K. Noise

Environmental Setting

Measurements of Noise

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound pressure intensity. Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting," referred to as dBA. With regard to increases in A-weighted noise levels, it is widely accepted that the average person can barely perceive noise level changes of 3 dBA, while a change in noise levels of 5 dBA is a readily perceptible change in noise levels and the minimum required increase for a change in community reaction (Caltrans, 1998). An increase of 10 dBA is perceived as a doubling of loudness.

Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Therefore, the cumulative noise level from two or more sources will combine logarithmically, rather than linearly (i.e., simple addition). For example, if two identical noise sources produce a noise level of 50 dBA each, the combined noise level would be 53 dBA, not 100 dBA.

Time variation in noise exposure is typically expressed in terms of the average energy over time (Leq), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given period of time. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour.

Several methods have been devised to relate noise exposure over time to human response. The Day-Night Noise Level (Ldn) is a 24-hour Leq that adds a 10-dBA penalty to sounds occurring between 10:00 p.m. to 7:00 a.m. to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. A commonly used noise metric for this type of study is the Community Noise Equivalent Level (CNEL). The CNEL, originally developed for use in the California Airport Noise Regulation, adds a five-dBA penalty to noise occurring during evening hours from 7:00 p.m. to 10:00 p.m., and a 10-dBA penalty to sounds occurring between the hours of 10:00 p.m. to 7:00 a.m. to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. Thus, the CNEL noise metric provides a 24-hour average of A-weighted noise levels at a particular location, with an evening and a

nighttime adjustment, which reflects increased sensitivity to noise during these times of the day. The Ldn and the CNEL are similar noise descriptors in most urban dominated environments. These descriptors are best used for measuring average increases in overall noise over a daily period and not single event noises, which are best described as unique events.

Noise Sources in the Project Vicinity

The major sources of noise in the City of Eureka include traffic on major roadways and highways, airports, and industrial and fixed noise sources. Noise measurement data are used to characterize noise conditions in the vicinity of the project site. Short-term measurements were taken at six locations (see Figure IV.K-1 for the noise measurement locations, and Table IV.K-1 for the measured noise levels). Noise levels in the vicinity of the project site are mostly influenced by local traffic. As indicated in Table IV.K-1, current ambient noise levels in the project area range between 58 and 72 dBA. One 24-hour noise measurement was collected on the site south of the proposed Fourth Street extension (see Figure IV.K-1 for location). The Ldn level for the 24-hour measurement period was estimated to be 61 dBA. Refer to Figure IV.K-2 for other statistical noise data (i.e., Leq, Lmax, L1, and L10) associated with the 24-hour measurement.

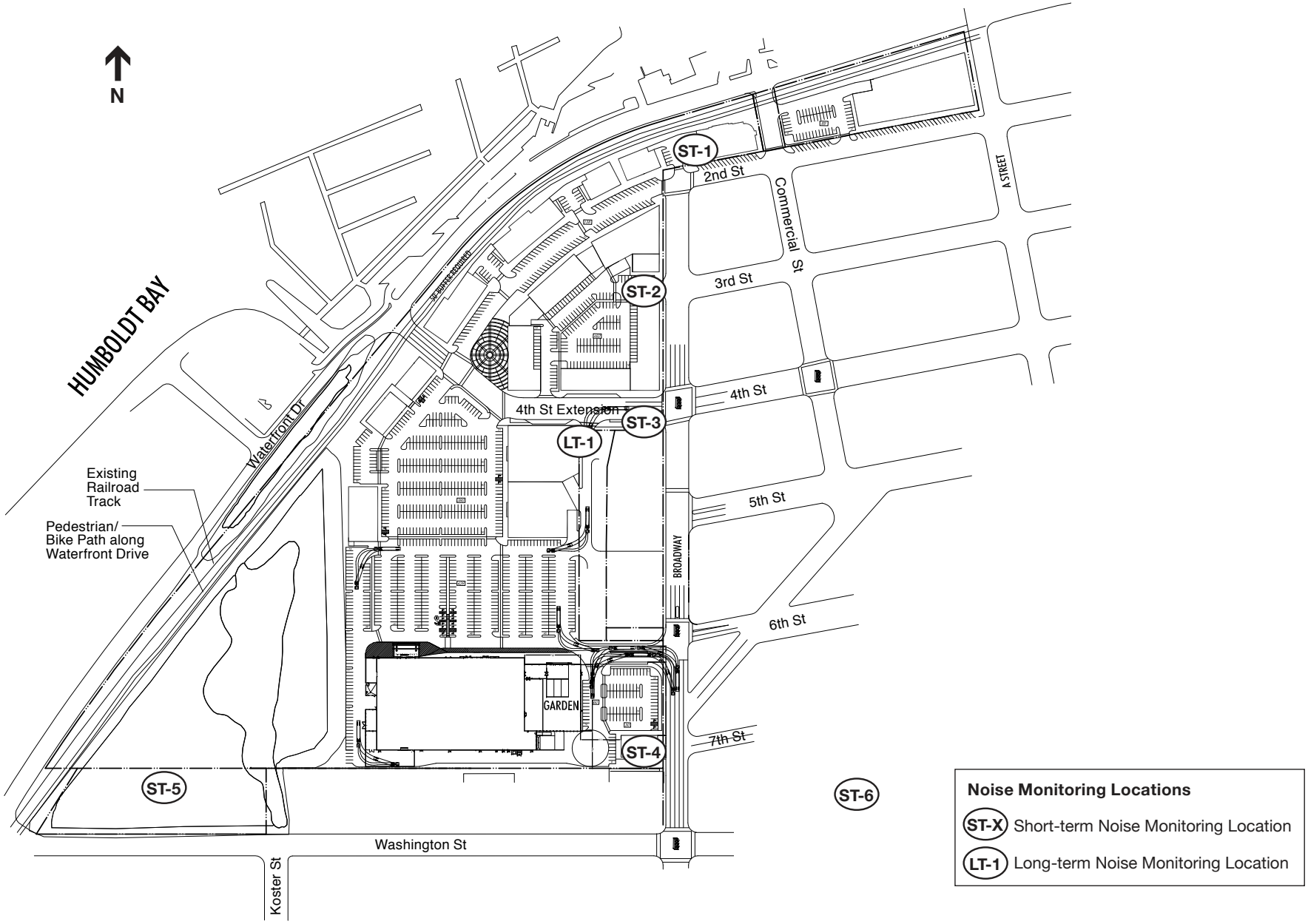
TABLE IV.K-1
SHORT-TERM NOISE LEVEL MEASUREMENTS IN THE VICINITY OF THE PROJECT SITE

Location[a]	Time Period[b]	Noise Levels (dBA)		Noise Sources
		Leq	Lmax	
ST-1	4:57 p.m.	61	74	Mobile noise, operations of fish packing plant
ST-2	5:05 p.m.	60	69	Mobile noise, barking dogs
ST-3	5:11 p.m.	72	83	Mobile noise
ST-4	5:22 p.m.	63	76	Mobile noise
ST-5	5:33 p.m.	58	72	Mobile noise
ST-6	5:42 p.m.	67	81	Mobile noise
ST-6[c]	10:28 a.m.	62	72	Mobile noise and restaurant drive through

[a] Noise measurement locations correspond to those illustrated in Figure IV.K-2.
[b] Short-term measurements were collected on a Monday and Tuesday, in five-minute intervals.
[c] Sample was collected the day after the other samples were collected during a non-peak traffic period.

SOURCE: Noise measurements collected by Environmental Science Associates on May 1 (locations ST-1 through ST-6) and May 2 (location ST-6[c]), 2006.

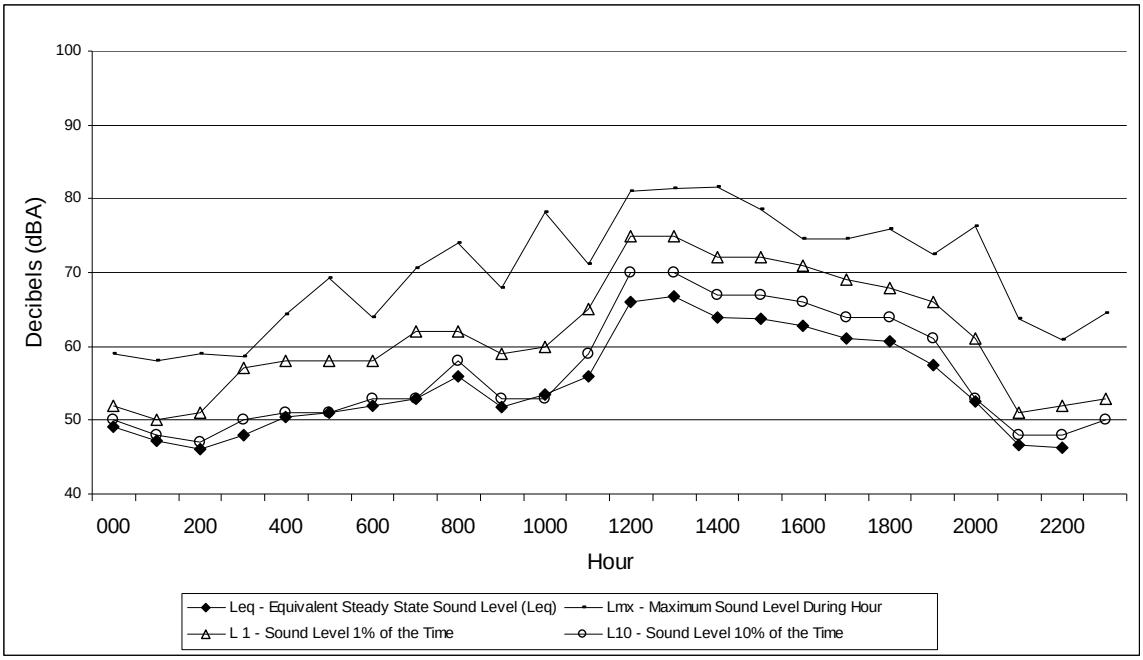
Roadway traffic noise is the primary noise source in the project site vicinity. U. S. 101 and major arterials dominate the noise environment. U.S. 101 is the primary route for certain heavy noise emitters such as logging trucks. Local collector streets also contribute to the noise environment at locations throughout the project site vicinity.



SOURCE: ESA

Marina Center Mixed-Use Project EIR . 205513

Figure IV.K-1
Noise Monitoring Locations



Marina Center Mixed Use Development Project / 205513

Figure IV.K-2
24-Hour Noise Measurement Data –
Location LT-1 Traffic-Related Noise

Aircraft Noise

Murray Field is a public use airport operated by Humboldt County and located within the Eureka city limits just east of Eureka Slough. The airport primarily serves single-engine and small twin-engine planes. Just over 100 aircraft are based at the airport and there are on average 179 flights per day. The airport is approximately three-and-a-half miles from the project site and does not heavily influence the noise environment within the project site vicinity.

The Eureka Municipal Airport, located on the Samoa Peninsula, is a public use airport operated by the City of Eureka. The airport primarily serves single-engine and small twin-engine planes. About 20 aircraft are based at the airport and there are on average 96 flights per week. The airport is just over 2 miles southwest of the project site.

Industrial, Retail, and Commercial Land Use Noise

Along the U.S. 101 transportation corridor east of the project site, land uses include retail and service businesses, and visitor-serving uses comprised of motels and restaurants. South of the project site are light industrial, distribution, and warehouses uses. Land use along Washington Street between Broadway and Waterfront Drive are generally office and light industrial uses. The Schmidbauer Lumber Co. lumber mill also occupies the block bound by Washington Street, Waterfront Drive, Koster Street, and West 14th Street, south of the project site.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. Typically, ground-borne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly and sick), and vibration-sensitive equipment.

Similar to the environmental setting for noise, the vibration environment is dominated by traffic from nearby roadways. Heavy trucks can generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions. As heavy trucks typically operate on major streets, existing ground-borne vibration in the project vicinity is largely related to heavy truck traffic on the surrounding roadway network.

Vibration levels from adjacent roadways, including U.S. 101, are barely perceptible at the project site.

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise and vibration) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise and vibration than are commercial and industrial land uses.

The nearest existing sensitive receptors in the project site vicinity are the Best Western hotel, located approximately 100 feet from the project site on the eastside of Broadway between Fourth and Fifth Streets, and the residential neighborhood beginning about 500 feet from east of the site at the 800 block of Summer Street; near noise sample location 6 (see Figure IV.K-1).

The small-boat basin west of the project site and west of Waterfront Drive is not considered a sensitive receptor because it is primarily used for boat storage, docking, and refueling of bay and ocean-going recreational and commercial fishing vessels. The small-boat basin is also a noise emitter from operation and maintenance of motor-powered recreational and commercial fishing vessels.

Environmental Analysis

Significance Criteria

For the purposes of this EIR, implementation of the proposed project would have a significant noise effect if, based on Appendix G of the CEQA Guidelines, it would:

1. Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. Expose persons to or generate excessive ground-borne vibration or ground borne noise levels;

3. Result in a substantial permanent increase in ambient noise levels of 5 dBA or more in the vicinity of sensitive receptors above levels existing without the project;

4. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

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

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

Regulatory Framework

The following standards and regulations govern noise and are used to measure impacts.

California Code of Regulations

Title 24, Part 2 of the California Code of Regulations contains requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards. For limiting noise transmitted from exterior sources, the standards set forth an interior standard of 45 Ldn in any habitable room with all doors and windows closed, and require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard (where such units are proposed in areas subject to transportation noise levels greater than 60 Ldn). Title 24 standards are enforced through the building permit application process in Eureka, similar to most jurisdictions.

General Plan and Local Coastal Program

The City of Eureka's adopted General Plan and adopted Local Coastal Program together formalize a long-term vision for the physical evolution of Eureka and they outline the policies, standards, and programs that guide day-to-day decisions concerning Eureka's development in the

coastal zone. The Policy Consistency Analysis, found in Section IV.I, *Land Use and Planning*, provides an evaluation of the Marina Center project's conformity with the policies of the adopted General Plan and Land Use Plan portion of the adopted Local Coastal Program.

Coastal Zoning Regulations

The Coastal Zoning regulations which implement the policies of the Land Use Plan portion of the adopted Local Coastal Program are codified in Chapter 156 of the Eureka Municipal Code (EMC), and are also referenced as Article 29, Part 1, Section 10-5.29 et. seq. of the zoning regulations of the City for the coastal zone.

Zoning Regulations

The Zoning Regulations of the City of Eureka are found in Chapter 155 of the EMC and are adopted pursuant to the City Charter to protect the public health, safety, peace, comfort, convenience, prosperity, and general welfare.

Project Impacts

Impact K-1: Would the Marina Center project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

The proposed project would include up to 54 multi-family residential dwelling units that would be located in the northern portion of the site along the west side of Broadway and north of the proposed Fourth Street extension, a museum along Waterfront Drive, retail uses along the southern portion of the site, and light industrial uses and office space off the Fourth Street Extension and Broadway.

Average short term noise levels in the project area were measured to be between 58 and 72 dBA (see Table IV.K-1) and proposed on-site retail uses, assumed to be the noisiest uses proposed for the site, could generate noise levels as high as 75 dBA (City of Oroville, 2003). In addition, the long term measurement data recorded south of the proposed Fourth Street extension site were used to calculate an existing Ldn level of approximately 61 dBA and the modeled existing plus project traffic Ldn noise in the area is estimated to be approximately 66 dBA (see Table IV.K-2 and Table IV.K-3). New development of sensitive uses should be located in areas where ambient Ldn noise levels do not exceed 60 dBA at the property line of the residences and the exterior noise in interior spaces should be reduced to at least 45 dBA Ldn, per recommended noise level performance standards identified in the City General Plan (see Table IV.K-5). Therefore, impacts related to locating proposed residences, museums, and offices in an incompatible noise environment would be significant without mitigation. The mitigation measures described below would ensure that the project would be consistent with the California Noise Insulation Standards so that sensitive receptors would not be exposed to excessive ambient noise levels, and would comply with the City's noise performance standards and maximum allowable noise exposure levels as defined in Tables IV.K-4 and IV.K-5.

TABLE IV.K-2
BASELINE (2010) AND BASELINE PLUS PROJECT TRAFFIC NOISE LEVELS ALONG ROADWAYS IN THE PROJECT VICINITY[a]

		Ldn at 50 feet from Roadway Centerline		
Roadway	**Location**	**Baseline**	**Baseline + Project**	**Incremental Increase (dBA) of Baseline Plus Project vs. Baseline**
Fourth Street	East of Broadway	67.8	68.5	0.7
Fifth Street	East of Broadway	67.5	68.6	1.1
Broadway	South of Fourth Street	65.1	66.1	1.0
Broadway	South of Sixth Street	68.5	69.1	0.6
Broadway	North of 14th Street	69.1	69.7	0.6
Waterfront Drive	South of Project Driveway	59.4	64.4	5.0

[a] Road center to receptor distance is 15 meters (approximately 50 feet) for values shown in this table. Noise levels were determined using FHWA Traffic Noise Prediction Model (FHWA RD-77-108). Vehicle mix on these road segments is assumed to be 88 percent auto, 8 percent medium trucks, and 4 percent heavy trucks. The average speed or these segments is assumed to be 22 miles per hour along Fourth and Fifth Streets, 13 to 15 miles per hour along Broadway, and 25 miles per hour along Waterfront.

SOURCE: ESA, 2007.

TABLE IV.K-3
BASELINE (2010) AND CUMULATIVE (2025) PLUS PROJECT TRAFFIC NOISE LEVELS ALONG ROADWAYS IN THE PROJECT VICINITY

		Ldn at 50 feet from Roadway Centerline		
Roadway	**Location**	**Baseline**	**2025 + Project**	**Incremental Increase (dBA) of 2025 Plus Project vs. 2010**
Fourth Street	East of Broadway	67.8	68.8	1.0
Fifth Street	East of Broadway	67.5	68.9	1.4
Broadway	South of Fourth Street	65.1	66.4	1.3
Broadway	South of Sixth Street	68.5	69.5	1.0
Broadway	North of 14th Street	69.1	70.5	1.4
Waterfront Drive	South of Project Driveway	59.4	66.4	7.0

NOTE: Road center to receptor distance is 15 meters (approximately 50 feet) for values shown in this table. Noise levels were determined using FHWA Traffic Noise Prediction Model (FHWA RD-77-108). Vehicle mix on these road segments is assumed to be 88 percent auto, 8 percent medium trucks, and 4 percent heavy trucks. The average speed or these segments is assumed to be 22 miles per hour along Fourth and Fifth Streets, 13 to 15 miles per hour along Broadway, and 25 miles per hour along Waterfront.

SOURCE: ESA, 2007.

TABLE IV.K-4
NOISE LEVEL PERFORMANCE STANDARDS FOR NEW PROJECTS AFFECTED BY OR INCLUDING NON-TRANSPORTATION NOISE SOURCES

Noise Level Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly Leq	50	45
Maximum Level (Lmax)	70	65

NOTE: Each of the noise levels specified above shall be lowered by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

SOURCE: City of Eureka, 1997.

TABLE IV.K-5
MAXIMUM ALLOWABLE NOISE EXPOSURE FOR TRANSPORTATION NOISE SOURCES

	Outdoor Activity Areas[a]	Interior Spaces	
Land Use	**Ldn**	**Ldn**	**Leq[b]**
Residential	60[c]	45	--
Transient Lodging	60[c]	45	--
Hospitals, Nursing Homes	60[c]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60[c]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

[a] Where the location of the outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. For residential uses with front yards facing the identified noise source, an exterior noise level criterion of 65 Ldn shall be applied at the building façade, in addition to a 60 Ldn criterion at the outdoor activity area.
[b] As determined for a typical worst-case hour during periods of use.
[c] Where it is not feasible to reduce noise in outdoor activity areas to 60 Ldn or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 Ldn may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

SOURCE: City of Eureka, 1997.

For discussion of proposed project operational impacts on offsite sensitive receptors, see Impact K-3, below.

Mitigation

Mitigation Measure K-1a: Any locations of outdoor activity for sensitive uses associated with the project site shall be designed so that the Ldn from the roadways does not exceed 60 dB at the property line. This shall be done by locating outdoor activity sites outside of the 60-dB noise contours or by buffering. Before building permits are issued, the project applicant shall be required to submit an acoustical analysis demonstrating that outdoor activity spaces associated with sensitive uses do not exceed 60 dBA at the property line.

Mitigation Measure K-1b: Any residential, office, or museum buildings shall be built to California's interior-noise insulation standard of 45 Ldn. Before building permits are issued, the project applicant shall be required to submit an acoustical analysis demonstrating that the buildings have been designed to limit interior noise to a CNEL (or Ldn) of 45 dBA.

Finding of Significance

The recommended mitigation measures would reduce the potential for the Marina Center project to expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, reducing the impact to a ***less-than-significant*** level.

Impact K-2: Would the Marina Center project expose persons to or generate excessive ground-borne vibration or ground-borne noise levels?

There are no adopted State or local policies or standards for ground-borne vibration. The average person is quite sensitive to ground motion, and levels as low as 0.50 mm/s (0.02 inches/sec) can be detected by the human body when background noise and vibration levels are low. Vibration intensity is expressed as Peak Particle Velocity (PPV), which is simply the maximum speed that the ground moves while it temporarily shakes. Since ground-shaking speeds are very small, PPV is measured in inches per second (inches/sec.) The Federal Railway Administration (FRA) and the Federal Transit Administration (FTA) have published guidance relative to vibration impacts. According to the FRA, fragile buildings can be exposed to ground-borne vibration (PPV) levels of 0.5 inches/sec without experiencing structural damage (FRA, 2005). Caltrans does recommend that extreme care be taken when sustained pile driving occurs within 25 feet of any building, or within 50 to 100 feet of a historic building or a building in poor condition (Caltrans, 2002).

There are no known activities that would be associated with the operations of the proposed project that would result in excessive ground-borne vibration. However, ground-borne vibration from construction activities that involve "impact tools," especially pile driving, could produce detectable vibration at sensitive receptors unless proper mitigation is followed. Mitigation measures described below would decrease the vibration associated with impact equipment, such as the pre-drilling of piles, and would decrease vibration levels.

Mitigation

Mitigation Measure K-2a: To mitigate pile-driving and/or other extreme vibration-generating construction impacts, the project applicant shall have a qualified acoustical professional prepare a set of site-specific vibration attenuation measures to reduce project vibration below the vibration annoyance level of 80 VdB. Before the start of grading, the project sponsor shall submit a plan for such measures for review and approval by the City of Eureka to ensure that maximum vibration attenuation will be achieved. These attenuation measures shall include, at a minimum, the following control strategies:

1. Implement "quiet" pile-driving technology or practices (such as pre-drilling of piles and the use of more than one pile driver to shorten the total pile-driving duration), in consideration of geotechnical and structural requirements and conditions.

2. Monitor the effectiveness of vibration attenuation measures by taking vibration measurements at locations and at a frequency adequate to ensure no excessive ground-borne vibration at sensitive receptors.

3. Limit pile-driving to mid-day weekday periods when the fewest people will likely be at the Best Western hotel. Ensure that the pile-driving in the vicinity of the Best Western is limited in time duration.

See also Biological Resources mitigation measure D-1b which describes possible seasonal restrictions and other measures to reduce pile-driving impacts on nearby fish populations.

Finding of Significance

The recommended mitigation measure would reduce the potential for the Marina Center project to generate or expose persons to ground-borne vibration and ground-borne noise, reducing the impact to a ***less-than-significant*** level.

Impact K-3: Would the Marina Center project result in a substantial permanent increase in ambient noise levels of 5 dBA or more in the vicinity of sensitive receptors above levels existing without the project?

Accepted noise prediction and sound propagation algorithms were used to predict changes in ambient noise levels resulting from project operation. To assess the impact of project traffic on roadside noise levels, noise level projections were made using the Federal Highway Administration's (FHWA) Noise Prediction Model algorithms for those road segments that would experience the greatest increase in traffic volume. The model is based on 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 results of the modeling effort are shown in Table IV.K-2 for the baseline (assumed to be in year 2010, for the purpose of this study) and baseline plus project scenarios. See also Appendix C for the detailed noise calculations. Based on the traffic analysis, the project would generate approximately 15,700 vehicle trips per day that would be distributed over the local street network (including on the roadway improvements associated with the project) and would affect roadside noise levels. Peak-hour p.m. traffic volumes were obtained from the project traffic report and were used to model the worst-case scenario for noise. Estimated noise levels correspond to a distance of approximately 50 feet from the centerline of the applicable roadway segment. As indicated in Table IV.K-2, although the roadway segments analyzed would have increased traffic over existing conditions, the additional project traffic would only minimally increase noise levels (by 0.6 to 1.1 dBA) along the majority of roadway segments. Noise level projections indicate that

noise increase from project traffic along Waterfront Drive would be approximately 5 dBA. However, there are no existing sensitive receptors in proximity to Waterfront Drive (the closest sensitive receptor, the existing Best Western, is more than 1000 feet from Waterfront Drive).

The proposed project would predominantly introduce new retail space on to the site, including a home improvement store, but would also introduce new office, residential, light industrial, restaurant, and museum uses, all of which could generate an increase in exterior noise levels.

Retail Uses. The proposed project would result in 313,500 square feet of retail uses, including a 132,000-square-foot anchor store (Anchor 1) which would include about 28,000 square feet of garden space. Development of the retail uses would locate a number of noise-generating activities at the currently vacant site. It is assumed that the retail uses would be open to the public 7 days a week, from as early as 6:00 a.m. to as late as 11:00 p.m. Some stocking may occur within the buildings during hours that the establishments are not open to the public. The majority of on-site noise from the retail use operations would generally be associated with the operations of the anchor store and would include noise from interior equipment use, loading dock activities, paging system loudspeakers and maintenance of parking and landscaped areas. The anchor store would be located on the southern portion of the project site, approximately 200 feet north of Washington Street and approximately 400 feet west of Broadway. The nearest sensitive receptors to the proposed anchor store retailer location would the residences on the 800 block of Summer Street, approximately 600 feet to the east.

Power tools and electric machinery may be used within the anchor store premises for cutting, preparing and modifying store products for individual use by the consumer. Based on measurements conducted at other large format anchor stores, interior noise levels from these activities would be less than 75 dBA at a distance of 50 feet. Immediately outside the building, these noise levels would be attenuated by the building itself and noise levels from these activities would be less than 45 dBA immediately outside the building. Given the ambient levels in the area, this would be a less-than-significant impact.

The main loading area at the project site would be at the Anchor 1 site. Noise measurements collected from active loading areas of two existing large-format anchor stores indicated Leq values are 75 dBA or less at a distance of 50 feet (City of Oroville, 2003). Using this level as a basis to calculate the likely offsite noise at the residential area to the east results in short-term noise levels of 54 dBA Leq at the residential location assumed to be 600 feet east of the proposed Anchor 1 building site. This value is less than the existing levels measured at location 6 (see Table IV.K-1) and would represent a less-than-significant impact.

Some large format retail stores use a loudspeaker paging system that includes outside speakers. Generally, commercial uses of business paging systems do not cause off-site noise complaints; however, mitigation is recommended to assure that speakers would be adjusted so that noise from the speakers does not exceed 60 dBA Leq. Implementation of mitigation would ensure a less-than-significant impact at the residential area at the 800 block of Summer Street.

Maintenance activities for the parking and landscaped areas that would occur throughout the project site could include the use of parking lot sweepers, mowers, and leaf blowers. These mechanical sounds would not be audible at off-site residential locations due to attenuation over distance, and would be infrequent and generally occur only during daytime hours. Thus, this would be a less-than-significant impact.

Other Uses. On-site operational noise sources associated with the new residential, light industrial, restaurant, and museum uses would primarily be related to heating and ventilation systems and maintenance of parking and landscaped areas. Heating and ventilation systems would not be expected to generate noise levels above 50 dBA at 50 feet and would essentially not be audible off the project site. Landscape maintenance activities would be similar to those described above and would not exceed 60 dBA as would be measured at off-site residential locations. This would be a less-than-significant impact.

Mitigation

Mitigation Measure K-3: All outdoor loudspeaker paging systems shall not exceed 60 dBA Leq at the property line.

Also, see Mitigation Measure K-1a.

Finding of Significance

The recommended mitigation measures would avoid or minimize the potential impact of project-generated permanent increase in ambient noise levels, reducing the impact to a ***less-than-significant*** level.

Impact K-4: Would the Marina Center project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Future noise levels related to construction within and adjacent to the project site would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction activities could involve excavation, grading, demolition, drilling, pile driving, trenching, earth movement, and vehicle travel to and from the project site.

Construction activities could generate significant amounts of noise at the project site, corresponding to the particular phase of building construction and the noise-generating equipment used during construction. In addition, construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. Table IV.K-6 provides typical noise levels produced by various types of construction equipment.

TABLE IV.K-6
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Truck	88
Air Compressor	81
Concrete Mixer	85
Scraper	89
Jack Hammer	88
Dozer	85
Paver	89
Generator	81
Pile Driver	101
Backhoe	80

SOURCE: FTA, 2006.

The nearest sensitive receptors to the project site are to the east and include the Best Western hotel between Fourth and Fifth Streets and the residences along Summer Street. Other sensitive receptors in the project site vicinity would be exposed to construction noise at incrementally lower levels.

A combination of noise monitoring, estimates, and application of accepted noise prediction and sound propagation algorithms were used to predict changes in ambient noise levels resulting from project construction. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance from the noise source. The project applicant estimates that construction activities would involve pile driving for approximately 72 work days. Exterior noise levels at the Best Western hotel and nearby residences could be as high as 95 dBA and 89 dBA, respectively, during pile-driving activities. Construction noise would be greater than existing noise levels at the nearby receptor locations.

In addition, noise from activities that involve “impact tools,” especially pile driving, could produce detectable noise in excess of General Plan standards at sensitive receptors unless proper mitigation is followed. Mitigation measures described below would decrease the noise associated with impact equipment, such as the pre-drilling of piles.

Construction activities associated with the proposed project would be temporary in nature. However, construction noise would be significant without mitigation.

Mitigation

Mitigation Measure K-4a: The project applicant shall require construction contractors to limit standard construction activities to between 7:00 a.m. and 7:00 p.m. Monday through Friday, with pile driving and/or other extreme noise-generating activities (greater than 90

dBA) limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday, with no extreme noise-generating activity permitted between 12:30 p.m. and 1:30 p.m. No construction activities shall be allowed on weekends, except that interior construction shall be permitted after buildings are enclosed. No extreme noise-generating activities shall be allowed on weekends and holidays. Construction activities outside of these hours and days may be allowed by prior approval from the City.

Mitigation Measure K-4b: To reduce daytime noise impacts due to construction, the project applicant shall require construction contractors to implement the following measures:

1. Equipment and trucks used for project construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds, wherever feasible).

2. Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible; this could achieve a reduction of 5 dBA. Quieter procedures, such as use of drills rather than impact tools, shall be used whenever feasible.

3. Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or other measures to the extent feasible.

Mitigation Measure K-4c: To mitigate pile driving and/or other extreme noise-generating construction impacts, the project applicant shall have a qualified acoustical professional prepare a set of site-specific noise attenuation measures. Prior to commencing construction, a plan for such measures shall be submitted for review and approval by the City of Eureka to ensure that noise attenuation and acoustical standards will be achieved. These attenuation measures may include, as necessary, the following control strategies:

1. Erect temporary plywood noise barriers around the construction site.

2. Use noise control blankets on building structures as buildings are erected to reduce noise emission from the site.

3. Monitor the effectiveness of noise attenuation measures by taking noise measurements at locations and frequencies necessary to ensure acoustical standards are satisfied.

Finding of Significance

The recommended mitigation measures would reduce the potential impact of the Marina Center project associated with temporary and periodic increases in ambient noise levels to a ***less-than-significant*** level.

Impact K-5: Would the Marina Center project expose people residing or working in the project area to excessive airport noise levels?

The Eureka Municipal Airport, located on the Samoa Peninsula, is a public use airport operated by the City of Eureka with one north-south-oriented runway. The airport primarily serves single-engine and small twin-engine planes. About 20 aircraft are based at the airport and there are on average 96 flights per week. The airport is just over 2 miles southwest of the project site. Given the proximity and orientation of the airport to the project site vicinity and the limited number of flights related to the facility, noise associated with aircraft using the Eureka Municipal Airport does not heavily influence the noise environment within the project site vicinity. Therefore, the Marina Center project would not expose people residing or working in the project area to excessive airport noise levels.

Mitigation

None recommended

Finding of Significance

The potential for the Marina Center project to expose people residing or working in the project area to excessive airport noise levels would be a ***less-than-significant*** impact.

Impact K-6: Would the Marina Center project expose people residing or working in the project area to excessive private airstrip noise levels?

The project site is not within the vicinity of a private airstrip.

Mitigation

None recommended

Finding of Significance

The Marina Center project is not located within the vicinity of a private airstrip therefore would have ***no impact*** in relation to this criterion.

Cumulative Impacts

Impact K-7: Would the Marina Center project, in combination with other potential planned or future development, result in adverse cumulative noise increases?

Based on the traffic analysis, the proposed project would generate approximately 15,700 vehicle trips per day that would be distributed over the local street network and would affect roadside noise levels. To assess the cumulative impact of project traffic on roadside noise levels, noise

level projections for year 2025 were made using the FHWA Noise Prediction Model and are shown above in Table IV.K-3.

Estimated noise levels shown in Table IV.K-3 correspond to a distance of approximately 50 feet from the centerline of applicable roadway segments. Most of the incremental increase in noise is negligible, ranging from 1.0 to 1.4 dBA. On Waterfront Drive, however, the project combined with future development is predicted to increase noise levels by 7 dBA. This is not a significant and unavoidable cumulative impact because the sensitive receptors in the area are the offices, museum, and residences that are fully mitigated under the mitigation listed above. The noise levels predicted for 2025 would be less than the 70 Ldn permitted under the Eureka General Plan (See Table IV.K-5). Even though the project plus 2025 traffic at the corner of Broadway and 14th Street is expected to reach an Ldn of 70.5 dBA, there would be no cumulatively considerable impact since there are no existing or proposed sensitive receptors in the vicinity of this commercial intersection. Therefore, long-term traffic noise increases associated with the project would be less than significant. The project in conjunction with other proposed projects is unlikely to result in significant cumulative impacts. Even if there would be a cumulative impact, the project's contribution would be less than cumulatively considerable through the implementation of measures to reduce noise in outdoor activity areas for sensitive receptors to less than 60 dBA and interior noise to less than 45 dBA.

Mitigation

See "K" Mitigation Measures.

Finding of Significance

The recommended mitigation measures would reduce the potential adverse noise impact of the Marina Center project to a ***less-than-significant*** level, and the Marina Center project would not make a cumulatively considerable contribution to cumulative noise impacts.

References – Noise

California Department of Transportation (Caltrans), *Traffic Noise Analysis Protocol*, Technical Noise Supplement, October 1998.

California Department of Transportation (Caltrans), *Transportation Related Earthborne Vibrations* (Caltrans Experiences). Technical Advisory, Vibration TAV-02-01-R9601. February 20, 2002.

City of Eureka, *City of Eureka General Plan*, adopted February 1997, amended through April 2008.

City of Eureka, *Eureka Redevelopment Final Program EIR*, prepared by Environmental Science Associates (ESA), January 10, 2005.

City of Eureka, *Eureka Municipal Code*, adopted May 1966, amended through April 2008.

City of Oroville, *Noise Impact Analysis for the Proposed Home Depot Project Oroville*, California, December, 2003.

Federal Rail Administration (FRA), *High Speed Ground Transportation Noise and Vibration Impact Assessment*. Final, 2005.

Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, 2006.

Federal Interagency Committee on Noise (FICON), *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.