

5.9.1 OVERVIEW AND SUMMARY

The proposed Master Plan Update will provide for the introduction of new stationary noise sources. Noise resulting from construction activities for the various components of the Master Plan Update may exceed acceptable noise levels at times but will be temporary in nature. Construction related noise impacts along existing arterials, the river well sites, and the water treatment plant would experience less than significant impacts with the implementation of mitigation measures. When mitigation measures are implemented, they will reduce construction related noise impacts to less than significant.

The City restricts the hours of construction activities from 7:30 AM to 5:30 PM on weekdays. The County restricts hours of construction activities from 8:00 AM to 5:00 PM on weekdays. Construction noise of any component of the proposed Master Plan Update would be of limited duration (i.e., short term), be restricted to daytime hours in accordance with the Solvang Municipal Code and in accordance with the County of Santa Barbara Municipal Code, and include a number of standard construction practices to reduce noise levels. Construction related noise impacts would be less than significant with mitigation (Class II). Construction and operational related vibration impacts would be less than significant (Class III).

Operation of pump stations and the water treatment facility would be located within 150 feet of sensitive receptors (i.e., residential homes, schools, or hospitals). Mitigation would require a noise study to verify that the facility design would meet City or County noise standards. The noise associated with the implementation of the Master Plan Update and operation of river wells and the water treatment plant would be less than significant with mitigation (Class II). Cumulative impacts for both construction and operation would be less than significant (Class III).

5.9.2 DATA SOURCES AND METHODOLOGY

5.9.2.1 Introduction to Noise

Noise is ordinarily described as unwanted sound. Sound is generally undesirable when it interferes with normal activities, causes actual physical harm, or has an adverse effect on health. The definition of “noise” as unwanted sound implies that it has an adverse effect on, or causes a substantial annoyance to, people and their environment.

Sound-pressure level alone is not a reliable indicator of loudness because the human ear does not respond uniformly to sounds at all frequencies. For example, the human ear is less sensitive to low and high frequencies than to the medium frequencies that more closely correspond to human speech. In

response to the human ear's sensitivity, or lack thereof, to different frequencies, the A-weighted noise level, referenced in units of dB(A), was developed to better correspond with people's subjective judgment of sound levels. In general, changes in a noise level of less than 3 dB(A) are not noticed by the human ear.¹

Changes from 3 to 5 dB(A) may be noticed by some individuals who are extremely sensitive to changes in noise. An increase of greater than 5 dB(A) is readily noticeable, while the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound volume. A doubling of sound energy results in a 3 dB(A) increase in sound, which means that a doubling of sound wave energy (e.g., doubling the volume of traffic on a roadway), would result in a barely perceptible change in sound level. Common noise levels associated with certain activities are shown on **Figure 5.9-1, Common Noise Levels**.

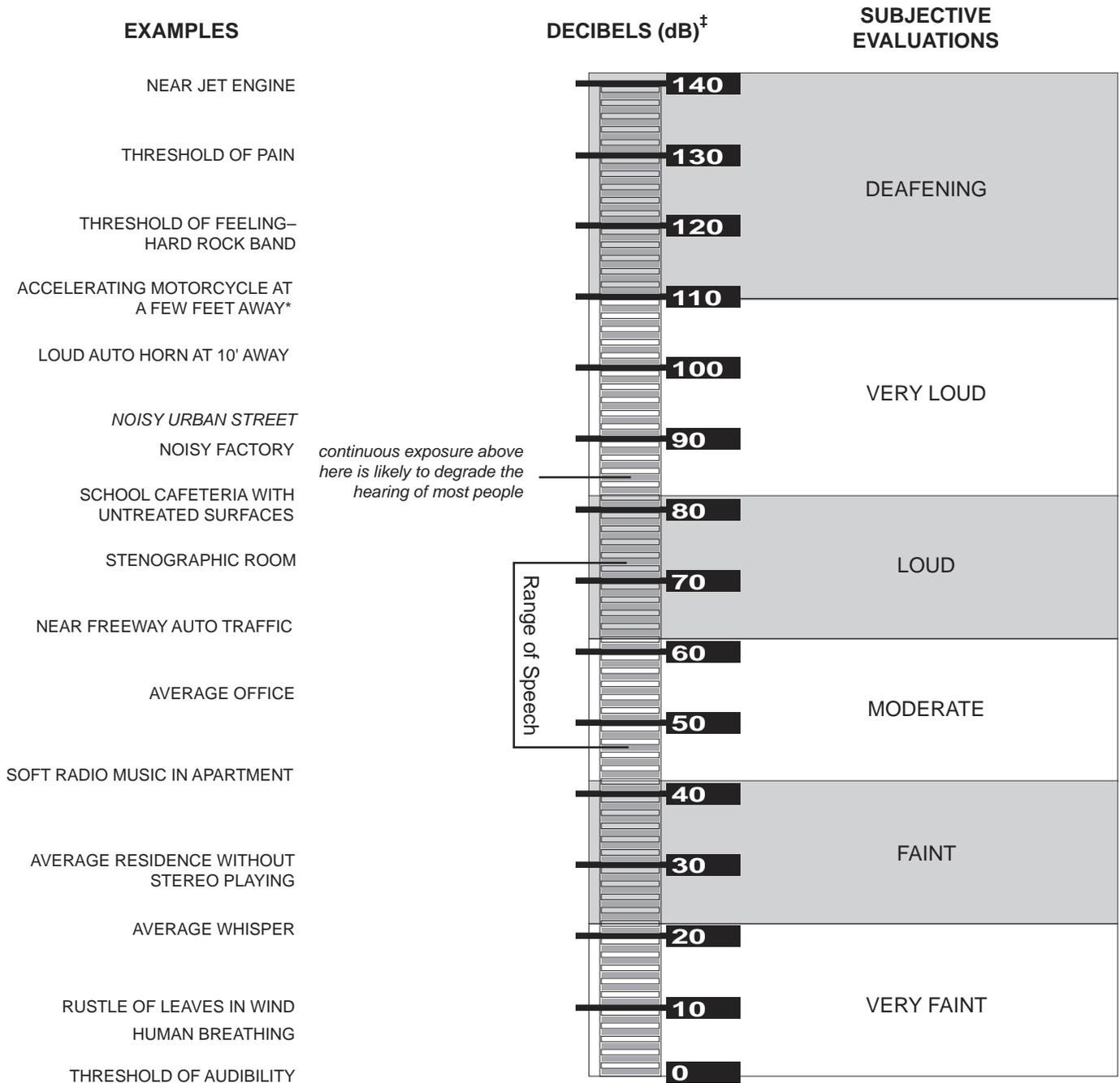
Noise sources occur in two forms: (1) point sources, such as stationary equipment or individual motor vehicles; and (2) line sources, such as a roadway with a large number of mobile point sources (motor vehicles). Sound generated by a stationary point source typically diminishes (attenuates) at a rate of 6 dB(A) for each doubling of distance from the source to the receptor at acoustically hard sites and at a rate of 7.5 dB(A) at acoustically soft sites.²

A hard, or reflective, site does not provide any excess ground-effect attenuation and is characteristic of asphalt, concrete, and very hard-packed soil. An acoustically soft or absorptive site is characteristic of normal earth and most ground with vegetation. As an example, a 60 dB(A) noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dB(A) at 100 feet from the source and it would be 48 dB(A) at 200 feet from the source. Noise from the same point source at an acoustically soft site would be 52.5 dB(A) at 100 feet and 45 dB(A) at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3 dB(A) and 4.5 dB(A) per doubling distance from the source to the receptor for hard and soft sites, respectively.³

¹ US Department of Transportation, Federal Highway Administration, *Highway Noise Fundamentals*, (Springfield, Virginia: Federal Highway Administration, 1980) 81.

² *Ibid*, 97.

³ *Ibid*.



* NOTE: 50' from motorcycle equals noise at about 2000' from a four-engine jet aircraft.

[‡] NOTE: dB are "average" values as measured on the A-scale of a sound-level meter.

FIGURE 5.9-1

Artificial or natural barriers can also attenuate sound levels, as illustrated in **Figure 5.9-2. Noise Attenuation by Barriers**. Solid walls and berms may reduce noise levels by 5 to 10 dB(A).⁴

The minimum attenuation of exterior to interior noise provided by typical structures in California is provided in **Table 5.9-1, Outside to Inside Noise Attenuation (dB(A))**.

**Table 5.9-1
Outside to Inside Noise Attenuation (dB(A))**

Building Type	Open Windows	Closed Windows¹
Residences	17	25
Schools	17	25
Places of Worship	20	30
Hospitals/Convalescent	17	25
Offices	17	25
Theaters	20	30
Hotels/Motels	17	25

Source: Transportation Research Board, National Research Council, Highway Noise: A Design Guide for Highway Engineers, National Cooperative Highway Research Program Report 117.

¹ *As shown, structures with closed windows can attenuate exterior noise by a minimum of 25 to 30 dB(A).*

When assessing community reaction to noise, there is an obvious need for a scale that averages sound-pressure levels over time and quantifies the result in terms of a single numerical descriptor. Several scales have been developed that address community noise levels. Those that are applicable to this analysis are the L_{eq} and CNEL. L_{eq} is the average A-weighted sound level measured over a given time interval L_{eq} can be measured over any period, but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods. CNEL is another average A-weighted sound level measured over a 24-hour period. However, this noise scale is adjusted to account for some individuals' increased sensitivity to noise levels during the evening and nighttime hours. A community noise equivalent level (CNEL) noise measurement is obtained by adding 5 decibels to sound levels occurring during the evening from 7:00 PM to 10:00 PM, and 10 decibels to sound levels occurring during the nighttime from 10:00 PM to 7:00 AM. The 5 and 10 decibel penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. The logarithmic effect of adding these penalties to the 1-hour equivalent continuous

⁴ US Department of Transportation, Federal Highway Administration, *Highway Noise Fundamentals*, (Springfield, Virginia: Federal Highway Administration, 1980) 97.

noise level (L_{eq}) measurements typically results in a CNEL measurement that is within approximately 3 dB(A) of the peak-hour L_{eq} .⁵

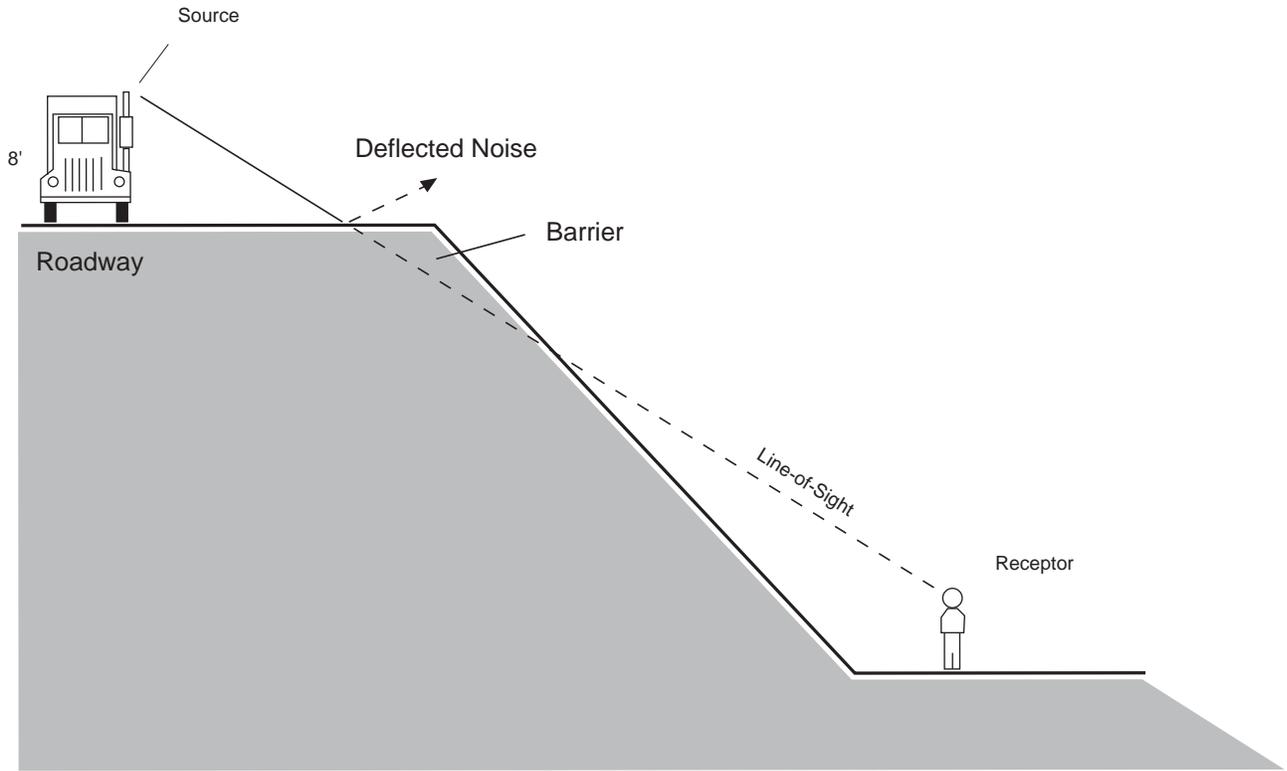
5.9.2.2 Introduction to Vibration

Vibration consists of waves transmitted through solid material. The solid medium can be excited by forces, movements, or pressure fields. Groundborne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may comprise a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in hertz (Hz). Most environmental vibrations consist of a composite, or “spectrum” of many frequencies, and generally are classified as broadband or random vibrations. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Vibration often is measured in terms of the peak particle velocity (PPV)⁶

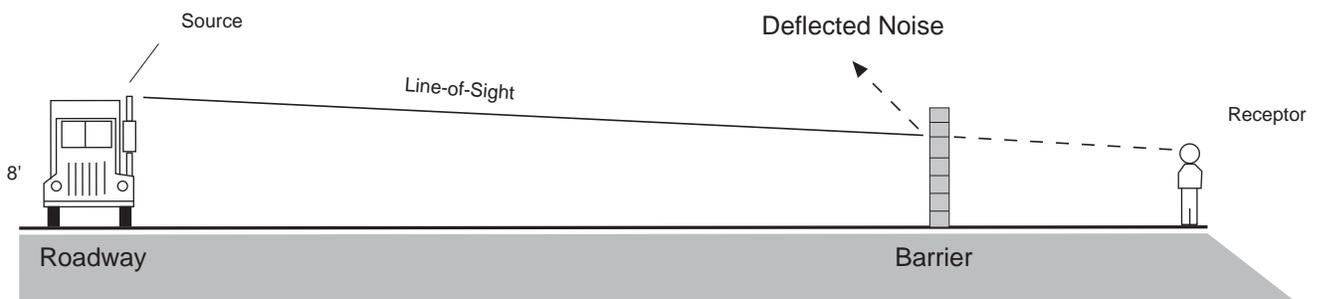
Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to attenuate with distance from the source. High-frequency vibrations reduce much more rapidly than low-frequency vibrations, so that in the far-field from a source the low frequencies tend to dominate. An example of high-frequency vibration would be the ultrasound used in medicine, while sources of low-frequency vibration include pumps, boilers, electrical installations, fans, and road and rail traffic. Soil properties also affect the propagation of vibration. When groundborne vibration interacts with a building, there is usually a ground-to-foundation coupling loss, but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings typically is perceived as rattling of windows or items on shelves, or the motion of building surfaces.

⁵ California Department of Transportation, *Technical Noise Supplement: A Technical Supplement to the Traffic Noise Analysis Protocol*, (Sacramento, California: October 1998), N51–N54.

⁶ Particle velocity is the velocity of a particle (real or imagined) in a medium as it transmits a wave.



"Barrier Effect" Resulting from Differences in Elevation.



"Barrier Effect" Resulting from Typical Soundwall.

SOURCE: Impact Sciences, Inc. - November 2011

FIGURE 5.9-2

Groundborne vibration can be perceived without instrumentation within a few hundred feet of certain types of construction activities, especially pile driving. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic, typically heavy trucks, induces perceptible vibration in buildings, such as window rattling or shaking of small loose items, then it is most likely an effect of low-frequency airborne noise or ground characteristics. Human annoyance by vibration is related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans. **Figure 5.9-3, Typical Levels of Ground-Bourne Vibration**, identifies the typical groundborne vibration levels in inches/second PPV and human response to different levels of vibration.

5.9.3 APPLICABLE REGULATIONS

5.9.3.1 Federal Regulations

Department of Housing and Urban Development

The US Department of Housing and Urban Development (HUD) has set a goal of 65 dB(A) L_{dn} (a 24-hour noise measurement equivalent to CNEL) as a desirable maximum exterior standard for residential units developed under HUD funding. While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings constructed under Title 24 standards typically provides in excess of 20 dB(A) of attenuation with the windows closed. Based on this premise, a residence's interior L_{dn} should not exceed 45 dB(A) L_{dn} .⁷

Federal Transit Administration

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of groundborne vibration associated with construction activities, which have been applied by other jurisdictions to other types of projects. The FTA measure of the threshold of architectural damage for conventional sensitive structures (e.g., residential units) is 0.2 inch/second PPV.⁸ The vibration threshold of perception is 0.01 inch/second PPV, which is approximately equal to 94 VdB.⁹

⁷ 24 Code of Federal Regulations 51, Housing and Urban Development, Environmental Criteria and Standards, revised April 1, 2004.

⁸ US Department of Transportation, Federal Transit Administration, Office of Planning and Environment, *Transit and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

⁹ Federal Transit Administration, Office of Planning and Environment, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, 2006, 12–13. The Federal Transit Administration recommends that these limits be viewed as “criteria that should be used during the environmental impact assessment phase to identify problem locations that must be addressed during final design.”

5.9.3.2 State Regulations

California Code of Regulations

The California Noise Insulation Standards of 1988¹⁰ require that interior noise levels from exterior sources be reduced to 45 dB(A) or less in any habitable room of a multi-residential use facility (e.g., hotels, motels, dormitories, long-term care facilities, and apartment houses and other dwellings, except detached single-family dwellings) with doors and windows closed. Measurements are based on L_{dn} or CNEL. Where exterior noise levels exceed 60 dB(A) L_{dn} or CNEL, an acoustical analysis is required to show that the proposed construction will reduce interior noise levels to 45 dB(A) L_{dn} or CNEL.

California Department of Health

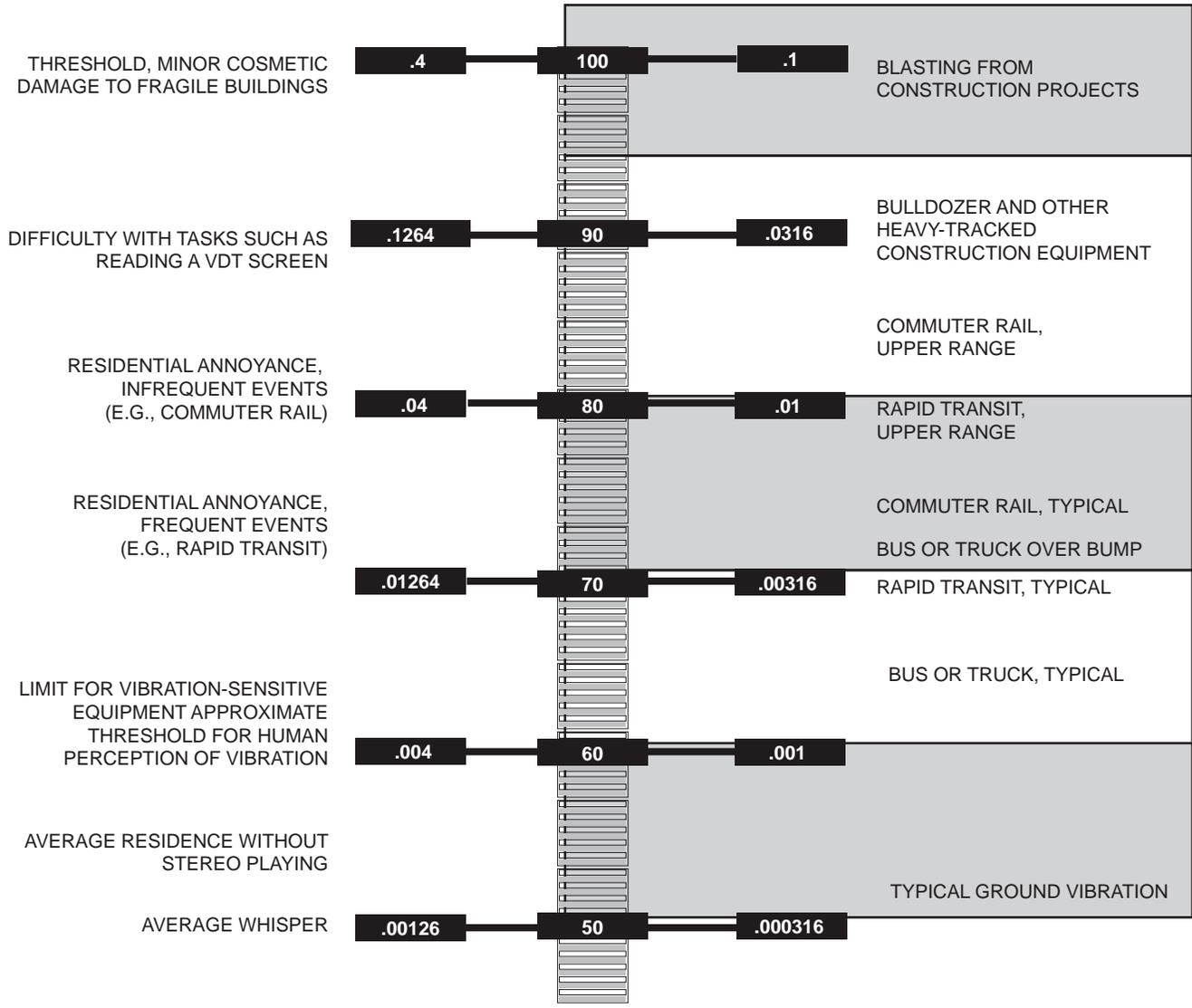
The State of California Department of Health Services, Environmental Health Division, has published *Guidelines for Noise and Land Use Compatibility (the State Guidelines)*.¹¹ The *State Guidelines*, illustrated in **Figure 5.9-4, State Land Use Compatibility Guidelines for Noise**, indicate that residential land uses and other noise-sensitive receptors generally should locate in areas where outdoor ambient noise levels do not exceed 65 to 70 dB(A) (CNEL or L_{dn}). The Department of Health Services does not mandate application of this compatibility matrix to development projects; however, each jurisdiction is required to consider the *State Guidelines* when developing its general plan noise element and when determining acceptable noise levels within its community. The State Department of Housing and Community Development does require, however, that new multi-family units not be exposed to outdoor ambient noise levels in excess of 65 dB(A) (CNEL or L_{dn}), and that, if necessary, sufficient noise insulation be provided to reduce interior ambient levels to 45 dB(A) L_{dn} /CNEL. The US Environmental Protection Agency (US EPA) identified a maximum indoor noise level of 45 dB(A) as necessary to protect against sleep interference. Assuming a conservative structural noise insulation of 20 dB for typical dwellings, 45 dB(A) corresponds to an outdoor CNEL of 65 dB(A) as minimizing sleep interference.

Under the *State Guidelines*, an exterior noise level of 70 dB(A) L_{dn} /CNEL is typically the dividing line between an acceptable and unacceptable exterior noise environment for all noise-sensitive uses, including schools, libraries, places of worship, hospitals, day care centers, and nursing homes of conventional construction.

¹⁰ California Code of Regulations Title 24, Section 3501 et seq.

¹¹ These guidelines are also published in *State of California General Plan Guidelines*, Appendix C: Guidelines for the Preparation and Content of the Noise Element of the General Plan (Sacramento, California: Governor's Office of Planning and Research, October 2003).

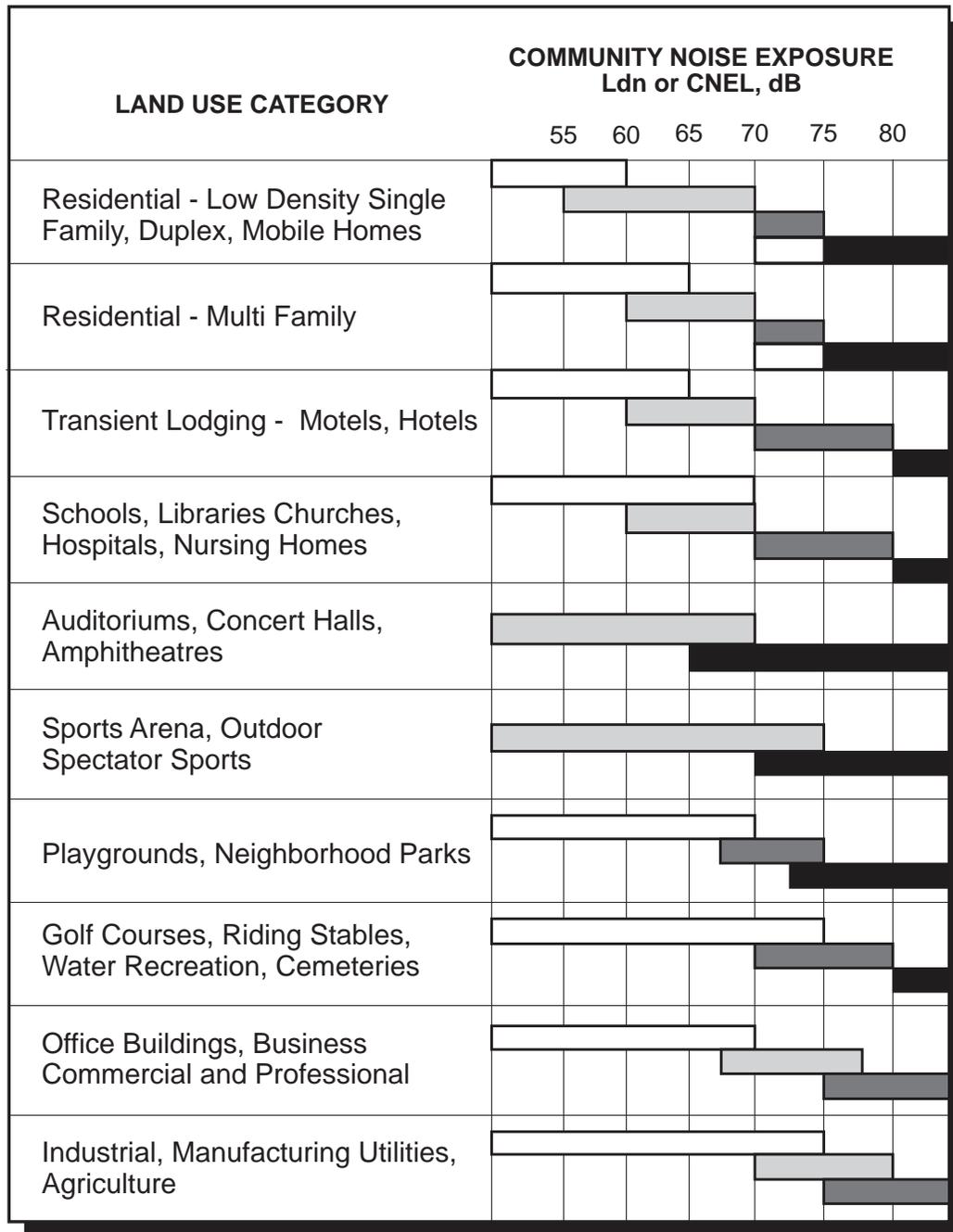
HUMAN/STRUCTURAL RESPONSE PPV AMPLITUDE IN INCHES ¹ PER SECOND VELOCITY LEVEL IN VdB RMS VELOCITY AMPLITUDE IN ² INCHES/SECOND TYPICAL SOURCES 50 FEET FROM SOURCE



¹ PPV is typically a factor 1.7 to 6 times greater than RMS vibration velocity. A factor of 4 was used to calculate noise levels.

² Vibration levels in terms of velocity levels are defined as: $V=20 \times \log_{10} (a/r)$
 V=velocity levels in decibels
 a=RMS velocity amplitude
 r=reference amplitude (accepted reference quantities for vibration velocity are 1×10^{-6} inches/second in the United States)

FIGURE 5.9-3



-  **NORMALLY ACCEPTABLE**
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
-  **CONDITIONALLY ACCEPTABLE**
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
-  **NORMALLY UNACCEPTABLE**
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise reduction features included in the design.
-  **CLEARLY UNACCEPTABLE**
New construction or development should generally not be undertaken.

SOURCE: California Governor's Office of Planning and Research, State of California General Plan Guidelines, Appendix C: Guidelines for the Preparation and Content of Noise Elements of the General Plan, October 2003.

FIGURE 5.9-4

Noise levels below 75 dB(A) L_{dn} /CNEL are typically acceptable for office and commercial buildings, while levels up to 80 dB(A) L_{dn} /CNEL are typically acceptable for industrial uses. In unacceptable interior noise environments, additional noise insulation features, such as extra batting or resilient channels¹² in exterior walls, double-paned windows, air conditioners to enable occupants to keep their windows closed without compromising their comfort, solid wood doors, and noise baffles on exterior vents, are typically needed to provide acceptable interior noise levels. The best type of noise insulation is based on detailed acoustical analyses that identify all practical noise insulation features and that confirm their effectiveness.

5.9.3.3 Local Regulations

City of Solvang

General Plan Noise Element

The General Plan Noise Element was adopted in 1987 and contains goals, objectives, and policies that are designed to protect public health and welfare by eliminating existing noise problems and by preventing significant degradation of the future acoustic environment. The Noise Element of the General Plan is a comprehensive program for including noise control in the planning process. It is a tool for local planners to use in achieving and maintaining compatible land use with environmental noise levels. The Noise Element identifies noise sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to ensure that Solvang residents will be protected from excessive noise intrusion.

The Noise Element indicates that the average community equivalent noise level for the exterior of single-family residences and parks shall be 60 CNEL.¹³ The exterior limit for hospitals and schools shall not exceed 65 CNEL.

The Noise Element contains the following objectives and policies applicable to the proposed Master Plan Update.

Objective 1.0 Incorporate noise considerations into land use planning decisions.

Policy 1.a Establish acceptable limits of noise for various land uses throughout the community. The City adopts the noise standards presented in the

¹² A resilient channel is a pre-formed section of sheet metal approximately 0.5 inch deep by 2.5 inches wide by 12 inches long that is installed between wallboard panels and framing to reduce sound transmission through walls. By preventing the wallboard from lying against the studs, the channel inhibits the transmission of sound through the framing.

¹³ City of Solvang, *General Plan Noise Element*, Exhibit 15, "Interior and Exterior Noise Standards."

Interior and Exterior Noise Standards (**Figure 5.9-5, Interior and Exterior Noise Standards** [Exhibit 15 of the Noise Element]) which identify interior and exterior noise standards in relation to specific land uses; particularly residential areas, schools, hospitals, open space preserves, and parks. The standards would specify the maximum noise levels allowable for new developments and impacted by transportation noise sources operating on public or quasi-public property. (Sources on private property would be subject to the noise ordinance requirements, as called out in Policy 3.a.)

Policy 1.b The City shall require a noise impact evaluation for all projects as part of the design review process to determine if unacceptable noise levels will be created or experienced. Should noise abatement be necessary, the City shall require the implementation of mitigation measures based on a detailed technical study prepared by a qualified acoustical engineer (i.e., a Registered Professional Engineer in the State of California with a minimum of three years' experience in acoustics.)

Objective 3.0 Establish measures to control non-transportation noise impacts.

Policy 3.a The City shall establish (a) new Community Noise Ordinance to mitigate noise conflicts between adjacent land uses. The (current) Noise Ordinance establishes noise limits that cannot be exceeded at the property line. ~~The Noise Ordinance~~ Because it is a City statute(, the Noise Ordinance) can only control noise generated on private property. Therefore, the primary function of the (new) Noise Ordinance is to control stationary noise sources and construction noise.

Policy 3.b Evaluate noise generated by construction activities, and subject them to the requirements of the Noise Ordinance.

LAND USE CATEGORIES		ENERGY AVERAGE CNEL	
CATEGORIES	USES	INTERIOR ¹	EXTERIOR ²
RESIDENTIAL	Single Family, Duplex, Multiple Family	40 ³	60
	Mobile Home	—	60 ⁴
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Hotel, Motel, Transient Lodging	40	60 ⁴
	Commercial Retail, Bank Restaurant	55	—
	Office Building, Research and Development, Professional Offices, City Office Building	45	—
	Amphitheatre, Concert Hall Auditorium, Meeting Hall	45	—
	Gymnasium (Multipurpose)	50	—
	Sports Club	55	—
	Manufacturing, Warehousing, Wholesale, Utilities	65	—
	Movie Theatre	45	—
INSTITUTIONAL	Hospital, Schools' classroom	45	65
	Church, Library	45	—
OPEN SPACE	Parks	—	60

INTERPRETATION

1. Indoor environment excluding: Bathrooms, toilets, closets, corridors.
2. Outdoor environment limited to: Private yard of single family
Multi-family private patio or balcony which is served by a means of exit from inside.
Mobile home Park
Hospital patio
Park's picnic area
School's playground
Hotel and motel recreation area
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
5. Except those areas affected by aircraft noise.

SOURCE: Noise Element of the General Plan for the City of Solvang, Mester Greve Associates - January 1987

FIGURE 5.9-5

Municipal Code

Section 11-9-3 Performance Standards

The Municipal Code Section 11-9-3¹⁴ requires that volume of sound measured outside during calm air conditions, generated by any use on a property shall not exceed 75 dB(A) at or beyond any point along the property boundary upon which such use is located. However, in no case shall the volume of sound exceed 65 CNEL at the location of any nearby noise sensitive uses, as defined in the noise element of the City's general plan.

The ground vibration inherently and recurrently generated by or resulting from any use, other than motor vehicles, operated on any lot shall not be perceptible without instruments at any point along the boundary of or outside of the lot upon which such use is located.

Section 11-12-21 Hours of Construction

The Solvang Municipal Code Section 11-12-21¹⁵ establishes hours of construction and limits such to 7:30 AM to 5:30 PM on weekdays. No construction shall be allowed on Saturday, Sunday, state or national holidays except as approved in writing by the public works director, or his designee, or in the case of an emergency for the immediate preservation of life, health, or property.

County of Santa Barbara

In the planning of land use, 65 dB(A) L_{dn} (similar to CNEL) is regarded as the maximum exterior noise exposure compatible with noise sensitive uses unless noise mitigation features are included in project designs. Noise from grading and construction activity proposed within 1,600 feet of sensitive receptors would be affected by noise levels over 65 dB(A).¹⁶ To mitigate this impact, construction within 1,600 feet of sensitive receptors shall be limited to weekdays between the hours of 8:00 AM to 5:00 PM only. Noise attenuation barriers and muffling of grading equipment may also be required. Construction equipment generating noise levels above 95 dB(A) may require additional mitigation.

¹⁴ City of Solvang, Municipal Code, Chapter 9, M Light Industrial District, Section 11-9-3, "Performance Standards."

¹⁵ Solvang Municipal Code, Chapter 12 Supplemental Regulations, Section 11-12-21, "Hours of Construction."

¹⁶ County of Santa Barbara, Planning and Development, *Environmental Thresholds and Guidelines Manual*, October 2008, Section 12. Noise Thresholds.

5.9.4 EXISTING CONDITIONS

5.9.4.1 Existing Noise Environment

The proposed project would occur within the City of Solvang. The City's water service area includes existing uses within the City limits and within the City's sphere of influence, as shown in **Figure 2.0-3, City of Solvang Water System**. The City drilled two wells in the Santa Ynez Uplands Groundwater Basin which are currently inactive (Wells 21 and 22), two active river wells (Wells 3 and 7A) located along the Santa Ynez River channel, one well located near City Hall (Well 4), a State Water Project (SWP) turnout located within Alisal Commons open space, pump stations and storage reservoirs, tanks and a cistern.

Wells 21 is located outside of City limits next to Reservoir 2. Well 22 was never equipped or used as a producing well. River well 3 is not currently in operation and river well 7A has a submersible pump. As such, the two river wells would not generate noise levels audible over existing traffic along Alisal Bridge. Well 4 is located near City Hall, and vehicle noise along Oak Street would be the most prominent source of noise in the area. Water pumped from City wells is treated at the wellhead with chlorine.

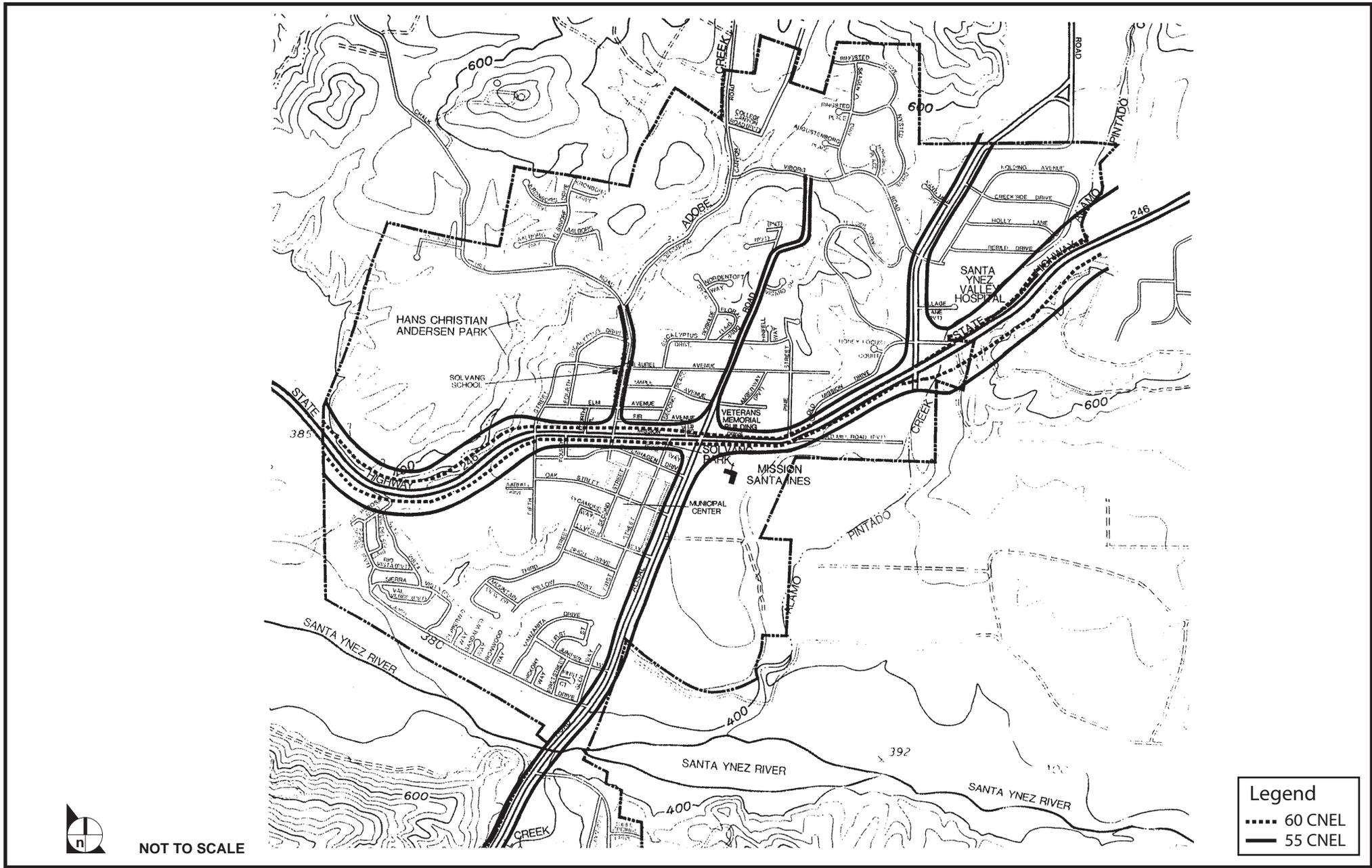
The City's General Plan Noise Element indicates that ambient noise within the City typically ranges from 60 CNEL along State Highway 246 to 55 CNEL within the remaining portions of the City. Other noise sources within the City include high aircraft overflights, air conditioning units on commercial buildings, and human speech.

Major sources of noise within the City include State Highway 246 and arterial roadways such as Alisal Road, as shown in **Figure 5.9-6, Solvang Street Noise Contours**.

According to the City's General Plan,¹⁷ vehicular traffic is one of the dominant noise sources within the City. The greatest noise levels occur along State Highway 246, which traverses the City to the west and east. Noise levels along State Highway 246 reach noise levels in excess of 60 CNEL. Additional roadway traffic noise occurs on major arterials, including Atterdag Road, Alisal Road, and Alamo Pintado Road.

The primary sources of stationary noise in the project vicinity are urban-related activities (i.e., mechanical equipment, loading/unloading areas, parking lots, landscape maintenance, conversations [normal to loud], and recreational areas) and residential activities (i.e., air conditioners, pool/spa equipment, landscape maintenance, and conversations). The noise associated with these sources may represent a single event noise occurrence, short-term or long-term/continuous noise.

¹⁷ City of Solvang, *General Plan Noise Element*, 1988, 8.



SOURCE: City of Solvang Noise Element - 1988

FIGURE 5.9-6

One long-term noise measurement, over a 24-hour period, was conducted on October 18, 2011 within the Alisal Commons Park, as shown on **Figure 5.9-7, Noise Monitor Location**. The noise measurement location was located approximately 45 feet east of a residential fence adjacent to the west of a concrete walking path. The noise measured at this location was 49.5 CNEL.

There is an existing State Water Project (SWP) pump station located within Alisal Commons Park west of Alisal Road and east to southeast of the noise monitor location, as shown on **Figure 5.9-7**. The SWP pump station is located within a concrete building and generates noise levels around 62 dB(A) when in operation.¹⁸

A portion of Well Site B is located within unincorporated Santa Barbara County. Existing noise sources would include gravel mining operations to the east, agricultural operations to the adjacent to the north with roadway noise from Highway 246 immediately north of the agricultural operations. Some residences may exist within the current agricultural areas immediately north of the proposed Well Site B.

Sensitive Receptors

Certain land uses are considered particularly sensitive to noise. Schools, hospitals, rest homes, long-term medical and mental care facilities, parks and recreation areas are all considered sensitive receptors. Residential areas are also considered noise-sensitive, especially during the nighttime hours. As illustrated in the **Figure 2.0-3** in the Project Description, the proposed Master Plan Update would include facilities that would be located throughout the City. Master Plan Update components could potentially be located adjacent to sensitive receptors such as schools, hospitals, and rest homes. At this time, facilities for the Master Plan Update are conceptual and subject to change. Pipelines would be located in existing or future public right-of-way, including street and highways.

5.9.5 THRESHOLDS OF SIGNIFICANCE

In order to assist in determining whether a project would have a significant effect on the environment, the *California Environmental Quality Act (CEQA) Guidelines* identify criteria for conditions that may be deemed to constitute a substantial or potentially substantial adverse change in physical conditions.

Specifically, Appendix G of the *State CEQA Guidelines* (Environmental Checklist Form) lists the following threshold, under which a project may be deemed to have a significant impact on noise if it would cause:

¹⁸ The proposed enclosure would comply with Title 24 of the Uniform Building Code for the conservation of energy associated with building design and construction with all walls constructed with twelve-inch concrete block walls filled with dense concrete. This type of concrete wall has a Sound Transmission Class (STC) rating (reduction capability) of 62 dB(A).

- exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinances, 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; or
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

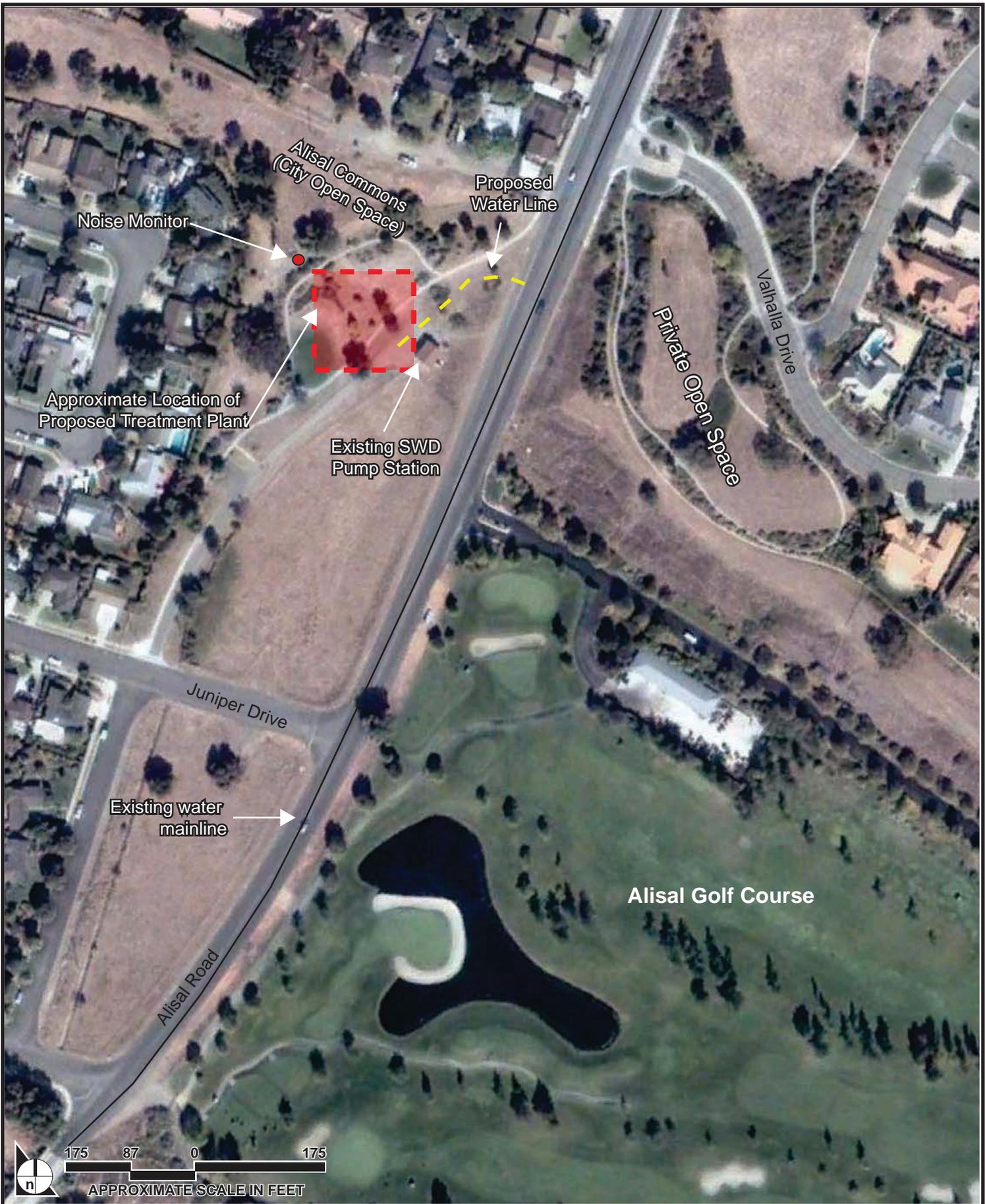
Neither the *State CEQA Guidelines* nor the City define the levels at which groundborne vibration is considered excessive. The FTA has published guidelines for assessing the impacts of ground-borne vibration associated with construction activities, which have been applied by other jurisdictions to other types of projects. The FTA threshold for architectural damage for non-engineered timber and masonry buildings (e.g., most residential units) is 0.2 inch per second PPV, which is approximately equal to 94 VdB.¹⁹ The Federal Highway Administration (FHWA) does not provide standards for traffic-related vibrations, since they do not consider highway traffic vibrations to pose a threat to buildings and structures.²⁰

5.9.6 ENVIRONMENTAL IMPACTS

The environmental impact analysis presented below is based on determinations made in the Notice of Preparation (NOP) for issues that were determined to be potentially significant with mitigation incorporated, or for issues identified by reviewing agencies, organizations, or individuals commenting on the NOP that made a reasonable argument that the issue was potentially significant (see Responses to NOP, **Appendix 1.0**).

¹⁹ Federal Transit Administration, Office of Planning and Environment, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, 2006, 12–13. The Federal Transit Administration recommends that these limits be viewed as “criteria that should be used during the environmental impact assessment phase to identify problem locations that must be addressed during final design.”

²⁰ California Department of Transportation, *Transportation Related Earthborne Vibrations (Caltrans Experiences)*, Technical Advisory, Vibration TAV-02-01-R9601, 2002, 10.



SOURCE: City of Sollvang - September 2011, Impact Sciences, Inc. - November 2011

FIGURE 5.9-7

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

Impacts

Construction Noise

Master Plan Update

Construction of the components of the proposed project would occur over a span of 10 to 15 years. As described in **Section 2.0, Project Description**, the City's Master Plan Update identifies generic objectives to improve the City's water system and distribution capabilities. The proposed Master Plan Update recommends that the City replace all sections of 2-inch diameter waterline with 6-inch waterline, replace 4-inch galvanized steel piping in First Street, and replace existing 8-inch waterline in Kronborg Drive from Elsinore Drive to the 12-inch Reservoir 2 inlet/outlet pipe with 12-inch waterline. Other recommendations by the Master Plan Update would include the construction of a new 400,000-gallon reservoir in Zone 1 which would replace the old cisterns, relocate the Riley Road booster station next to the new reservoir and would replace the 6-inch diameter waterline in Riley Road with a 10-inch waterline from the new reservoir to Rancho Alisal Road. Installation of a permanent emergency generator at the SWP Pumping Station will provide emergency power to the SWP Pumping station and to the future river well water treatment facility.

The construction related noise level associated with implementation of the Master Plan Update would vary during the construction period and would depend upon the construction phase. The first phase, site preparation, is generally the noisiest and has the shortest duration. Activities during this phase include excavation, earth moving, and soils compaction. Other construction phases that would be included with construction of future waterlines would include demolition, building construction and asphalt paving. Construction activities would not be continuous.

Construction typically involves use of both mobile and stationary equipment. Mobile equipment, such as bulldozers, scrapers, and graders, are operated in a cyclical schedule in which a period of full power is followed by a period of reduced power. Stationary equipment can be subdivided into two groups. One group contains such items as pumps, generators, compressors, and similar equipment that generally operates at a fixed power and produces a constant sound level under normal operations. The other group contains impact equipment, such as jackhammers, pavement breakers, etc., which are operated in a cyclical fashion.

The US EPA has compiled data on the noise-generating characteristics of specific types of construction equipment. This data is presented in **Figure 5.9-8, Noise Levels of Typical Construction Equipment**. As shown, noise levels generated by heavy equipment can range from approximately 68 dB(A) to excess of 100 dB(A) when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of approximately 6 dB(A) per doubling of distance. For example, a noise level of 68 dB(A) measured at 50 feet from the noise source to the receptor would reduce to 62 dB(A) at 100 feet from the source to the receptor, and further reduce by another 6 dB(A) to 56 dB(A) at 200 feet from the source to the receptor.

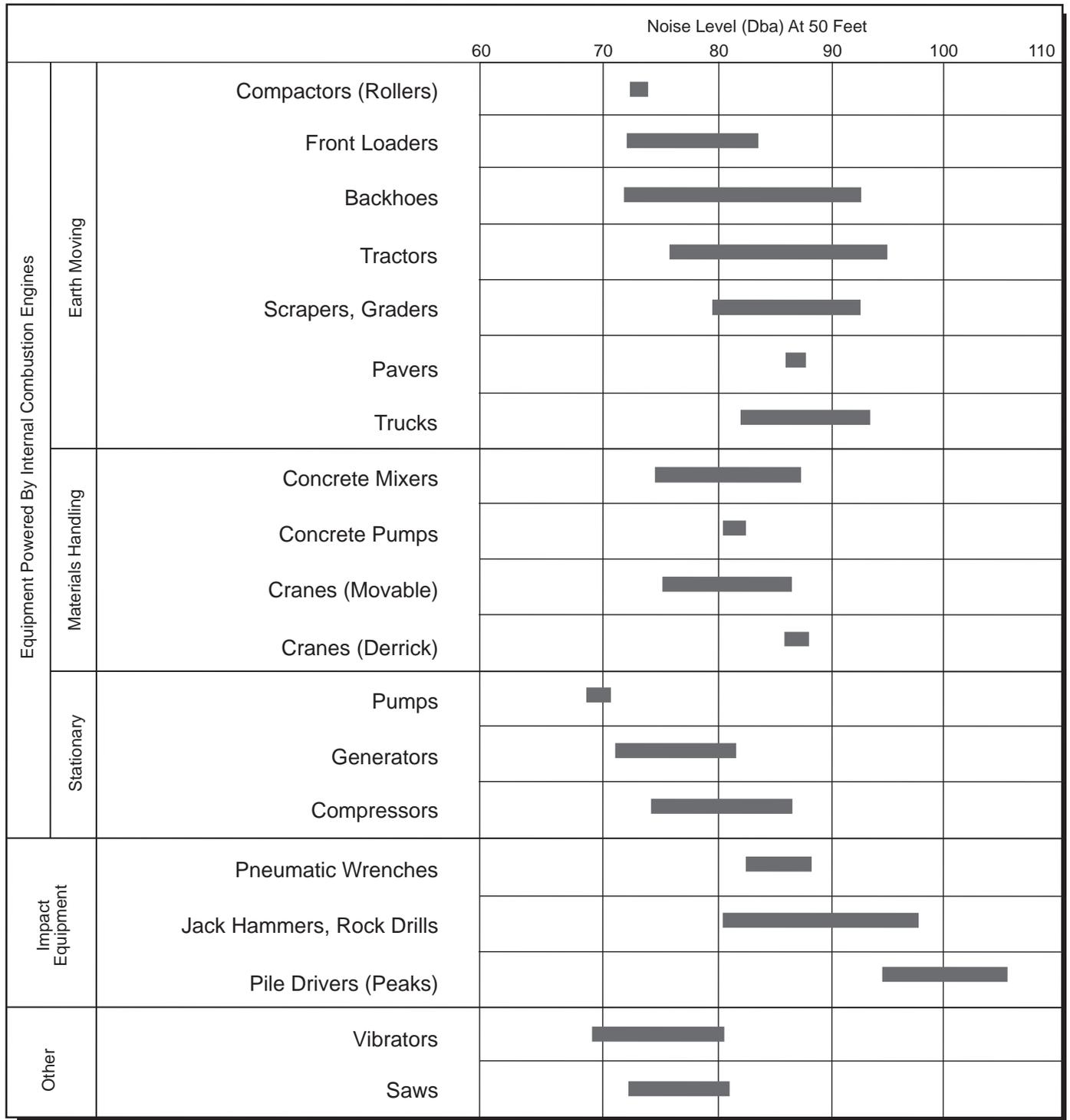
Noise levels generated during each sub-phase are presented in **Table 5.9-2, Estimated Noise Levels for Construction Phases**. Equipment estimates used for the analysis for grading and building construction of the water treatment plant are representative of worst-case conditions, since it is unlikely that all the equipment contained on site would operate simultaneously. The demolition of existing roadway pavement, grading/excavation of the water treatment plant site, construction of future components of the Master Plan Update, and re-paving of existing roadways upon completion of waterline improvements could generate related construction noise approximately 15 feet from the nearest sensitive receptor as it may occur within a roadway right-of-way.

**Table 5.9-2
Estimated Noise Levels for Construction Phases**

Construction Phase	Approximate L_{eq} dB(A) without Noise Attenuation			
	12.5 feet	25 Feet	50 Feet	100 Feet
Demolition	93	87	81	75
Excavation	99	93	87	81
Building Construction	97	91	85	79
Asphalt Paving	94	88	82	76

Construction noise levels at adjacent noise-sensitive land uses would be considered significant.

Additionally, the construction periods would also cause increased noise along access routes to the site due to movement of equipment and workers to and from the site. The primary heavy construction equipment and vehicles are expected to be moved on site during the initial construction period and would have a less than significant impact on nearby roadways.



Note: Based On Limited Available Data Samples.

SOURCE: United States Environmental Protection Agency, 1971, "Noise From Construction Equipment And Operations, Building Equipment, And Home Appliances," Ntid 300-1.

FIGURE 5.9-8

Some of the proposed facilities identified by the Master Plan Update may be located adjacent to sensitive receptors, including schools, hospitals, and residential areas. Activities associated with the construction of each of the proposed facilities will be performed in accordance with applicable City and County noise ordinances to minimize construction noise impacts. However, these measures may not reduce temporary construction noise to the City's standard of 65 dB(A) for residential areas should the activities be close to existing residential uses. Therefore, temporary construction-related noise impacts would be considered potentially significant.

Proposed Wells and Water Treatment Facilities

To reliably meet projected water demand as the city nears buildout, up to six new water wells and associated pipelines will be constructed in two potential areas (Well Sites A and B) along the Santa Ynez River south of the Alisal Bridge. The land uses are residential located north of the proposed Well Site A in the City, and agricultural located north of Well Site B in unincorporated Santa Barbara County.

Noise levels generated during the construction phases of the six proposed wells in proposed Well Site A could affect nearby residential land uses. The distance of the construction site to the nearest residential use in the City from the proposed Well Site A would be a minimum of 50 feet. At this distance, noise levels during construction could reach 87 dB(A), which would exceed the City's threshold and would be considered a significant impact.

Construction of well facilities within the proposed Well Site B located within unincorporated Santa Barbara County would be subject to the County's noise threshold of 65 dB(A) and construction within 1,600 feet of sensitive receptors could exceed 65 dB(A). However, there are no sensitive receptors located near the proposed Well Site B that would be affected. Impacts would be less than significant.

Grading and construction activities, which involve the use of backhoes, tractors, scrapers, graders, and trucks, would be carried out within open space areas along the Santa Ynez River to the south existing residences.

As surface water would be extracted for use by the City within 150 feet of wells, the California Department of Public Health Services (CDPH) requires additional treatment to meet water quality standards. As a result, a water treatment plant would be constructed within the City owned Alisal Commons open space. Existing residences that would be most sensitive to temporary construction noise are located to the north and east of the proposed water treatment plant. Grading and construction activities, which involve the use of backhoes, tractors, scrapers, graders, and trucks, would be carried out within Alisal Commons open space, near existing residences, for the water treatment plant.

Earth-grading equipment can generate some of the loudest noise levels of all standard construction equipment (**Figure 5.9-8**). Unattenuated noise levels at these residences could exceed 95 dB(A) at edge of the nearest property line. The loudest source of noise identified in **Figure 5.9-8**, pile drivers, would not be used during the construction of the project. Construction noise levels at adjacent noise-sensitive land uses in the City would be considered significant.

Operational Noise

Master Plan Update

Implementation of the Master Plan Update would direct the future construction of water distribution pipelines, storage reservoirs, and emergency generators. Pipes and storage reservoirs would not generate operational noise. Emergency generators would only operate for short periods of time and during emergencies, such as local power outages.

Operational noise would mainly consist of stationary noises, since the proposed Master Plan Update is not a traffic-generating project, with the exception of occasional maintenance-related traffic. Thus, significant traffic related noise impacts would not occur. Additionally, all facilities would be constructed according to industry standards and according to the City noise ordinance requirements and would not be considered excessive or significant.

Operations at storage reservoirs are not considered significant noise generators. Storage reservoirs would require scheduled maintenance, which would result in short-term random incidences that would not result in an increase of ambient noise levels within the surrounding area. Thus, impacts associated with storage reservoirs would not be significant.

Where possible, the distribution pipeline routes are located along existing public rights-of-way and planned roadways to maintain accessibility and minimize the costs of acquiring pipeline easements. Operation of the pipeline facilities would not result in significant noise impacts since these facilities would be located below ground surface, except for valves, etc. The following are general pipeline and interconnection operation and maintenance procedures:

- Weekly visual inspection of pipeline alignments;
- Mowing within those portions of pipeline alignments that are not within streets;
- Grading of access roads as needed;
- Testing and servicing of blow-off valves, air/vacuum relief valve assemblies as needed;

- Yearly walking of pipeline alignment and inspection of cathodic protection system;
- Pressure testing pipeline, painting pipeline appurtenances, repairing tunnel entrances, and repairing minor leaks in buried pipeline joints or segments (when necessary).

Sound associated with pipeline maintenance would result in short-term, random incidences that would not result in an increase of ambient noise levels within the surrounding area. In addition, pipeline work would be limited to daylight hours in order to avoid disturbing any sensitive receptors. Therefore, impacts would be less than significant.

Proposed Wells and Water Treatment Facilities

Operation of the six proposed new wells to be located in Well Sites A and B would not generate a discernible amount of noise, as the pumps would be submerged. The wells would operate only when needed, which usually occurs during peak water use hours (early morning) and during the peak months (summer). As such, operational noise impacts generated by the wells would be less than significant.

Typical pump station noise attenuation features, include the following: (1) enclosing the pumps within a concrete and masonry building, fully grouted with appropriate wall thickness; (2) sound attenuating panel insulation installed on the roof; and (3) ventilation system designed to mitigate the noise from normal pump operation. Noise enclosures provide as much as 10 to 15 dB(A) attenuation depending on the type of noise absorption materials. Operation of the proposed pump stations would also include the following maintenance procedures:

- Conduct routine operation maintenance checks;
- Conduct routine general pump station cleaning and maintenance;
- Perform routine maintenance of pump station exteriors;
- Routinely test pumps during non-emergency periods, verify operational readiness under anticipated full emergency project head;
- Annually perform major maintenance and clean-up; and
- Service motor cooling system (emergency pumps), replace pump seals, paint pump station, and equipment, and disassemble pumps to inspect bearing and impeller (recirculation pumps, emergency pumps) on an as needed basis.

The amount of noise radiated from the wall surfaces and ventilation system of any given pump housing is controllable over a reasonably wide range of frequencies. Typically, a pump station housing is designed to limit near field (within a close radius) noise levels ranging from 85 to 93 dB(A). Pump stations located within 500 feet of sensitive receptors (i.e., residential homes, schools, or hospitals) should

be designed not to exceed the 60 CNEL at the sensitive receptor property line per the City of Solvang's noise standards. Should pump stations be located within the jurisdiction of the County of Santa Barbara, the facilities located within 500 feet of a sensitive use should be designed not to exceed 65 dB(A) at the property line of the sensitive receptors. Note that these noise limitations are for steady state, base load operations, and exclude startups, shutdowns, and off-normal or emergency conditions. Implementation of the noise reduction measures where applicable would reduce noise impacts from the pump stations to less than significant.

An existing SWP pump station is located at the Alisal Commons open space. The City presently plans to design and construct a package water treatment plant adjacent to this existing pump station between Alisal Road and the Alisal Glen housing subdivision (as shown in **Figure 5.9-7**). The treatment plant site would be approximately 150 feet by 200 feet, and surrounded by a 7-foot-high decorative block wall. Noise generated during the water treatment facility operation could directly impact adjacent residential dwelling units, with the closest property line approximately 100 feet to the west. Primary on-site noise sources include the booster pumping station, the treatment plant and associated pumps.

Acoustic information would depend on the number of pumps and the pieces of equipment. Typical noise levels for 75-horsepower pumps/motors, a ventilation system and a 300 kilowatt diesel engine generator would range from 80 dB(A) to 100 dB(A). With all equipment operating in unison the noise would combine for a noise level of approximately 100 dB(A) at 3 feet from the source. For a conservative analysis, as the distance doubles, sound levels would decrease 6.0 dB(A). Assuming the nearest package treatment unit is a distance of 50 feet to the decorative wall, noise levels would be 76 dB(A). The decorative wall would act as a barrier between the treatment plant and the nearest residence, conservatively reducing noise approximately 5 dB(A) to 71 dB(A). The distance to the nearest residence from the decorative wall would be 100 feet. As a result, the noise level at the nearest residence, from the decorative wall, would be 66 dB(A) which is below the City's General Plan guideline for noise generated on-site (75 dB(A)). As such, operational impacts generated by the water treatment plant would be less than significant.

Mitigation Measures

The following mitigation measure shall be implemented:

Construction

NOS-1 For all demolition and construction activities, noise-attenuation techniques shall be employed as needed to ensure that noise remains as low as possible during construction.

The following measures shall be incorporated into contract specifications to reduce the impact of construction noise:

- Ensure that construction equipment is properly muffled according to industry standards and in good working condition.
- Place noise-generating construction equipment and locate construction staging areas away from sensitive uses, where feasible.
- Schedule high noise-producing activities between the hours of 7:30 AM and 5:30 PM Monday through Fridays and excluding Saturday, Sunday, state or national holidays as required by the City of Solvang to minimize disruption to sensitive uses. When construction work is conducted within the County of Santa Barbara, construction activities shall be scheduled between 8:00 AM and 5:00 PM Monday through Friday only.
- Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, temporary noise barriers or noise blankets around stationary construction noise sources.
- Use electric air compressors and similar power tools rather than diesel equipment, where feasible.
- All stationary construction equipment (e.g., air compressor, generators, impact wrenches, etc.) shall be operated as far away from residential uses as possible and shall be shielded with temporary sound barriers, sound aprons, or sound skins.
- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 20 minutes.
- Residences within 500 feet of a construction area shall be notified of the construction schedule in writing, at least 48 hours prior to construction. The City and the contractor shall designate a noise disturbance point of contact that would be responsible for responding to complaints regarding construction noise. The point of contact shall determine the cause of the complaint and ensure that reasonable measures are implemented to correct the problem. A contact number for the noise disturbance shall be conspicuously placed on construction site fences and written into the construction notification schedule sent to nearby residences.

Operations

NOS-2 Pump stations and water treatment facilities located within 150 feet of sensitive receptors (i.e., residential homes, schools, or hospitals) shall have a site-specific noise study conducted to verify that the design and operation will meet the City or County noise standards. Note that these noise limitations for operations are for steady state, base load operations, and exclude startups, shutdowns, and off-normal or emergency conditions.

Residual Impacts

Construction noise of any component of the proposed Master Plan Update would be of limited duration (i.e., short term), be restricted to daytime hours in accordance with the *Solvang Municipal Code* and in accordance with the *County of Santa Barbara Municipal Code*, and include a number of standard construction practices to reduce noise levels to a less than significant (as identified in **Mitigation Measure NOS-1**). Construction related noise impacts would be less than significant with mitigation (Class II).

The noise associated with the implementation of the Master Plan Update and operation of proposed new wells and water treatment plant would be less than significant with the implementation of **Mitigation Measure NOS-2** (Class II).

5.9.6.2 Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Impacts

Construction

Master Plan Update

Ground vibrations from construction activities very rarely reach the levels that can damage structures, but they can achieve the audible range and be felt in buildings very close to the site. The primary and most intensive vibration source associated with the development of the project would be the use of bulldozers and pile drivers during construction. These types of equipment can create intense noise that is disturbing and can result in ground vibrations.

The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Site ground vibrations from construction activities very rarely reach the levels that can damage structures, but they can achieve the audible range and be felt in buildings very close to the site. The primary and most intensive vibration source associated with development of each site would be the use of bulldozers. **Table 5.9-3, Vibration Source Levels for Construction Equipment**, lists vibration source levels for typical construction equipment.

**Table 5.9-3
Vibration Source Levels for Construction Equipment**

Equipment	Approximate VdB			
	15 Feet	25 Feet	50 Feet	100 Feet
Compressor	88	81	72	63
Loaded trucks	92	86	77	68
Jackhammer	86	79	70	61
Small Bulldozer	64	58	49	39
Backhoe	87	80	71	62
Paver	91	84	75	66

Source: Federal Transit Administration, Office of Planning and Environment, Transit Noise and Vibration Impact Assessment (May 2006) FTA-VA-90-1003-06, 12-9.

The FTA threshold for architectural damage to non-engineered timber and masonry buildings is approximately 94 VdB. As indicated in **Table 5.9-3**, loaded trucks, which would create the greatest amount of vibration for equipment to be used during construction, are capable of producing approximately 92 VdB at 15 feet.

Land uses (Residential designations in the City and Agricultural designations in the County) adjacent to potential Master Plan Update improvements could be affected by groundborne vibration include residential uses along roadway arterials (i.e., Alisal Road). As construction and implementation of the proposed improvements identified in the Master Plan Update would occur over the next 10 to 15 years, there would be substantially less than 70 vibration events per day²¹ at nearby sensitive land use receptors.

Given that construction equipment will be used in at distance more than 15 feet from the nearest sensitive land uses (Residential Land Use in the City) and the infrequent number of vibration events anticipated per day,²² construction activities most likely would not exceed the FTA ground-borne vibration threshold for the nearest sensitive land uses near the proposed Wells Sites A and B or the proposed water treatment plant site. Grading and construction activities would be limited to operation during the hours of 7:30 AM to 5:30 PM Monday through Friday, with no construction allowed on Saturday, Sunday or any state or national holiday as described in the *Solvang Municipal Code*. Impacts related to the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels would be less than significant, and no mitigation measures are required. Impacts would be less than significant.

²¹ A vibration event refers to the number of times the piece of vibratory equipment would be operated per day.

²² For frequent vibration events, defined as greater than 70 vibration events per day. For infrequent vibration events, defined as less than 70 vibration events per day.

Proposed Wells and Water Treatment Facilities

As discussed above, a conservative analysis of potential vibration impacts was analyzed approximately 15 feet from the nearest sensitive receptor. The construction of the proposed wells in Wells Site A would be located a minimum of 50 feet south of the nearest residential dwelling unit and further in Well Site B. The water treatment plant would also be located in the Alisal Commons open space area and a minimum of 50 feet south and east of the nearest sensitive residential dwelling unit. As vibration impacts were determined to result in less than significant impacts approximately 15 feet from a sensitive receptor. Vibrations from construction equipment would not be noticed from drilling and construction of the proposed wells or construction of the water treatment plant as the proposed wells and water treatment plant would be located at sufficient distances (greater than 15 feet) from nearby sensitive receptors to reduce vibration impacts. Impacts would be less than significant (Class III).

Operation

No generation of groundborne vibration or groundborne noise would occur during operation of the City's wells or water treatment plant or through the pipelines and storage reservoirs. There would be no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

Construction and operational related vibration impacts would be less than significant (Class III).

5.9.6.3 Have a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Impacts

Construction

Please refer to **Impact 5.9.6.1**. In general, construction activities would result in short-term increases in ambient noise levels for all components of the proposed project. As noted during construction, there could be increases in the local noise environment for the construction of wells at Wells Site A and the proposed water treatment in the Alisal Commons open space area. Noise from these construction

activities could temporarily increase local ambient noise above acceptable levels and exceed the City noise limits. As such, impact would be significant albeit temporary.

Operation

Operation of wells within the proposed Well Sites A and B would be subject to the applicable City and County noise threshold of 65 dB(A). Wells would be operated using submersible pumps, which would limit noise generation during operation. Well operation is largely dependent on the level of waters in reservoirs, which are dependent on demand in the City's system and the weather. As such, noise would be episodic in nature and generally not steady over long periods of time. Therefore, operational of wells within the proposed Well Sites would not result in a substantial increase in the permanent ambient levels. Impacts would be less than significant.

According to the noise measurement conducted on October 18, 2011, the existing ambient noise was measured at 49.5 CNEL approximately 50 feet east of the residential property line nearest to the water treatment plant site. As discussed above in **Impact 5.9.6.1**, the proposed operational noise levels at the residential property line nearest to the proposed water treatment plant would be 66 dB(A). This is considered a conservative analysis, as the plant would operate only during operation of the proposed wells to treat water entering the City's distribution system. Furthermore, the estimated noise at the nearest residential property line to the west would still be below the City's Noise Element threshold of 75 dB(A). Therefore, the proposed water treatment plant would result in less than significant impacts to a substantial permanent increase in ambient noise levels.

Mitigation Measures

Mitigation Measure NOS-1 shall be implemented during construction for any phase of the proposed project.

Residual Impacts

Construction impacts would be less than significant with mitigation (Class II). Operational impacts would be less than significant (Class III).

5.9.6.4 Have a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Impacts

Construction

Please refer to **Impact 5.9.6.1**, above. Construction impacts would potentially be significant.

Operation

Master Plan Update

As discussed under **Impact 5.9.6.1**, operational noise would mainly consist of stationary noises, since the proposed Master Plan Update is not a traffic-generating project, with the exception of occasional maintenance-related traffic. Thus, significant traffic related noise impacts would not occur. Additionally, all facilities would be constructed according to industry standards and according to the City noise ordinance requirements and would be less than significant.

Operations at storage reservoirs are not considered significant noise generators. Storage reservoirs would require scheduled maintenance, which would result in short-term random incidences that would not result in an increase of ambient noise levels within the surrounding area. Thus, impacts associated with storage reservoirs would be less than significant.

Where possible, the distribution pipeline routes are located along existing public rights-of-way and planned roadways to maintain accessibility and minimize the costs of acquiring pipeline easements. Operation of the pipeline facilities would not result in significant noise impacts since these facilities would be located below ground surface, except for valves, etc. Sound associated with pipeline maintenance would result in short-term, random incidences that would not result in an increase of ambient noise levels within the surrounding area. In addition, pipeline work would be limited to daylight hours in order to avoid disturbing any sensitive receptors. Therefore, potential impacts would be less than significant.

Proposed Wells and Water Treatment Facilities

Please refer to **Impact 5.9.6.1** above in regards to noise associated with operation of the six proposed new wells and the water treatment plant. The proposed wells would operate only during peak hours and peak months when water demand is greatest. The operation of the water treatment plant would coincide with the operation of the proposed wells. Impacts would be less than significant.

The amount of noise radiated from the wall surfaces and ventilation system of any given pump housing is controllable over a reasonably wide range of frequencies. Typically, a pump station housing is designed to limit near field (within a close radius) noise levels ranging from 85 to 93 dB(A). Pump stations located within 500 feet of sensitive receptors (i.e., residential homes, schools, or hospitals) should be designed not to exceed the 60 CNEL at the sensitive receptor property line per the City's noise standards. Should pump stations be located within the jurisdiction of the County of Santa Barbara, the facilities located within 500 feet of a sensitive use should be designed not to exceed 65 dB(A) at the property line of the sensitive receptors. Note that these noise limitations are for steady state, base load operations, and exclude startups, shutdowns, and off-normal or emergency conditions. With implementation of the noise reduction measures where applicable. Impacts from the pump stations would be less than significant.

Mitigation Measures

Mitigation Measure NOS-1 shall be implemented during construction phases of the proposed project.

Residual Impacts

Construction impacts would be less than significant with mitigation (Class II). Operation impacts would be less than significant (Class III).

5.9.7 CUMULATIVE ANALYSIS

Cumulative Impacts

According to the Master Plan Update, the City of Solvang is approximately 464 residential dwelling units from General Plan buildout conditions. Specific projects proposed within the City would be required to undergo project-level review. Further, each individual development proposal within the City would be required to comply with applicable goals, policies and actions contained in the General Plan to assure that potential impacts are mitigated to the extent feasible.

Because of the location of potential other projects along pipeline routes, the proposed project in combination with other projects under construction may result in cumulative short-term noise impacts. Each project located along a pipeline route would be required to implement construction mitigation measures to reduce noise impacts to the extent feasible. Given the relatively short-term duration of construction activities, and the City's and County's restrictions on periods when construction can occur, as well as the incorporation of standard noise control measures, potential cumulative noise impacts are considered to be less than significant.

Long-term noise impacts associated with the project are considered to be less than significant. As such, the project would not contribute to cumulative noise level increases within the project area and would result in less than significant cumulative noise impacts.

Cumulative Mitigation Measures

No mitigation is required.

Residual Cumulative Impacts

Cumulative impacts would be less than significant (Class III) for both construction and operation.