terrain, where applicable.

Traffic noise levels were evaluated using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 computer program. TNM is the latest analytical method developed for roadway traffic noise prediction. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles), heavy trucks (3 or more axles), buses and motorcycles, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, atmospheric conditions, and the acoustical characteristics of the site. TNM was developed to predict hourly L_{eq} values for free-flowing and interrupted-flow traffic conditions.

Traffic data used in the noise model were developed from the traffic impact study data provided by the project traffic consultant (LLG, 2017). Projected future peak-hour and daily traffic volumes with and without the project, for the project completion year (2019), on area roadways affected by the project were utilized in TNM to assess changes in noise exposure of noise-sensitive uses due to traffic changes induced by the proposed project. The traffic noise evaluation also assesses the cumulative noise effects as it includes all future non-project and project-related traffic volumes.

To assess future traffic noise exposure at proposed front-row homes within the project site along Mission Trail, traffic noise models were developed using the TNM. To validate the use of these models in accurately predicting traffic noise levels, existing traffic noise measurements and traffic counts were conducted concurrently, and the traffic count data were used in the model to compare the calculated noise levels in the model to measured noise levels obtained in the field. The results of such comparisons indicate that the model can be used for accurate prediction of noise levels within the project site.

5. SETTING

The project site is located west of Mission Trail, south of Hidden Trail in the city of Lake Elsinore in Riverside County. Figure 1 is an aerial of the project site and the surrounding land uses. The Project site, which encompasses approximately 5.4 acres, is currently vacant.

Single-family residential development within the Summerly residential community abuts the Project site to the north. Mission Trail abuts the eastern property boundary of the project site; and single-family residential and commercial developments, including a self-service car wash (U Wash) and a liquor store, are located east of Mission Trail. Areas immediately south of the project site are currently vacant.

5.1 Existing Noise Environment

5.1.1 Existing Noise Measurements

The dominant source of noise currently affecting the project site is vehicular traffic on Mission Trail. Other noise sources regularly affecting the project site on a daily basis include the U Wash car wash, distant traffic on other area roadways, including Interstate 15, distant aircraft overflights, and other neighborhood sounds such as occasional dog barks, and chirping of birds.

Existing ambient noise levels in the project environs were quantified based upon long-term (24-hour) measurements at one location and short-term (15-minute) noise level measurements conducted at four locations representative of the nearest noise-sensitive uses in the vicinity of the project site and locations of proposed future homes within the project site closest to Mission Trail. The noise monitoring locations are depicted on Figure 2. The long-term noise monitoring location is designated as LT-1, and short-term noise monitoring locations are shown as locations ST-1 through ST-4. Following are brief descriptions of the noise monitoring locations:

LT-1: This 24-hour noise monitoring site is located near the southwestern tip of the project site, near the property line wall of the existing homes within the Summerly subdivision. The purpose of choosing this site is to capture day and night noise levels representative of the existing residences along the north/northwest side of the project site.

Short-term noise monitoring was also conducted for the purpose of quantifying daytime noise levels at noise-sensitive locations surrounding the project site during times when future construction activities would take place. Descriptions of the short-term noise monitoring locations are as follows:

ST-1: This short-term location is located within the project site at a distance of approximately 100 feet from the centerline of Mission Trail. The purpose of choosing this site is to characterize traffic noise exposure at locations of future homes nearest to the roadway.

ST-2: This short-term location is located within the project site at a distance of approximately 200 feet from the centerline of Mission Trail. The purpose of choosing this site is to assess attenuation of traffic noise with distance within the project site.

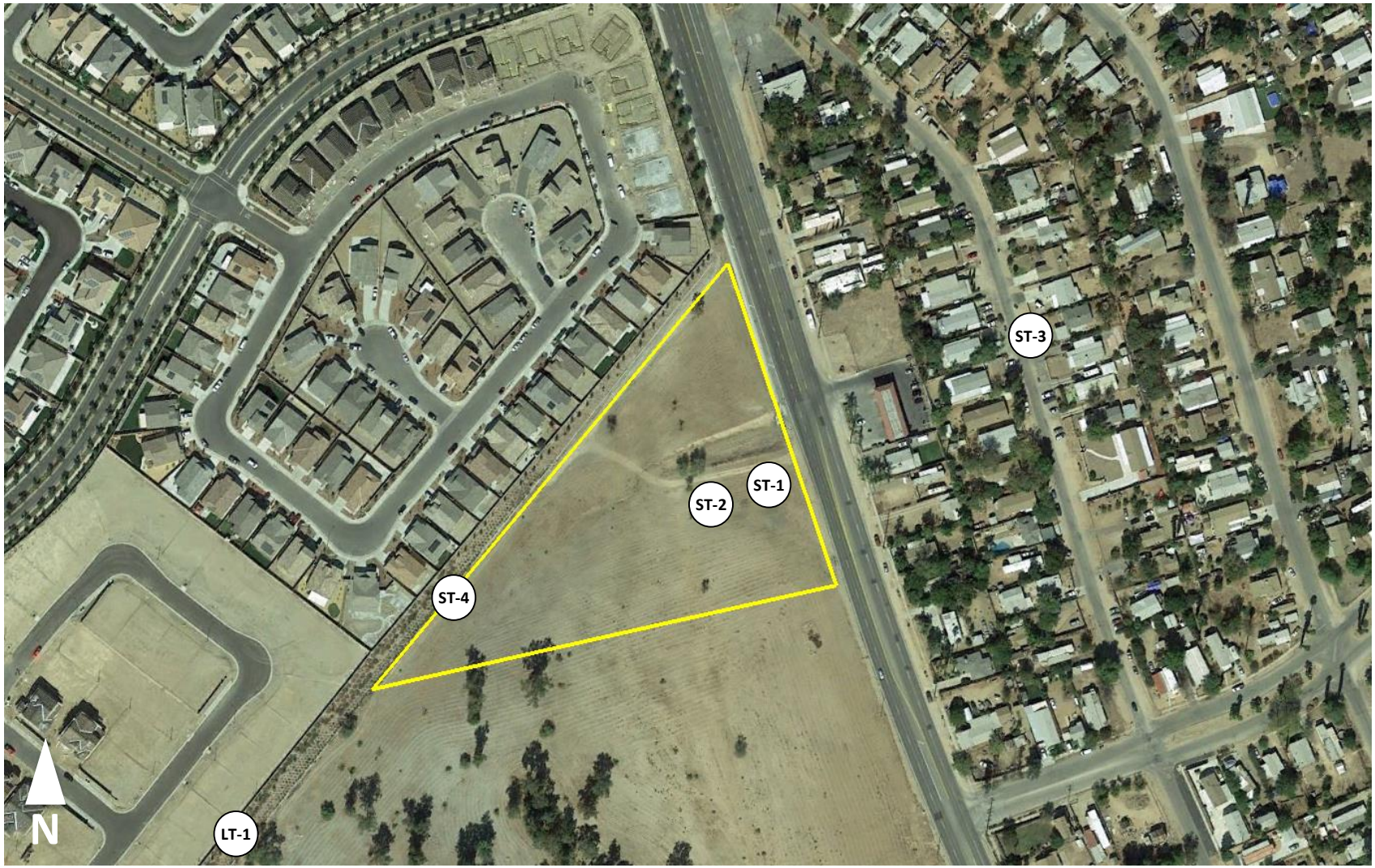
ST-3: This short-term noise measurement location is located at the front yard of the existing residence at 32548 Crescent Avenue in Wildomar. Background noise levels measured at this location represent the existing daytime sound levels at exterior of homes in its neighborhood.

ST-4: This short-term noise monitoring location is close to the southwest portion of the project, near the existing Summerly homes. It closely resembles the long-term measurement location (LT-1).

Instrumentation utilized for the measurement of existing noise levels included a Rion NL-52 sound level meter equipped with a Rion Type UC-59 ½" microphone. The instrumentation was calibrated prior to and following each measurement with a Rion model NC-74 acoustical calibrator to ensure the accuracy of the measurements. All measurement equipment complies with applicable specifications of the American National Standards Institute (ANSI) and the International Electrotechnical Commission (IEC) for the Type I (precision) sound level meters. The microphone was located on a tripod at 5 feet above the ground.

The background noise level measurements were conducted during several time periods on Monday, January 16, 2017 and Wednesday, February 1, 2017 at the locations noted on Figure 2. At each of the short-term monitoring locations, the measurements included one to two 15-minute continuous samples of background noise. The noise measurements at all locations included average background noise level (L_{eq}), L_{min} (minimum sound level), L_{max} (maximum sound level), L_{25} (level exceeded 25 percent of the time), L_{50} (level exceeded 50 percent of the time), and L_{90} (level exceeded 90 percent of the time).

Figure 2
Noise Measurement Locations
Mission Trail Apartments Project



(#) Noise Monitoring Location

The measurements are deemed to be adequate to depict typical daytime noise levels (i.e., during times when construction would occur). Appendix B depicts photographs of the noise monitors at each of the noise monitoring locations. Tables 4 summarizes the measured background noise levels at the long-term (24-hour) site LT-1. The 24-hour L_{dn} is also calculated and shown in Table 4. The measured background sound levels reported in these tables may be compared to the noise level standards of the City to determine if existing noise levels exceed the City's applicable noise level criteria.

Table 4

24-hour Noise Monitoring Results
Site LT-1
February 1-2, 2017

Measurement Start Time	Measured Sound Levels, dBA					
	L_{eq}	L_{min}	L_{max}	L_{25}	L_{50}	L_{90}
12:00	50.7	44.1	67.2	50.9	49.3	47.3
13:00	50.3	44.7	63.6	50.6	49.6	47.9
14:00	53.7	47.9	71.4	53.6	52.4	50.7
15:00	52.6	47.6	66.8	52.8	51.6	50.1
16:00	53.6	47.3	67.9	53.6	52.1	50.3
17:00	51.6	45.6	69.6	51.5	50.3	48.4
18:00	52.9	47.0	65.1	53.3	52.2	50.2
19:00	53.2	47.8	63.5	53.9	52.7	50.7
20:00	53.0	47.7	65.0	53.4	52.5	50.6
21:00	52.4	42.8	62.8	53.0	51.8	49.9
22:00	49.0	43.2	55.3	49.7	48.7	46.8
23:00	48.8	40.9	63.2	49.3	48.0	45.7
0:00	47.9	41.2	56.6	48.7	47.3	44.9
1:00	48.6	40.9	61.3	49.4	47.9	45.1
2:00	49.9	40.8	59.2	50.8	49.2	46.0
3:00	52.7	42.2	61.6	53.4	52.4	50.4
4:00	56.5	51.3	64.7	57.2	56.2	54.6
5:00	58.8	53.5	63.8	59.5	58.5	57.1
6:00	57.5	52.6	64.8	58.1	57.2	55.6
7:00	58.5	54.5	75.5	58.6	58.0	57.0
8:00	56.0	50.4	64.5	56.7	55.6	53.7
9:00	51.4	44.1	68.4	51.4	50.4	48.7
10:00	48.9	41.4	68.4	47.6	46.0	44.2
11:00	51.5	44.8	64.8	51.3	49.8	48.1
Ldn	60.5					

Source: A/E Tech

From the measured existing background sound level data at the long-term location and the presence of a property line wall along the backyards of homes in Summerly, it is apparent that existing L_{dn} value at exterior activity areas of these homes is in compliance with the City's land use compatibility threshold of 60 dB L_{dn} for residential uses.

Summary of the noise levels measured during the short-term sampling effort is shown in Table 5. During the measurements at location ST-1, closest to the U Wash Car Wash, it was noted that sound levels from the car wash were near 54 dB during lull periods in traffic. While such sound levels were audible within the site, they were near the minimum measured sound levels and faint enough to be regarded as non-intrusive.

TABLE 5

Summary of Measured Short-Term Background Noise Levels (dB)
Mission Trail Apartments Project

Monitoring Location	Date	Start Time	Duration (minutes)	L_{eq}	L_{min}	L_{max}	L_{25}	L_{50}	L_{90}
ST-1	1/16/17	3:55 p.m.	15	67.3	52.0	76.3	68.8	65.9	58.3
		4:16 p.m.	15	67.6	52.2	80.0	68.5	65.9	56.0
ST-2	1/16/17	4:35 p.m.	15	61.7	53.7	72.3	62.7	60.8	56.5
		4:51 p.m.	15	62.5	51.5	78.1	63.5	60.9	55.4
ST-3	2/1/17	10:53 a.m.	15	49.9	41.6	67.8	48.5	46.9	44.0
ST-4	2/1/17	11:26 a.m.	15	50.6	44.4	64.1	50.5	49.4	46.3
		11:41 a.m.	15	53.1	48.6	64.4	53.7	52.1	50.0
Source: A/E Tech									

5.1.2 Traffic Noise Measurements

As previously stated, the purpose of the short-term noise level measurements conducted within the project site at locations ST-1 and ST-2 was to determine the existing traffic noise levels within the Project site.

During the afternoon of January 16, when the measurements were taken, weather conditions were generally calm to slightly breezy (2 to 8 miles per hour) with clear skies. Temperatures ranged between 62 degrees Fahrenheit (°F) and 65°F. Relative humidity during the measurements was 40 percent.

In addition to documenting existing traffic noise levels, another utility of the traffic noise level measurements is to validate the use of TNM in accurately predicting traffic noise exposure within the project site. Therefore, concurrent counts of traffic on Mission Trail were conducted during the noise

level measurements. The results of the traffic noise level measurements and concurrent traffic counts are summarized in Table 6.

TABLE 6

Measured Traffic Noise Levels and Concurrent Traffic Counts
Mission Trail Apartments Project
January 16, 2017

Monitor Location	Start Time	Measured Sound Level (dB)			Traffic Counts (15 minutes)							
					Southbound				Northbound			
		L_{eq}	L_{min}	L_{max}	A	MT	HT	MC	A	MT	HT	MC
ST1-1	3:55 p.m.	67.3	52.0	76.3	191	1	1	0	160	2	0	1
	4:16 p.m.	67.6	52.2	80.0	171	3	1	1	145	1	0	6
ST-2	4:35 p.m.	61.7	53.7	72.3	184	1	0	0	172	1	0	1
	4:51 p.m.	62.5	51.5	78.1	179	2	0	5	163	0	0	3

A = Automobiles MT = Medium Trucks HT = Heavy Trucks MC = Motorcycles

Source: A/E Tech

Existing roadway geometry, number of vehicles counted during the noise measurement periods, and existing terrain features with potential for shielding were entered into the noise model. Table 7 is a summary of noise levels obtained during the traffic noise measurements and their comparison to levels predicted by the TNM.

The last column of Table 7 depicts the differences between the measured and modeled noise levels. At both noise measurement locations, the difference between measured and modeled noise levels are within +/- 1 dBA, which depicts very close agreement between the two levels. This close agreement verifies the accuracy of the TNM in predicting traffic noise levels in areas near the roadway.

TABLE 7

Comparison of Measured and Modeled Traffic Noise Levels (dB)

Measurement Location	Measured L_{eq}	Modeled L_{eq}	Modeled minus Measured L_{eq}
ST-1	67.3	67.7	+0.4
	67.6	67.8	+0.2
ST-2	61.7	61.3	-0.4
	62.5	61.8	-0.7
Source: A/E Tech			

6. FUTURE NOISE IMPACTS

Future noise impacts from the proposed project would include short-term, temporary effects during the construction phase of the project and potential permanent effects resulting from increased traffic brought on the local roadway system by the proposed project. This section describes the methods, data, and findings of the construction and traffic noise analyses performed to determine the level of impacts, and whether predicted noise exposure would be in compliance with the applicable noise criteria.

6.1 Construction Noise

During the construction of the proposed project, overall noise levels would vary based on the level of construction activity, the types of equipment used, when the equipment is being operated, and the distance from construction activities to noise-sensitive receivers. Construction of the proposed project will include several components generally consisting of excavation, materials haul, site preparation, grading, infrastructure installation, and buildings construction. The beginning construction phases will include excavation of fill soil from a Borrow Site located near the north end of the Summerly Golf Course, and finishing grading of the project site.

6.1.1 Borrow Site

It is proposed that, during the initial phases of construction fill material for grading the project site will be borrowed from a Borrow Site located in close proximity to the north boundary of the Summerly Golf Course, as shown in Figure 3.

Activities at the Borrow Site will occur over no more than 60 work days. Activities are currently tentatively scheduled for mid-January 2018 through early April 2018(first calendar quarter of 2018).

Figure 3
Borrow Site Location and Haul Route
Mission Trail Apartments Project

During this time, 38,000 cubic yards (CY) of fill dirt will be excavated from the Borrow Site using bulldozers, scrapers, loaders, and/or backhoes. Fill dirt will go into haul trucks, which will transport the material along Malaga Road to Mission Trail directly to the project site.

Typical construction equipment noise levels were obtained from the Roadway Construction Noise Model developed by FHWA (FHWA, 2006). The noise database utilized for estimating construction noise levels includes maximum noise levels from each piece of machinery at a reference distance of 50 feet.

For each construction equipment, the L_{eq} is estimated using its reference noise level and usage factor combined with the distance to the receiver and local shielding factors, if applicable. Distance attenuation effect on noise levels from a construction point source is 6 dB per doubling of distance. The nearest noise-sensitive receivers to the Borrow Site are single-family homes at the southern end of Lucerne Street, located over 1,400 feet north of the Borrow Site, and homes within the Summerly Subdivision, located at distances of more than 3,200 to the east/southeast. Construction noise level calculations for excavation activities at the Borrow Site at these locations are shown in Appendix C.

Estimated construction noise levels from the Borrow Site at exterior areas of the nearest noise-sensitive land uses would be below 60 dB at any time, which is far below the City's daytime noise standard for mobile construction sources.

6.1.2 Project Site

Grading and site preparation phases of the proposed project are expected to be the noisiest construction phases at the site. During these phases there will be a combination of equipment in use, including scrapers, a compactor, a loader, backhoe, water and concrete trucks, pickup trucks, maintenance trucks, and air compressors.

The equipment to be utilized during the peak grading activities period at the project site include two scrapers, one loader, one backhoe, one compactor, one dozer, two water trucks, four air compressors, and a number of other utility trucks. Noise levels at the nearest noise-sensitive receivers, within Summerly and across Mission Trail in Wildomar, were estimated for the grading phase by using the same methodology applied at the Borrow Site. For a conservative assessment, it was assumed that all the equipment would operate simultaneously at a location in the middle of the project site. Construction noise level calculations of grading activities at the project site at the nearest noise-sensitive locations are shown in Appendix C.

The estimated construction noise levels show that the levels at nearest backyards within Summerly would be below the City's daytime noise limit of 75 dB. At exterior of homes along the east side of Mission Trail, noise levels from project construction would be louder because there is no shielding from walls. However, the City of Wildomar exempts construction noise from its limits so long as construction does not occur between the hours of 6:00 p.m. and 6:00 a.m. during the months of June through September, or between the hours of 6:00 p.m. and 7:00 a.m. during the months of October through May (see Section 3.2).

6.1.3 Construction Traffic Noise

During the construction of the proposed project, vehicular traffic on local roadways will increase due to use of personal vehicles by construction employees and haul trucks transporting fill dirt between the Borrow Site and the project site. Such increases in traffic volumes may result in increased traffic noise levels along the local roadways utilized by traffic associated with the project.

As indicated previously, approximately 38,000 CY of dirt fill will be transported by haul trucks over the span of 60 work days at the Borrow Site, meaning that approximately 633 CY of dirt would need to be hauled to the project site during an average work day (38,000÷60=633). Since each haul truck has a 12-CY capacity, there would be approximately 53 truck trips during an average work day (633÷12=53). If fill deliveries are spread evenly over an 8-hour work day, there would be between six to seven truck round trips between the two sites (53÷8=7).

In addition to the above haul truck traffic, it is assumed that there would be about 20 employee trips. Each worker would make 2 trips per day (one during the AM peak hour and one during the PM peak hour). All employee trips are assumed to arrive at the site and leave the site on Mission Trail, half from the south and half from the north.

Potential increases in traffic noise exposure due to vehicle trips generated during construction were evaluated using existing traffic volumes on local roadways of interest, and adding the highest anticipated construction traffic volumes to the existing volumes. The traffic data were utilized in the TNM to evaluate the differences in hourly average traffic noise level (L_{eq}) between the existing and existing with construction AM peak-hour conditions. AM peak-hour was used for the analysis because it presents lower existing total traffic volumes than PM peak-hour on the roadways of interest, and would therefore result in higher increases in noise levels due to addition of construction traffic.

Based on the construction traffic assumptions, during the most intensive construction activities, a total of 20 employee automobiles would travel to the project site in the AM peak-hour and 7 trucks would arrive at and depart from the project site during this hour.

Table 8 summarizes the comparison of calculated existing AM peak-hour L_{eq} values between the baseline and existing with construction conditions. As shown in Table 8, the proposed project construction truck traffic would cause increases in hourly traffic noise level of only 0.5 dB at the exterior of homes along Mission Trail and slightly over 2 dB at exterior of homes along Malaga Road. Such increases in traffic noise would not be noticeable during daytime construction hours.

TABLE 8

Comparison of AM Peak-Hour Traffic Leq (dB)
Between Existing and Existing with Construction Conditions
Proposed Mission Trail Apartments Project

Roadway Segment	AM Peak-hour Traffic Volume		Predicted Peak-hour Traffic Noise Level at 100 ft from Roadway Centerline		
	Existing	With Construction	Existing	With Construction	Noise Level Change
SB Mission Trail - South of Malaga Rd.	393	410	67.3	67.8	+0.5
NB Mission Trail - South of Malaga Rd.	593	600			
EB Malaga Rd. – West of Mission Trail	100[1]	107	55.7	58.1	+2.4
WB Malaga Rd. – West of Mission Trail	160[1]	167			

Based on the construction traffic assumptions, a total of 10 employee automobiles would travel to the project site in the AM peak-hour on Mission Trail and 7 haul trucks would arrive at and depart from the project site during this hour, traveling on Mission Trail and Malaga Road.

1. Based on onsite short-term traffic counts along Malaga Road.

Sources: LLG, 2017
A/E Tech

On an average daily basis, the project construction during its most intensive periods would increase the average daily traffic (ADT) volume of 16,593 vehicles by 126 vehicle trips on Mission Trail north of the project site, which includes 10 employee vehicle trips and 53 heavy truck trips in and out of the project site. Noise effect of this increase in ADT on the L_{dn} at noise-sensitive locations along Mission Trail would be an increase of only 0.1 dB or less. Therefore, increase in traffic L_{dn} along area roadways would not be noticeable at nearby noise-sensitive locations during the construction phase of the proposed project.

6.2 Project-Related Operational Noise

Potential long-term noise effects of the proposed project on neighboring noise-sensitive uses would be due to increased vehicular traffic on the local roadways generated by the proposed project. This analysis quantifies noise effects of increased traffic on local roadways due to the proposed project by comparing the forecast future traffic noise levels along area roadways without the project to those with the project.

6.2.1 Project-related Traffic Noise

The proposed project will incrementally add traffic to the local roadway system on a daily basis. Future vehicular traffic generated by the project would utilize the local area roadway network for accessing the

project site. Potential increases in traffic noise exposure due to vehicle trips generated by the proposed project were evaluated using forecast peak-hour and ADT volumes on local roadways in the project opening year (Year 2019) with and without the proposed project.

With- and without-project completion year (Year 2019) AM and PM peak-hour traffic volumes and ADT volumes on the project area roadway network were obtained from the Traffic Impact Analysis prepared for the project (LLG, 2017). Vehicle composition data, including breakdown of automobiles, medium trucks (2-axle), and heavy trucks (3 or more axles) for peak-hour traffic conditions were derived from the actual onsite traffic counts conducted during the noise measurements. For 24-hour vehicle composition, the percentages used in the County of Riverside Noise Element of the General Plan (County of Riverside, 2015) were applied.

The traffic data were utilized in the FHWA TNM version 2.5 to evaluate differences in hourly average (L_{eq}) and daily (L_{dn}) traffic noise levels between the with- and without-project scenarios. Table 9 summarizes comparisons of calculated 2019 peak-hour L_{eq} values between the with-project and without-project scenarios at a set distance of 100 feet from the centerline of Mission Trail in the project area during AM and PM peak traffic hours.

From data in Table 9, it is apparent that the proposed project would cause virtually no change in peak hour traffic noise levels in its completion year (zero to 0.1 dB). Therefore, project traffic would not result in noticeable changes in traffic noise at noise-sensitive uses along area roadways during peak traffic hours, and such impacts would not be significant.

On a daily basis, the proposed project would increase the 2019 ADT volume on Mission Trail by 377 vehicles. Noise effect of such an increase in daily volumes on the L_{dn} at locations along the roadway would only be a 0.1 dB increase. Therefore, increase in daily average traffic noise levels would also be insignificant.

TABLE 9

Comparison of Forecast Completion Year (2019) Traffic Noise Levels With and Without the Proposed Mission Trail Apartments

Roadway Segment	AM Peak Hour Leq, dB						PM Peak Hour Leq, dB					
	2019 No Project		2019 + Project		Difference		2019 No Project		2019 + Project		Difference	
	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB
Mission Trail												
South of Project Entrance	66.2	67.9	66.3	67.9	0.1	-0-	67.8	69.3	67.9	69.3	0.1	-0-
North of Project Entrance	62.2	67.7	62.2	67.8	-0-	0.1	63.9	69.0	64.0	69.1	0.1	0.1
Hidden Trail												
West of Mission Trail	41.3	41.3	41.3	41.3	-0-	-0-	39.7	39.7	39.7	39.7	-0-	-0-
Elberta Rd.												
East of Mission Trail	44.3	44.0	44.3	44.0	-0-	-0-	42.7	42.4	42.7	42.4	-0-	-0-
Olive St.												
East of Mission Trail	45.7	45.4	45.7	45.4	-0-	-0-	45.8	45.6	45.8	45.6	-0-	-0-

Source: A/E Tech

6.3 Future Noise Impacts on the Project

6.3.1 Exterior Noise

Noise exposure at the exterior areas of proposed future homes within the project would be primarily due to vehicular traffic movements on Mission Trail. Based upon onsite noise measurements, noise from activities at the U Wash Car Wash is demonstrably negligible and would not be a cause for concern.

Future (2019) cumulative with-project traffic data and future project site topography and proposed lot plans were utilized in the TNM models developed for the project for assessment of future traffic noise levels within the project site. The selected analysis locations include the setbacks of Buildings Type 1 and Building Type 2. The representative future noise-sensitive locations where traffic noise levels are evaluated are shown by Figure 4.

A day/night traffic split of 90%/10% was utilized and applied to the ADT for estimating future (2019) L_{dn} under the cumulative plus project traffic conditions. Table 10 summarizes the results of the traffic noise analysis in terms of the estimated L_{dn} at the selected receiver locations.

As shown in Table 10, at the exterior activity areas (patios and balconies) of future buildings closest to Mission Trail, future traffic noise levels without mitigation would exceed the City's exterior noise standard and land use compatibility limit of 60 dB L_{dn} for residential uses.

Figure 4
Traffic Noise Calculation Locations
Mission Trail Apartments Project

(#) Noise Calculation Location

TECH

TABLE 10

Calculated Future (2019) Cumulative With Project Traffic Noise Levels Mission Trail Apartments Project

Receiver Location	Building - Floor	L_{dn}, dB
Nearest Building Facades		
1-1	Building 1 – First Floor	65
	Building 1 – Second Floor	69
1-2	Building 1 – First Floor	63
2-1	Building 2 – First Floor	66
	Building 2 – Second Floor	67
	Building 2 – Third Floor	67
2-2	Building 2 – First Floor	66
	Building 2 – Second Floor	67
	Building 2 – Third Floor	67
Patios, Balconies, and Outdoor Area		
1-3	Building 1 – First Floor	64
	Building 1 – Second Floor	66
1-4	Building 1 – First Floor, Unit B	61
	Building 1 – Second Floor, Unit B	62
2-3	Building 2 – First Floor	61
	Building 2 – Second Floor	61
	Building 2 – Third Floor	62
2-4	Building 2 – First Floor	63
	Building 2 – Second Floor	64
	Building 2 – Third Floor	64
2-5	Courtyard between Buildings 2 and 3	57

Source: A/E Tech

6.3.2 Interior Noise

The interior noise level standard of the City of Lake Elsinore for residential land uses is 45 dB L_{dn}. The worst-case future exterior noise exposure would be 70 dB L_{dn} and occur at the facade of the apartments closest to Mission Trail (second floor of Building 1, Unit B). This means that an outdoor to indoor noise level reduction (NLR) of up to 25 dB (70-45=25) will be required to comply with the City's interior noise level standard.

To document compliance with the interior noise level standard of the City, a detailed analysis of the proposed construction was conducted to determine the NLR which will be provided by the buildings. The NLR provided by a building may be calculated by assuming a generalized sound level spectrum, correcting for A-weighting, determining the composite transmission loss and resulting sound level inside an affected room, correcting for room absorption and calculating the overall sound level inside the room. Worst-case exterior noise exposures were assumed to be 70 dB at the multi-family building facades along Mission Trail. It was also assumed for the calculations that windows and doors would remain closed, meaning that air conditioning or some form of mechanical ventilation would be required. Since experience has shown that the transmission loss performance reported for laboratory test conditions cannot be expected from normal "as-built" assemblies, a 3 dB adjustment is applied for the determination of compliance with applicable County noise level standards.

Construction details, based upon floor plans provided by the builder are summarized as follows, including the Sound Transmission Class (STC) of each sound transmitting component:

a. Exterior Walls: Stucco siding, 2"×4" wood studs, 1/2" gypsum board on the inside with cavity insulation (STC 46)

b. Windows: Low air-infiltration-rate aluminum frame sliders with dual glazing (STC 26)

c. Doors: Solid core wood or french doors with perimeter weather-stripping and threshold seals (STC 31)

d. Interior Floors: Carpet and pad or a combination of carpet and vinyl or other soft tile

e. Interior Walls and Ceiling: Gypsum board walls and ceiling

Table 11 presents a summary of calculated NLR values based upon the above-described construction details and transmission loss data obtained from laboratory test reports for individual building component assemblies.

From Table 11 it is apparent that the proposed construction of the buildings will achieve the required NLR levels for compliance with the City's interior noise level standard.

TABLE 11

Summary of Building Noise Level Reduction (NLR) Calculations
Proposed Mission Trail Apartments

Room	Exterior L_{dn}	Building Attenuation (NLR)	Resulting Interior Sound Level
Master BR - Building 1 – First Floor	65 dB	27 dB	38 dB
Master BR - Building 1 – Second Floor	69 dB	27 dB	42 dB
Master BR - Building 2 – First Floor	66 dB	27 dB	39 dB
Master BR - Building 2 – Second Floor	67 dB	27 dB	40 dB
Master BR - Building 2 – Third Floor	67 dB	27 dB	40 dB
Master BR - Building 2 – First Floor	66 dB	27 dB	39 dB
Master BR - Building 2 – Second Floor	67 dB	27dB	40 dB
Master BR - Building 2 – Third Floor	67 dB	27 dB	40 dB

NLR = Outdoor-to-indoor Noise Level Reduction
Note: NLR values include a 3 dB adjustment for "as-built" assemblies.

Source: A/E Tech

7. CUMULATIVE NOISE IMPACTS

7.1 Construction Noise

For determination of cumulative noise impacts from construction of the proposed project, existing background noise levels that were determined through onsite noise monitoring at representative noise-sensitive receivers have been combined with the estimated noise levels from project construction. No other cumulative projects is in close enough proximity to the project site to affect the adjoining noise-sensitive land uses.

7.2 Operational Noise

The long-term, permanent source of noise from the project is vehicular traffic generated by the project. The traffic noise analysis presented in this report (see Section 6.2.1) takes all future traffic, including project and non-project traffic, into account. Therefore, the analysis is inherently a cumulative noise evaluation of traffic in the project area. This analysis shows that the project would not result in significant effects on cumulative noise levels at neighboring noise-sensitive locations in the project environs.

8. MITIGATION

8.1 Construction Noise

At noise-sensitive uses adjoining the project site, estimated noise exposure due to construction of the proposed project would exceed the existing background sound levels during daytime hours. The City of Wildomar exempts construction activities from its Municipal Code noise requirements during daytime hours on weekdays and Saturdays. While the project construction times would be limited to daytime hours, the project construction would still result in significant noise level increases at the nearest noise-sensitive locations within Summerly during intensive grading at the project site. Typically, to minimize annoyance of neighboring noise-sensitive uses, the contractors develop construction noise mitigation plans that include:

- Using equipment engines fitted with mufflers,
- Placing construction staging and equipment storage areas at locations as far away from noise-sensitive locations as possible.

Given that the backyards of the nearest homes in Summerly Subdivision are already shielded by a property line wall, use of temporary noise barriers would not be needed nor effective in that such temporary barriers would not result in noticeable noise reductions beyond those already afforded by the existing wall. Implementation of standard City requirements for construction noise control should be sufficient in maintaining construction noise at levels that would not be intrusive to neighboring homes during the daytime hours.

8.2 Operational Noise

8.2.1 Noise Mitigation of Existing Land Uses

Based on estimated future peak-hour traffic noise level changes predicted for the project (as presented in Section 6.2.1 and Table 9), project-induced increases in traffic would not cause significant noise impacts during future traffic peak hours nor over a 24-hour period at existing noise-sensitive locations along area roadways. Therefore, no mitigation of traffic noise would be required for existing noise-sensitive land use.

8.2.2 Noise Mitigation of Future (Project) Homes

Based on noise level predictions within the project site, future unmitigated traffic noise exposure at the exterior areas of first rows of apartments within the project site facing Mission Trail would exceed the applicable City of Lake Elsinore exterior noise standard for residential uses (see Table 10).

In addition to the patios and balconies of future apartment units, the project design includes various other outdoor activity areas, such as barbeque pavilions, children's play area, and a number of seating areas. The outdoor activity areas adjoining Building 1 will be located at the far west side of the building away from Mission Trail. Future noise levels at these locations will be below the City's exterior noise level standard. Also, noise level at the open courtyard located between Buildings 2 and 3 would be 57 dB L_{dn}, which complies with the City's exterior standard.

Because the only outdoor activity areas where future traffic noise levels would exceed the City's noise level limit will be at the patios and balconies nearest to Mission Trail, localized noise mitigation at each of the patios or balconies would be the most practical and reasonable approach to reducing noise at these locations. To mitigate noise at first-floor patios and second- and third-floor balconies, it is recommended that each patio and balcony be outfitted with 4-foot-high solid fencing on the sides exposed to traffic noise so that residents using these areas could be shielded from traffic noise in a seated position. It is further recommended that care should be taken to avoid installation of smooth surfaces for the building walls enclosing each of these patios or balconies in order to minimize sound buildup within the space due to reflections.

Figure 5 shows the locations of patios and balconies around which solid fencing should be built to reduce traffic noise levels.

Furthermore, to ensure that the interior sound levels of the future homes within the proposed project comply with the City's noise criterion, the following conditions should be satisfied:

1. Windows and sliding glass doors of homes closest to the traffic and commercial noise sources along the west, east, and north sides of the project should be mounted in low air infiltration rate frames (0.5 cfm/ft. or less per ANSI specifications).

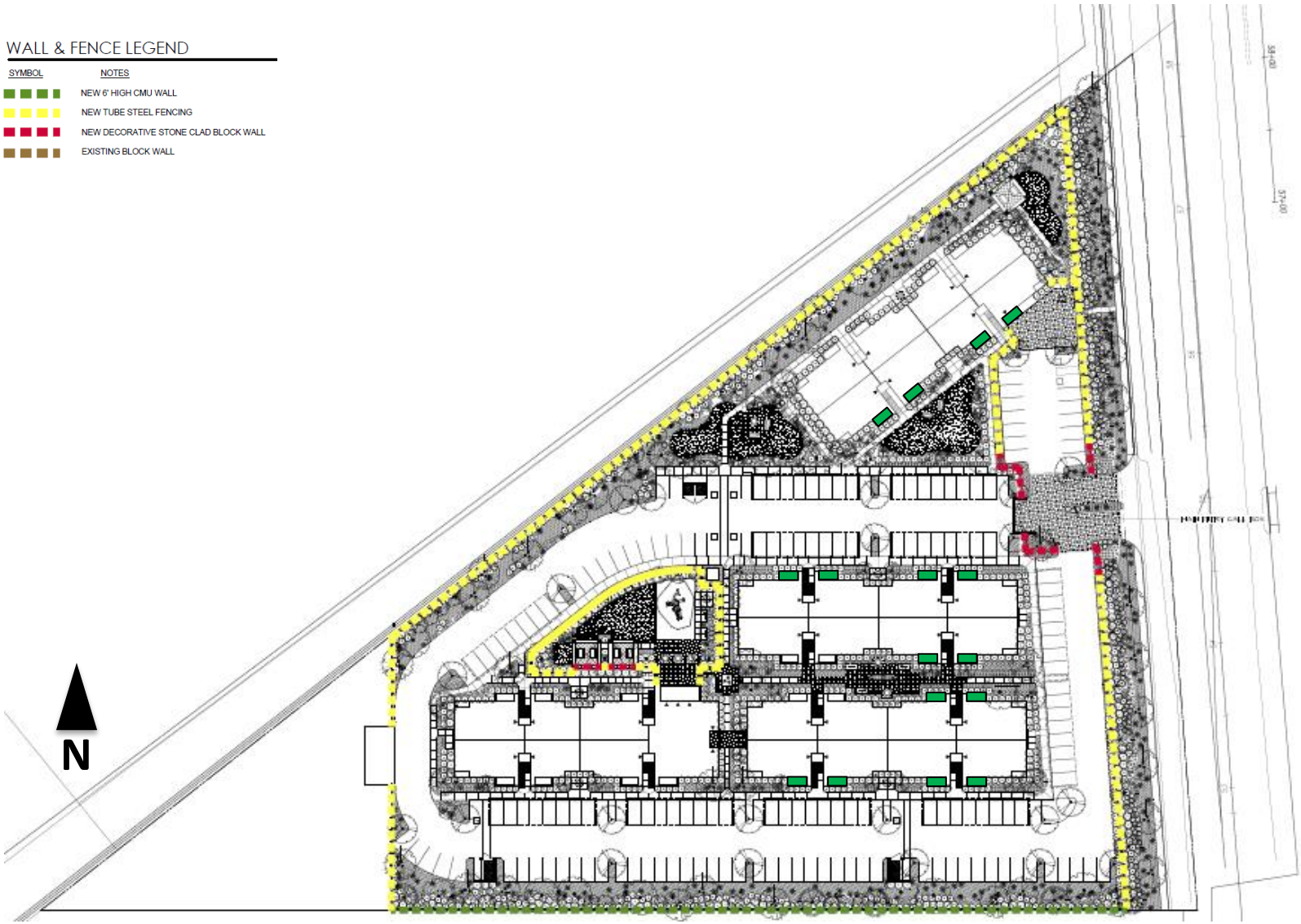
2. Exterior doors of homes closest to the traffic and commercial noise sources along the west, east, and north sides of the project should be solid core with perimeter weatherstripping and threshold seals.

3. Air conditioning or mechanical ventilation should be provided for the first row of homes closest to the traffic and commercial noise sources along the west, east, and north sides of the project to allow occupants to close doors and windows for the required acoustical isolation.

4. Roof or attic vents directly facing the traffic and commercial noise sources should be baffled so that sound must take an indirect route when entering the attic space.

It is the responsibility of the builder to ensure that all materials and construction practices employed for this project are consistent with the design assumption used for this analysis, and with these recommendations. A/E Tech LLC would not be responsible for degradation of acoustical performance due to substitutions, deletions, modifications or defects in manufacture or workmanship.

Figure 5
Traffic Noise Mitigation Locations
Mission Trail Apartments Project



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Appendix A
Acoustical Terminology

List of Technical Terms

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base of 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below the atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1, 10, 50 and 90 percent of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Day-Night Average Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after the addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
STC Rating	Sound Transmission Class (or STC) is an integer rating of how well a building partition attenuates airborne sound. STC rating is widely used to rate interior partitions, ceilings/floors, doors, windows, and exterior wall configurations.

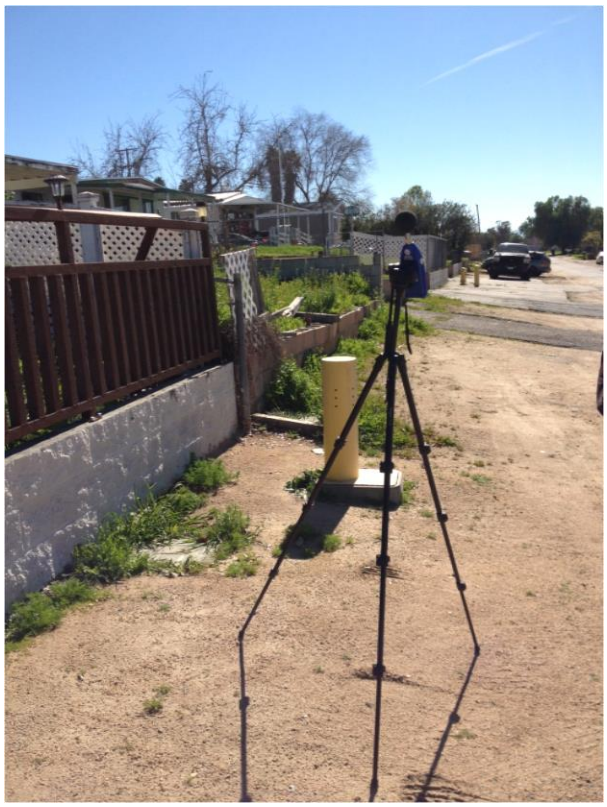
Appendix B

Noise Measurement Photographs

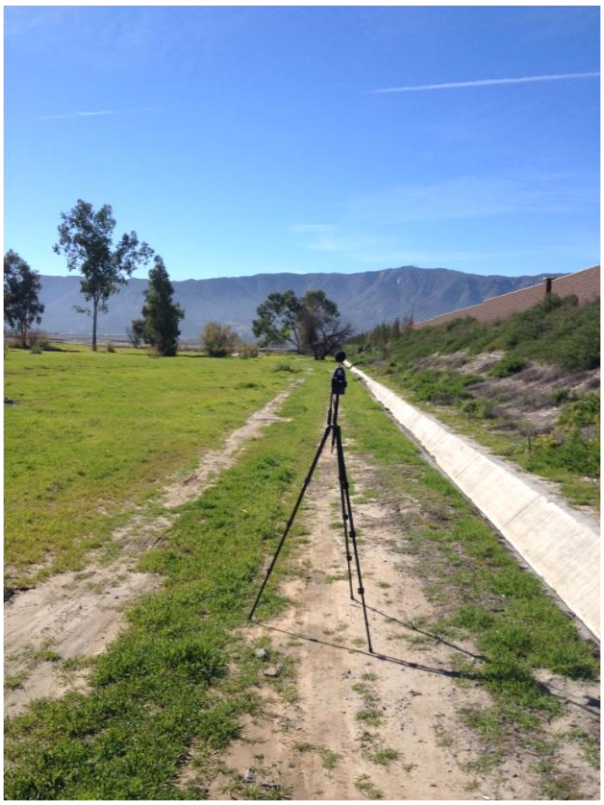
B-1. Ambient Noise Measurement Photographs at Site ST-1

B-2. Ambient Noise Measurement Photographs at Site ST-2

B-3. Ambient Noise Measurement Photographs at Site ST-3



B-4. Ambient Noise Measurement Photographs at Site ST-4



B-5. Ambient Noise Measurement Photographs at Site LT-1

Appendix C

Construction Noise Calculation Data Sheets

C-1
Estimated Construction Noise Levels
Borrow Site

Receiver 1 (Lucerne St.)	Distance	Shielding	Source Lmax @ 50 ft	Equipment Lmax	Usage Factor	Equipment Leq
Scraper 1	1420	5	83.6	49.5	40%	45.6
Scraper 2	1420	5	83.6	49.5	40%	45.6
Loader 1	1420	5	85.0	50.9	40%	47.0
Backhoe 1	1420	5	85.0	50.9	50%	47.9
Backhoe 2	1420	5	85.0	50.9	50%	47.9
Dozer	1420	5	81.7	47.6	40%	43.7
Water Truck 1	1420	5	80.0	45.9	100%	45.9
Water Truck 2	1420	5	80.0	45.9	100%	45.9
			Overall:	**58**		**55**

Receiver 2 (Summerly)	Distance	Shielding	Source Lmax @ 50 ft	Equipment Lmax	Usage Factor	Equipment Leq
Scraper 1	3200	0	83.6	47.5	40%	43.5
Scraper 2	3200	0	83.6	47.5	40%	43.5
Loader 1	3200	0	85.0	48.9	40%	44.9
Backhoe 1	3200	0	85.0	48.9	50%	45.9
Backhoe 2	3200	0	85.0	48.9	50%	45.9
Dozer	3200	0	81.7	45.6	40%	41.6
Water Truck 1	3200	0	80.0	43.9	100%	43.9
Water Truck 2	3200	0	80.0	43.9	100%	43.9
			Overall:	**56**		**53**

C-2
Estimated Construction Noise Levels
Project Site Grading Operations

Receiver 1 (Summerly)	Distance	Shielding	Source Lmax @ 50 ft	Equipment Lmax	Usage Factor	Equipment Leq
Scraper 1	210	10	83.6	61.1	40%	57.2
Scraper 2	210	10	83.6	61.1	40%	57.2
Compressor 1	210	10	83.6	61.1	40%	57.2
Compressor 2	210	10	83.6	61.1	40%	57.2
Compressor 3	210	10	83.6	61.1	40%	57.2
Compressor 4	210	10	83.6	61.1	40%	57.2
Manlift 1	210	10	80.0	57.5	50%	54.5
Manlift 2	210	10	80.0	57.5	50%	54.5
3 Pickup Trucks	210	10	80.0	57.5	40%	53.6
Water Truck 1	210	10	80.0	57.5	100%	57.5
Water Truck 2	210	10	80.0	57.5	100%	57.5
Maint. Truck	210	10	80.0	57.5	100%	57.5
			Overall:	**70**		**67**

Receiver 2 (Wildomar)	Distance	Shielding	Source Lmax @ 50 ft	Equipment Lmax	Usage Factor	Equipment Leq
Scraper 1	350	0	83.6	66.7	40%	62.7
Scraper 2	350	0	83.6	66.7	40%	62.7
Compressor 1	350	0	83.6	66.7	40%	62.7
Compressor 2	350	0	83.6	66.7	40%	62.7
Compressor 3	350	0	83.6	66.7	40%	62.7
Compressor 4	350	0	83.6	66.7	40%	62.7
Manlift 1	350	0	80.0	63.1	50%	60.1
Manlift 2	350	0	80.0	63.1	50%	60.1
3 Pickup Trucks	350	0	80.0	63.1	40%	59.1
Water Truck 1	350	0	80.0	63.1	100%	63.1
Water Truck 2	350	0	80.0	63.1	100%	63.1
Maint. Truck	350	0	80.0	63.1	100%	63.1
			Overall:	**76**		**73**