

# **Guidelines for the Preparation of Noise Analysis**



**Permit Sonoma  
County of Sonoma  
February 2019**

**Version 2**

# COUNTY OF SONOMA

## GUIDELINES FOR THE PREPARATION OF NOISE ANALYSIS

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## **A. INTRODUCTION**

Permit Sonoma/Permit and Resource Management Department (Permit Sonoma) is responsible for analyzing the potential noise impacts of new public and private development projects, and establishing mitigation measures and conditions of approval to avoid or substantially lessen those potential impacts. Noise related mitigation measures and conditions of approval must be based on Permit Sonoma's analysis of the project in relation to ambient conditions, the County's General Plan noise standards, these Guidelines, and the CEQA Initial Study Checklist thresholds. The General Plan Noise Element contains goals, objectives, policies and noise level performance standards for the assessment of noise impacts related to development. The General Plan Noise Element articulates the County's overarching objective in Goal NE-1: "Protect people from the adverse effects of exposure to excessive noise and to achieve an environment in which people and land uses may function without impairment from noise."

The General Plan Noise Element calls for the preparation of an acoustical analysis or noise analysis (collectively Noise Analysis), prior to approval of any discretionary project involving a potentially significant new noise source or a noise sensitive land use in a noise impacted area. These Guidelines serve as a tool to implement the General Plan Noise Element policies by providing the following: 1) criteria to determine when a Noise Analysis is required; 2) minimum qualifications for persons preparing a Noise Analysis; and 3) substantive requirements for a Noise Analysis, including format content, standards, and thresholds of significance. A consistent format and standards will promote uniform application of the General Plan Noise Element policies, and will provide for an easier comparison and evaluation of the Noise Analysis by County staff and decision-makers. The "Required Content and Standards for Noise Analysis" are provided in Attachment A. The "Policy Framework" as articulated in the General Plan Noise Element and thresholds of significance are summarized in Attachment B. Distances to existing traffic noise contours on select county roads are provided in Attachment C.

## **B. NOISE ANALYSIS PROCESS**

A Noise Analysis prepared by a qualified acoustical consultant may be required, based on the screening criteria in Table 1 below, prior to approval of any discretionary project involving: a potentially significant new noise source; a noise sensitive land use in a noise impacted area; or a noise-generating use that exceeds any of the thresholds of significance identified in Attachment B. The Noise Analysis, and any required peer review, shall be provided at the sole expense of the applicant. Peer review of any Noise Analysis submitted by an applicant may be required at the discretion of Permit Sonoma. Alternatively, the County may contract directly for a Noise Analysis on behalf of an applicant, and charge the cost to the applicant without requiring a peer review. The Noise Analysis shall be reviewed by Permit Sonoma staff, and must be found to be consistent with these Guidelines prior to completion of any environmental document and approval of the project.

A Noise Analysis must be prepared by a qualified acoustical consultant, defined as a person with one or more of the following credentials, or, as determined by the Director of Permit Sonoma, that is the functional equivalent of the below criteria:

- Minimum of a bachelor's degree in physics from an accredited college or university, or
- Industry training or sponsored coursework in acoustical analysis; or,
- Experience working at a firm conducting outdoor acoustical analysis.

Submittal of a previous Noise Analysis for the development project under review is acceptable only if: (1) the project description and the noise-generating land uses and other conditions in the general area have not changed, (2) if the Noise Analysis meets the requirements of these Guidelines, and (3) the Noise Analysis is less than two years old.

These Guidelines apply to all Noise Analysis conducted in connection with applications submitted to Permit Sonoma for discretionary land use entitlements, and for all projects of the County. The Noise Analysis shall be prepared consistent with the requirements set forth in these Guidelines, unless a different scope is approved by Permit Sonoma. The Noise Analysis must cite all references and must clearly state all assumptions used, in addition to providing substantial evidence to support reliance upon such.

The Noise Analysis shall be submitted to Permit Sonoma for review and acceptance. Revisions to the Noise Analysis shall be made when required by Permit Sonoma, prior to Permit Sonoma's acceptance of the Analysis. The need for revisions will be based on: 1) Permit Sonoma's determination regarding the completeness and accuracy of the Noise Analysis, 2) the project's consistency with County policies and standards, 3) the project's compatibility with the surrounding area, and 4) the validity of the impact evaluation methodology and assumptions.

### **C. CRITERIA FOR REQUIRING A NOISE ANALYSIS**

Key factors used in determining if a Noise Analysis is required include: the proposed land use, the types of noises generated by the proposed project, and the proximity of the project to noise impacted areas or noise sensitive land uses.

#### Noise impacted areas (not exclusive):

- Areas near airports, highways, and major roadways with high traffic volumes (see Appendix C)

#### Noise generating land uses include (not exclusive):

- Highways and freeways
- Primary arterial and other roadways
- Railroad operations
- Aircraft and airport operations

- Agricultural processing facilities
- Cannabis operations
- Industrial facilities
- Commercial facilities
- Mining operations
- Recreational, entertainment and outdoor event activities
- Other sources including outdoor activity uses

Noise sensitive uses include (not exclusive):

- Residences (including single family homes, multi-family apartments, condominiums, and mobile homes, and other permitted structures being used as residential uses)
- Schools, both public and private, and day care facilities
- Hospitals, nursing homes and long term medical or mental care facilities
- Churches, synagogues and other places of worship
- Libraries and museums
- Transient lodging
- Office building interiors

Table 1 below provides preliminary screening criteria for determining when a Noise Analysis is required and what type of study should be completed, based on a preliminary review of the project. Permit Sonoma staff may require a Noise Analysis to address specific issues related to a projects operation, ambient conditions, proximity to existing or future noise sensitive land uses, or other issues that arise during the project review process, regardless of the preliminary screening criteria.

**TABLE 1 – PRELIMINARY SCREENING CRITERIA FOR REQUIRING NOISE IMPACT ANALYSIS**

Criteria	Yes	No
A. Does the project propose a noise sensitive land use?		
1. Is the proposed project located in or adjacent to: <ul style="list-style-type: none"> <li>a. A noise generating land use?</li> <li>b. A noise impacted area identified in Attachment C (roads and highways within the 60 and 65 dB Ldn contours)?</li> <li>c. 300 feet of a railroad line?</li> <li>d. 900 feet of a railroad crossing (to address sleep disturbance)?</li> <li>e. A public airport? If yes, consult with Permit Sonoma staff as to compliance with GP Policy AT-1a.</li> </ul>		
<b><i>If the answer to A and any of 1 a - d is yes, then a Noise Analysis is required.</i></b>		
B. Does the project propose a noise generating land use?		
1. Is the project: <ul style="list-style-type: none"> <li>a. Located in a rural area with low ambient conditions?</li> <li>b. A winery or a similar agricultural processing or cannabis cultivation or processing, or a commercial use with outdoor use, parking lot or loading activity within 450 feet of a noise sensitive land use or land zoned for residential or other noise sensitive land use?</li> <li>c. An asphalt batch plant; a recycling facility; contractor's storage or maintenance yard; a kennel; a mechanical or repair shop that uses pneumatic tools, or a similar land use located within 625 feet of an existing noise sensitive land use or land zoned for residential or other noise sensitive land use?</li> <li>d. A land use involving outdoor events or groups of people, non-amplified speech, or music from piano, strings, and woodwinds within 625 feet of a noise sensitive land use or land zoned for residential or other noise sensitive land use?</li> <li>e. A land use involving the outdoor use of amplified sound, or loud instruments such as brass instruments, horns, or drums; a land use that uses any fireworks, explosives or blasting; or a hunting club, firearms range, mining site or a similar use located within 1,600 feet of an existing noise sensitive land use or land zoned for residential or other noise sensitive land use?</li> <li>f. An industrial use that generates substantial noise?</li> <li>g. A land use that generates substantial traffic on public roads?</li> <li>h. A new roadway, roadway extension, or road widening project located within 600 feet of noise sensitive land use?</li> </ul>		

<ul style="list-style-type: none"> <li>i. A land use that includes a 30kW or greater emergency generator that is less than 700 feet from the closest property line? If a smaller output emergency generator is proposed, and it is located less than 700 feet from the closest property line, a noise study is <i>not</i> required.</li> <li>j. A construction project that takes longer than one year to complete; requires pile driving; or involves night time hours of 10 pm to 7 am within 600 feet of a noise sensitive use?</li> <li>k. For a revised project – has the proposed project been revised or otherwise significantly modified from the project that was analyzed in the previous Noise Analysis?</li> </ul>		
<p><b><i>If the answer to B and any of 1 a – k is yes, then a Noise Analysis is required. Further evaluation is needed if the noise generating use is separated from the sensitive use by another noise source (i.e.: highway).</i></b></p>		

**D. NOISE ANALYSIS PROTOCOL**

A meeting with Permit Sonoma staff is recommended prior to beginning a Noise Analysis to define appropriate acoustical methodologies and the scope of the analysis. Topics for discussion include noise measurements adequate to describe existing and future ambient conditions; noise sensitive study areas; duration and location of noise measurements; noise-generating aspects of the proposed use; noise measuring equipment; and the methodology for predicting future noise levels (if applicable).

Two hard copies of the Noise Analysis, and an ADA accessible electronic file copy, shall be submitted to Permit Sonoma. Once accepted by Permit Sonoma as complete, the Noise Analysis will be incorporated into the environmental document for the project. The environmental document will then be made available for public review and circulated to responsible agencies pursuant to CEQA.

**E. NOISE MANAGEMENT METHODOLOGY**

Prior to designing a project and submitting an application for land use entitlements to Permit Sonoma, applicants and their acoustical consultants should consider noise management in the design of their project to minimize noise impacts. Successful noise management is based on a spectrum of considerations and options initiated in the project design phase. Examples of noise mitigation and noise reduction strategies are discussed below, and also in Attachment A.

### Order of Preference for Noise Management:

- a. Control at the Source. Best Management Practices and Best Available Technologies serve to reduce the noise output of the source so that the surrounding environment is better protected against noise increases. These strategies seek to reduce noise levels at the source, and contain excessive noise levels or intrusive noise onsite. Examples include locating noisy onsite activities away from sensitive uses, providing noise barriers around noisy activity areas, restricting hours of operation, siting driveways away from property lines, and requiring the use of quieter equipment (e.g., HVAC equipment). Source controls should always be included in project design wherever practical.
- b. Control in Transmission. This method involves attempts at controlling the noise level by placing noise barriers in the line of sight between a noise source and sensitive receptor. Examples include sound walls at the property line, or use of a new building to function as a sound wall. Note vegetation that blocks line of sight of the noise source rarely offers significant reduction in sound transmission.
- c. Receiver Controls. This method provides noise attenuation at the receiver site, through techniques such as double pane windows, ceilings and walls, double dry wall installed on resilient channels, insulated attics, insulated floors, insulated ventilation ducts, and insulated electrical outlets. Note these methods protect only the internal environment of the receiver and not the external noise environment. In addition, when windows are open, the noise attenuation is reduced. Project applicants will need to consider the feasibility of retrofitting existing buildings under separate ownership to provide receiver controls. A less preferred option are sound walls, which are generally used to control noise from transportation facilities.

### When to Consider Noise Management

The development and planning stages where potential noise impacts should be considered in developing a noise management plan include:

- where to locate noisy activities on the site, taking advantage of intervening structures, topography, or equipment orientation to reduce noise levels at receiver sites
- minimizing the number of noisy events (per week or per year)
- choosing appropriate operating times to minimize intrusiveness and sleep disturbance
- complaint management procedures for the operator
- a noise monitoring plan for the operator
- best management practices for the activity
- whether the noisy activity might reasonably be expected to occur in that zoning district
- community and other stakeholder views

a. Subdivision Stage. When a commitment has already been made to locate residential and industrial land uses close to one another, but subdivision development has not started, there is an opportunity to design the internal subdivision layout to minimize noise impacts. This may apply to new residential or new industrial developments. Noise mitigation strategies that can be used at this stage of development include:

- using the natural topography to prevent line of sight between the noise source and residential areas and thus block direct propagation of noise
- locating activities that are not noise sensitive, such as commercial areas and parkland, between residences and the noise source
- orienting dwellings so that living areas face away from noise sources
- defining areas affected by noise where building design needs to incorporate noise mitigation

b. Building Design Stage. Noise control measures can also be applied to individual buildings to ensure that internal noise levels are acceptable. It is far more cost effective to install appropriate noise insulation at the building stage, rather than later adding it to a finished building. Internal noise can also be minimized by:

- locating living areas away from the area most exposed to a noise source
- using double-pane windows, solid walls and doors, and window and door seals, insulation in the walls, double dry wall installed on resilient channels, insulated attics, insulated floors, insulated ventilation ducts, and insulated electrical outlets.
- carefully selecting the location for installation of noise sources (such as air conditioners and gas water heaters). Similar approaches can be used to prevent noise escaping from properties that generate noise. Considering the impact of a new building's noise sources (e.g. air conditioning unit) is important in minimizing impacts on existing or future neighbors. Site layouts for premises with noisy activities should consider using building structures to shield noisy operations and should locate areas of access to the site or buildings away from noise sensitive areas.
- placing buildings so that the structures themselves create a noise barrier for rear yard areas should also be considered instead of sound walls, to enclose the development

## ATTACHMENT A

### REQUIRED CONTENT AND STANDARDS FOR NOISE ANALYSIS

The following are the required sections of a Noise Analysis.

#### ***I. TITLE PAGE***

- A. Project name, site address, location with the property, APN, and Permit Sonoma File Number
- B. Project sponsor and contact person
- C. Person/organization preparing the report and contact information

#### ***II. TABLE OF CONTENTS***

#### ***III. EXECUTIVE SUMMARY***

If the Noise Analysis is more than 15 pages in length (excluding appendices) it must include an Executive Summary. The executive summary should briefly describe the project and findings and conclusions from the technical portion of the Noise Analysis. The executive summary should be understandable to the general public and include a table listing noise sensitive receptors, existing noise levels, projected noise levels, the types of mitigations proposed, and the mitigated noise levels. The executive summary shall not exceed three pages in length and should describe the following:

- **Scope:** An overview of the scope of the Noise Analysis
- **Project Description:** A summary of the proposed development, including a description of each of its components, the size and intensity of each of the components, and the proximity of each component to a nearby noise source.
- **Land Use:** A brief description of the current land use, General Plan and zoning designation of the project site and in the project vicinity
- **Setting:** A brief description of the site setting and terrain
- **Existing Noise Levels:** discuss ambient noise levels, including traffic, railroad, other nearby noise generating uses, or airport noise (if applicable)
- **Future Noise Levels:** including traffic, railroad, other nearby noise generating uses, or airport noise, (if applicable)
- **Future Cumulative Noise Levels:** discuss any potential cumulative noise levels assuming development of the project, and past, current, and reasonably foreseeable

development, including if the project has any incremental contribution to noise levels that are cumulatively considerable.

- **Findings and Mitigation Measures:** A brief discussion of the findings, mitigations considered (sound walls, building placement/orientation, hours of operation, equipment modification, etc.), areas where abatement/mitigation is not feasible, and justification for infeasibility determinations, and any recommendations.

#### **IV. INTRODUCTION/STUDY PARAMETERS**

##### **A. Introduction**

The introduction should include the purpose of the Noise Analysis, study objectives, and background information, such as need for the project and need for the study, or any other general information useful to the understanding of the Noise Analysis.

##### **B. Fundamentals of Noise and Ground Vibration**

A short review of the physical principles of noise and ground vibration, how noise travels, and how the human ear perceives different types of noise should be included. The intent is to provide a link for lay persons to understand the technical noise information presented in the analysis. Briefly describe the noise characteristics of the type of noise the project would generate. Include a discussion of single event noise and sleep disturbance.

##### **C. Description of the Proposed Development**

The following items must be included in this section:

1. Project location, address, and location map at an appropriate scale showing the project in relation to noise sensitive receivers such as residences, schools, hospitals, churches and parks, within the project vicinity (those within 1,200 feet of the proposed project, or as determined appropriate by Permit Sonoma staff).
2. A description of existing land uses at the project site and existing noise sources, such as roadways, railroads, airports and other noise generating land uses, including in the project vicinity.
3. A statement of the purpose and goals of the project/project objectives.
4. A complete description of the proposed project including the size and intensity of all land uses, construction phasing and duration, hours of operation, and planned completion date. The Project Description should include a detailed description of all components and activities of project construction and operation that could generate noise. If periodic cultural or special events are included in the project, noise generation from these events should be specifically identified.
5. A site plan that is appropriately annotated with a key showing where noise-producing activities will occur, identifying the location of noise measurements, and labeling any sensitive receptors. The site plan shall contain a north arrow and scale. Dimensions from proposed noise sources, noise measurement locations, and relevant property

boundaries and sensitive receptors shall be noted. Also include the required Permit Sonoma Site Plan, with all the required features shown for the specific application type.

6. A cross-section(s) illustrating the elevation of the proposed project, nearby receptors, property lines, and noise generating land uses. Include the line-of-site for any existing structures (natural or man made).

***D. Noise Analysis Study Area***

The Noise Analysis must identify the study area included in the noise assessment. The study area shall include any potentially impacted existing and future noise sensitive land uses or areas within 1,200 feet of the project site or as determined appropriate by Permit Sonoma staff.

***E. Operating Scenarios and Hours to Be Studied***

The Noise Analysis should include sufficient information for the reader to understand how the project will operate during peak and off-peak periods of use, including the times, frequency, and duration of noise-generating activities; as described below:

1. A description of the peak period operating scenarios to be evaluated, and the reasoning behind the selection of these scenarios.
2. A description of the hours of operation to be evaluated, and the reasoning behind the selection of these hours. Include separate descriptions of weekday activities and weekend activities, as well as any proposed evening or nighttime activities.
3. A description of a phasing plan including proposed dates of project completion.

***F. Description of Methodologies and Assumptions***

The Noise Analysis should include a description of the methodologies used, assumptions applied, and the basis or rationale for these assumptions, including all land use projections and assumed future conditions.

1. Describe how noise sensitive receivers were selected and how measurement sites and measurement times for ambient noise levels were determined. When measuring ambient noise consider the following:
  - Ambient Noise and Vibration Levels: the ambient, or pre-project noise level is the noise from all sources near and far, and usually refers to the noise level that is present before a noise source being studied is introduced.
  - Outdoor Activity Area: outdoor activity area includes, but is not limited to, yard areas, pools, patios, gardens, decks, and balconies of single-family dwellings and related accessory structures, and private or community outdoor use areas for multi-family developments, and other areas which have been designated for outdoor activities and recreation.

**G. Characteristics of Noise Measurement Sites:**

- Sites must be clear of major obstructions between source and receiver, unless they are representative of the area of interest; reflecting surfaces should be more than 10 feet from the microphone positions.
- Sites must be free of noise contamination by sources other than those of interest. Avoid sites located near barking dogs, lawn mowers, pool pumps, air conditioners, etc.
- Sites must be acoustically representative of areas and conditions of interest. They must either be located at, or represent, locations of potential human use (this includes yard areas, porches, and sites zoned for noise sensitive land uses).
- Noise measurement sites should be selected according to the purpose of the measurement. For example, if the objective is to determine noise impacts to adjacent rural residential uses, the site selected should be at the property line closest to the nearest residence. The sites should also represent areas of outdoor human use, as defined above as outdoor activity areas.
- If adjustments are made for topography, site geometry, or reflection or absorption of the ground surface, the analysis shall explain and justify how and why these adjustments were made.

**H. Measuring Times, Durations, and Repetition:**

The Noise Analysis should include the following principles, assumptions, and methodologies, and these shall be employed when estimating ambient noise levels:

- Noise characteristics, which yield the worst hourly noise impact on a regular basis, should be used for predicting noise levels and assessing noise impacts. In some cases, weekly and/or seasonal variations need to be taken into consideration to use the peak operating period of the use.
- To determine ambient noise levels, a minimum, 24-hour weekday and 24-hour weekend measurements need to be recorded and analyzed.
- Ambient day and night-time noise levels shall be determined based on the *average of the four quietest hours* (Leq), measured during the day or night.
- Audio recordings should be evaluated to determine the source of any unusual peak noise levels (aircraft, dogs barking, etc.) and explained.
- Steps must be taken to exclude noise sources when under the control of the applicant (barking dogs, vehicles, other equipment, etc).
- A noise measurement representing an hourly Leq need not last the entire hour. A shorter time period will usually be sufficient to represent the entire hour of interest, provided noise levels do not change significantly during the hour, however, a

minimum of a 15-minute measurement is required. The length of measurements depends on the extent to which noise levels fluctuate. A measurement may be terminated when the range of the fluctuations in displayed Leq is less than 0.5 dBA.

- Because of the potential variables and errors that may occur during a measurement, it is recommended that a time-averaged measurement (such as the Leq descriptor) be repeated *at least once* at each site. The recommended minimum of two measurements should be taken independently (at the same time or at different time intervals). If more than one measurement is taken, the mean noise levels for the two measurements should agree within 2.0 dBA.

*I. Field Measurement Procedures:*

The following information must be documented in the Noise Analysis:

- Time and date of noise and vibration measurements
- Type of noise and vibration measuring instruments and data recorders used, as well as a brief description of calibration and field setup
- Noise and vibration measurements (note field data needs to be included as appendices to the Noise Analysis)
- Traffic counts and speeds during the noise measurements (if applicable)
- Meteorology during the noise measurements
- Data reduction

*J. Noise Prediction Methodology Used:*

The following assumptions and measurement variables must be documented in the Noise Analysis:

- Describe all assumptions used for project-predicted noise levels
- Were similar land use activities or project operations measured at other locations?
- Was proposed construction or anticipated project equipment brought to the site and noise levels measured?
- Were noise levels assumed from prior studies, reports, or publications? If yes, justify and cite the references
- For noise consisting primarily of speech or music (amplified or non-amplified), a minimum of two similar events in the local area is necessary (Sonoma County preferred, if available). Data from events within the last seven years shall be used as a reference in order to predict proposed noise levels

- There are several methods of averaging sound data (i.e., CNEL, Ldn, Leq, mean). The methodology used for measuring project noise levels must be consistent with the methodology used for measuring ambient noise, and with the manufacturer's data or other published data sources used

***K. Thresholds:***

The Noise Analysis must identify the applicable noise thresholds as provided in Attachment B, The General Plan, and the CEQA Guidelines.

**V. NOISE IMPACT ANALYSIS**

***A. Existing Noise Environment***

The Noise Analysis must include the following:

1. Detailed description of the existing surrounding land uses that could be impacted or that contribute to existing ambient noise (including transportation noise on nearby roadways or other transportation related noise sources).
2. Maps showing sensitive noise receivers and noise measurement sites.
3. Table showing existing noise levels at receivers, including:
  - a. Field measured results (ambient and background)
  - b. Modeled results
4. Discussion on model calibration (if appropriate) for adjusting modeled noise levels (existing or future).

***B. Other Noise Considerations***

The following other potential noise issues need to be considered in the Noise Analysis, as applicable.

***1. Parking Lot Noise***

Parking lots can generate various noise levels from doors closing, engines starting, car alarms, vehicles circulating in the lot, and voices. The maximum instantaneous noise levels typically range from 50 – 60 dbA at 50 feet. In addition, depending on the use of the parking lot, noise levels can vary. In order to address the variability in parking lot use, parking lot noise modeling needs to be conducted for two scenarios, as applicable: 1) for a site with the edge of a parking lot that is 200 feet or closer to a receptor on an adjacent parcel; and 2) for a site with the edge of the parking lot 200 feet or greater to a receptor on an adjacent parcel, using the following methods:

a. For the Edge of a Parking Lot 200 Feet or Less from Closest Receptor:

For this scenario, the noise center of the parking lot needs to be adjusted, based on site specific preferential parking – ie, shaded parking spaces, or parking spaces closest to the event or subject venue. The Noise Analysis needs to explain the justification for the determination of the noise center location. Once the noise center has been defined, then the noise analysis will be from the noise center to the property line of the receptor along the closest line of site (or to the outdoor area of the receptor if an exception to the standard has been approved). The noise analysis shall include the L02, L08, L25, and L50 noise levels.

b. For the Edge of a Parking Lot 200 Feet or More from Closest Receptor:

For this scenario, the noise center may be defined as the center of the parking lot. The Noise Analysis needs to explain the justification for the determination of the noise center location. Once the noise center has been identified, then the noise analysis will be from the noise center to the property line of the receptor along the closest line-of-sight (or to the outdoor area receptor if an exception to the standard is approved). The noise analysis shall include the L02, L08, L25, and L50 noise levels.

2. Emergency Generators

Although used infrequently, emergency generators can cause noise impacts from use. Noise from the emergency use of generators must be included in the Noise Analysis at full load. Consider location and acoustical shielding to reduce noise levels at the property lines of sensitive uses or outdoor activity areas per Sonoma County General Plan Policy NE-1c (5). Note this includes meeting the nighttime noise standards, when applicable.

3. Sleep Disturbance

While there are no widely accepted industry thresholds for sleep disturbance, the Noise Analysis needs to include a discussion of potential sleep disturbance issues during the hours of 10:00 pm and 7:00 am, where the source consists of intermittent single events. Consider noise from any nighttime operations, including traffic coming to and leaving the site. Emphasis should be on minimizing or eliminating noise during these hours. Generally, when two or more events exceed the 45 dBA interior noise threshold, the concern of sleep disturbance needs to be evaluated.

4. Low Frequency Noise and Vibration

Low frequency noise and vibration impacts need to be considered for projects such as blasting, pile driving, repetitive noise, in addition to mechanical equipment. The Noise Analysis needs to consider the most appropriate noise descriptor and justify use of any alternative methodology. Such techniques could include using a “C” scale or adjusting the meter settings.

## 5. Temporary Construction Noise

Temporary construction noise generally needs to be evaluated at a qualitative level, given its temporary and short term nature, however, construction noise may be considered significant if it occurs in the early morning or evening hours and require a qualitative analysis. If construction activities occur during the hours 10 pm to 7 am, then the noise standards in Attachment B shall be applied. If construction activities and the associated noise were to occur for a period of more than one year, then the noise analysis, using the General Plan thresholds as shown in Attachment B, will be required.

Although there is often little that can be done to reduce noise levels generated by construction equipment, measures should be considered in cases where sensitive receptors may be impacted. Measures to be considered include:

- Limiting hours of construction to avoid the early morning and evening hours (such as 7 am to 7 pm weekdays and 7 am to 5 pm weekends)
- Limiting work to non-motorized equipment on Sundays and holidays
- Using sound blankets for loud operations such as pile driving, air compressors or other mechanical equipment, and consider pre-drilling holes prior to pile driving
- Siting construction staging areas as far as practical from nearby sensitive receptors
- Require street legal mufflers on all construction equipment

When evaluation of construction-related noise is warranted, the following should be considered:

- Discussion of noise levels associated with proposed equipment; hours of operation; and duration of construction activities. The emphasis should be on the types of equipment that generate the most persistent and objectionable sounds, such as backup alarms, jackhammers, pavement saw cutting, metal dumpsters, tub grinders, chain saws, chippers, compressors, and pile drivers.
- A table showing predicted noise levels in the Study Area
- Discussion of noise abatement options (equipment mufflers, hours of operation, location of staging areas, sound blankets, etc.)

## 6. Periodic Noise Events from Blasting, Firearms Ranges, Hunting Clubs, Fireworks Displays or similar

These types of activities must be addressed in the Noise Analysis, as applicable.

## C. Cumulative Noise Environment

The Noise Analysis needs to consider the potential for how any new noise sources generated by the proposed project could contribute to the cumulative noise in the project area.

**D. CEQA Initial Study Checklist Questions:**

In addition to the above analysis, the noise study must specifically answer the CEQA Initial Study checklist questions, as listed below.

Will the project result in:

12 a): Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

12 b): Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

12 c): A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

12 d): A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

12 e): For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

12 f): For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

See Attachment B as to the methods used to address these questions.

Examples of previously prepared Noise Analysis and CEQA assessments are available from Permit Sonoma planning staff, and some are posted on the Permit Sonoma web site. A good example of a study addressing groundborne vibration and noise levels from blasting was for the Stony Point Road Quarry Project in 2013 (Permit Sonoma file number PLP09-0004). Other examples of periodic noise include grape crushing and wine bottling operations, blasting, fireworks displays, firearms ranges, and hunting clubs.

**E. Discussion of Noise Impacts**

The analysis must address the following:

1. An explanation for the siting of facilities
2. Impact of the proposed sitting on surrounding noise-sensitive land uses (for each activity area, if more than one)
3. Discussion of the proposed equipment, vehicles, and other noise-generating features
4. Impact of equipment, vehicles, and other noise generating features on surrounding land uses

The analysis must also include the following:

- A. A calculation of noise levels at the property lines and at sensitive receptors, based on measured and identified noise sources.
- B. Identify and describe potentially significant adverse impacts that would occur prior to implementation of mitigation measures.
  - 1. Comparison of various noise levels to General Plan Noise Element Table NE-2 (in Attachment B) and 60 dB Ldn (road or rail), and 65 dB CNEL (aircraft) thresholds, including:
    - a. Discussion of any qualifying exceptions that would allow or require Table NE-2 thresholds to be modified, or the 60dB Ldn (for road or rail) to be exceeded.
    - b. Discussion of any areas where Table NE-2 values, or Ldn's or CNEL's exceed thresholds.
  - 2. Summarize impacts in a table/matrix.

## **VI. RECOMMENDED MITIGATIONS**

This section must include the following:

- A. Recommended site planning modifications, operational restrictions, construction features to attenuate noise, relocation/reorientation of noise sources away from noise-sensitive uses, and other revisions to mitigate each of the identified adverse impacts, must be described. Recommendations shall include a thorough assessment of the site plan and operational alternatives. Recommended mitigation measures or project revisions should be designed to meet the thresholds in Table NE-2, and applicable Ldn or CNEL values for transportation noise sources, and applicable groundborne vibration standards. The recommendations should include:
  - 1. Descriptions of each recommended improvement and the timing, phasing plan or required thresholds for implementing the noise reduction mitigation.
  - 2. Explanation of how each improvement mitigates the related adverse impact.
  - 2. Maps or drawings of the recommended changes/improvements.
  - 3. An analysis of the timing and responsibilities for implementation of mitigation measures.
  - 4. A table showing future (cumulative) noise levels and noise reduction for each noise mitigation measure.
  - 5. Discussion of areas where noise abatement/mitigation is not feasible and an explanation as to why.

6. Discussion of a method of verification of mitigations by County staff that are not visible from the public right of way or inspected under a building permit. Mitigations that are difficult to verify are to be avoided.

Each noise mitigation shall be accompanied by a detailed description of the characteristics needed to construct the mitigation, for example: if a sound wall is proposed, the analysis must specify the height, length, location on the site map, materials used, etc. Also, the analysis must consider secondary impacts such as aesthetics, sight distance for traffic, etc. of any mitigation measure. The study should discuss where analysis by other experts may be needed to address the secondary impacts of the mitigation measures.

- B.** Priority of mitigations should be considered in the Noise Analysis in the following order:
  1. Elimination of the sound source (i.e., looped driveways to remove the need for backup alarms, reduction in the number of events, etc.).
  2. Relocation of the sound source (i.e., move the driveway to the facility away from nearby receptors).
  3. Engineered reduction of the sound source (i.e., use of higher grade mufflers, sound insulating enclosures of mechanical equipment, sound berms, sound blankets, sound walls etc.).
  4. Management control of the sound source (i.e., 10 pm closure, prohibition on amplified noise, noise monitoring with authority to immediately reduce or stop the activity, preparation of a Noise Management Plan as described in section IX).

## **VII. NOISE IMPACTS WITH PROPOSED MITIGATIONS**

The Noise Analysis must include the following:

1. A list of the significant sound sources on the property.
2. A list of mitigation measures to be in place before each sound source is placed in operation.
3. A description of the noise reduction achieved by each separate mitigation, and a specific/detailed explanation of how noise attenuation is achieved.
4. Description of how the mitigations result in compliance (or non-compliance) with the thresholds as described in Attachment B.
5. A table that shows the calculated noise levels with and without mitigation for easy comparison.
6. A discussion of any noise monitoring as part of the project.
7. A list of mitigations to be applied to each sound source when monitoring identifies a violation of the county noise standards.

8. A discussion of procedures to be implemented for terminating sound sources that do not meet the county noise standards after mitigation.

## ***IX. COMPLIANCE MONITORING***

Monitoring of operational and construction noise levels from a development to determine condition compliance is essential to proper management of noise sources. This is the responsibility of the development proponent, and should generally be performed at specific stages of a development and/or as a result of complaints from affected receivers. Monitoring of all mitigation measures is required by CEQA. Condition compliance fees for Permit Sonoma staff to receive and review monitoring reports will be included in project conditions of approval. A good monitoring program should involve the community in reviewing the performance of a development by providing the community with access to noise monitoring results and an opportunity to express concerns directly to the project sponsor.

An additional way to monitor the performance of a development project is to establish a sponsor run complaints system. This is a beneficial management tool, allowing further involvement of the community in the performance review of a development. The sections below outline the various methods for reviewing and managing the performance of a development project.

### Monitoring on a Continual Basis:

In some cases, monitoring on a continual basis may be warranted, such as for events with outdoor amplified music, or for industrial uses where the predicted noise levels were not known with certainty. The frequency of monitoring could range from monthly to annually depending on the use. Monitoring could automatically cease if condition compliance was demonstrated for a stated number of consecutive reports - and could be resumed on a valid complaint basis.

### Monitoring at Specific Stages of a Development:

This involves identifying the various stages of a development where different noise outputs were predicted during the assessment process, and monitoring at each of these stages. For example, for industrial projects, noise could be monitored during the first year of operation and at four or five other key years in the buildout of the project. Noise could be monitored over a full day (day, evening and night), a week, or longer depending on the development. It will usually be necessary to monitor noise at several sites, but these should at least include noise sensitive locations where noise levels are likely to be the highest.

### Monitoring as a Result of Community Complaints:

Another method is to monitor noise levels as a result of community complaints. This may be done in addition to noise monitoring at various stages of the development described above, or could stand alone as the sole driver for performance monitoring. With this option, noise should be monitored at the property lines or as conditioned in the Use Permit. Monitoring should also be conducted to cover the time at which noise impacts were reported to occur.

### Results of Non-Compliance with Conditions:

If results come back in excess of the projects conditioned noise levels, the conditions of approval will be considered in violation. In such case, the applicant must develop alternative

measures that will bring the noise levels into compliance, re-monitor and report back to the Permit Sonoma project planner. This report must describe in detail the actions taken to bring the project back into compliance. Failure to comply with conditions of approval may result in the project being brought back to the decision making body for a public hearing to consider modification or revocation of the entitlement.

#### Preparation of a Noise Management Plan:

In some cases, there may be a need for a long term Noise Monitoring Plan (Plan). The Plan shall specify if a qualified Outdoor Acoustical Consultant will be contracted to do long term monitoring, or if the applicant will do the long term monitoring. If the applicant proposes to implement the long term monitoring plan, then the following will be required to be provided to Permit Sonoma:

1. The name and qualifications of the acoustic consultant preparing the Plan.
2. The make and model of outdoor sound equipment to be purchased.
3. The training classes to be attended.
4. Which persons or employees (by job title) are to be trained to use the sound equipment.
5. Training for new or replacement employees shall be specified.
6. A sufficient number of persons or employees shall be trained so all events can be monitored.
7. The noise monitoring locations shall be specified on the site plan.
8. The location and type of complaint shall dictate which monitoring locations are used.
9. The acceptable dBA value shall be specified for each monitoring location.
10. The frequency of monitoring shall be specified for each monitoring site based upon the location and type of complaint.
11. The trained person for noise monitoring shall be empowered to alter or modify events or operations immediately if specified noise levels are exceeded.
12. The trained person for noise monitoring shall be empowered to halt or cease events or operations immediately if modifications fail to bring the site into compliance with the County noise standards.
13. An equipment log is required to record dates of equipment calibration.
14. An event log is required to record the results of noise monitoring, and modifications that were made to address noise issues, and any noise complaints received from nearby sites.

#### **X. TECHNICAL APPENDICES**

Include the following in a technical appendices if not already part of the Noise Analysis:

- a. Data collected for the study including graphs, noise level charts and tables, and work sheets
- b. Projected land use assumptions and cumulative projects list
- c. Future noise contours for transportation noise sources

- d. Noise Instruments manufacturers, models, types, serial numbers, and calibration
- e. Noise Measurement site details and instrument setups
- f. Noise Measurement procedures, duration, and number of repetitions
- g. Measured noise data, dates, and times
- h. Meteorological conditions during recording of noise measurements
- i. Data reduction and measurement results
- j. Details of any computer modeling assumptions, inputs, and outputs
- k. References, including prior studies in the study area (references cited must be available to the County upon request)
- l. Study participants and persons contacted

**ATTACHMENT B**  
**POLICY FRAMEWORK**  
**GENERAL PLAN NOISE ELEMENT POLICIES and THRESHOLDS**

This section identifies the General Plan 2020 (adopted by the Board of Supervisors in 2008) Noise Element policies which govern the regulation of new noise-producing land uses, and the siting of noise sensitive land uses. The Noise Guidelines also provide policy direction with regard to the application of General Plan policies to new development. The Noise Element seeks to minimize and reduce noise impacts related to land use compatibility, typically “point source” noises and transportation corridor-related noises (roads, railroads, aircraft).

**I. General Plan Goals and Policies**

Below are the basic goals of the 2020 Noise Element:

**GOAL NE-1:** *“Protect people from the adverse effects of exposure to excessive noise and to achieve an environment in which people and land uses may function without impairment from noise.”*

**Objective NE-1.1:** *“Provide noise exposure information so that noise impacts may be effectively evaluated in land use planning and project review.”*

**Objective NE-1.2:** *“Develop and implement measures to avoid exposure of people to excessive noise levels.”*

**Objective NE-1.3:** *“Protect the present noise environment and prevent intrusion of new noise sources which would substantially alter the noise environment.”*

**Objective NE-1.4:** *“Mitigate noise from recreational and visitor serving uses.”*

**Policy NE-1a:** *“Designate areas within Sonoma County as noise impacted if they are exposed to existing or projected exterior noise levels exceeding 60 dB Ldn, 60 dB CNEL, or the performance standards of Table NE-2.”*

Discussion:

When a Noise Analysis is prepared, and alternatives and mitigations assessed to reduce noise levels, the final noise levels need to be consistent with all of the following:

- Table NE-2 standards, which are used to assess impacts related to point-source noises;
- Consistent with the 60 Ldn for roadway or rail noises;
- Consistent with the 60dB CNEL for areas surrounding airports.

**Policy NE-1b:** *“Avoid noise sensitive land use development in noise impacted areas unless effective measures are included to reduce noise levels. For noise due to traffic on public roadways, railroads and airports, reduce exterior noise to 60 dB Ldn or less in outdoor activity areas and interior noise levels to 45 dB Ldn or less with windows and doors closed. Where it is not possible to meet this 60 dB Ldn standard using a practical application of the best available noise reduction technology, a maximum level of up to 65 dB Ldn may be allowed but interior noise level shall be maintained so as not to exceed 45 dB Ldn. For uses such as Single Room Occupancy, Work-Live, Mixed Use Projects, and Caretaker Units, exterior noise levels above 65 dB Ldn or the Table NE-2 standards may be considered if the interior standards of 45 dB Ldn can be met. For schools, libraries, offices, and other similar uses, the interior noise standard shall be 45 dB Leq in the worst case hour when the building is in use.”*

Discussion:

See Attachment C for roadway noise contours to assist in determining noise impacted roadways. Note this attachment is not exhaustive, and should be used as a guide only. Although the contours are good for traffic volumes, they do not account for tire noise due to change in pavement type, braking or the use of jake brakes, or acceleration after stops or due to uphill climbs.

The definition of outdoor activity areas includes, but not limited to, yard areas, pools, patios, gardens, decks, and balconies of single-family dwellings and related accessory structures, and private or community outdoors use areas for multi-family developments, and other areas which have been designated for outdoor activities and recreation.

Alternatives which must be assessed include orienting buildings such that the outdoor activity areas are not located within noise impacted areas, or so that building orientation provides noise attenuation to outdoor activity areas.

Best available noise reduction technology examples include: landscape berms, landscape berms with a sound wall on top, sound walls, and sound fencing.

**Policy NE-1c:** *“Control non-transportation related noise from new projects. The total noise level resulting from new sources shall not exceed the standards in Table NE-2 as measured at the exterior property line of any adjacent noise sensitive land use. Limit exceptions to the following:*

- (1) *If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level, up to a maximum of 5 dBA above the standard, provided that no measurable increase (i.e. +/- 1.5 dBA) shall be allowed;*
- (2) *Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises, such as pile drivers and dog barking at kennels;*
- (3) *Reduce the applicable standards in Table NE-2 by 5 decibels if the proposed use exceeds the ambient level by 10 or more decibels;*
- (4) *For short term noise sources which are permitted to operate no more than six days per year, such as concerts or race events, the allowable noise exposures shown in Table NE-2 may be increased by 5 dB. These events shall be subject to a noise management plan including provisions for maximum noise level limits, noise monitoring, complaint response and allowable hours of operation. The plan shall address potential cumulative noise impacts from all events in the area;*
- (5) *Noise levels may be measured at the location of the outdoor activity area of the noise sensitive land use, instead of the exterior property line of the adjacent noise sensitive land use where:*
  - (a) *the property on which the noise sensitive use is located has already been substantially developed pursuant to its existing zoning, and*
  - (b) *there is available open land on those noise sensitive lands for noise attenuation.*

*This exception may not be used on vacant properties which are zoned to allow noise sensitive uses.”*

**Table NE-2 Maximum Allowable Exterior Noise Exposures for Non-Transportation Noise Sources**

<b>Hourly Noise Metric<sup>1</sup>, dBA</b>	<b>Daytime (7 am to 10 pm)</b>	<b>Nighttime (10 pm to 7 am)</b>
<i>L50 (30 minutes in any hour)</i>	50	45
<i>L25 (15 minutes in any hour)</i>	55	50
<i>L08 (4 minutes 48 seconds in any hour)</i>	60	55
<i>L02 (72 seconds in any hour)</i>	65	60

<sup>1</sup> The sound level exceeded n% of the time in any hour. For example, the L50 is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level.

\*Sonoma County General Plan 2020.

### Discussion:

Adjustments to Table NE-2 must be done in the order outlined in Policy NE-1c, and the Noise Analysis must explain what adjustments were done and why, and provide a table of the revised standards with notes explaining the adjustments. The table must show the noise levels with and without the adjustments to Table NE-2.

**Policy NE-1c (1)** – This policy is to address situations where the existing noise environment already exceeds Table NE-2, and allows a proposed project to generate more noise. This does not mean the project is allowed to generate 70 dbA. This policy is intended to avoid allowing an ambient level to “creep” upward without limit and would result in potential cumulatively significant noise impacts.

The Noise Analysis must consider any permanent increase in ambient noise levels created by the project. See discussion in Goal NE-1 above.

**Policy NE-1c (2)** – This policy is to address noises that tend to be more annoying. Note that the noise does not have to be amplified for the adjustment to be applied.

**Policy NE-1c (3)** – This policy is to address portions of the County that have very low ambient noise levels.

**Policy NE-1c (4)** – If a proposed project requests using this exception, the applicant shall submit a Noise Management Plan with the Noise Analysis for the project. Noise monitors must be trained and present during the events, and they need to be authorized to immediately correct the violation to meet County standards. Phone numbers shall be posted on site and distributed to the neighbors as to who to call if there are complaints of the noise levels.

In order to address the cumulative noise impacts of events in the area, the Noise Analysis shall include all events within 1,200 feet of the proposed project, and any recurring zoning permits, by analyzing the County winery database.

**Policy NE-1c (5)** – “Substantially developed” means parcels where the density has been exhausted. If this exception is requested, the Noise Analysis must identify the appropriate location where noise standards must be met, and evaluate both the property line and the outdoor activity area of the noise sensitive land use.

“Available open land” means areas with limited or no regular human activity, such as grazing lands, vineyards, or forested areas, or a minimum of 300 feet from a residential structure or other sensitive land use.

**Table NE-2** applies to non-transportation noise, which includes all project noise except the noise which occurs on public roads and highways.

For a project to comply with the thresholds in Table NE-2, it must be consistent with all four of the hourly noise metrics listed in Table NE-2. Standard statistical methods of rounding shall be used (ie, if the decimal is 0.5, round down if next whole number is even, and round up if odd). Staff may waive the noise analysis and require only ambient noise level measurements in remote areas where ambient levels are low, and the distance to noise sensitive land uses is substantial (typically a quarter-mile or more away).

When the project conditions of approval are drafted by the County and included in the proposed use permit, any adjustments to the noise thresholds in Table NE-2 shall be made very clear as a footnote on the table.

Any given project could have multiple receptors and activities requiring separate Table NE-2 standards analysis with different adjustments, as applicable.

**Policy NE-1d (4)** – *“Include estimated noise levels in terms of Ldn and/or the standards of Table NE-2 for existing and projected future (20 years hence) conditions, based on accepted engineering data and practices, with a comparison made to the adopted policies of the Noise Element. Where low frequency noise (ex: blasting) would be generated, include assessment of noise levels and vibration using the most appropriate measuring technique to adequately characterize the impact.*

#### Discussion:

Future noise projections are commonly done for transportation or airport projects related to future traffic projections. For projects such as these, provide information on what the traffic projections were based on and the source of the projections.

Low frequency noise needs to be considered for projects such as blasting, in addition to mechanical equipment. The Noise Analysis needs to consider the most appropriate noise descriptor and justify use of any alternative methodology. Such techniques could include using a “C” scale or adjusting the meter settings.

## **II. Definitions**

**ADT** – average daily traffic: the average 24-hour volume of traffic on a given roadway at a designated point.

**dB** – decibel: a logarithmic unit of the loudness (intensity) of a sound. The loudness of normal adult human voice is approximately 70 dB at three feet.

**dBA** – decibel A-weighted average: a unit of measurement used to measure “A-weighted” sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear, and is most commonly used for environmental noise assessment, as it correlates well with human response to noise sources such as aircraft or traffic. To measure low frequency sound levels, such as blasting, the “C” weighted scale may be more appropriate.

**CNEL** –community noise exposure level: the average sound level during a 24-hour day, obtained after the addition of 5 decibels to sound levels in the evening, from 7:00 pm to 10:00 pm, and 10 decibels added to the sound levels in the night, from 10:00 pm to 7:00 am. Note there is usually little difference between the CNEL and the Ldn, and they are often used interchangeably.

**Ldn** – day/night average sound level: the average equivalent sound level during a 24-hour day, obtained after the addition of ten decibels to sound levels in the night, between 10:00 pm and 7:00 am.

**Leq** – equivalent sound level: the sound level containing the same total energy as a time varying sound over a given sample period. Leq is typically calculated over a one-hour sample period.

**Lmax** – the maximum noise level measured.

**ATTACHMENT C**  
**DISTANCES TO EXISTING LDN TRAFFIC NOISE CONTOURS FOR ROADS**  
**AND STATE HIGHWAYS**

The following pages were taken from the General Plan 2020 EIR, Appendix 7.7, Noise, January 2006.

**Exhibit 7.7-5**  
**Distances To Existing Ldn Traffic Noise Contours, Sonoma State Highways**

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB L<sub>dn</sub>, feet</b>	<b>Distance to 65 dB L<sub>dn</sub>, feet</b>
SR 1	Sonoma County Petaluma Valley Ford Road	54	25
SR 1	Valley Ford/Freestone Roads	52	24
SR 1	Bodega Highway	52	24
SR 1	Eastshore Road	65	30
SR 1	Jct. Rte. 116 East	39	18
SR 1	Jenner	23	11

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB L<sub>dn</sub>, feet</b>	<b>Distance to 65 dB L<sub>dn</sub>, feet</b>
SR 1	Fort Ross, Fort Ross Road	22	10
SR 1	Stewarts Point/Skaggs Springs Road	25	12
SR 12	Sebastopol, Jct. Rte. 116, Main Street	189	88
SR 12	Sebastopol East City Limits	273	127
SR 12	Santa Rosa, Wright/Fulton Roads	400	186
SR 12	Santa Rosa, Stony Point Road	581	270
SR 12	Santa Rosa, Dutton Avenue	642	298
SR 12	Santa Rosa, Jct. Rte. 101	662	307
SR 12	Santa Rosa, Bennett Valley Road	488	226
SR 12	Santa Rosa, Brookwood/Maple Avenues	560	260
SR 12	Santa Rosa, Farmers Lane, West Junction	441	205
SR 12	Santa Rosa, Brush Creek Road	429	199
SR 12	Santa Rosa, Farmers Lane, East Junction	461	214
SR 12	Santa Rosa, Middle Rincon Road	445	207
SR 12	Santa Rosa, Calistoga Road	362	168
SR 12	Santa Rosa, Los Alamos Road	324	150
SR 12	Adobe Canyon Road	281	131
SR 12	Kenwood, Warm Springs Road	266	123
SR 12	Trinity Road	270	125
SR 12	Arnold Drive	252	117
SR 12	Madrone Road	207	96
SR 12	Cavedale Road	151	70
SR 12	Agua Caliente Road	131	61
SR 12	Boyes Boulevard	113	52
SR 12	Verano Avenue	119	55
SR 12	Sonoma, Petaluma Avenue	122	57

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB L<sub>dn</sub>, feet</b>	<b>Distance to 65 dB L<sub>dn</sub>, feet</b>
SR 12	Sonoma, Fifth Street West	102	47
SR 12	Sonoma, First Street West	96	44
SR 12	Sonoma, Patten Street	81	37
SR 12	Sonoma, Mac Arthur Street	129	60
SR 12	Napa/Leveroni Roads	107	50
SR 12	Watmaugh Road	149	69
SR 37	Sonoma County Lakeville Road	860	399
SR 37	Jct. Rte. 121 North	686	318
SR 101	Sonoma County Kastania Road	1627	755
SR 101	South Petaluma Boulevard	1566	727
SR 101	Petaluma, South Jct. Rte. 116 East	1686	783
SR 101	Petaluma, East Washington Street	1674	777
SR 101	Petaluma, Old Redwood Highway North	1780	826
SR 101	Pepper Road	1745	810
SR 101	Railroad Avenue	1609	747
SR 101	Cotati, Sierra Avenue	1555	722
SR 101	Cotati, North Jct. Rte. 116	1609	747
SR 101	Rohnert Park, Rohnert Park Expressway	1663	772
SR 101	Rohnert Park, Wilfred Avenue	1860	863
SR 101	Santa Rosa Avenue	1468	682
SR 101	Todd Road	1468	682
SR 101	Santa Rosa, Hearn Avenue	1526	708
SR 101	Santa Rosa, Baker Avenue	1620	752
SR 101	Santa Rosa, Jct. Rte. 12, Third Street	1488	691
SR 101	Santa Rosa, Fourth Street	1620	752
SR 101	Santa Rosa, College Avenue	1564	726

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB L<sub>dn</sub>, feet</b>	<b>Distance to 65 dB L<sub>dn</sub>, feet</b>
SR 101	Santa Rosa, Steele Lane	1478	686
SR 101	Santa Rosa, Bicentennial Way	1278	593
SR 101	Santa Rosa, Mendocino Avenue	1299	603
SR 101	Santa Rosa, Hopper Avenue	1370	636
SR 101	East Fulton/River Roads	1529	710
SR 101	Fulton Road	1582	735
SR 101	Airport Boulevard	1516	704
SR 101	Shiloh Road	1321	613
SR 101	Windsor River Road	1078	501
SR 101	Grant Avenue	918	426
SR 101	South Healdsburg	752	349
SR 101	Healdsburg, Westside Road	825	383
SR 101	Healdsburg, Dry Creek Road	701	325
SR 101	Lytton Springs Road	683	317
SR 101	Independence Lane	674	313
SR 101	South Geyserville	608	282
SR 101	Jct. Rte. 128 East, Canyon Road	606	281
SR 101	Asti	604	280
SR 101	Dutcher Creek Road	604	280
SR 101	South Cloverdale	560	260
SR 101	Central Cloverdale/Citrus Fair Drive	487	226
SR 101	Jct. Rte. 128 West	481	223
SR 116	Jct. Rte. 1; Jenner, South	69	32
SR 116	Austin Creek	117	54
SR 116	Monte Rio Road (Town Center)	139	65
SR 116	Guernewood Park, Hulbert Creek Bridge	197	91

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB L<sub>dn</sub>, feet</b>	<b>Distance to 65 dB L<sub>dn</sub>, feet</b>
SR 116	Guerneville, Armstrong Woods Road	140	65
SR 116	Santa Nella Winery Road	66	31
SR 116	Forestville, Mirabel Road	181	84
SR 116	Guerneville Road	176	81
SR 116	Graton/Frei Roads	224	104
SR 116	Occidental/Molino Roads	225	105
SR 116	Sebastopol, Covert Lane	272	126
SR 116	Sebastopol, on Main Street	251	117
SR 116	Sebastopol, on Petaluma Avenue	179	83
SR 116	Sebastopol, Jct. Rte. 12 East	213	99
SR 116	Sebastopol, Jct. Rte. 12 East	218	101
SR 116	Sebastopol, Petaluma Avenue	323	150
SR 116	Bloomfield Road	244	113
SR 116	Mt. Vernon/lone Pine Roads	246	114
SR 116	Stony Point Road (East)	235	109
SR 116	Petaluma, South Jct. Rte. 101	568	263
SR 116	Frates Road/Cader Lane	476	221
SR 116	Lakeville Road	106	49
SR 116	Adobe Road	391	181
SR 116	Watmaugh Road (To Sonoma)	347	161
SR 116	Arnold Drive	380	176
SR 121	Jct. Rte. 37	369	171
SR 121	Jct. Rte. 116 West, Arnold Drive	435	202
SR 121	Jct. Rte. 12 North; Schellville, West	401	186
SR 121	Schellville, Eighth Street	407	189
SR 121	Ramal Road	373	173

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB L<sub>dn</sub>, feet</b>	<b>Distance to 65 dB L<sub>dn</sub>, feet</b>
SR 121	Napa Road	558	259
SR 121	Mendocino Sonoma County Line	95	44
SR 121	South Jct. Rte. 101, Canyon Road	98	46
SR 121	Canyon Road/Old Redwood Highway	100	46
SR 121	River Road	73	34
SR 121	Geyersville, Old Redwood Highway	115	53
SR 121	Geysers Road	88	41
SR 121	Alexander Valley Road	152	71
SR 121	Pine Flat Road	138	64
SR 121	Chalk Hill Road	104	48
SR 121	Kellogg, Franz Valley Road	81	38
SR 121	Sonoma County Napa County	107	49

**Exhibit 7.7-6****Distances to Existing Ldn Traffic Noise Contours, Sonoma County Roads**

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Adobe Rd	E/Old Redwood Hwy N	76	35
Adobe Rd	W/Petaluma Hill Rd	84	39
Adobe Rd	W/Woodward Ave	171	79
Adobe Rd	E/Woodward Ave	171	79
Adobe Rd	W/ Corona Rd	189	88
Adobe Rd	W/ East Washington Rd	181	84
Adobe Rd	E/ East Washington Rd	190	88
Adobe Rd	E/ Frates Rd	208	96
Agua Caliente Rd	E/Arnold Dr	37	17
Airport Blvd	W/Ordinance Rd	52	24
Airport Blvd	W/Laughlin Rd	60	28
Airport Blvd	E/ Skylane	134	62
Airport Blvd	E/ Brickway	173	80
Airport Blvd	W/ Regional Parkway	145	67
Airport Blvd	E/ Concourse Blvd	143	67
Airport Blvd	E/ RR Tracks	179	83
Airport Blvd	E/ Regional Pkwy	203	94
Airport Blvd	E/ Aviation Blvd	258	120
Airport Blvd	W/ Fulton Rd	140	65
Airport Blvd	E/ Fulton Rd	151	70
Airport Blvd	W/ Faught Rd	87	40
Alexander Valley Rd	W/ Lytton Station Rd	82	38
Armstrong Woods Rd	N/ Hwy 116	40	18
Armstrong Woods Rd	N/ Watson	18	8

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Arnold Dr	S/ Watmaugh Rd	201	93
Arnold Dr	N/ Watmaugh Rd	237	110
Arnold Dr	N/ Almeria	254	118
Arnold Dr	N/ Leveroni Rd	219	102
Arnold Dr	S/ Petaluma Ave	195	91
Arnold Dr	N/ Solano Ave	221	103
Arnold Dr	N/ Verano Ave	224	104
Arnold Dr	S/ Agua Caliente Rd	206	96
Arnold Dr	N/ Agua Caliente Rd	178	83
Arnold Dr	N/ Chauvet Rd	87	40
Arnold Dr	S/ London Ranch Rd	89	41
Arnold Dr	S/ Dunbar Rd	64	30
Arnold Dr	S/ Hwy 12	65	30
Aviation Blvd	W/ Airport Ave	76	35
Barham Ave	E/ Dutton Ave	49	23
Barham Ave	W/ Olive St	21	10
Barham Ave	E/ Olive St	12	5
Barnes Rd	S/ River Rd	62	29
Bonnet Valley Rd	W/ Grange Rd	113	53
Bennett Valley Rd	E/ Sonoma Mountain Rd	68	32
Bennett Valley Rd	W/ Warm Springs Rd	54	25
Bloomfield Rd	N/ Valley Ford Rd	32	15
Bloomfield Rd	S/ Kennedy Rd	62	29
Bloomfield Rd	S/ Pleasant Hill Rd	55	25
Bloomfield Rd	S/ Hwy 116	111	52
Bodega Ave	W/ King Rd	93	43

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Bodega Ave	W/ Thompson Ln	129	60
Bodega Ave	E/ Lohrman Ln	161	75
Bodega Ave	W/ Paula	164	76
Bodega Ave	E/ Paula	158	73
Bodega Hwy	E/ Valley Ford / Freestone Rd	161	75
Bodega Hwy	W/ Bohemian Hwy	152	70
Bodega Hwy	W/ Jonive	107	50
Bodega Hwy	E/ Wagon Rd	117	54
Bodega Hwy	E/ Grandview Rd	143	66
Bodega Hwy	W/ Watertrough Rd	157	73
Bodega Hwy	E/ Watertrough Rd	177	82
Bohemian Hwy	S/ Hwy 116	86	40
Bohemian Hwy	N/ Freestone Flat Rd	52	24
Bohemian Hwy	S/ Bittner Rd	58	27
Bohemian Hwy	S/ Main St	58	27
Bohemian Hwy	N/ Graton Rd	73	34
Boyes Blvd	W/ Railroad Ave	45	21
Boyes Blvd	E/ Railroad Ave	71	33
Boyes Blvd	E/ Riverside Rd	61	28
Brush Creek Rd	N/ Montecito Ave	88	41
Calistoga Rd	S/ Rincon Ave	75	35
Calistoga Rd	S/ Porter Creek Rd	68	32
Corby Ave	S/ Smokewood Drive	71	33
Corby Ave	S/ Peach St	58	27
Corby Ave	N/ Peach St	53	24

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Corona Rd	S/ Adobe Rd	86	40
Crane Canyon Rd	E/ Petaluma Hill Rd	67	31
Crane Canyon Rd	E/ Inverness Ave	46	21
D St	S/ San Antonio Rd	63	29
Dry Creek Rd	N/ Lytton Springs Rd	108	50
Dry Creek Rd	N/ Lambert Bridge Rd	78	36
Dutton Ave	N/ Hearn Ave	62	29
Dutton Ave	S/ Barham Ave	77	36
East Cotati Ave	W/ Petaluma Hill Rd	98	45
East Napa St	W/ Seventh St. East	71	33
East Washington St	S/ Adobe Rd	84	39
Eighth St East	N/ Hwy 12 / 121	39	18
Eighth St East	S/ Napa Rd	68	31
Eighth St East	N/ Napa Rd	79	37
Eighth St East	S/ East Napa St	65	30
Ely Rd	E/ Old Redwood Hwy N	56	26
Fifth St West	N/ Leveroni Rd	132	61
Frates Rd	S/ Adobe Rd	100	46
Fulton Rd	S/ River Rd	191	89
Fulton Rd	N/ River Rd	206	96
Grange Rd	S/ Bennett Valley Rd	86	40
Graton Rd	W/ Green Hill Rd	37	17
Graton Rd	W/ Ross Rd	37	17
Graton Rd	W/ Hwy 116	35	16
Green Valley Rd	E/ Hwy 116	6	3
Green Valley Rd	E/ Harrison Grade Rd	11	5

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Green Valley Rd	W/ Hwy 116	38	18
Guerneville Rd	E/ Vine Hill Rd	104	48
Guerneville Rd	E/ Frei Rd	123	57
Guerneville Rd	W/ Willowside Rd	211	98
Guerneville Rd	E/ Willowside Rd	259	120
Guerneville Rd	W/ Lance Ave	178	82
Hearn Ave	W/ Dutton Ave	72	34
Hearn Ave	E/ Dutton Ave	138	64
High School Rd	N/ East Hurlbut Ave	69	32
High School Rd	S/ Occidental Rd	71	33
Lakeville Rd	N/ Hwy 37	287	133
Lakeville Rd	N/ Cannon Ln	279	130
Leveroni Rd	E/ Arnold Dr	190	88
Leveroni Rd	E/ Harrington	159	74
Llano Rd	N/ Hwy 116	72	34
Llano Rd	N/ Ludwig Ave	120	56
Lone Pine Rd	W/ Hwy 116	55	25
Ludwig Ave	W/ Stony Pt. Rd	84	39
Madrone Rd	W/ Hwy 12	46	21
Main St	S/ Hwy 12	37	17
Main St	S/ Adobe Rd	77	36
Main St	N/ Tyrone Rd	22	10
Mark West Springs Rd	E/ Hwy 101	236	110
Mark West Springs Rd	E/ Ursuline Rd	189	88

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Mark West Springs Rd	W/ Mark West Springs Lodge	122	57
Mark West Springs Rd	E/ Michele Way	125	58
Mark West Springs Rd	W/ Porter Creek Rd	134	62
Mark West Springs Rd	E/ Trenton Healdsburg Rd	22	10
Mecham Rd	S/ Dump	50	23
Mecham Rd	N/ Pepper Rd	49	23
Mecham Rd	N/ Refuse Rd	79	36
Mecham Rd	S/ Stony Pt. Rd	74	34
Mill Station Rd	W/ Occidental Rd	33	15
Millbrae Ave	W/ Stony Pt. Rd	35	16
Millbrae Ave	E/ Stony Pt. Rd	101	47
Mirabel Rd	S/ Trenton Rd	128	59
Moorland Ave	N/ Todd Rd	49	23
Mountain View Ave	E/ Santa Rosa Ave	60	28
Mountain View Ave	W/ Hunter Ln	49	23
Mountain View Ave	E/ Hunter Ln	43	20
Napa Rd	W/ Fifth St East	120	56
Napa Rd	E/ Pueblo Ave	125	58
Napa Rd	W/ Eighth St East	125	58
Napa Rd	W/ Hyde Rd	131	61
Napa Rd	E/ Burndale Rd	125	58
Occidental Rd	E/ Mill St	108	50
Occidental Rd	E/ Hwy 116	147	68

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Occidental Rd	W/ Sanford Rd	169	78
Occidental Rd	E/ High School Rd	133	62
Occidental Rd	E/ Irwin Ln	139	65
Occidental Rd	E/ Merced	138	64
Old Redwood Hwy	N/ Mendocino	175	81
Old Redwood Hwy	S/ Ursuline	179	83
Old Redwood Hwy	N/ Mark West Springs Rd	218	101
Old Redwood Hwy	S/ Wikiup Dr	191	88
Old Redwood Hwy	N/ Mark West Circle Bridge	196	91
Old Redwood Hwy	N/ Wikiup Dr	175	81
Old Redwood Hwy	N/ Faught Rd	171	79
Old Redwood Hwy	N/ Fulton Rd	165	76
Old Redwood Hwy	N/ Eastside Rd	117	54
Old Redwood Hwy	N/ Ely Rd	239	111
Old Redwood Hwy	N/ Adobe Rd	157	73
Old Redwood Hwy	S/ West Railroad Ave	171	79
Old Redwood Hwy	N/ West Railroad Ave	177	82
Old Redwood Hwy	N/ East Railroad Ave	169	78
Olivet Rd	N/ Guerneville Rd	78	36
Olivet Rd	S/ River Rd	71	33
Pepper Rd	E/ Walker Rd	104	49
Pepper Rd	E/ Mecham Rd	74	34
Pepper Rd	W/ Stony Pt. Rd	92	43
Petaluma Ave	E/ Arnold Dr	92	43
Petaluma Blvd N	N/ Skillman Ln	257	119
Petaluma Blvd S	N/ Hwy 101 S/B Off Ramp	221	102

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Petaluma Hill Rd	N/ Adobe Rd	280	130
Petaluma Hill Rd	S/ East Railroad Ave	282	131
Petaluma Hill Rd	N/ East Railroad Ave	291	135
Petaluma Hill Rd	N/ Roberts Rd	246	114
Petaluma Hill Rd	N/ East Cotati Ave	268	124
Petaluma Hill Rd	S/ Crane Canyon Rd	265	123
Petaluma Hill Rd	N/ Crane Canyon Rd	190	88
Petaluma Hill Rd	N/ Snyder Ln	306	142
Petrified Forest Rd	W/ Sharp Rd	164	76
Porter Creek Rd	E/ Franz Valley Rd	77	36
Railroad ave	S/ Verano Ave	21	10
Railroad Ave	N/ Verano Ave	76	35
Railroad Ave	S/ Boyes Blvd	48	22
Railroad Ave	N/ Boyes Blvd	28	13
Riel Rd	W/ Wilshire Dr	67	31
River Rd	W/ Orchard Rd	126	59
River Rd	E/ Canyon Two Rd	120	56
River Rd	W/ Mirabel Rd	130	60
River Rd	W/ Trenton_Healdsburg Rd	116	54
River Rd	W/ Fulton Rd	137	64
River Rd	E/ Fulton Rd	133	62
Riverside Dr	N/ Hwy 12	101	47
Riverside Dr	N/ Petaluma Ave	63	29
Riverside Dr	S/ Grove St	47	22
Riverside Dr	N/ Grove St	26	12
Riverside Dr	N/ Verano Ave	36	17

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Roblar Rd	W/ Canfield Rd	38	18
Roblar Rd	E/ Canfield Rd	52	24
Roblar Rd	W/ Stony Pt. Rd	82	38
Rohnert Park Exp	E/ Stony Pt. Rd	209	97
Rohnert Park Exp	W/ Petaluma Hill Rd	158	73
Santa Rosa Ave	S/ Horn Ave	147	68
Santa Rosa Ave	S/ Mountain View Ave	175	81
Santa Rosa Ave	N/ Mountain View Ave	195	91
Santa Rosa Ave	S/ East Robles Ave	181	84
Santa Rosa Ave	N/ East Robles Ave	160	74
Sebastopol Rd	E/ Stony Pt. Rd	196	91
Sebastopol Rd	E/ West Ave	230	107
Skillman Ln	E/ Bodega Ave	50	23
Skillman Ln	E/ Thompson Ln	77	36
Skillman Ln	W/ Petaluma Blvd	106	49
Skylane Blvd	N/ Airport Blvd	68	31
Snyder Ln	S/ Petaluma Hill Rd	127	59
Standish Ave	N/ Todd Rd	69	32
Stony Point Rd	S/ Pepper Rd	127	59
Stony Point Rd	N/ Pepper Rd	114	53
Stony Point Rd	S/ Mecham Rd	165	76
Stony Point Rd	N/ Mecham Rd	132	61
Stony Point Rd	N/ Roblar Rd	201	93
Stony Point Rd	S/ Madrone	166	77
Stony Point Rd	N/ Hwy 116	144	67
Stony Point Rd	N/ Rohnert Park Exp	127	59

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Stony Point Rd	S/ Millbrae Ave	152	71
Stony Point Rd	N/ Millbrae Ave	160	74
Stony Point Rd	N/ Scenic Ave	186	86
Stony Point Rd	S/ Todd Rd	145	67
Stony Point Rd	N/ Todd Rd	172	80
Todd Rd	W/ Llano Rd	59	28
Todd Rd	W/ Stony Pt. Rd	79	37
Todd Rd	E/ Stony Pt. Rd	101	47
Todd Rd	W/ Standish Ave	88	41
Todd Rd	E/ Standish Ave	140	65
Valley Ford Rd	E/ Gericke Rd	85	39
Valley Ford Rd	W/ Tomales Rd	88	41
Verano Ave	E/ Hickory St	51	23
Verano Ave	E/ Linden Ave	62	29
Verano Ave	W/ Railroad Ave	64	30
Verano Ave	W/ Riverside Dr	67	31
Verano Ave	E/ Riverside Dr	75	35
Verano Ave	W/ Hwy 12	77	36
Verano Ave	E/ Lomita Ave	62	29
Vine Hill Rd	S/ Guerneville	92	43
Warm Springs Rd	N/ Henno Rd	51	24
Warm Springs Rd	N/ Sonoma Mt Rd	45	21
Warm Springs Rd	S/ Lawndale	19	9
Warm Springs Rd	N/ Bennett Valley Rd	21	10
Warm Springs Rd	N/ Lawndale	27	12
Warm Springs Rd	S/ Hwy 12	28	13

<b>Roadway Name</b>	<b>Segment Description</b>	<b>Distance to 60 dB Ldn, feet</b>	<b>Distance to 65 dB Ldn, feet</b>
Watertrough Rd	S/ Burnside Rd	66	31
Watertrough Rd	S/ Bodega Hwy	91	42
Watmaugh Rd	W/ Arnold Dr	95	44
Watmaugh Rd	E/ Arnold Dr	71	33
Watmaugh Rd	W/ Hwy 12	66	31
West Ave	N/ Gloria Dr	32	15
West Ave	S/ South Ave	40	18
West Ave	N/ South Ave	44	20
West Ave	S/ Sunset Ave	45	21
West Third St	W/ Dutton Ave	116	54
Westside Rd	N/ Felta Rd	65	30
Westside Rd	S/ Kinley Dr	93	43
Wikiup Dr	E/ Old Redwood Hwy N	46	21