3.11
NOISE

3.11 Noise

The purpose of this section is to describe the existing and the future noise environments within the City of Merced. This section provides an assessment of long term noise impacts associated with traffic, railroad operations, aircraft operations, commercial/light industrial uses and other non-transportation noise sources. Based upon the analysis, mitigation measures associated with the buildout of the proposed General Plan are provided where a potentially significant impact has been identified. The mitigation measures generally take the form of the proposed goals, policies and implementation measures.

3.11.1 SETTING

Environmental Setting

The City of Merced is located approximately 100 miles southeast of Sacramento, 55 miles northwest of Fresno, and 150 miles southeast of San Francisco, in the Central Valley of California. Incorporated in 1889, the City of Merced is situated within the eastern section of Merced County and is the largest City in the County. Principal highway access to Merced is via State Highway 99, which runs through the central portion of the City in a general north/south direction. State Highways 140 and 59 also serve the City.

The City contains a typical mix of residential, commercial, industrial and public land uses. The City is centered around Main Street. Older development transitions into new development as one goes farther north. Significant areas in the extreme north remain undeveloped, though they have been annexed. Less new development has occurred in the south portion of the City.

ACOUSTIC TERMINOLOGY

Noise is often defined as unwanted sound, and its perception can be characterized as a subjective reaction to a physical phenomenon. Researchers have grappled for many years with the problem of translating objective measurements of sound into directly correlated measures of public reaction to noise. The descriptors of community noise in current use are the results of these efforts, and represent simplified, practical measurement tools to gauge community response. Table 3.11-1 provides examples of maximum or continuous noise levels associated with common noise sources.

Table 3.11-1
Typical A-Weighted Maximum Sound Levels of Common Noise Sources

dB (Sound Pressure Level)	Source (with distance)
130	Threshold of pain
120	Jet aircraft take-off at 100 feet
110	Riveting machine at operators position
100	Shot-gun at 200 feet
90	Bulldozer at 50 feet

dB (Sound Pressure Level)	Source (with distance)
80	Diesel locomotive at 300 feet
70	Commercial jet aircraft interior during flight
60	Normal conversation speech at 5-10 feet
50	Open office background level
40	Background level within a residence
30	soft whisper at 2 feet
20	Interior of recording studio

Source: j.c. brennan and associates, Inc., 2007

A common statistical tool to measure the ambient noise level is the average sound level (Leq), which is the sound level corresponding to a steady-state A-weighted sound level in decibels (dB) containing the same total energy as a time-varying signal over a given time period (usually one hour). The Leq, or average sound level, is the foundation for determining composite noise descriptors such as Ldn and CNEL (see below), and shows very good correlation with community response to noise. For an explanation of these terms, see Table 3.11-2 "Acoustical Terminology."

Table 3.11-2
Acoustical Terminology

Term	Definition
Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of noise.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one hour period

Term	Definition
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
SEL	A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches

Source: j.c. brennan and associates, Inc., 2007

Two composite noise descriptors commonly used are: Ldn and CNEL. The Ldn (Day-Night Average Level) is based upon the average hourly Leq over a 24-hour day, with a +10 decibel weighting applied to nighttime (10:00 p.m. to 7:00 a.m.) Leq values. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were subjectively twice as loud as daytime exposures. The CNEL (Community Noise Equivalent Level), like Ldn, is based upon the weighted average hourly Leq over a 24-hour day, except that an additional +4.77 decibel penalty is applied to evening (7:00 p.m. to 10:00 p.m.) hourly Leq values.

The CNEL was developed for the California Airport Noise Regulations, and is normally applied to airport/aircraft noise assessment. The Ldn descriptor is a simplification of the CNEL concept, but the two will usually agree, for a given situation, within 1 dB. Like the Leq, these descriptors are also averages and tend to disguise short-term variations in the noise environment. Because they presume increased evening or nighttime sensitivity, these descriptors are best applied as criteria for land uses where nighttime noise exposures are critical to the acceptability of the noise environment, such as residential developments.

The State Office of Planning and Research Noise Element Guidelines require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Noise measurements and modeling are used to develop these contours. Significant noise sources include traffic on major roadways and highways, railroad operations, airports, representative industrial activities and fixed noise sources.

Noise modeling techniques use source-specific data, including average levels of activity, hours of operation, seasonal fluctuations, and average levels of noise from source operations. Modeling methods have been developed for a number of environmental noise sources such as roadways, railroad line operations and industrial plants. Such methods produce reliable results so long as data inputs and assumptions are valid.

The modeling methods used in this report closely follow recommendations made by the State Office of Noise Control, and were supplemented, where appropriate, by field-measured noise levels to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site-specific.

As described earlier, the CNEL and Ldn are 24-hour average noise level descriptors, which assume that individuals are more sensitive to noise occurring during the evening and nighttime hours. The CNEL and Ldn descriptors have been found to provide good correlation to the potential for annoyance from transportation-related noise sources (ie: roadways, airports and, to a lesser extent, railroad operations). However, these descriptions do not provide a good correlation to the potential for annoyance from non-transportation or stationary noise sources, such as industrial and commercial operations, because many times stationary noise sources operate sporadically or for short durations. Examples of these types of noise sources include loading docks, special event concerts, pressure relief valves or alarms, which tend to be short duration noise events. When applying an Ldn or CNEL descriptors, the noise levels associated with these types of short term operations will be averaged over a 24-hour period, underscoring the potential for annoyance.

The State of California "Model Community Noise Control Ordinance" suggests that an exterior hourly L50/Leq noise level of 55 dBA should be used for evaluating stationary noise source impacts during the daytime period (7 am - 10 pm) and 45 dBA during the nighttime period (10 pm - 7 am), within "suburban" areas. The hourly Leq, or hourly average noise level, has been found to provide good correlation to noise sources which operate for a short duration.

ROADWAY NOISE LEVELS

The Federal Highway Administration's (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD 77-108) was used to develop Ldn (24-hour average) noise contours for all highways and major roadways in the General Plan study area. The model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly Leq values for free-flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict Ldn values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour period.

Traffic data representing annual average traffic volumes for existing conditions were obtained from Caltrans and the project traffic consultant. Day/night traffic distribution for Highway 99,

State Route 59, and State Route 140 were based upon continuous hourly noise measurement data collected for those roadways. Truck mix data were also based upon Caltrans and j.c. brennan & associates, Inc. file data. Using these data sources and the FHWA traffic noise prediction methodology, traffic noise levels were calculated for existing traffic volumes in terms of the Ldn metric. Distances from the centerlines of selected roadways to the 60 and 65 dB Ldn contours are summarized in Table 3.11-3. Continuous noise measurement data is shown in Appendix B of Appendix I.

In many cases, the actual distances to noise level contours may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation. The distances reported in Table 3.11-3 are generally considered to be conservative estimates of noise exposure along roadways in the City of Merced.

The effects of factors such as roadway curvature, and grade, can be determined from site-specific traffic noise measurements. The noise measurement results can be compared to the FHWA model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA model. The differences between the measured and predicted noise levels can be used to adjust the FHWA model and more precisely determine the locations of the traffic noise contours.

Table 3.11-3
Existing Traffic Noise Levels

Roadway	Segment	Ldn at 100 feet	Distances[1] to Ldn Contours		
			70 dB	65 dB	60 dB
SR 59	16th to Olive	67 dB	66	142	306
SR 59	Olive to Yosemite	69 dB	89	192	415
SR 59	Yosemite to Cardella	67 dB	62	133	287
SR 59	Cardella to Bellevue	66 dB	51	109	235
SR 59	Bellevue to Old Lake	65 dB	45	98	211
SR 59	Old Lake to Castle Farms	65 dB	45	98	211
SR 59	Roduner to Mission	63 dB	36	78	169
SR 59	Mission to Gerard	64 dB	39	83	180
SR 59	Gerard to Childs	66 dB	52	113	243
SR 59	Childs to SR 99	64 dB	40	86	185
SR 59	SR 99 to 16th Street	65 dB	49	106	229
SR 59	Castle Farms Rd to Oakdale Rd	61 dB	25	54	116
SR 99	Franklin to Thornton	79 dB	416	897	1933
SR 99	Thornton to V Street	79 dB	369	795	1712
SR 99	V Street to R Street	79 dB	369	795	1712
SR 99	R Street to MLK JR	78 dB	360	775	1670
SR 99	MLK JR to G Street	79 dB	373	804	1732
SR 99	G Street to SR 140	79 dB	425	915	1970
SR 99	SR 140 to Childs	79 dB	414	892	1922
SR 99	Childs to Gerard	79 dB	396	853	1837
SR 99	Gerard to Mission	78 dB	357	770	1659

Roadway	Segment	Ldn at 100 feet	Distances[1] to Ldn Contours		
			70 dB	65 dB	60 dB
SR 99	Mission to Mariposa	78 dB	357	770	1659
SR 99	Castle Xpway to Franklin	79 dB	422	910	1960
SR 140	Tina to Thornton	72 dB	132	285	614
SR 140	Thornton to V Street	64 dB	37	80	173
SR 140	G Street to Parsons/Gardner	67 dB	64	138	296
SR 140	Parsons/Gardner to Campus Parkway	67 dB	64	138	298
13th Street	V Street to R Street	58 dB	16	34	74
13th Street	R Street to M Street	56 dB	11	25	53
13th Street	M Street to MLK JR	58 dB	16	35	75
13th Street	MLK JR to G Street	58 dB	17	37	79
13th Street	G Street to B Street	57 dB	13	28	61
14th Street	V Street to R Street	58 dB	16	34	73
14th Street	R Street to M Street	57 dB	13	28	60
14th Street	M Street to MLK JR	48 dB	4	8	16
16th Street	SR 99 to V Street	63 dB	33	72	155
16th Street	V Street to R Street	63 dB	36	79	169
16th Street	R Street to M Street	63 dB	32	69	149
16th Street	M Street to G Street	61 dB	23	51	109
16th Street	G Street to SR 99	59 dB	19	41	88
Bellevue Road	SR 59 to R Street	62 dB	30	64	137
Bellevue Road	R Street to M Street	62 dB	29	63	135
Bellevue Road	M Street to G Street	62 dB	29	63	135
Bellevue Road	G Street to Parsons/Gardner	63 dB	33	71	153
Bellevue Road	Parsons/Gardner to Campus Parkway	60 dB	22	48	104
Bellevue Road	SR 59 to Thornton	60 dB	23	49	106
Bellevue Road	Thornton to Castle Xpway	60 dB	23	49	106
Cardella Road	R Street to M Street	57 dB	13	28	61
Cardella Road	M Street to G Street	58 dB	16	35	75
Childs Avenue	West Ave to SR 59	58 dB	15	33	71
Childs Avenue	SR 59 to Tyler	57 dB	13	27	58
Childs Avenue	Tyler to SR 99	58 dB	16	34	73
Childs Avenue	SR 99 to Coffee	61 dB	25	53	114
Childs Avenue	Coffee to Campus Parkway	58 dB	16	34	73
Childs Avenue	Campus Parkway to Tower	55 dB	10	21	46
Dickenson Ferry	Thorton to West Ave	53 dB	7	15	32
Dickenson Ferry	West Ave to SR 59	53 dB	7	15	32
Dickenson Ferry	Grove to Thornton	53 dB	7	15	32
G Street	Mission to Childs	58 dB	16	34	73
G Street	Childs to SR 99	63 dB	34	74	160
G Street	SR 99 to Bear Creek	63 dB	35	76	164
G Street	Bear Creek to Olive	65 dB	48	104	225

Roadway	Segment	Ldn at 100 feet	Distances[1] to Ldn Contours		
			70 dB	65 dB	60 dB
G Street	Olive to Yosemite	66 dB	53	114	245
G Street	Yosemite to Cardella	63 dB	33	71	154
G Street	Cardella to Bellevue	63 dB	32	69	149
G Street	Bellevue to Old Lake	59 dB	20	42	91
G Street	Old Lake to Snelling	59 dB	20	42	91
Gerard Avenue	M Street to SR 59	53 dB	7	16	34
Gerard Avenue	SR 59 to Tyler	53 dB	7	16	34
Gerard Avenue	Parsons/Gardner to Coffee	60 dB	21	45	97
Gerard Avenue	Coffee to Campus Parkway	46 dB	2	5	11
Gerard Avenue	Campus Parkway to Tower	46 dB	2	5	11
M Street	Mission to Childs	56 dB	12	26	57
M Street	Childs to SR 99	59 dB	19	41	87
M Street	SR 99 to Bear Creek	63 dB	34	72	156
M Street	Bear Creek to Olive	63 dB	34	74	159
M Street	Olive to Yosemite	64 dB	42	90	194
M Street	Yosemite to Cardella	61 dB	25	54	116
Mission Avenue	SR 59 to Tyler	52 dB	7	14	31
Mission Avenue	Tyler to Henry	51 dB	5	11	24
Mission Avenue	Henry to SR99	53 dB	7	15	33
Mission Avenue	Coffee to Tower	48 dB	3	7	15
North Bear Creek	SR 99 to Campus Parkway	56 dB	12	26	57
North Bear Creek	R Street to M Street	58 dB	16	34	72
North Bear Creek	M Street to G Street	59 dB	18	40	86
North Bear Creek	G Street to Parsons/Gardner	59 dB	19	41	89
North Bear Creek	Parsons/Gardner to McKee	54 dB	8	17	37
Old Lake Road	Parsons/Gardner to Lake	45 dB	2	5	10
Olive Avenue	SR 99 to Campus Parkway	66 dB	56	121	260
Olive Avenue	R Street to M Street	66 dB	54	116	251
Olive Avenue	M Street to G Street	66 dB	51	110	238
Olive Avenue	G Street to Parsons/Gardner	64 dB	39	83	179
Olive Avenue	Parsons/Gardner to Campus Parkway	60 dB	21	45	98
Parsons	Coffee to Gerard	51 dB	5	11	24
Parsons/Gardner	Childs to SR 140	60 dB	20	44	94
Parsons/Gardner	SR 140 to Bear Creek	60 dB	23	49	105
Parsons/Gardner	Bear Creek to Olive	56 dB	12	26	55
Parsons/Gardner	Olive to Yosemite	57 dB	14	30	66
Parsons/Gardner	Yosemite to Cardella	52 dB	6	13	28
R Street	Gerard to Childs	47 dB	3	6	13
R Street	Childs to SR 99	60 dB	22	47	101
R Street	SR 99 to Bear Creek	62 dB	27	59	126
R Street	Bear Creek to Olive	62 dB	31	67	145

Roadway	Segment	Ldn at 100 feet	Distances[1] to Ldn Contours		
			70 dB	65 dB	60 dB
R Street	Olive to Yosemite	64 dB	39	83	179
Santa Fe Ave	SR 59 to Franklin	66 dB	54	116	250
Thornton Avenue	Mission to SR140	56 dB	11	24	51
Yosemite Ave	SR 59 to Campus Parkway	62 dB	29	63	136
Yosemite Ave	R Street to M Street	63 dB	35	75	163
Yosemite Ave	M Street to G Street	65 dB	49	105	227
Yosemite Ave	G Street to Parsons/Gardner	64 dB	41	88	190
Yosemite Ave	Parsons/Gardner to Campus Parkway	61 dB	26	55	119

Notes: [1]Distances to traffic noise contours are measured in feet from the centerlines of the roadways.
Source: j.c. brennan & associates, Inc., 2007

RAILROAD NOISE LEVELS

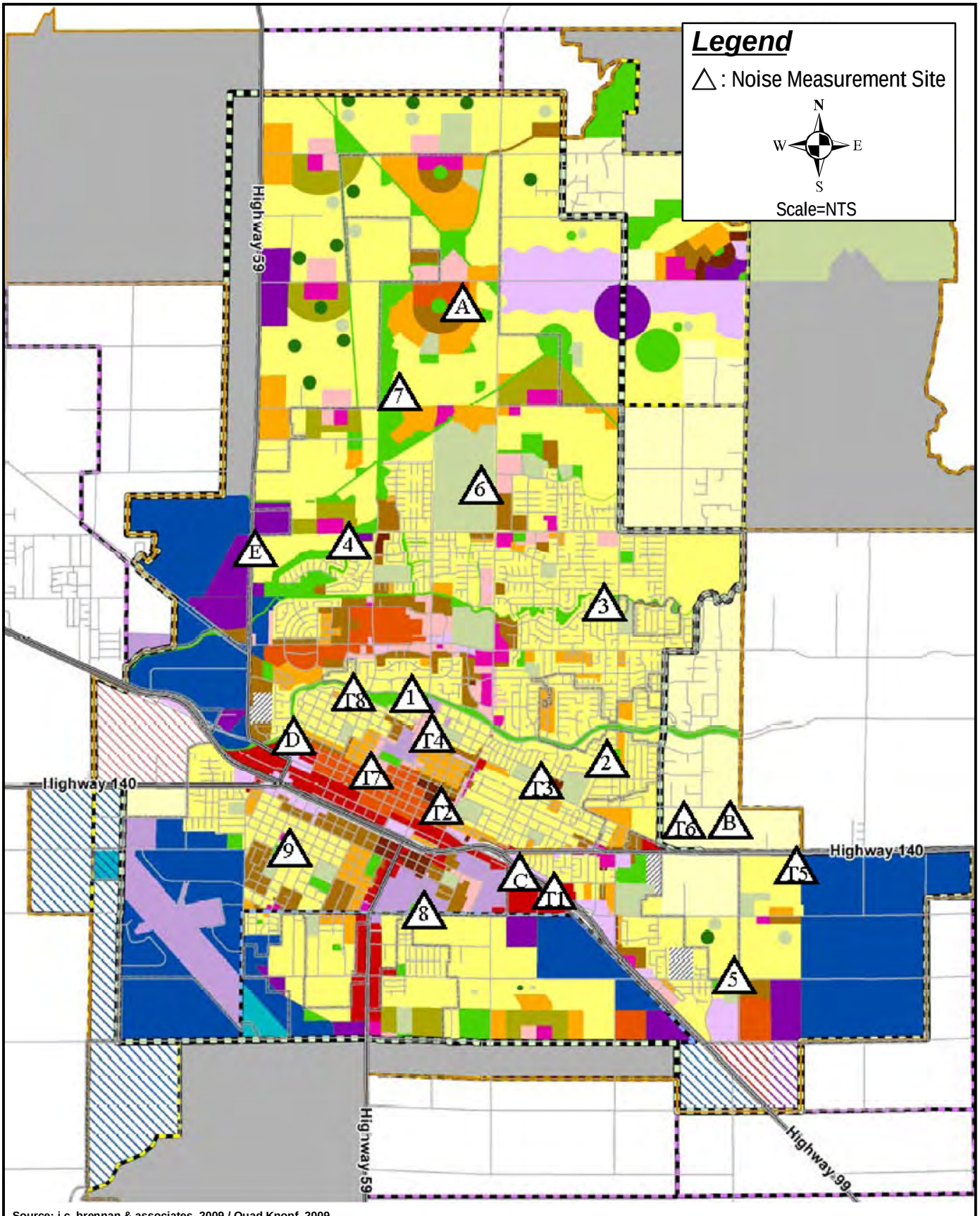
Railroad activity in the City of Merced General Plan Study Area occurs along the Union Pacific Railroad (UPRR) and Burlington Northern/Santa Fe (BNSF) railroad tracks. The UPRR mainline track generally runs parallel to the State Route 99 outside of the downtown area. Within the downtown area of Merced, the Union Pacific Railroad (UPRR) runs parallel and directly between 16th Street and 15th Street. The Burlington Northern Santa Fe Railroad generally runs parallel to Santa Fe Avenue until reaching the intersection of Highway Ca-140. At which point the tracks redirect easterly and follow Highway 140/Yosemite Parkway towards Planada.

In order to quantify existing train usage, j.c. brennan & associates, Inc., conducted continuous noise level monitoring at three location within the General Plan area. The purpose of the noise level measurements was to determine typical sound exposure levels (SEL) for railroad line operations in the General Plan area, accounting for the effects of travel speed, warning horns and other factors which may affect noise generation. In addition, the noise measurement equipment was programmed to identify individual train events, so that the typical number of train operations could be determined. Locations of continuous noise monitoring sites are shown on Figure 3.11-1. Table 3.11-4 shows a summary of the continuous noise measurement results for the UPRR and BNSF railroad lines. Figure 3.11-2, Figure 3.11-3 and Figure 3.11-4 show the results of the continuous railroad noise measurements.

Table 3.11-4
Railroad Noise Measurement Results

Measurement Location	Railroad Track	Grade Crossing /Warning Horn	Trains Events Per Day	Distance to CL	Average SEL
Site B	BNSF	No	26	110’	100 dB
Site C	UPRR	No	16	114’	103 dB
Site D	UPRR	Yes	16	46’	108 dB

Source: j.c. brennan & associates, Inc., 2007



Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

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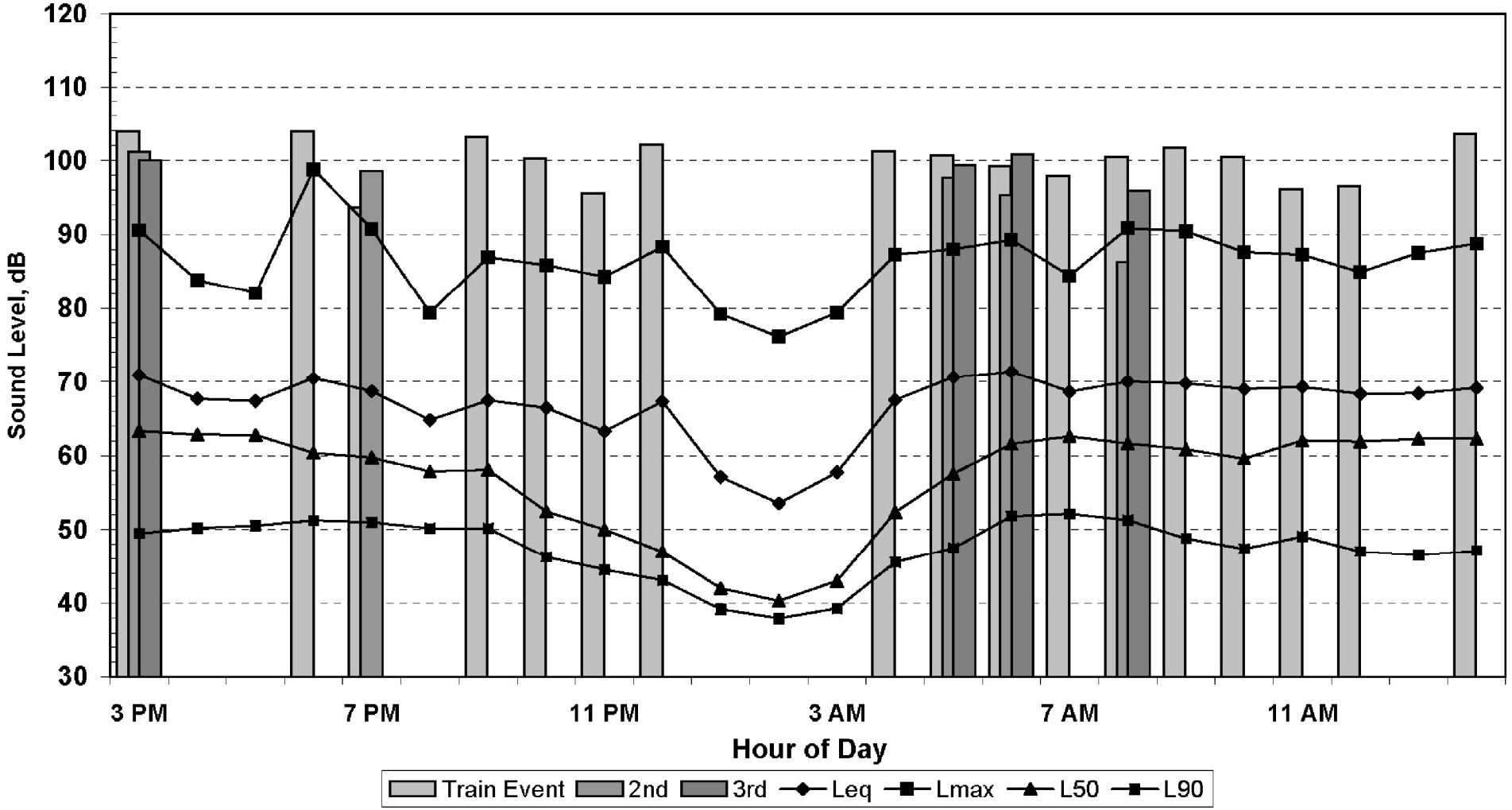
MERCED VISION 2030 GENERAL PLAN EIR
NOISE MEASUREMENT SITE LOCATIONS

Figure 3.11-1

Job No.: 060429



Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

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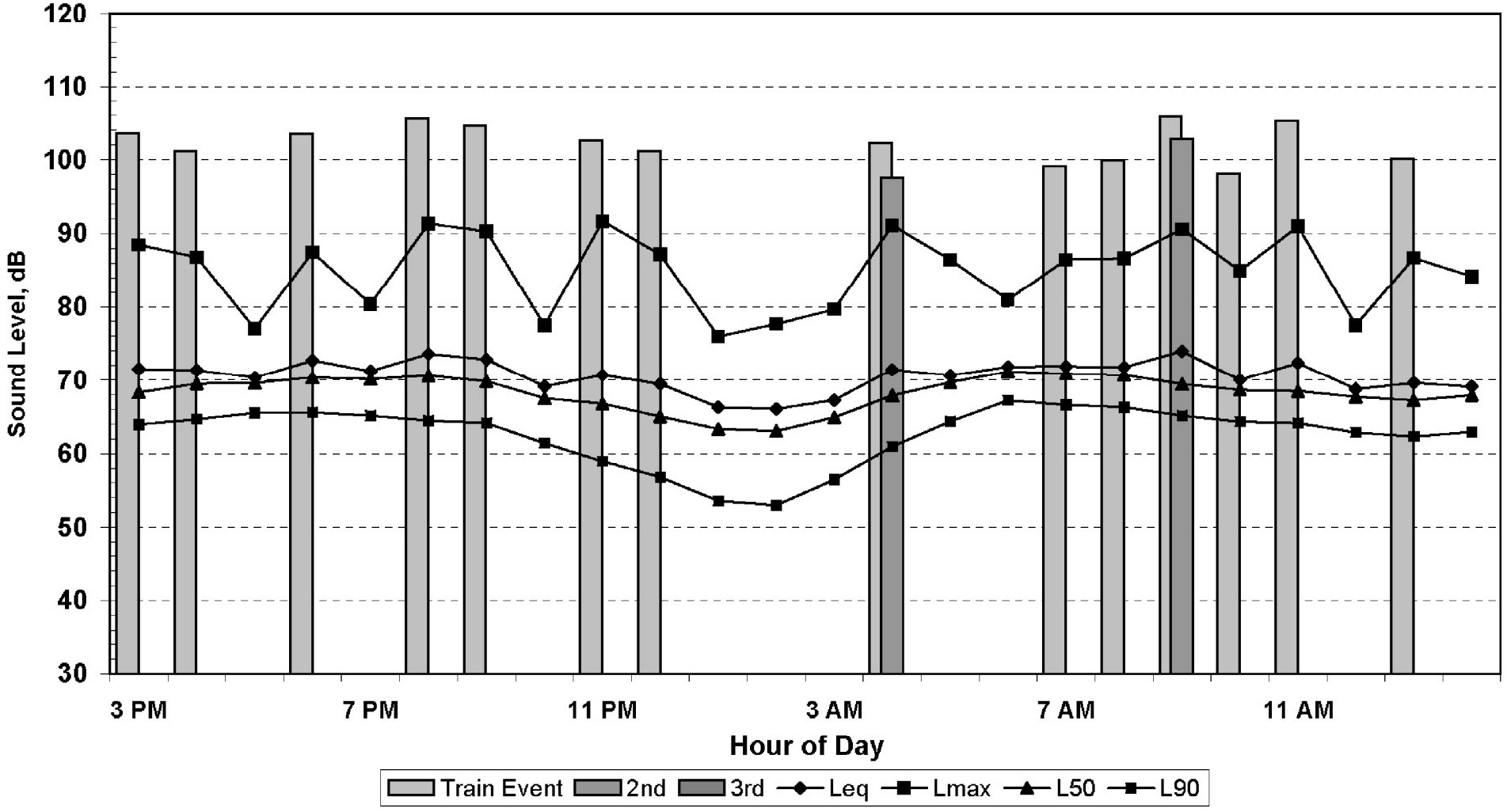
MERCED VISION 2030 GENERAL PLAN EIR
CONTINUOUS MEASURED RAILROAD AND HOURLY NOISE LEVELS - SITE B
JUNE 11-12, 2007

Figure 3.11-2

Job No.: 060429



Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

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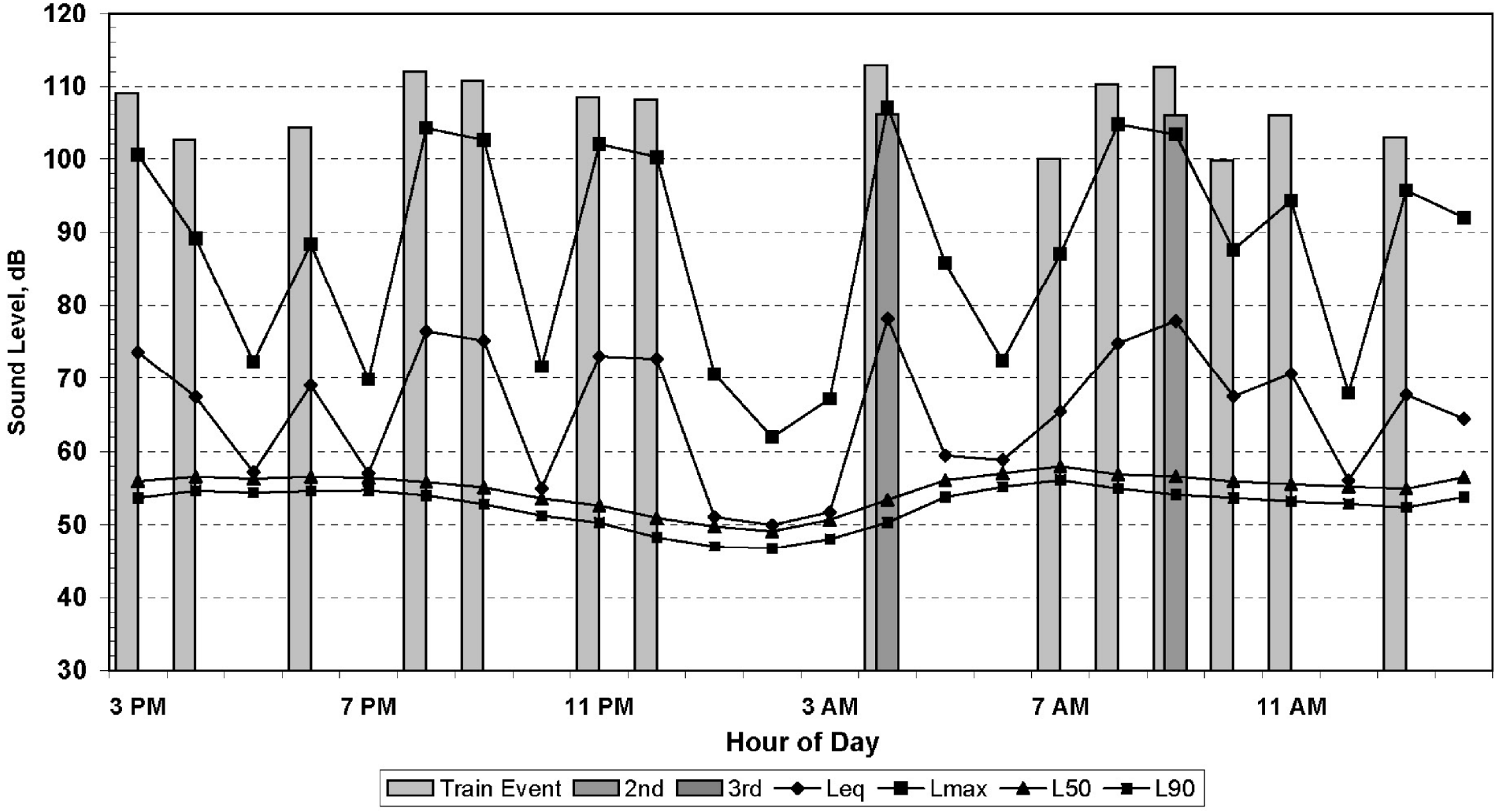
MERCED VISION 2030 GENERAL PLAN EIR
CONTINUOUS MEASURED RAILROAD AND HOURLY NOISE LEVELS - SITE C
JUNE 11-12, 2007

Figure 3.11-3

Job No.: 060429



Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

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MERCED VISION 2030 GENERAL PLAN EIR
CONTINUOUS MEASURED RAILROAD AND HOURLY NOISE LEVELS - SITE D
JUNE 11-12, 2007

Figure 3.11-4

Job No.: 060429

Noise measurement equipment consisted of Larson Davis Laboratories (LDL) Model 820 and Model 824 precision integrating sound level meter equipped with a LDL ½" microphone. The measurement systems were calibrated using a LDL Model CAL200 acoustical calibrator before testing. The measurement equipment meets all of the pertinent requirements of the American National Standards Institute (ANSI) for Type 1 (precision) sound level meters.

Based upon the noise level measurements shown in Table 3.11-4, the average SEL for train operations along the UPRR line is 103 dB at 100 feet, with approximately 16 train events occurring per day. The average SEL for train operations along the BNSF railroad line is 101 dB, with approximately 26 train events occurring per day. Train operations for each railroad line are assumed to be equally and randomly distributed throughout the daytime and nighttime hours.

To determine the distances to the Ldn railroad contours, it is necessary to calculate the Ldn for typical train operations. This was done using the SEL values and above-described number and distribution of daily freight train operations for each railroad line. The Ldn may be calculated as follows:

Ldn = SEL + 10 log Neq - 49.4 dB, where:

SEL is the mean Sound Exposure Level of the event, Neq is the sum of the number of daytime events (7 a.m. to 10 p.m.) per day, plus ten times the number of nighttime events (10 p.m. to 7 a.m.) per day, and 49.4 is ten times the logarithm of the number of seconds per day. Based upon the above-described noise level data, number of operations and methods of calculation, the Ldn value for railroad line operations have been calculated, and the distances to the Ldn noise level contours are shown in Table 3.11-5.

Table 3.11-5
Approximate Distances to the Railroad Noise Contours without Horn Use

Ldn at 100 feet	Distance to Ldn Contour		
	60 dB	65 dB	70 dB
UPPR line			
72.6 dB	700 feet	325 feet	151 feet
BNSF line			
72.0 dB	635 feet	295 feet	137 feet

Source: j.c. brennan & associates, Inc., 2007

In addition j.c. brennan & associates, Inc. conducted short-term noise measurements of train operations at eight locations throughout the City. The intent of the short-term noise monitoring was to determine the effects of railroad grade-crossings and the use of warning horns on environments in the vicinity of railroad tracks. Short-term noise monitoring was conducted for the UPRR line at: the End of Brantley St, 16th and "G" St., and 16th and "M" Street. Noise measurements of the BNSF railroad line were conducted at: Santa Fe and Glenn Ave, The Amtrak Station, end of Baker Dr., off SR 140 near Santa Fe, and "R" Street. Union Pacific Railroad sound exposure levels (SEL) within the City ranged from 101 dB to 103 dB, with maximum noise levels ranging from 92 dB to 96 dB Lmax at a distance of 100 feet. Burlington Northern Santa Fe Railroad sound exposure levels (SEL) within the City ranged from 100 dB to 108 dB, with maximum noise levels ranging from 89 dB to 103 dB Lmax at a distance of 100

feet. Grade crossings and the use of warning horns was found to raise noise levels associated with train operations 5 dB to 10 dB.

AVIATION NOISE LEVELS

In the vicinity of the City of Merced there are currently two public airports in operation: Castle Airport, and Merced Regional Airport. The Merced Regional Airport is owned and operated by the City of Merced. Ownership of Castle Airport was turned over from the US Military to the Castle Joint Powers Authority (CJPA). The CJPA was disbanded a number of years ago and Merced County has overtaken operation of the Castle Airport. Additionally, there are a number of privately owned and operated airfields in the area surrounding the City of Merced.

Noise Impacts and contours associated with Castle Airport and Merced Regional Airport are addressed in the *Merced County Airport Land Use Compatibility Plan*, adopted by the Airport Land Use Commission on April 15, 1999.

Merced Regional Airport

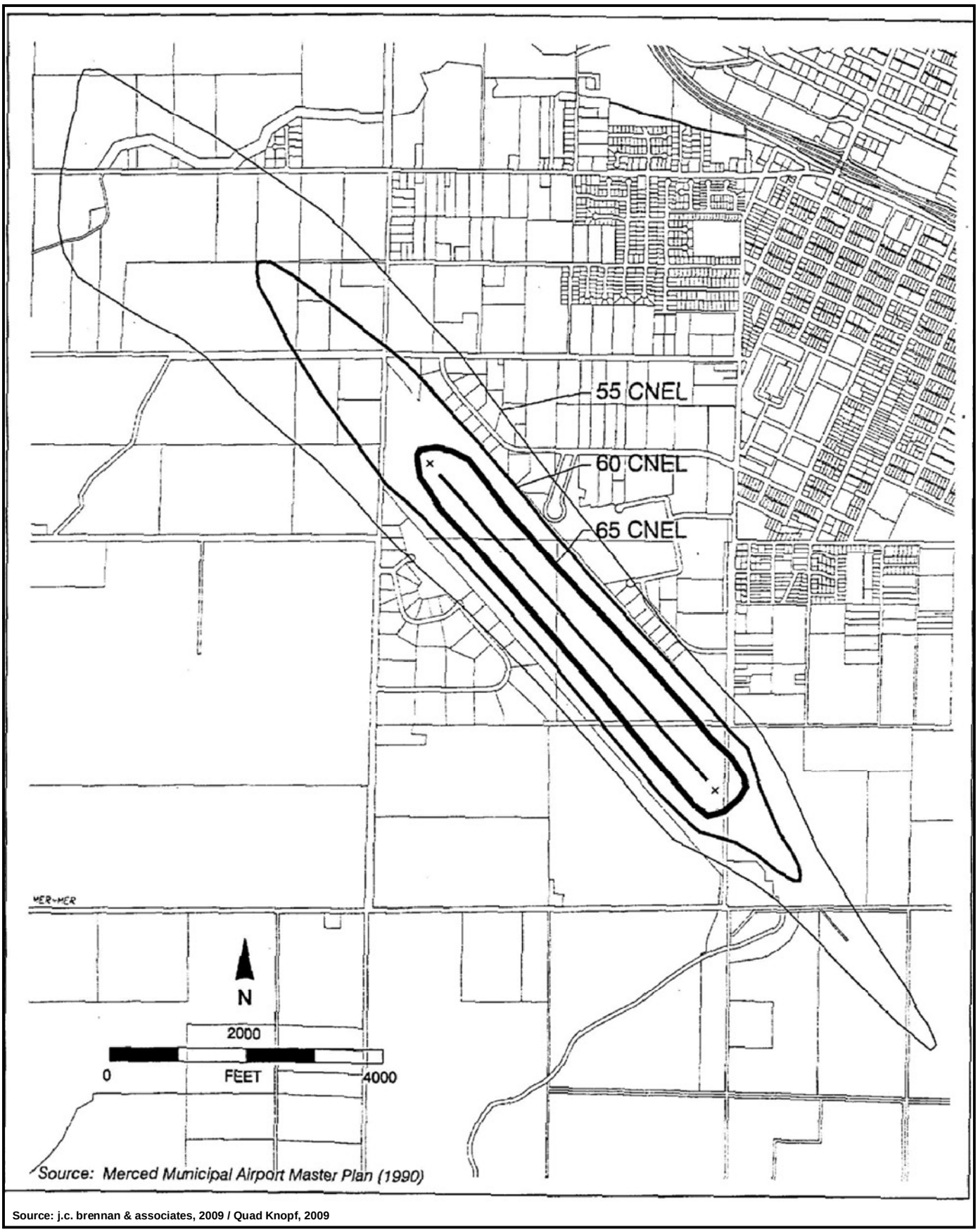
The Merced Regional Airport/Macready Field is located 2 miles southwest of the center of the City of Merced. This airport has a single runway with a heading of 12/30, at an elevation of 157 feet above sea level. The airport is open 24 hours per day, and has multiple instrument and GPS approaches in addition to a lighted runway for night operations. Merced Regional Airport is a Commercial Non-Primary Hub with scheduled daily flights. In addition, the airport primarily serves single-engine fixed wing aircraft used for general aviation purposes. Twin engine, business jet, and turbo prop aircraft also frequent the airport. On an annual average basis, there are approximately 229 operations per day, with the majority of aircraft using the northwest approach (Runway 30). Further information and analysis for this airport can be found in the above referenced ALUCP. Figure 3.11-5 shows the Merced Regional Airport noise impact area..

Castle Airport

Castle Airport is located approximately 6 miles northwest of the City of Merced. Prior to October 1995, Castle Airport was operated for more than fifty years by the military. The Airport consists of a single runway with a heading of 13/31. The airport is open 24 hours per day, and has a lighted runway for night operations. Aircraft that primarily use the airport are single-engine fixed-wing general aviation aircraft. Twin-engine aircraft, business jets, and commercial jet airplanes also utilize the airport. On an annual average basis, there are approximately 579 operations per day, with the majority of aircraft using the southeast approach (Runway 31). Further information and analysis for this airport can be found in the above referenced ALUCP. Figure 3.11-6 show the Castle Airport noise impact area.

Other Aviation Activity

Other general aviation activities can be expected to occur in the vicinity of the City of Merced. The Mercy Medical Center Merced owns and operates a Bell 407 helicopter for emergency airlift services, which is operated as needed 24 hours a day. Other general aviation may be associated with agricultural, forestry, recreational or other private operation.



Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

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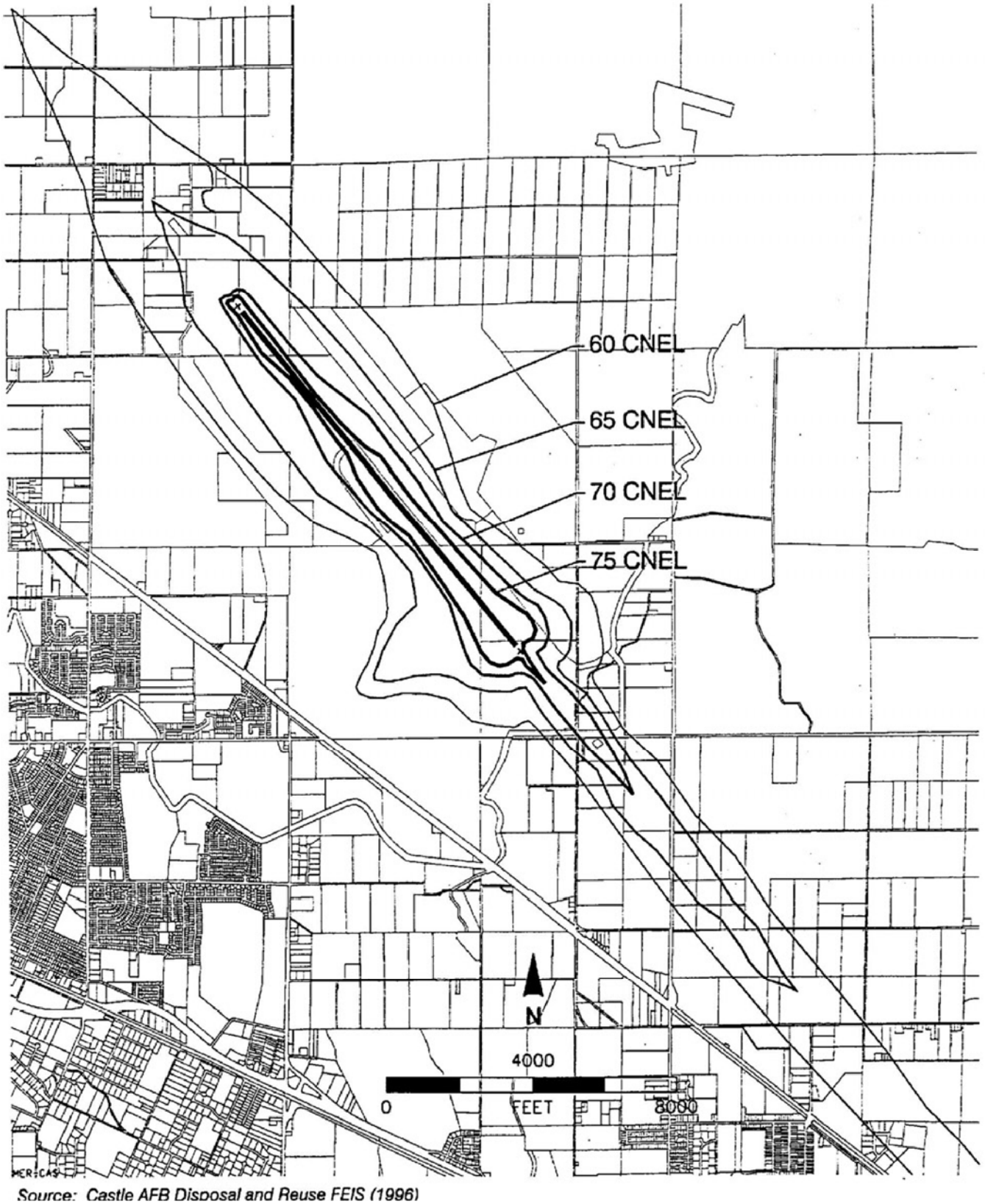
MERCED VISION 2030 GENERAL PLAN EIR
MERCED REGIONAL AIRPORT NOISE CONTOURS

Figure 3.11-5

Job No.: 060429



Source: Castle AFB Disposal and Reuse FEIS (1996)

Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

Quad Knopf

MERCED VISION 2030 GENERAL PLAN EIR
CASTLE AIRPORT NOISE CONTOURS

Figure 3.11-6

Job No.: 060429

FIXED NOISE SOURCES

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by Federal and State employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components which have a potential to annoy individuals who live nearby. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus upon two goals:

1) To prevent the introduction of new noise-producing uses in noise-sensitive areas, and
2) To prevent encroachment of noise sensitive uses upon existing noise-producing facilities.

The first goal can be achieved by applying noise level performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in near proximity to noise-producing facilities include mitigation measures that would ensure compliance with noise performance standards.

Fixed noise sources which are typically of concern include but are not limited to the following:

- HVAC Systems
- Pump Stations
- Steam Valves
- Generators
- Air Compressors
- Conveyor Systems
- Pile Drivers
- Drill Rigs
- Welders
- Outdoor Speakers
- Chippers
- Loading Docks
- Cooling Towers/Evaporative Condensers
- Lift Stations
- Steam Turbines
- Fans
- Heavy Equipment
- Transformers
- Grinders
- Gas or Diesel Motors
- Cutting Equipment
- Blowers
- Cutting Equipment
- Amplified music and voice

The types of uses which may typically produce the noise sources described above, include, but are not limited to: wood processing facilities, pump stations, industrial facilities, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, special events such as concerts, and athletic fields.

The City of Merced has three primary areas where industrial noise sources exist. The primary industrial noise generating areas are located along the western, southwestern and southeastern

City boundaries. The following descriptions are intended to be representative of the relative noise impacts of such uses and to identify individual noise sources needing consideration during the environmental review process of developments in their vicinity. Pepsi-Cola Metropolitan Bottling and Distribution Facility, Werner Corporation, McLane Pacific Grocery Distribution, and Quebecor World (now known as Quad/Graphic) have been identified as primary industrial noise generators located within the City of Merced in 2007.

Pepsi-Cola Bottling Facility

Pepsi-Cola operates a bottling, production, and distribution facility at the corner of West Avenue and Eagle Street. Noise sources associated with the facility include air compressors, cooling towers and evaporator equipment located at the north side of the facility, and on-site truck circulation along the southern and western property boundaries. Liquid carbon dioxide is delivered generally once per week, causing 15-20 minutes of elevated noise levels along the eastern portion of the facility. The facility is operated continuously year-round, 24 hours a day. Noise measurements were conducted outside the northern property line, adjacent to the facilities cooling towers. The cooling towers generated an average noise level of 69.8 dB Leq and a maximum noise level of 70.8 dB Lmax, at a distance of 50 feet.

Werner Corporation

The Werner Corporation is located west of the Grogan Avenue and West Avenue intersection. The facility manufactures, assembles, and distributes fiberglass, wood, and metal climbing equipment such as ladders and scaffolding. Hours of operation are 6:00 a.m. to 11:15 p.m. seven days a week. Noise sources include manufacturing equipment located inside the building, audible through bay doors at the northwestern facade, and on-site truck operations. Werner Co. receives and dispatches approximately ten semi tractor-trailers per day. j.c. brennan & associates file data indicates that slowly moving trucks may produce maximum noise levels of 71-74 dB at 100 feet, and idling trucks generate approximately 62-63 dB at 100 feet. Noise measurements of manufacturing operations ranged from 71 dB to 75 dB Lmax 110 feet north of the facility.

McLane Pacific

McLane Pacific operates a 250,000 square foot food service/grocery processing and distribution facility located at the northwest corner of Childs Ave and Kibby Rd. Hours of operation are 24 hours a day, Sunday through Saturday. Primary noise sources associated with the facility include rooftop cooling towers, refrigeration equipment, loading dock activities, and on-site truck circulation. Due to the nature of the product, the majority of trailers are outfitted with diesel powered refrigeration units and may remain idling at the facility for extended periods of time. Mclane Pacific dispatches between 30 and 35 trucks per day and receives 45 to 60 trucks per day. Noise measurements conducted east of the McLane Pacific facility ranged from 56 dB to 63 dB Leq, and 72 dB to 77 dB Lmax approximately 450 feet from the primary noise sources.

Quebecor World (now known as Quad/Graphic)

Quebecor World Incorporated (now known as Quad/Graphic) operates a 500,000 square foot digital media production, printing, and distribution facility located northwest of Cooper Avenue

and Highway 59 in Merced, California. A representative for the facility was not available for comment during our survey, and therefore operational statistics are unknown. Daytime noise levels associated with the facility were at or below the ambient noise environment in the vicinity, which was primarily comprised of transportation noise on Highway 59 and Santa Fe Boulevard. Nighttime noise measurements of the Quebecor World facility resulted in noise levels of 64 dB Leq, and 68 dB Lmax at a distance of 650 feet.

Aggregate Batch Plants

There are three aggregate/rock processing facilities in the vicinity of Merced: Builders Concrete, Boulders Unlimited, and Central Valley Concrete/Trucking. Central Valley Concrete processes batches of concrete and supplies sand and gravel throughout Merced and many neighboring counties. The main plant is located at the Highway 59 and Buena Vista Ave intersection, with a secondary plant located in southern Merced on Brantley Street. Operations at the facility are dependent on type of material, demand from contractors, and number of internal CVC jobs in operation. Typical hours of operation are 6:00 a.m. to 4:00 p.m., four to five days per week. Approximately 30-40 trucks of concrete are produced per day; however, when demand peaks production can accommodate 120 trucks per day.

Builders Concrete located northwest of the City limits operates in a similar manner to Central Valley Concrete. Hours of operation are typically 5:00 a.m. to 3:00 p.m. but may vary considerable to meet demand. Builders Concrete operates locally in the Merced area with a fleet of 10-22 trucks making multiple trips when required. At a distance of 280 feet from the center of the batch plant the average noise level was 59 dB Leq, with a maximum noise level of 63 dB Lmax.

Boulders Unlimited, located at the Highway 59 and Yosemite Avenue intersection, batches concrete and supplies sand, gravel, boulders, and landscaping materials. Hours of operation are 7:30 am to 5:30 pm, five days per week. Boulders Unlimited also provides crane, and general trucking services which are dispatched from the facility.

Merced County Fairgrounds

The Merced County Fairgrounds are located on Martin Luther King Junior Way, between East 11th street and Childs Avenue, in the City of Merced. There are a variety of potential noise sources associated with fairground operations including parking lot noise, amplified speech/music, amusement/carnival rides, livestock, concerts, and the Merced Speedway. The majority of these activities are limited to one week of operation during the Merced County Fair. Off-season use of the fairgrounds is generally associated with the Merced Flea Market, held weekly year-round, private facilities rentals, and the Merced Speedway.

Merced Speedway. Merced Speedway is a 3/8th of a mile dirt oval located on the northwestern portion of the Merced County Fairgrounds. The speedway can accommodate 3,250 guests in grandstand seating and an additional 1,750 in bleacher seating. Racing series' range from super modified, high output classes to small sport compacts. The Merced Speedway track schedule shows the pit areas opening at 4 pm, racing beginning at 7 pm, and awards/standings closing

between 9:30 pm and 10:00 pm. Racing events occur Saturdays and some Sundays from March through October.

In order to evaluate noise levels associated with the Merced Speedway, j.c. brennan & associates, Inc. conducted short-term noise level measurements at the Fairgrounds. Short-term measurements were conducted at three locations at the speedway. Continuous noise level measurements were conducted at a nearby residential receiver, located adjacent to the speedway along East 11th Street. Table 3.11-6 summarizes the results of the noise monitoring. Noise measurement locations are shown on Figure 3.11-7.

Nightly Concert Series. The Merced County Fair hosts a nightly concert series during the Merced County Fair. Nightly concerts are held at a temporary outdoor theater located in the western portion of the fairgrounds. The outdoor theater is arranged with a main seating area for 2,000 attendees surrounded by bleacher seating for an additional 3,000 guests. Performances at the outdoor theater ranged from contemporary/pop styles to country, and alternative rock music. The performance stage was approximately 72 feet by 40 feet, and was outfitted with four JBL Vertec line array speaker cabinets and four sub woofers per side. Noise levels associated with concerts and musical events such as these can vary considerably depending on several factors: crowd size, type of music, operational levels of the sound system, and the duration of the event. During the July 17, 2007 visit to the Merced County Fair, j.c. brennan & associates, Inc. performed short-term noise measurements at five locations at the outdoor theater. Table 3.11-6 shows the results of noise monitoring for the concert series.

Table 3.11-6
Existing Merced County Fair Noise Measurement Results - July 17, 2007

Site	Location	Time	Measured Noise Level, dBA		
			Leq	L50	Lmax
1	145 West 11th Street, 800' from Speedway Center	Continuous Monitoring – 6:00 pm to 10:00 pm	61.2	57.9	85.7
			63.0	60.7	75.4
			66.4	61.6	91.1
			64.0	60.5	88.7
			65.3	61.8	82.6
Speedway – Short Term					
2	105' South of Track Center Line, 350' to Center of Oval	7:11 pm	90.0	82.0	99.6
2	105' South of Track Center Line, 350' to Center of Oval	7:22 pm	90.4	86.3	98.8
3	Center of Speedway Oval	7:29 pm	88.9	81.7	99.3
4	300' North of Speedway Center, Crowd Cheering & Announcer over PA	7:48 pm	69.1	69.1	71.2
4	300' Northeast of Speedway Center,	7:53 pm	86.5	80.6	96.3
Concert Series – Short Term					
5	Center of Main Seating Area, 100' South of Center Stage	9:08 pm	86.8	86.0	97.6

Site	Location	Time	Measured Noise Level, dBA		
			Leq	L50	Lmax
6	200' South of Center Stage	9:27 pm	85.3	84.8	88.9
7	100' West of Center Stage	9:35 pm	93.0	80.8	92.7
8	100' North of Center Stage	9:39 pm	75.2	74.2	80.0
9	100' West of Center Stage	9:42 pm	86.0	85.5	90.7

Source: j.c. brennan & associates, Inc., 2007

COMMUNITY NOISE SURVEY

A community noise survey was also conducted in 2007 to describe existing noise levels in noise-sensitive areas within the General Plan study area so that noise level performance standards may be developed to maintain an acceptable noise environment. Noise monitoring sites were selected to be representative of typical residential, commercial or recreational areas within the City.

Three sets of short-term noise measurements were conducted at nine locations on July 11, 2007 through July 13, 2007. In addition, five continuous 24-hour noise monitoring sites were also established throughout the City of Merced to record day-night statistical noise level trends. The data collected included the hourly average (Leq), and the maximum level (Lmax) during the measurement period. Noise monitoring sites and the measured noise levels at each site are summarized in Table 3.11-7 and Table 3.11-8. Figure 3.11-1 shows the locations of the noise monitoring sites. A comprehensive listing and graphical representation of the continuous noise measurement data is provided in Appendix B of Appendix I of this EIR.

Community noise monitoring equipment included Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters equipped with a LDL ½" microphone. The measurement systems were calibrated using a LDL Model CAL200 acoustical calibrator before testing. The measurement equipment meets all of the pertinent requirements of the American National Standards Institute (ANSI) for Type 1 (precision) sound level meters.

Table 3.11-7
Existing Continuous 24-Hour Ambient Noise Monitoring Results - July 11-12, 2007

Site	Location	Average Measured Hourly Noise Levels, dBA								
		Ldn (dBA)	Daytime (7:00 am - 10:00 pm)				Nighttime (10:00 pm – 7:00 am)			
			Leq	Lmax	L50	L90	Leq	Lmax	L50	L90
A	West of the Gilmore Ct. and Beckman Way intersection.	54.0	47.5	67.8	42.4	38.7	47.7	62.1	43.5	38.6
B	State Route 140 near Santa Fe Avenue.	73.7	68.9	87.6	61.2	49.5	66.9	84.2	49.6	43.9
C	South of State Route 99 near the Childs Avenue over-crossing.	76.4	71.7	86.0	69.3	64.5	69.7	83.1	66.6	59.2
D	West of the 16th Street, V Street intersection.	77.3	71.9	90.7	56.1	54.0	70.7	82.1	52.6	50.1

Site	Location	Average Measured Hourly Noise Levels, dBA								
		Ldn (dBA)	Daytime (7:00 am - 10:00 pm)				Nighttime (10:00 pm – 7:00 am)			
			Leq	Lmax	L50	L90	Leq	Lmax	L50	L90
E	Southwest of the State Route 59, Yosemite Avenue Intersection.	70.4	67.0	81.5	62.4	50.6	63.2	79.5	52.3	43.6

Source: j.c. brennan & associates, Inc., 2007

Table 3.11-8
Existing Short-Term Community Noise Monitoring Results

Site	Location	Date	Time[1]	Measured Sound Level, dB			
				Leq	Lmax	L50	L90
1	Applegate Community Park – Near Entrance	July 11, 2007	7:37 pm	59.0	74.1	55.1	52.8
		July 12,2007	1:48 am	45.2	51.1	44.6	43.3
		July 12, 2007	1:31 pm	54.7	68.2	51.7	48.5
2	Entrance to Ada Givens Park	July 11, 2007	8:45 pm	54.4	64.3	52.6	48.8
		July 12,2007	12:12 am	44.6	51.8	44.5	43.5
		July 12, 2007	10:36 am	51.9	68.6	45.1	43.1
3	Nottingham @ Rahilly Park	July 11, 2007	9:24 pm	46.3	56.7	45.0	43.5
		July 12,2007	12:31 am	40.1	51.6	39.8	38.2
		July 12, 2007	11:00 am	44.8	58.8	42.5	40.0
4	Donna and Tres Logos (Open Space Area)	July 11, 2007	8:07 pm	49.3	61.6	48.6	46.3
		July 12,2007	1:28 am	40.3	48.0	39.9	39.1
		July 12, 2007	3:02 pm	44.6	54.2	44.1	42.5
5	60’ NW of Coffee and Gerard	July 11, 2007	7:36 pm	51.2	69.5	46.3	43.3
		July 11,2007	11:32 pm	48.2	55.4	48.6	45.8
		July 12, 2007	9:51 am	54.8	74.1	48.8	45.7
6	Merced Community College	July 11, 2007	8:43 pm	55.4	65.9	52.4	44.7
		July 12,2007	12:52 am	39.2	46.4	38.8	38.1
		July 12, 2007	11:26 am	59.1	71.5	55.7	48.8
7	Cardella Road and Freemark Avenue	July 11, 2007	9:02 pm	42.8	61.8	42.0	39.9
		July 12,2007	1:08 am	40.3	48.0	39.9	39.1
		July 12, 2007	3:24 pm	41.5	62.7	38.5	36.5
8	“G” Street and Childs Avenue	July 11, 2007	7:56 pm	60.1	70.3	56.3	51.6
		July 12,2007	2:08 am	59.3	77.1	50.2	47.2
		July 12, 2007	2:07 pm	58.7	71.1	62.2	55.5

Site	Location	Date	Time[1]	Measured Sound Level, dB			
				Leq	Lmax	L50	L90
9	"S" Street and 6th Street	July 11, 2007	8:19 pm	53.5	63.3	51.8	49.6
		July 12,2007	2:26 am	48.5	53.3	48.1	46.0
		July 12, 2007	2:28 pm	58.7	65.9	58.1	55.3
10	Kibby and E. Childs Avenue	July 11, 2007	7:20 pm	62.1	74.4	57.9	55.0
		July 11,2007	11:49 pm	56.3	72.2	50.7	48.8
		July 12, 2007	10:13 am	63.0	77.1	52.4	49.1
1 - All Community Noise Measurement Sites have a test duration of 10:00 minutes.							

Source: j.c. brennan & associates, Inc., 2007

The results of the community noise survey shown in Table 3.11-7 and 3.11-8 are indicative of the major noise sources, such as SR 99, Highway 59, Highway 140, Union Pacific Railroad, Burlington Northern Santa Fe Railroad, and some industrial uses which are located in close proximity to noise-sensitive receivers such as residential uses. Measured noise levels within most areas of Merced are consistent with typical urban and suburban communities. Recently developed residential areas within the City of Merced are generally located away from major noise sources, or have included noise mitigation in the project designs, so as to reduce overall noise levels at the developments.

Regulatory Setting

FEDERAL

HUD Noise Abatement and Control

The Federal Department of Housing and Urban Development (HUD) standards (24 CFR Part 51, subpart B) define the 65 Ldn dBA as an acceptable outdoor noise level for residential uses. If outdoor noise levels exceed 75 dBA Ldn, the interior noise level in residential homes could exceed 45 dBA, however, with proper insulation and other construction techniques, the interior noise level can be reduced to the 45 dBA level.

Federal Highway Administration

The Federal Highway Administration (FHWA) requires abatement of highway traffic noise for highway projects through the Code of Federal Regulations (23 CFR Part 772).

Federal Transit Administration and Federal Railroad Administration

The Federal Transit Administration (FTA) and Federal Railroad Administration (FRA) each recommend thorough noise and vibration assessments for any mass transit or high-speed railroad projects that would pass by residential areas.

STATE

The California Department of Health Services has developed guidelines for acceptable community noise levels, which are frequently adopted by local agencies. Selected relevant noise levels are as follows:

- CNEL below 60- normally acceptable for low-density residential use.
- CNEL of 55 to 70 dBA-conditionally acceptable for low-density residential use.
- CNEL below 65-normally acceptable for high-density residential, transient lodging, churches, educational and medical facilities.
- CNEL below 70 dBA-normally acceptable for playgrounds, neighborhood parks.

"Normally acceptable" is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" may require some additional noise attenuation or study. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall in within the overlapping range.

The State of California additionally regulates the noise emission levels of licensed motor vehicles traveling on public thoroughfares, sets noise emission limits for certain off-road vehicles and watercraft, and sets required sound levels for light rail transit vehicle's warning signals. The extensive State regulations pertaining to worker noise exposure are for the most part only applicable to the construction phase of any project.

California requires each local jurisdiction to perform noise studies and implement a noise element as part of its general plan. The Governor's Office of Planning and Research (in conjunction with the California Department of Health Services) has published guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The Department of Health guidelines indicate that residential land uses and other noise-sensitive uses would generally be acceptable without special noise insulation requirements in areas where exterior ambient noise levels do not exceed approximately 60 dBA (day-night noise levels, Ldn or CNEL). Residential uses in areas with Ldn between 60 and 65 dBA would generally be acceptable with noise reduction measures or insulation, and residential uses should generally be discouraged in areas where noise levels are above 65 dBA Ldn.

LOCAL

The existing City of Merced General Plan Noise Element is based upon recommendations by the California State Office of Noise Control as contained in the *Guidelines for the Preparation and Content of Noise Elements of the General Plan.*

The criteria in the Noise Element are established for determining potential noise conflicts between various land uses, and noise sources. The standards for all noise sources are based upon

Legend

△: Noise Measurement Site

N
W E
S

Scale=NTS

Source: j.c. brennan & associates, 2009 / Quad Knopf, 2009

Quad Knopf

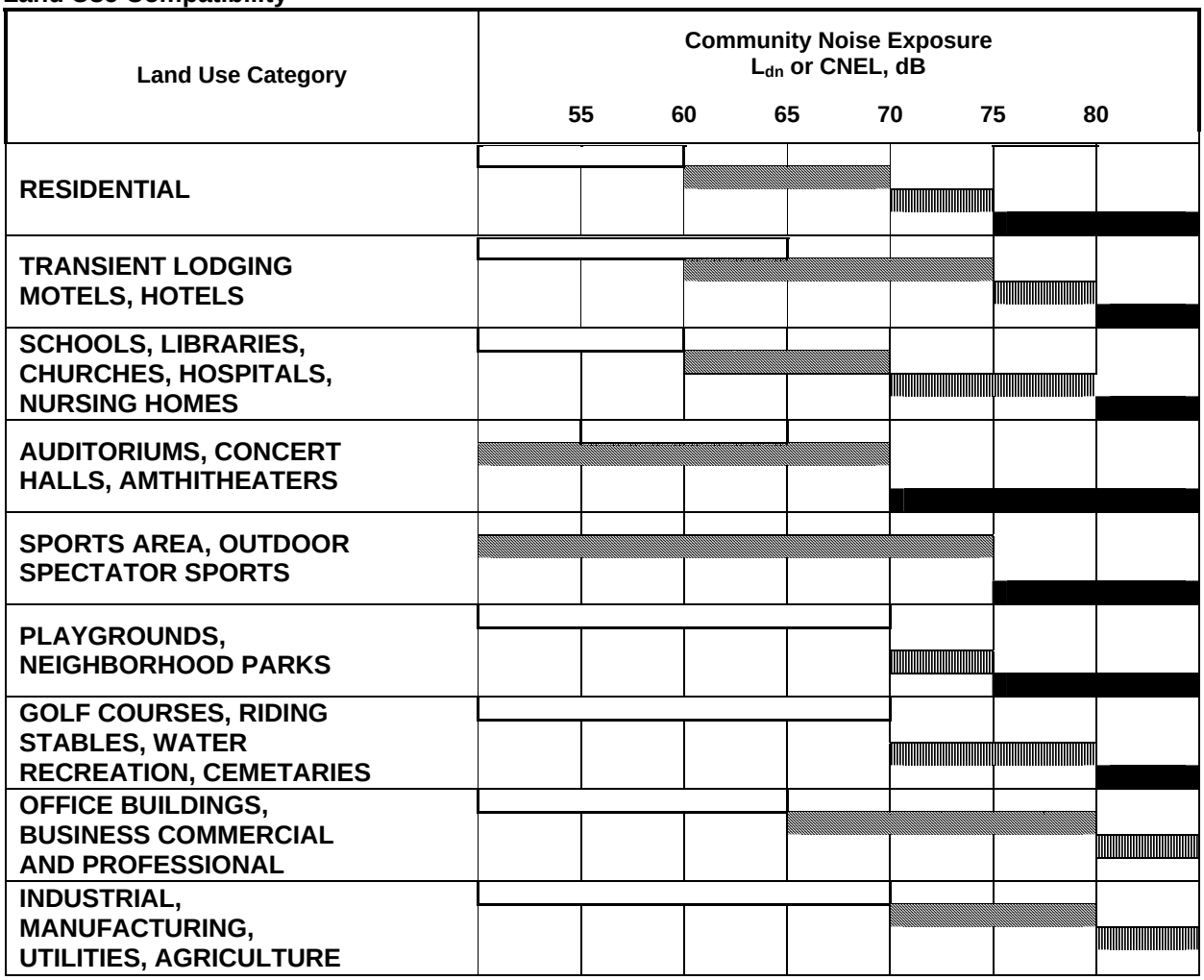
MERCED VISION 2030 GENERAL PLAN EIR
FAIRGROUNDS SPEEDWAY CONFIGURATION/MEASUREMENT SITES

Figure 3.11-7

Job No.: 060429

the CNEL/Ldn descriptor. Table 3.11-9 shows the land use compatibility chart contained in the existing City of Merced Noise Element.

Table 3.11-9
Land Use Compatibility



NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise requirements

NORMALLY UNACCEPTABLE

New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE

New construction or development clearly should not be undertaken.

Source: Adapted from the State of California General Plan Guidelines, 1990. Office of Planning and Research. Suggested CNEL/Ldn metrics for evaluating land use noise compatibility.

General Plan Consistency

The *Merced Vision 2030 General Plan* contains a number of policies that apply to noise impacts in conjunction with ultimate build-out of the City in accordance with the General Plan. The specific policies listed below contained in the Land Use, Transportation and Circulation, Open Space, Conservation, and Recreation, and Noise Elements of the General Plan are designed to ensure that noise impacts are minimized as development occurs in accordance with the *Merced Vision 2030 General Plan.*

Land Use Policies:

L-2.2 Locate new or expanded industrial, research & development, technology, and business parks in appropriate areas.

Transportation and Circulation Policies:

T-1.7 Minimize street system impacts on residential neighborhoods and other sensitive land uses.

Open Space, Conservation, and Recreation Policies:

OS-4.1 Preserve open space areas which are necessary to maintaining public health and safety.

Noise Policies:

N-1.1 Minimize the impacts of aircraft noise.

N-1.2 Reduce surface vehicle noise.

N-1.3 Reduce equipment noise levels.

N-1.4 Reduce noise levels at the receiver where noise reduction at the source is not possible.

N-1.5 Coordinate planning efforts so that noise-sensitive land uses are not located near major noise sources.

N-1.6 Mitigate all significant noise impacts as a condition of project approval for sensitive land uses.

3.11.2 THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on the environment if it will:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies

- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels

- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. For the purposes of this analysis, a 4 dB increase is considered a significant increase in noise levels.

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

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the Plan Area to excessive noise levels

- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the Plan Area to excessive noise levels

3.11.3 IMPACTS AND MITIGATION MEASURES

Impact #3.11-1: Buildout of the General Plan may contribute to increased traffic noise levels, and an exceedance of the City's noise standards and resulting in potential noise impacts to new sensitive receptors.

Discussion/Conclusion: To describe future noise levels due to traffic, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD108) was used. Direct inputs to the model included traffic volumes provided by Fehr & Peers traffic engineers. The FHWA model is the analytical method currently favored for highway traffic noise prediction by most state and local agencies, including the California Department of Transportation (Caltrans).

The FHWA model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

The FHWA model was developed to predict hourly Leq values for free-flowing traffic conditions. To predict Ldn/CNEL values, it is necessary to determine the day/night distribution of traffic and adjust the traffic volume input data to yield an equivalent hourly traffic volume. Table 3.11-10 shows the results of the traffic noise analysis for the existing and future buildout of the General Plan.

Table 3.11-10
Existing and Predicted General Plan Build Out Traffic Noise Levels
Merced General Plan – City of Merced, California

Roadway	Segment	Distance[1]	Traffic Noise Levels (dBA, Ldn)			Distance[1] to Ldn Contours Existing			Distance[1] to Ldn Contours General Plan Build Out		
			Existing	General Plan Build Out	Change	70 dB	65 dB	60 dB	70 dB	65 dB	60 dB
SR 59	16th to Olive	100’	67.3	70.4	3.1	66	142	306	106	227	490
SR 59	Olive to Yosemite	100’	69.3	73.2	**4.0**	89	192	415	164	353	761
SR 59	Yosemite to Cardella	100’	66.9	72.6	**5.7**	62	133	287	148	320	688
SR 59	Cardella to Bellevue	100’	65.6	73.1	**7.5**	51	109	235	160	345	743
SR 59	Bellevue to Old Lake	100’	64.9	73.9	**9.0**	45	98	211	182	392	844
SR 59	Old Lake to Castle Farms	100’	64.9	71.9	**7.1**	45	98	211	134	289	623
SR 59	Roduner to Mission	100’	63.4	68.7	**5.3**	36	78	169	82	177	381
SR 59	Mission to Gerard	100’	63.8	68.5	**4.7**	39	83	180	80	172	370
SR 59	Gerard to Childs	100’	65.8	69.7	3.9	52	113	243	96	206	445
SR 59	Childs to SR 99	100’	64.0	66.5	2.5	40	86	185	59	127	273
SR 59	SR 99 to 16th Street	100’	65.4	67.0	1.6	49	106	229	63	136	292
SR 59	Castle Farms Rd to Oakdale Rd	100’	61.0	69.8	**8.8**	25	54	116	97	208	448
SR 99	Franklin to Thornton	100’	79.3	81.0	1.7	416	897	1933	542	1167	2515
SR 99	Thornton to V Street	100’	78.5	80.4	1.9	369	795	1712	492	1059	2282
SR 99	V Street to R Street	100’	78.5	80.3	1.8	369	795	1712	485	1046	2253
SR 99	R Street to MLK JR	100’	78.3	80.5	2.2	360	775	1670	504	1085	2338
SR 99	MLK JR to G Street	100’	78.6	80.5	2.0	373	804	1732	505	1088	2343
SR 99	G Street to SR 140	100’	79.4	81.5	2.1	425	915	1970	585	1261	2717
SR 99	SR 140 to Childs	100’	79.3	81.7	2.5	414	892	1922	607	1307	2815
SR 99	Childs to Gerard	100’	79.0	81.3	2.3	396	853	1837	563	1213	2613
SR 99	Gerard to Mission	100’	78.3	80.9	2.6	357	770	1659	531	1144	2465
SR 99	Mission to Mariposa	100’	78.3	80.3	2.0	357	770	1659	483	1041	2243
SR 99	Castle Xpway to Franklin	100’	79.4	81.0	1.6	422	910	1960	543	1169	2519
SR 140	Tina to Thornton	100’	71.8	73.8	2.0	132	285	614	179	385	829
SR 140	Thornton to V Street	100’	63.6	64.5	0.9	37	80	173	43	92	199
SR 140	G Street to Parsons/Gardner	100’	67.1	72.3	5.2	64	138	296	143	307	662

Roadway	Segment	Distance[1]	Traffic Noise Levels (dBA, Ldn)			Distance[1] to Ldn Contours Existing			Distance[1] to Ldn Contours General Plan Build Out		
			Existing	General Plan Build Out	Change	70 dB	65 dB	60 dB	70 dB	65 dB	60 dB
SR 140	Parsons/Gardner to Campus Parkway	100'	67.1	69.6	2.5	64	138	298	94	202	435
13th Street	V Street to R Street	100'	58.0	60.5	2.5	16	34	74	23	50	109
13th Street	R Street to M Street	100'	55.9	59.5	3.6	11	25	53	20	43	92
13th Street	M Street to MLK JR	100'	58.2	61.7	3.5	16	35	75	28	60	129
13th Street	MLK JR to G Street	100'	58.5	59.4	0.9	17	37	79	20	42	91
13th Street	G Street to B Street	100'	56.8	61.0	**4.2**	13	28	61	25	54	116
14th Street	V Street to R Street	100'	57.9	60.0	2.1	16	34	73	22	47	100
14th Street	R Street to M Street	100'	56.7	61.4	**4.7**	13	28	60	27	57	124
14th Street	M Street to MLK JR	100'	48.2	61.6	**13.4**	4	8	16	28	59	128
16th Street	SR 99 to V Street	100'	62.8	64.3	1.5	33	72	155	42	90	195
16th Street	V Street to R Street	100'	63.4	64.4	0.9	36	79	169	42	91	196
16th Street	R Street to M Street	100'	62.6	63.6	1.0	32	69	149	38	81	175
16th Street	M Street to G Street	100'	60.6	64.0	3.4	23	51	109	40	85	184
16th Street	G Street to SR 99	100'	59.1	63.4	**4.2**	19	41	88	36	78	168
Bellevue Road	SR 59 to R Street	100'	62.1	72.2	**10.2**	30	64	137	141	303	654
Bellevue Road	R Street to M Street	100'	61.9	72.0	**10.1**	29	63	135	136	293	630
Bellevue Road	M Street to G Street	100'	61.9	72.2	**10.2**	29	63	135	139	300	647
Bellevue Road	G Street to Parsons/Gardner	100'	62.8	71.8	**9.0**	33	71	153	132	284	612
Bellevue Road	Parsons/Gardner to Campus Parkway	100'	60.2	71.6	**11.3**	22	48	104	127	274	590
Bellevue Road	SR 59 to Thornton	100'	60.4	72.0	**11.6**	23	49	106	136	293	631
Bellevue Road	Thornton to Castle Xpway	100'	60.4	73.3	**12.9**	23	49	106	165	356	768
Campus Parkway	SR 99/Mission to Childs	100'	--	67.8	--	--	--	--	71	153	330
Campus Parkway	Childs to SR 140	100'	--	65.2	--	--	--	--	48	104	223
Campus Parkway	SR 140 to Olive	100'	--	64.8	--	--	--	--	45	98	210
Campus Parkway	Olive to Yosemite	100'	--	65.1	--	--	--	--	47	101	218

Roadway	Segment	Distance[1]	Traffic Noise Levels (dBA, Ldn)			Distance[1] to Ldn Contours Existing			Distance[1] to Ldn Contours General Plan Build Out		
			Existing	General Plan Build Out	Change	70 dB	65 dB	60 dB	70 dB	65 dB	60 dB
Campus Parkway	Yosemite to Cardella	100'	--	65.3	--	--	--	--	49	105	226
Campus Parkway	Cardella to Bellevue	100'	--	65.1	--	--	--	--	47	102	220
Cardella Road	SR 59 to R Street	100'		64.8	--	--	--	--	45	97	209
Cardella Road	R Street to M Street	100'	56.8	65.3	**8.5**	13	28	61	48	104	224
Cardella Road	M Street to G Street	100'	58.1	65.0	**6.9**	16	35	75	47	100	217
Cardella Road	G Street to Parsons/Gardner	100'	--	65.0	--	--	--	--	47	100	216
Cardella Road	Parsons/Gardner to Campus Parkway	100'	--	64.9	--	--	--	--	46	99	212
Childs Avenue	West Ave to SR 59	100'	57.7	59.8	2.1	15	33	71	21	45	97
Childs Avenue	SR 59 to Tyler	100'	56.5	64.2	**7.7**	13	27	58	41	88	190
Childs Avenue	Tyler to SR 99	100'	58.0	66.5	**8.5**	16	34	73	58	125	270
Childs Avenue	SR 99 to Coffee	100'	60.9	66.1	**5.2**	25	53	114	55	119	255
Childs Avenue	Coffee to Campus Parkway	100'	58.0	64.8	**6.9**	16	34	73	45	98	210
Childs Avenue	East of Campus Parkway to Tower	100'	55.0	62.7	**7.7**	10	21	46	32	70	150
Dickenson Ferry	Thorton to West Ave	100'	52.6	64.5	**12.0**	7	15	32	43	93	201
Dickenson Ferry	West Ave to SR 59	100'	52.6	65.3	**12.8**	7	15	32	49	105	227
Dickenson Ferry	Grove to Thornton	100'	52.6	61.0	**8.4**	7	15	32	25	54	116
G Street	Mission to Childs	100'	57.9	60.6	2.7	16	34	73	24	51	110
G Street	Childs to SR 99	100'	63.1	65.1	2.0	34	74	160	47	101	218
G Street	SR 99 to Bear Creek	100'	63.2	64.9	1.7	35	76	164	46	98	212
G Street	Bear Creek to Olive	100'	65.3	66.5	1.2	48	104	225	58	125	269
G Street	Olive to Yosemite	100'	65.8	67.5	1.6	53	114	245	68	146	315
G Street	Yosemite to Cardella	100'	62.8	68.8	**6.0**	33	71	154	84	180	388
G Street	Cardella to Bellevue	100'	62.6	69.4	**6.8**	32	69	149	91	196	423
G Street	Bellevue to Old Lake	100'	59.4	70.2	**10.9**	20	42	91	103	223	480
G Street	Old Lake to Snelling	100'	59.4	68.7	**9.4**	20	42	91	82	177	381
Gerard Avenue	M Street to SR 59	100'	53.0	61.0	**8.0**	7	16	34	25	54	117
Gerard Avenue	SR 59 to Tyler	100'	53.0	59.6	**6.6**	7	16	34	20	44	94
Gerard Avenue	Tyler to Henry	100'	--	56.4	--	--	--	--	12	27	58

Roadway	Segment	Distance[1]	Traffic Noise Levels (dBA, Ldn)			Distance[1] to Ldn Contours Existing			Distance[1] to Ldn Contours General Plan Build Out		
			Existing	General Plan Build Out	Change	70 dB	65 dB	60 dB	70 dB	65 dB	60 dB
Gerard Avenue	Parsons/Gardner to Coffee	100'	59.8	65.1	**5.4**	21	45	97	47	102	220
Gerard Avenue	Coffee to Campus Parkway	100'	45.8	65.0	**19.2**	2	5	11	46	100	215
Gerard Avenue	East of Campus Parkway to Tower	100'	45.8	58.3	**12.5**	2	5	11	16	36	76
M Street	Mission to Childs	100'	56.3	60.9	**4.6**	12	26	57	25	53	114
M Street	Childs to SR 99	100'	59.1	61.6	2.5	19	41	87	28	59	128
M Street	SR 99 to Bear Creek	100'	62.9	63.9	1.0	34	72	156	39	84	181
M Street	Bear Creek to Olive	100'	63.0	64.6	1.6	34	74	159	44	94	202
M Street	Olive to Yosemite	100'	64.3	67.3	3.0	42	90	194	66	142	307
M Street	Yosemite to Cardella	100'	61.0	66.7	**5.7**	25	54	116	60	129	278
M Street	Cardella to Bellevue	100'	--	62.3	--	--	--	--	30	66	141
M Street	Bellevue to Old Lake	100'	--	61.9	--	--	--	--	29	62	134
M Street	Old Lake to	100'	--		--	--	--	--	--	--	--
Mission Avenue	SR 59 to Tyler	100'	52.3	65.2	**12.9**	7	14	31	48	103	222
Mission Avenue	Tyler to Henry	100'	50.7	65.1	**14.3**	5	11	24	47	101	218
Mission Avenue	Henry to SR99	100'	52.8	67.8	**15.0**	7	15	33	71	154	331
Mission Avenue	Coffee to Tower	100'	47.6	52.5	**5.0**	3	7	15	7	15	32
North Bear Creek	SR 99 to Campus Parkway	100'	56.3	61.4	**5.1**	12	26	57	27	58	125
North Bear Creek	R Street to M Street	100'	57.9	61.4	3.5	16	34	72	27	58	124
North Bear Creek	M Street to G Street	100'	59.0	61.5	2.5	18	40	86	27	58	126
North Bear Creek	G Street to Parsons/Gardner	100'	59.2	61.7	2.5	19	41	89	28	60	130
North Bear Creek	Parsons/Gardner to McKee	100'	53.6	57.8	**4.3**	8	17	37	15	33	72
Old Lake Road	SR 59 to R Street	100'	--	63.0	--	--	--	--	34	73	158
Old Lake Road	R Street to M Street	100'	--	62.3	--	--	--	--	31	66	142
Old Lake Road	M Street to G Street	100'	--	62.1	--	--	--	--	30	64	138
Old Lake Road	G Street to Parsons/Gardner	100'	--	59.1	--	--	--	--	19	41	88

Roadway	Segment	Distance[1]	Traffic Noise Levels (dBA, Ldn)			Distance[1] to Ldn Contours Existing			Distance[1] to Ldn Contours General Plan Build Out		
			Existing	General Plan Build Out	Change	70 dB	65 dB	60 dB	70 dB	65 dB	60 dB
Old Lake Road	Parsons/Gardner to Lake	100'	45.1	55.6	**10.5**	2	5	10	11	24	51
Olive Avenue	SR 99 to Campus Parkway	100'	66.2	67.8	1.5	56	121	260	71	153	329
Olive Avenue	R Street to M Street	100'	66.0	67.3	1.3	54	116	251	66	142	305
Olive Avenue	M Street to G Street	100'	65.6	67.7	2.0	51	110	238	70	151	325
Olive Avenue	G Street to Parsons/Gardner	100'	63.8	66.6	2.8	39	83	179	59	127	274
Olive Avenue	Parsons/Gardner to Campus Parkway	100'	59.9	63.4	3.5	21	45	98	36	78	168
Parsons	Coffee to Gerard	100'	50.7	62.8	**12.1**	5	11	24	33	71	154
Parsons	Gerard to Childs	100'	--	64.1	--	--	--		40	87	187
Parsons/Gardner	Childs to SR 140	100'	59.6	64.9	**5.3**	20	44	94	46	98	212
Parsons/Gardner	SR 140 to Bear Creek	100'	60.3	65.3	**4.9**	23	49	105	48	104	224
Parsons/Gardner	Bear Creek to Olive	100'	56.1	64.5	**8.3**	12	26	55	43	92	198
Parsons/Gardner	Olive to Yosemite	100'	57.3	65.2	**7.9**	14	30	66	48	103	221
Parsons/Gardner	Yosemite to Cardella	100'	51.8	65.0	**13.3**	6	13	28	47	100	216
Parsons/Gardner	Cardella to Bellevue	100'	--	64.6	--	--	--	--	44	95	204
Parsons/Gardner	Bellevue to Old Lake	100'	--	62.2	--	--	--	--	30	65	140
Parsons/Gardner	Old Lake to	100'	--	59.6	--	--	--	--	20	44	95
R Street	Gerard to Childs	100'	46.8	60.1	**13.4**	3	6	13	22	47	102
R Street	Childs to SR 99	100'	60.1	62.1	2.1	22	47	101	30	65	139
R Street	SR 99 to Bear Creek	100'	61.5	62.8	1.3	27	59	126	33	72	154
R Street	Bear Creek to Olive	100'	62.4	64.1	1.7	31	67	145	40	87	187
R Street	Olive to Yosemite	100'	63.8	67.5	**3.7**	39	83	179	68	147	317
R Street	Yosemite to Cardella	100'	--	66.6	--	--	--	--	59	127	274
R Street	Cardella to Bellevue	100'	--	66.6	--	--	--	--	59	128	276
R Street	Bellevue to Old Lake	100'	--	66.5	--	--	--	--	59	127	273
R Street	Old Lake to	100'	--	61.1	--	--	--	--	26	55	119
Santa Fe Ave	SR 59 to Franklin	100'	66.0	67.7	1.7	54	116	250	70	151	325
Thornton Avenue	Mission to SR140	100'	55.6	65.0	**9.4**	11	24	51	46	100	215
Tyler Road	Childs to Mission	100'	--	59.7	--	--	--	--	21	44	96
West Road	Hwy 140 to	100'	--	57.3	--	--	--	--	14	31	67

Roadway	Segment	Distance[1]	Traffic Noise Levels (dBA, Ldn)			Distance[1] to Ldn Contours Existing			Distance[1] to Ldn Contours General Plan Build Out		
			Existing	General Plan Build Out	Change	70 dB	65 dB	60 dB	70 dB	65 dB	60 dB
West Road	V Street to Childs	100’	--	60.5	--	--	--	--	23	50	108
West Road	Childs to Gerard	100’	--	59.0	--	--	--	--	19	40	86
West Road	Gerard to Mission	100’	--	58.8	--	--	--	--	18	39	84
West Road	South of Mission to	100’	--	60.1	--	--	--	--	22	47	102
Yosemite Ave	SR 59 to Campus Parkway	100’	62.0	65.3	3.3	29	63	136	49	105	226
Yosemite Ave	R Street to M Street	100’	63.2	67.0	3.8	35	75	163	63	136	292
Yosemite Ave	M Street to G Street	100’	65.3	68.3	2.9	49	105	227	77	165	356
Yosemite Ave	G Street to Parsons/Gardner	100’	64.2	68.3	**4.1**	41	88	190	77	166	357
Yosemite Ave	Parsons/Gardner to Campus Parkway	100’	61.2	67.1	**5.9**	26	55	119	64	138	297

[1]Distances are measured in feet from the centerline of the roadway.
Bold indicates a relative change of approximately 4 dB or higher.

The General Plan Noise Element has developed Implementing Actions and criteria for mitigating traffic noise levels at new developments within the City through the following implementation actions:

1.2.a Continue to discourage truck traffic and through traffic in residential areas in Merced.

1.2.c New development of noise-sensitive land uses may not be permitted in areas exposed to existing or projected levels of noise from transportation noise sources which exceed the levels specified in Table N-3, unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels specified in Table N-3.

1.2.d Noise created by new transportation noise sources shall be mitigated to the extent feasible so as not to exceed the levels specified in Table N-3 at outdoor activity areas or interior spaces of existing noise-sensitive land uses.

1.2.e It is anticipated that roadway improvement projects will be needed to accommodate build-out of the General Plan. Therefore, existing noise-sensitive uses may be exposed to increased noise levels due to roadway improvement projects as a result of increased roadway capacity, increases in travel speeds, etc. It may not be practical to reduce increased traffic noise levels consistent with those contained Table N-3. Therefore, as an alternative, the following criteria may be used for roadway improvement projects:

- Where existing traffic noise levels are less than 60 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +5 dB L_{dn} increase in noise levels due to roadway improvement projects should be mitigated to the extent feasible; and,

- Where existing traffic noise levels range between 60 and 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in noise levels due to roadway improvement projects should be mitigated to the extent feasible; and,

- Where existing traffic noise levels are greater than 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a + 1.5 dB L_{dn} increase in noise levels due to roadway improvement projects should be mitigated to the extent feasible.

1.4.a Require new residential projects to meet acceptable noise level standards as follows:

- A maximum of 45 dB Ldn/CNEL for interior noise level for residential projects.

- A maximum of 65 dB Ldn/CNEL for exterior noise level for residential projects proximate to major road way and railroad corridors. For other arterial, collector and local streets a maximum of 60 dB Ldn/CNEL exterior noise with a maximum of 65 dB Ldn/CNEL when all the best available noise-reduction techniques have been exhausted without achieving 60 dB, and the strict application of such a maximum becomes a hindrance to development needed or typical for an area.

- For Railroad operations the standard shall be 65 dB L_{dn}/CNEL or less for exterior noise level using a practical application of the best-available noise reduction measures. An exterior noise level of up to 70 dB L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with Table N-3.

1.5.f As feasible, require noise barriers and/or increased setbacks between heavy circulation corridors and noise-sensitive land uses (see Figures 10.2a and 10.2b).

1.6.a Where noise mitigation measures are required to achieve the standards of Tables N-1 and N-3, the emphasis of such measures should be placed upon site planning and project design. The use of noise barriers should be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

These, and several more policies and implementing actions in the General Plan, reduce the noise impacts within and surrounding the planning area. This impact is ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Impact #3.11-2: Buildout of the General Plan may contribute to increased traffic noise levels, and a significant increase in overall traffic noise levels at existing sensitive receptors.

Discussion/Conclusion: Table 3.11-10 indicates that numerous roadway segments will experience a significant increase in traffic noise levels above what they currently experience. For this analysis, an increase of 4 dB Ldn or more due to the project, is considered to be a significant increase in traffic noise levels. This is due to both the buildout of the General Plan and buildout of the area outside of the City of Merced General Plan Specific Urban Development Plan (SUDP)/Sphere of Influence (SOI). Some implementation actions such as Implementation Action 1.2.a which discourages truck traffic and through traffic in residential areas will assist in providing some mitigation. In addition, Implementation Action 1.2.e which addresses mitigation for roadway improvement projects will also assist in providing some mitigation of increased roadway traffic noise. However, in many cases the increase in roadway noise levels at existing noise sensitive uses is expected to occur. This is a ***potentially significant*** impact.

Mitigation Measures

No mitigation measures are available. This impact is ***significant and unavoidable.***

Impact #3.11-3: Buildout of the General Plan will result in construction activities which will contribute to the overall ambient noise environment.

Discussion/Conclusion: Noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in typical construction would generate

maximum noise levels, as indicated in Table 3.11-11, ranging from 80 to 89 dB Lmax at a distance of 50 feet.

Table 3.11-11
Noise Levels of Typical Construction Equipment

Equipment Type	Typical Equipment Level (dBA)- 50 ft from Source
Air Compressor	81
Backhoe	85
Concrete Pump	82
Concrete Breaker	82
Truck Crane	88
Dozer	87
Generator	78
Loader	84
Paver	88
Pneumatic Tools	85
Water Pump	76
Power Hand Saw	78
Shovel	82
Trucks	88

Source: Bolt, Beranek and Newman, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, U.S. EPA, 1971.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours.

The Merced General Plan Noise Element provides policies and implementing actions for reducing equipment noise levels. Implementing Actions 1.3.a, and 1.3.b provide for restrictions on hours of construction activities and noise control on equipment.

1.3.a Limit operating hours for noisy construction equipment used in the City of Merced.

1.3.b Review City functions (e.g. construction, refuse collection, street sweeping, tree trimming) to insure that noise generated by equipment has been reduced to the lowest practicable level.

This impact is ***less than significant***

Mitigation Measures

No mitigation measures are required.

Impact #3.11-4: Proposed General Plan Buildout will result in construction activities which could contribute to vibration levels at building facades.

Discussion/Conclusion: The City of Merced General Plan does not include standards for evaluating vibration levels associated construction activities. Certain types of construction activities, such as pile driving and large compacting equipment may produce noise and vibration levels which may be excessive and/or result in damage to structures. Table 3.11-12 shows the potential vibration levels associated with construction activities. This is a ***potentially significant*** impact.

Table 3.11-12
Vibration Levels for Varying Construction Equipment

Type of Equipment	Peak Particle Velocity @ 25 feet	Approximate Velocity Level @ 25 feet
Large Bulldozer	0.089 (inches/second)	87 (VdB)
Loaded Trucks	0.076 (inches/second)	86 (VdB)
Small Bulldozer	0.003 (inches/second)	58 (VdB)
Auger/drill Rigs	0.089 (inches/second)	87 (VdB)
Jackhammer	0.035 (inches/second)	79 (VdB)
Vibratory Hammer	0.070 (inches/second)	85 (VdB)
Vibratory Compactor/roller	0.210 (inches/second)	94 (VdB)

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006

Mitigation Measures

Implementation of the following mitigation measures will reduce the impact to ***less than significant.***

Mitigation Measure #3.11-4:

Table 3.11-13 provides criteria for evaluating construction vibration impacts. If construction activities include the use of pile drivers or large vibratory compactors, an analysis of potential vibration impacts should be conducted. The vibration impacts should not exceed a peak particle velocity of 0.1 inches/second.

Table 3.11-13
Effects of Vibration on People and Buildings

Peak Particle Velocity inches/second	*Peak Particle Velocity mm/second*	*Human Reaction*	*Effect on Buildings*
0-.006	*0.15*	*Imperceptible by people*	*Vibrations unlikely to cause damage of any type*
.006-.02	*0.5*	*Range of Threshold of perception*	*Vibrations unlikely to cause damage of any type*
.08	*2.0*	*Vibrations clearly perceptible*	*Recommended upper level of which ruins and ancient monuments should be subjected*

Peak Particle Velocity inches/second	Peak Particle Velocity mm/second	Human Reaction	Effect on Buildings
0.1	*2.54*	*Level at which continuous vibrations begin to annoy people*	*Virtually no risk of architectural damage to normal buildings*
0.2	*5.0*	*Vibrations annoying to people in buildings*	*Threshold at which there is a risk of architectural damage to normal dwellings*
1.0	*25.4*		*Architectural Damage*
2.0	*50.4*		*Structural Damage to Residential Buildings*
6.0	*151.0*		*Structural Damage to Commercial Buildings*

Source: Survey of Earth-borne Vibrations due to Highway Construction and Highway Traffic, Caltrans 1976.

Effectiveness of Mitigation Measure:

Implementation of Mitigation Measure #3.11-4 will reduce this impact to a ***less than significant*** level**.**

Impact #3.11-5: Proposed General Plan Buildout could expose new noise-sensitive receptors to railroad noise levels.

Discussion/Conclusion: New development of residential or other noise-sensitive uses could occur adjacent to the Union Pacific Railroad (UPRR) and Burlington Northern/Santa Fe (BNSF) railroad tracks. The locations of the UPRR mainline track generally runs parallel to the State Route 99 outside of the downtown area. Within the downtown area of Merced, the Union Pacific Railroad (UPRR) runs parallel and directly between 16th Street and 15th Street. The location of the Burlington Northern Santa Fe Railroad generally runs parallel to Santa Fe Avenue until reaching the intersection of Highway CA-140. At which point the tracks redirect easterly and follow Highway 140/Yosemite Parkway towards Planada.

Railroad noise levels are described in Tables 3.11-4 and 3.11-5 of this document. Updated information on future railroad operations have not been available from the railroads. The City of Merced General Plan Noise Element has developed Implementing Actions and criteria for mitigating traffic noise levels at new developments within the City. Specifically, the Implementation Actions discussed under Impact #3.11-1 above address the noise level criteria and implementation measures within the proposed Noise Element. This impact is ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact #3.11-6: The Proposed General Plan Buildout may include stationary noise sources such as automotive and truck repair facilities, tire installation centers, car washes, loading docks, corporation yards, parks, and play fields may create noise levels in excess of the City standards.

Discussion/Conclusion: New development of residential or other noise-sensitive uses could encroach upon existing stationary noise sources. In addition, new stationary noise sources could encroach upon existing noise-sensitive land uses. The City of Merced General Plan Noise Element has developed Implementing Actions and criteria for mitigating stationary noise source levels within the City. Specifically, Implementation Actions 1.5.a, 1.5.b, 1.5.c and 1.5.d address the noise level criteria and implementation measures within the proposed Noise Element. This impact is ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact #3.11-7: Proposed General Plan Buildout could expose new noise sensitive receptors to aircraft operations noise levels.

Discussion/Conclusion: New development of residential or other noise-sensitive uses could be located within the environs of Castle Airport, and Merced Regional Airport. The Merced Regional Airport is owned and operated by the City of Merced. Ownership of Castle Airport was turned over from the US Military to the Castle Joint Powers Authority (CJPA). The CJPA was disbanded a number of years ago and Merced County took over operations of the Castle Airport. Additionally, there are a number of privately owned and operated airfields in the area surrounding the City of Merced.

Noise Impacts and contours associated with Castle Airport and Merced Regional Airport are addressed in the *Merced County Airport Land Use Compatibility Plan*, adopted by the Airport Land Use Commission on April 15, 1999.

The City of Merced General Plan Noise Element has developed Implementing Actions and criteria for mitigating aircraft operations noise impacts at new development. Specifically, Implementation Actions 1.5.d, 1.6.a and 1.6.b address the noise level criteria and implementation measures within the proposed Noise Element. This impact is ***less than significant.***

Mitigation Measures

No mitigation measures are required.

CUMULATIVE IMPACT ANALYSIS

Increased urban development is accompanied by increased noise. The proposed General Plan contains an update to the Noise Element which has several specific development policies and standards to minimize and mitigate noise impacts. Uses that generate noise and construction

noise are time restricted to minimize impacts to adjacent land uses and have performance standards for noise levels at property lines. Based on the implementation of these policies, build-out of the proposed General Plan would result in a ***less than significant cumulative impact***.