# 4.11 NOISE

## INTRODUCTION

This section discusses the existing noise environment in the immediate project vicinity and identifies potential noise-related impacts and mitigation measures associated with the proposed project. Specifically, this section analyzes potential noise impacts due to and upon development within the project site relative to applicable noise criteria and to the existing ambient noise environment. This section is primarily based on the *Wheatland General Plan Update Background Report*[1] *(2004)*, and from noise level analyses provided by Bollard Acoustical Consultants, Inc.[2]

## ENVIRONMENTAL SETTING

The environmental setting of the Wheatland General Plan Update noise chapter relies upon the Wheatland General Plan Update Background Report, Public Review Draft, prepared for the City of Wheatland, July 2, 2004.

### Existing Noise Setting

The ambient noise environment in Wheatland is defined primarily by traffic on State Route (SR) 65 and local roadways, Union Pacific Railroad (UPRR) operations, and distant aircraft operations associated with Beale Air Force Base. The noise environment in Wheatland is also locally influenced by commercial uses (car wash, light auto repair, and HVAC warehouse), active recreation areas of parks and outdoor play areas of schools. Airports do not reside within Wheatland, but a portion of the study area is located within the noise impact contours for Beale AFB. Significant industrial noise sources were not identified within the City of Wheatland. Subjectively, the ambient noise environment in Wheatland is considered to be fairly quiet at locations removed from SR 65 and the railroad tracks. The individual noise generations of the various representative noise sources identified within Wheatland are described below.

### Purpose of the Noise Element

The Noise Element provides a basis for comprehensive local policies to control and abate environmental noise and to protect the citizens of Wheatland from excessive noise exposure. The fundamental goals of the noise portion of the General Plan are as follows:

- To provide sufficient information concerning the community noise environment so that noise may be effectively considered in the land use planning process.

- To develop strategies for abating excessive noise exposure through cost-effective mitigation measures in combination with appropriate zoning to avoid incompatible land uses.

- To protect those existing regions of the planning area whose noise environments are deemed acceptable and also those locations throughout the community deemed "noise sensitive."

- To protect existing noise-producing commercial and industrial uses in the City of Wheatland from encroachment by noise-sensitive land uses.

**Fundamentals of Noise**

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and hence are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Table 4.11-1 shows examples of noise levels for several common noise sources and environments.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. A strong correlation is evident between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of A-weighted levels.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (Leq), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The Leq is the foundation of the composite noise descriptor, Ldn, and shows very good correlation with community response to noise.

The Day-Night Average Level (Ldn) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because Ldn represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

**Table 4.11-1**
**Typical A-Weighted Sound Levels of Common Noise Sources**

| Loudness Ratio Level | A-Weighted Sound Level (dBA) | |
|---|---|---|
| | 130 | Threshold of pain |
| 64 | 120 | Jet aircraft take-off at 100 feet |
| 32 | 110 | Riveting machine at operators position |
| 16 | 100 | Cut-off saw at operators position |
| 8 | 90 | Bulldozer at 50 feet |
| 4 | 80 | Diesel locomotive at 300 feet |
| 2 | 70 | Commercial jet aircraft interior during flight |
| 1 | 60 | Normal conversation speech at 5-10 feet |
| 1/2 | 50 | Open office background level |
| 1/4 | 40 | Background level within a residence |
| 1/8 | 30 | soft whisper at 2 feet |
| 1/16 | 20 | Interior of recording studio |

Noise in the community has often been cited as being a health problem, not in terms of actual physiological damages such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities such as sleep, speech, recreation and tasks demanding concentration or coordination. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases, and the acceptability of the environment for people decreases. This decrease in acceptability and the threat to public well-being are the bases for land use planning policies preventing exposures to excessive community noise levels.

To control noise from fixed sources, which have developed from processes other than zoning or land use planning, many jurisdictions have adopted community noise control ordinances. Such ordinances are intended to abate noise nuisances and to control noise from existing sources. They may also be used as performance standards to judge the creation of a potential nuisance, or potential encroachment of sensitive uses upon noise-producing facilities. Community noise control ordinances are generally designed to resolve noise problems on a short-term basis (usually by means of hourly noise level criteria), rather than on the basis of 24-hour or annual cumulative noise exposures.

In addition to the A-weighted noise level, other factors should be considered in establishing criteria for noise sensitive land uses. For example, sounds with noticeable tonal content such as whistles, horns, droning or high-pitched sounds may be more annoying than the A-weighted sound level alone suggests. Many noise standards apply a penalty, or correction, of 5 dBA to such sounds. The effects of unusual tonal content are generally more of a concern at nighttime, when residents may notice the sound in contrast to low levels of background noise.

Because many rural residential areas experience very low noise levels, residents may express concern about the loss of "peace and quiet" due to the introduction of a sound, which was not audible previously. In very quiet environments, the introduction of virtually any change in local activities will cause an increase in noise levels. A change in noise level and the loss of "peace and quiet" is the inevitable result of land use or activity changes in such areas. Audibility of a new noise source and/or increases in noise levels within recognized acceptable limits are not usually considered to be significant noise impacts, but these concerns should be addressed and considered in the planning and environmental review processes.

Technical acoustical terms are described in Table 4.11-2.

**Table 4.11-2: Acoustical Terminology**

| | |
|---|---|
| **Acoustics** | The science (or physics) of sound. |
| **Ambient Noise** | The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study. |
| **Attenuation** | The reduction of noise. |
| **A-Weighting** | A frequency-response filter that conditions a given sound signal to approximate human response. |
| **CNEL** | Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours (10 p.m. - 7 a.m.) weighted by a factor of 10 prior to averaging. |
| **Decibel or dB** | A Bel is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bel. |
| **Frequency** | The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz). |
| **$L_{dn}$** | Day/Night Average Sound Level. Similar to CNEL but with no evening weighting. |
| **$L_{eq}$** | Equivalent or energy-averaged sound level. |
| **$L_{max}$** | The highest root-mean-square (RMS) sound level measured over a given period of time. |
| **Loudness** | A subjective term for the sensation of the magnitude of sound. |
| **Noise** | Unwanted sound. |
| **Peak Noise** | The level Corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level. |
| **$RT_{60}$** | The time it takes reverberant sound to decay by 60 dB once the source is removed. |
| **Sabin** | The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin. |
| **SEL** | A single-number rating indicating the total energy of a discrete noise event compressed into a one (1)-second time duration. |
| **Threshold of Hearing** | The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB at 1,000 Hz for persons with good hearing. |
| **Threshold of Pain** | Approximately 120 dB above the threshold of hearing. |

*Source*: Bollard Acoustical Consultants, 2005.

**Existing Noise Environment**

Transportation Noise Sources

The major noise sources in Wheatland consist of SR 65 and local traffic on City streets, commercial uses, Beale Air Force Base operations, active recreation areas of parks, outdoor play areas of schools, and railroad operations on the Union Pacific Railroad. Each of these noise sources is discussed individually below.

*Roadways*

The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) with the Calveno vehicle noise emission curves was used to predict traffic noise levels within the Wheatland General Plan study area. The FHWA Model is the traffic noise prediction model currently preferred by the Federal Highway Administration, the State of California Department of Transportation (Caltrans), and most City and County governments, for use in traffic noise assessment. Although the FHWA Model is in the process of being updated by a more sophisticated traffic noise prediction model, the use of RD-77-108 is considered acceptable for the development of General Plan traffic noise predictions.

SR 65 is the most heavily traveled roadway in the City of Wheatland. The FHWA Model was used with traffic data obtained from published Caltrans traffic counts and Bollard Acoustical field surveys to develop Ldn contours for SR 65 within the City of Wheatland, as well as local roadways. The FHWA Model input data for those roadways is provided in Table 4.11-3. The distances from the centerlines of the major roadways to the 60 and 65 dB Ldn contours are also summarized in Table 4.11-3. Many roadways are not contained in Table 4.11-3 because these roadways are not major traffic arterials within the City of Wheatland.

*Railroads*

The railroad tracks in Wheatland are operated by the Union Pacific Railroad. The tracks run from north to south and generally parallel SR 65. According to noise level measurements and field observations conducted by Bollard Acoustical, this line was observed to support approximately 30 train operations in a 24-hour period. Give this level of railroad activity, a measured average railroad Sound Exposure Level (SEL) of 98 dB at the measurement distance of 200 feet, and a random distribution of railroad activity throughout the day and nighttime periods, the Ldn computed for the railroad tracks in Wheatland was 70 dB at a distance of 200 feet from the tracks. Table 4.11-4 shows the distances from the railroad tracks to the 60 and 65 dB Ldn railroad noise contours based on 30 operations per day, and likely variations from that observed number of daily operations.

**Table 4.11-3**
**FHWA-RD-77-108 Highway Traffic Noise Prediction Model Data Inputs and Distances To 60 and 65 DB LDN Contours**
**City of Wheatland Noise Element - Existing (2004) Conditions**

| | | Segment Description | | | | | Truck Usage | | | Distance to Ldn Contours, feet | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Segment** | **Roadway Name** | **From** | **To** | **ADT** | **Day %** | **Night %** | **Med.** | **Hvy.** | **Speed** | **60 dB Ldn** | **65 dB** |
| 1 | SR 65 | North of Evergreen | | 17370 | 83 | 17 | 12 | 16 | 35 | 429 | 199 |
| 2 | | Evergreen Dr | Mc Devitt Dr | 17710 | 83 | 17 | 12 | 16 | 35 | 435 | 202 |
| 3 | | Mc Devitt Dr | First St | 18670 | 83 | 17 | 12 | 16 | 35 | 450 | 209 |
| 4 | | First St | Second St | 19180 | 83 | 17 | 12 | 16 | 35 | 459 | 213 |
| 5 | | Second St | Third St | 18660 | 83 | 17 | 12 | 16 | 35 | 450 | 209 |
| 6 | | Third St | Fourth St | 19270 | 83 | 17 | 12 | 16 | 35 | 460 | 214 |
| 7 | | Fourth St | Main St | 18030 | 83 | 17 | 12 | 16 | 35 | 440 | 204 |
| 8 | | South of Main St | | 16200 | 83 | 17 | 12 | 16 | 35 | 410 | 190 |
| 9 | Evergreen St | West of SR 65 | | 640 | 83 | 17 | 2 | 2 | 35 | 19 | 9 |
| 10 | Mc Devitt Dr | West of SR 65 | | 1770 | 83 | 17 | 2 | 2 | 35 | 38 | 18 |
| 11 | First St | West of SR 65 | | 1680 | 83 | 17 | 2 | 2 | 35 | 37 | 17 |
| 12 | | East of SR 65 | | 400 | 83 | 17 | 2 | 2 | 35 | 14 | 7 |
| 13 | Second St | West of SR 65 | | 140 | 83 | 17 | 2 | 2 | 35 | 7 | 3 |
| 14 | | East of SR 65 | | 980 | 83 | 17 | 2 | 2 | 35 | 26 | 12 |
| 15 | Third St | West of SR 65 | | 450 | 83 | 17 | 2 | 2 | 35 | 15 | 7 |
| 16 | | East of SR 65 | | 340 | 83 | 17 | 2 | 2 | 35 | 13 | 6 |
| 17 | Fourth St | West of SR 65 | | 500 | 83 | 17 | 2 | 2 | 35 | 16 | 8 |
| 18 | | East of SR 65 | | 1980 | 83 | 17 | 2 | 2 | 35 | 41 | 19 |
| 19 | Main St | West of SR 65 | | 3710 | 83 | 17 | 2 | 2 | 35 | 63 | 29 |
| 20 | | SR 65 | Front St | 4030 | 83 | 17 | 2 | 2 | 35 | 66 | 31 |
| 21 | | Front St | Olive St | 4340 | 83 | 17 | 2 | 2 | 35 | 69 | 32 |
| 22 | | West of Olive St | | 1020 | 83 | 17 | 2 | 2 | 35 | 26 | 12 |

**Table 4.11-4**
**Railroad Noise Exposure as a Function of the Number of Daily Trains**

| | | Distance to Ldn Noise Contours | |
|---|---|---|---|
| **Number of daily Trains** | **Ldn at 100 feet, dB** | **60 dB** | **65 dB** |
| 20 | 73 | 683 | 317 |
| 25 | 73 | 793 | 368 |
| 30 | 74 | 896 | 416 |
| 35 | 75 | 992 | 461 |
| 40 | 76 | 1085 | 504 |

Note: The predicted distances to the Ldn contours assume a mean railroad sound exposure level of 103 dB (with horn usage) at a reference distance of 100 feet from the tracks and that train operations are uniformly distributed across day and nighttime hours.

*Aircraft Noise*

According to the Comprehensive Land Use Plan (CLUP) for Beale Air Force Base (adopted 1987, amended 1992), the 65 dB CNEL noise exposure contours extend into a portion of the Wheatland General Plan study area. Due to changing operations at Beale since the CLUP Noise Contours were developed, the extent by which the noise contours shown on Figure 4.11-1 reflect the current aircraft noise environment in the Wheatland study area is unknown. Nonetheless, the CLUP noise contours are incorporated into this background document for reference.

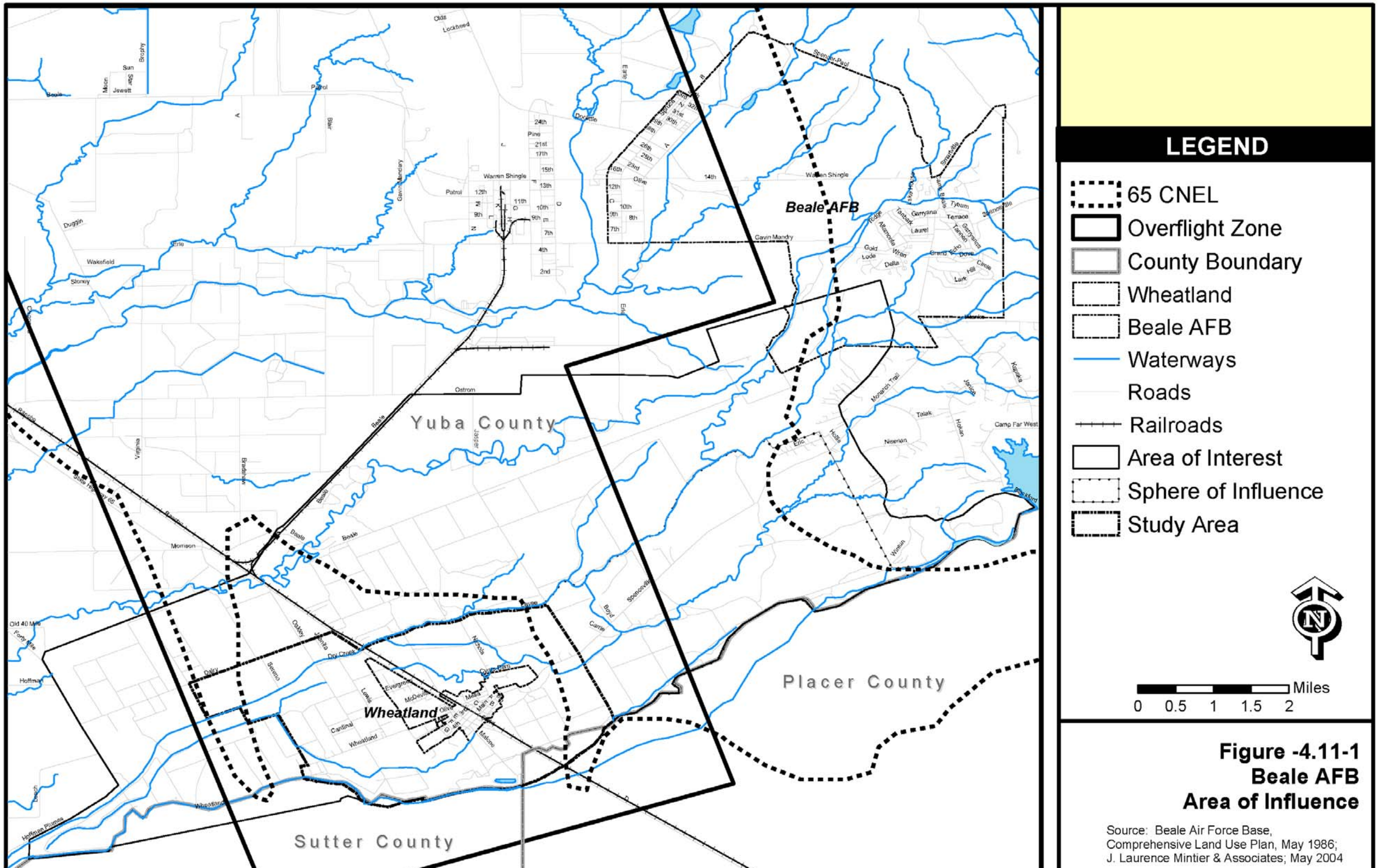


**Figure -4.11-1**
**Beale AFB**
**Area of Influence**

Source: Beale Air Force Base, Comprehensive Land Use Plan, May 1986; J. Laurence Mintier & Associates; May 2004

*Noise Related Land Use Policies*

Significant issues related to the noise produced by aircraft at Beale AFB exist. As a result of annoyances that occur due to air traffic noise, the base has adopted airport noise contours for various decibel (dB) ranges and appropriate measure to lessen the effects of noise. The main policy goal is to reduce the number of people exposed to noise from aircraft operating from the airport to the lowest level possible. The plan states that if development is proposed in areas between the 60dB and 65dB Community Noise Equivalency Level (CNEL) noise contours, affected cities and counties should evaluate the impact of aircraft noise on proposed development and consider requiring noise reduction measures, aviation noise easements, and buyer-renter notification. As a result, the plan provides a detailed analysis of compatible land uses within 60-65dB, 65-70dB, 70-75dB, 75-80dB, and 80-85dB ranges.

<u>Non-Transportation Noise Sources</u>

The production of noise is a result of many processes and activities, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by Federal and State employee health and safety regulations (OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise, which affects adjacent sensitive land uses.

From a land use planning perspective, fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas, and to prevent encroachment of noise-sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in proximity to noise-producing facilities include mitigation measures to ensure compliance with those noise performance standards.

Descriptions of existing fixed noise sources in Wheatland are provided below. These uses are intended to be representative of the relative noise generation of such uses, and are intended to identify specific noise sources, which should be considered in the review of development proposals. Site-specific noise analyses should be performed where noise sensitive land uses are proposed in proximity to these (or similar) noise sources, or where similar sources are proposed to be located near noise-sensitive land uses.

*The Jones Company*

The Jones Company, the only existing industrial land use within the City, is located between 2$^{nd}$ and 3$^{rd}$ Street, west of the UPRR Tracks. Operations at the Jones Company consist of warehousing and distribution of HVAC units. According to a Jones Company representative, their operations generate an average of two truck operations per day, and they have no current plans for expansion. Other than mechanical equipment associated with the office air conditioning systems, no appreciable sound was being generated by this facility during various site inspections. The site is located immediately adjacent to existing residential uses, but no noise complaints have reportedly been filed due to this operation. Although this facility was not observed to be a significant noise source, it is included within this section due to the industrial appearance of the Jones Company facilities.

*General Service Commercial and Light Industrial Uses*

Noise sources associated with service commercial uses such as automotive repair facilities, car washes, loading docks, retail stores, are found at various locations within Wheatland. The noise emissions of these types of uses are dependant on many factors, and are therefore, difficult to quantify precisely. Nonetheless, noise generated by the these uses contributes to the ambient noise environment in the immediate vicinity of these uses, and should be considered where either new noise-sensitive uses are proposed nearby or where similar uses are proposed in existing residential areas.

*Parks and School Play Fields*

Several park and school uses exist within the study area. These uses are spread throughout the City. Noise generated by these uses depends on the age and number of people the respective facility at a given time, and the types of activities they are engaged in. School playing field activities tend to generate more noise than those of neighborhood parks, as the intensity of school playground usage tends to be much higher. At a distance of 100 feet from an elementary school playground being used by 100 students, average and maximum noise levels of 60 and 75 dB, respectively, can be expected. At organized events such as high-school football games with large crowds and public address systems, the noise generation is often significantly higher. As with service commercial uses, the noise generation of parks and school playing fields is variable.

Community Noise Survey

To quantify existing noise levels in the quieter parts of the City of Wheatland, a community noise survey was performed at 8 locations in this City, which are removed from major noise sources. Two of the eight locations were monitored over a continuous 24-hour period, while the other six locations were each monitored for two short term periods during daytime hours and one during nighttime hours. The results of the community noise survey are provided in Table 4.11-5.

**Table 4.11-5**
**Community Noise Measurement Survey Results**
**Wheatland Noise Element - May 4-11, 2002**

| Site | Location | Dates | Time Period | Leq | Lmax | Estimated Ldn | Sources |
|---|---|---|---|---|---|---|---|
| 1 | Most Southern End of Oakley St. | 5-6-04<br>5-4-04<br>5-11-04 | Morning<br>Afternoon<br>Nighttime | 44<br>41<br>38 | 52<br>58<br>47 | 45-50 | Local Traffic<br>Faint Distant Train<br>Natural sounds |
| 2 | Northwest corner of study area off Dairy Rd | 5-6-04<br>5-4-04<br>5-11-04 | Morning<br>Afternoon<br>Nighttime | 43<br>44<br>40 | 54<br>63<br>46 | 45-50 | Local Traffic<br>Faint Distant Train<br>Distant Traffic |
| 3 | Park at Sullivan Wy and Hudson Wy | 5-6-04<br>5-4-04<br>5-11-04 | Morning<br>Afternoon<br>Nighttime | 43<br>45<br>39 | 55<br>57<br>49 | 45-50 | Local Traffic<br>Aircraft Flyovers<br>Traffic |
| 4 | Nichols Park | 5-6-04<br>5-4-04<br>5-11-04 | Morning<br>Afternoon<br>Nighttime | 54<br>54<br>48 | 64<br>61<br>59 | 55 | Local Traffic<br>(SR 65) |
| 5 | Just South of Malone Ave and Main St. | 5-6-04<br>5-4-04<br>5-11-04 | Morning<br>Afternoon<br>Nighttime | 51<br>52<br>47 | 59<br>63<br>62 | 55 | Local Traffic<br>(SR 65) |
| 6 | Park at Wheatland Park Dr. and McDevit Dr. | 5-6-04<br>5-4-04<br>5-11-04 | Morning<br>Afternoon<br>Nighttime | 50<br>52<br>44 | 65<br>63<br>59 | 55 | Local Traffic |
| A | Carpenter Ct. Residence | 5-4-04 | Daytime<br>Nighttime | 68<br>65 | 100<br>96 | 72 | Local Traffic (SR 65)<br>Train Passes |
| B | Fraser Ct. Residence | 5-4-04 | Daytime<br>Nighttime | 56 | 64 | 64 | Local Traffic |
| C | Nichols St. Residence | 5-4/5-5 | Daytime<br>Nighttime | 52<br>48 | 77<br>76 | 55 | Local Traffic<br>Train Passes |

Source: Bollard & Brennan, Inc., 2004.

## REGULATORY CONTEXT

Existing policies, laws and regulations that would apply to the proposed project are summarized below.

**State Building Code, Title 24**

Title 24, Part 2 of the State of California Code of Regulations establishes uniform minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than detached single-family units from the effects of excessive noise, including, but limited to, hearing loss or impairment and interference with speech and sleep. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise measurement should be either the day/night average sound (Ldn) or the Community Noise Equivalent (CNEL). Title 24 requires that "worst case" noise levels, either existing or future, are to be used as the basis for determining compliance. Future noise levels must be predicted for a minimum period of ten years from time of the building permit application.

Title 24 mandates that for structures containing noise-sensitive uses to be located where the Ldn or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structures must also specify a ventilation or air-conditioning system to provide a habitable interior environment.

**Wheatland General Plan Update**

The project involves establishment of goals and policies aimed at protecting Wheatland residents, businesses, and visitors from the harmful noise effects. These applicable goals and policies have been included in the following impact discussions, where appropriate, in order to mitigate potential impacts.

**Determination of a Significant Increase in Noise Criteria**

Another means of determining a potential noise impact is the assessment of a person's reaction to changes in noise levels due to a project. The effects of increased traffic noise resulting from a new project at existing noise-sensitive land uses are often evaluated using standards developed by the Federal Interagency Committee on Noise (FICON). The FICON standards provide thresholds for likely noise impacts based on the anticipated project-related noise-level increase and the pre-project ambient noise conditions.

The FICON standards are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, they have commonly been applied to most transportation noise sources such as traffic noise, aircraft noise and to a lesser extent railroad noise, which are generally described in terms of cumulative noise exposure metrics such as Ldn and CNEL. The FICON standards are shown in Table 4.11-6.

**Table 4.11-6**
**Significance of Changes In Cumulative Noise Exposure**

| Noise Level Without Project (Ldn or CNEL) | Significant Impact |
|---|---|
| <60 dB | +5.0 dB or more |
| 60-65 dB | +3.0 dB or more |
| >65 dB | +1.5 dB or more |

Data Source: *Federal Interagency Committee on Noise (FICON)*

## IMPACTS AND MITIGATION MEASURES

### Standards of Significance

CEQA guidelines state that implementation of a project would result in significant noise impacts if the project would result in any of the following:

- Exposure of persons to, or generation of, traffic noise levels in excess of standards established in the local plans or ordinances (See Table 4.11-7).

**Table 4.11-7**
**Maximum Allowable Noise Exposure Transportation Noise Sources**

| Land Use | Outdoor Activity Areas[1] $L_{eq}$ /CNEL dB | Interior Spaces: $L_{eq}$ / CNEL, dB | Interior Spaces: $L_{eq}$, dB[2] |
|---|---|---|---|
| Residential | 60[3] | 45 | -- |
| Transient Lodging | 60[3] | 45 | -- |
| Hospitals, Nursing Homes | 60[3] | 45 | -- |
| Theaters, Auditoriums, Music Halls | -- | -- | 35 |
| Churches, Meeting Halls | 60[3] | -- | 40 |
| Office Buildings | -- | -- | 45 |
| Schools, Libraries, Museums | -- | -- | 45 |
| Playgrounds, Neighborhood Parks | 70 | -- | -- |

[1] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. For residential uses with front yards facing the identified noise source, an exterior noise level criterion of 65 dB $L_{dn}$ shall be applied at the building facade, in addition to a 60 dB $L_{dn}$ criterion at the outdoor activity area.

[2] As determined for a typical worst-case hour during periods of use.

[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB $L_{dn}$/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB $L_{dn}$/ CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

- Exposure of persons to, or generation of, non-traffic noise levels in excess of standards established in the local plans or ordinances (See Table 4.11-8).

**Table 4.11-8**
**NOISE LEVEL PERFORMANCE STANDARDS**
**New Projects Affected by or Including Non-transportation Sources***

| Noise Level Descriptor | Daytime (7am-10pm) | Nighttime (10pm to 7am) |
|---|---|---|
| Hourly $L_{eq}$, dB | 50 | 45 |
| Maximum Level, dB | 70 | 65 |

Each of the noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

*For the purposes of compliance with the provisions of this section, the City defines transportation noise sources as traffic on public roadways, railroad line operations, and aircraft in flight. Control of noise from these sources is preempted by Federal and State regulations. Other noise sources are presumed to be subject to local regulations. Non-transportation noise sources may include industrial operations, outdoor recreation facilities, HVAC units, and loading docks.

- 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 without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels.
- For a project within the vicinity of a private airstrip, where the project would expose people residing or working in the project area to excessive noise levels.

**Method of Analysis**

Expected impacts due to the project as they affect existing noise-sensitive land uses are expected to be limited to increased traffic noise levels due to the project and construction noise impacts.

<u>Noise Reduction Methodology</u>

Any noise problem may be considered as being composed of three basic elements: the noise source, a transmission path, and a receiver. The appropriate acoustical treatment for a given project should consider the nature of the noise source and the sensitivity of the receiver. The problem should be defined in terms of appropriate criteria (Ldn, Leq, or Lmax), the location of the sensitive receiver (inside or outside), and when the problem occurs (daytime or nighttime). Noise control techniques should then be selected to provide an acceptable noise environment for the receiving property while remaining consistent with local aesthetic standards and practical structural and economic limits. Fundamental noise control techniques include the following:

*Use of Setbacks*

Noise exposure may be reduced by increasing the distance between the noise sources and receiving use. Setback areas can take the form of open space, frontage roads, recreational areas, storage yards, etc. The available noise attenuation from this technique is limited by the characteristics of the noise source, but is generally about 4 to 6 dB per doubling of distance from the source.

*Use of Barriers*

Shielding by barriers can be obtained by placing walls, berms or other structures, such as buildings, between the noise source and the receiver. The effectiveness of a barrier depends upon blocking line-of-sight between the source and receiver, and is improved with increasing the distance the sound must travel to pass over the barrier as compared to a straight line from source to receiver. The difference between the distance over a barrier and a straight line between source and receiver is called the "path length difference," and is the basis for calculating barrier noise reduction.

Barrier effectiveness depends upon the relative heights of the noise source, barrier and receiver. In general, barriers are most effective when placed close to either the receiver or the source. An intermediate barrier location yields a smaller path-length-difference for a given increase in barrier height than does a location closer to either source or receiver.

For maximum effectiveness, barriers must be continuous and relatively airtight along their length and height. To ensure that sound transmission through the barrier is insignificant, barrier mass should be about 4 lbs. per square foot, although a lesser mass may be acceptable if the barrier material provides sufficient transmission loss. Satisfaction of the above criteria requires substantial and well-fitted barrier materials, placed to intercept line of sight to all significant noise sources. Earth, in the form of berms or the face of a depressed area, is also an effective barrier material.

The attenuation provided by a barrier depends upon the frequency content of the source. Generally, higher frequencies are attenuated (reduced) more readily than lower frequencies. This results because a given barrier height is relatively large compared to the shorter wavelengths of high frequency sounds, while relatively small compared to the longer wavelengths of the frequency sounds. The effective center frequency for traffic noise is usually considered to be 550 Hz. Railroad engines, cars and horns emit noise with differing frequency content, so the effectiveness of a barrier will vary for each of these sources. Frequency analyses are necessary to properly calculate barrier effectiveness for noise from sources other than highway traffic.

The noise reduction provided by barriers has practical limits. For highway traffic noise, a 5 to 10 dB noise reduction may often be reasonably attained. A 15 dB noise reduction is sometimes possible, but a 20 dB noise reduction is extremely difficult to achieve. Barriers usually are provided in the form of walls, berms, or berm/wall combinations. The use of an earth berm in lieu of a solid wall may provide up to 3 dB additional attenuation over that attained by a solid wall alone, due to the absorption provided by the earth. Berm/wall combinations offer slightly better acoustical performance than solid walls, and are often preferred for aesthetic reasons.

*Site Design*

Buildings can be placed on a project site to shield other structures or areas, to remove them from noise-impacted areas, and to prevent an increase in noise level caused by reflections. The use of one building to shield another can significantly reduce overall project noise control costs, particularly if the shielding structure is insensitive to noise. As an example, carports or garages can be used to form or complement a barrier shielding adjacent dwellings or an outdoor activity area. Similarly, one residential unit can be placed to shield another so that noise reduction measures are needed for only the building closest to the noise source. Placement of outdoor activity areas within the shielded portion of a building complex, such as a central courtyard, can be an effective method of providing a quiet retreat in an otherwise noisy environment. Patios or balconies should be placed on the side of a building opposite the noise source, and "wing walls" can be added to buildings or patios to help shield sensitive uses.

Another option in site design is the placement of relatively insensitive land uses, such as commercial or storage areas, between the noise source and a more sensitive portion of the project. Examples include development of a commercial strip along a busy arterial to block noise affecting a residential area, or providing recreational vehicle storage or travel trailer parking along the noise-impacted edge of a mobile home park. If existing topography or development adjacent to the project site provides some shielding, as in the case of an existing berm, knoll or building, sensitive structures or activity areas may be placed behind those features to reduce noise control costs.

Site design should also guard against the creation of reflecting surfaces which may increase onsite noise levels. For example, two buildings placed at an angle facing a noise source may cause noise levels within that angle to increase by up to 3 dB. The open end of "U"-shaped buildings should point away from noise sources for the same reason. Landscaping walls or noise barriers located within a development may inadvertently reflect noise back to a noise-sensitive area unless carefully located. Avoidance of these problems while attaining an aesthetic site design requires close coordination between local agencies, the project engineer and architect, and the noise consultant.

*Building Design*

When structures have been located to provide maximum noise reduction by barriers or site design, noise reduction measures may still be required to achieve an acceptable interior noise environment. The cost of such measures may be reduced by placement of interior dwelling unit features. For example, bedrooms, living rooms, family rooms and other noise-sensitive portions of a dwelling can be located on the side of the unit farthest from the noise source.

Bathrooms, closets, stairwells and food preparation areas are relatively insensitive to exterior noise sources, and can be placed on the noisy side of a unit. When such techniques are employed, noise reduction requirements for the building facade can be significantly reduced, although the architect must take care to isolate the noise impacted areas by the use of partitions or doors.

In some cases, external building facades can influence reflected noise levels affecting adjacent buildings. This is primarily a problem where high-rise buildings are proposed, and the effect is most evident in urban areas, where an "urban canyon" may be created. Bell-shaped or irregular building facades and attention to the orientation of the building can reduce this effect.

*Noise Reduction by Building Facades*

When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through acoustical design of building facades. Standard residential construction practices provide 10-15 dB noise reduction for building facades with open windows, and approximately 25 dB noise reduction when windows are closed. Thus a 25 dB exterior-to-interior noise reduction can be obtained by the requirement that building design include adequate ventilation systems, allowing windows on a noise-impacted facade to remain closed under any weather condition.

Where greater noise reduction is required, acoustical treatment of the building facade is necessary. Reduction of relative window area is the most effective control technique, followed by providing acoustical glazing (thicker glass or increased air space between panes) in low air infiltration rate frames, use of fixed (non-movable) acoustical glazing or the elimination of windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall members by the use of double- or staggered- stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways is provided by reducing door area, using solid-core doors, and by acoustically sealing door perimeters with suitable gaskets. Roof treatments may include the use of plywood sheathing under roofing materials.

Whichever noise control techniques are employed, it is essential that attention be given to installation of weather stripping and caulking of joints. Openings for attic or subfloor ventilation may also require acoustical treatment; tight-fitting fireplace dampers and glass doors may be needed in aircraft noise-impacted areas.

Design of acoustical treatment for building facades should be based upon analysis of the level and frequency content of the noise source. The transmission loss of each building component should be defined, and the composite noise reduction for the complete facade calculated, accounting for absorption in the receiving room. A one-third octave band analysis is a definitive method of calculating the A-weighted noise reduction of a facade.

A common measure of transmission loss is the Sound Transmission Class (STC). STC ratings are not directly comparable to A-weighted noise reduction, and must be corrected for the spectral content of the noise source. Requirements for transmission loss analyses are outlined by Title 24 of the California Code of Regulations.

*Use of Vegetation*

Trees and other vegetation are often thought to provide significant noise attenuation. However, approximately 100 feet of dense foliage (so that no visual path extends through the foliage) is required to achieve a 5 dB attenuation of traffic noise. Thus the use of vegetation as a noise barrier should not be considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.

Vegetation can be used to acoustically "soften" intervening ground between a noise source and receiver, increasing ground absorption of sound and thus increasing the attenuation of sound with distance. Planting of trees and shrubs is also of aesthetic and psychological value, and may reduce adverse public reaction to a noise source by removing the source from view, even though noise levels will be largely unaffected. It should be noted, however, that trees planted on the top of a noise control berm can actually slightly degrade the acoustical performance of the barrier. This effect can occur when high frequency sounds are diffracted (bent) by foliage and directed downward over a barrier.

In summary, the effects of vegetation upon noise transmission are minor, and are primarily limited to increased absorption of high frequency sounds and to reducing adverse public reaction to the noise by providing aesthetic benefits.

**Project-Specific Impacts and Mitigation Measures**

**Development of Noise Sensitive Land Uses within Existing Noise-impacted Areas**

**4.11-1 Development of noise-sensitive land uses within existing noise-impacted areas.**

Implementation of the proposed General Plan could result in the creation of new noise-sensitive land uses within areas impacted by existing or future noise sources, or new noise-producing land uses within noise-sensitive areas. Sensitive land uses may be affected by noise generated from stationary noise sources, such as industrial and manufacturing activities. The proposed Land Use Map designates residential land uses adjacent to areas designated for industrial and manufacturing uses. As these land uses become occupied, machinery necessary for specific industrial and manufacturing uses may create noise levels that are incompatible with adjacent residences.

In addition, depending on project phasing, the Land Use Map proposes residential uses to agricultural lands. The operation of farming machinery may result in noise complaints.

The General Plan Update includes the following goals and policies related to the development of noise-sensitive land uses within noise-impacted areas, and noise-producing land uses within noise sensitive areas.

Goal 9.G To protect Wheatland residents from the harmful and annoying effects of exposure to excessive noise.

Policy 9.G.1 The City shall prohibit development of new noise-sensitive land uses where the noise level due to non-transportation noise sources will exceed the noise level standards of Table 9-1 as measured immediately within the property line of the new development, unless effective noise mitigation measures have been incorporated into the development design to achieve the standards set out in Table 4.11-8.

Policy 9.G.2. The City shall require that noise created by new non-transportation sources be mitigated so as not to exceed the noise level standards of Table 4.11-8 as measured immediately within the property line of lands designated for noise-sensitive uses.

Policy 9.G.3 Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards of Table 9-1 at existing or planned noise-sensitive uses, the City shall require an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design. The acoustical analysis shall meet the following requirements:

a) It shall be the financial responsibility of the applicant.

b) It shall be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics.

c) It shall include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources.

d) It shall include estimates of existing and projected cumulative (20 years) noise levels in terms of Ldn or CNEL and/or the standards of Table 4.11-7, and compare those levels to the policies and standards of this section of the General Plan.

e) It shall recommend appropriate mitigation to achieve compliance with the policies and standards of this section of the General Plan, giving preference to proper site planning and design over mitigation measures which require the construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses. Where the noise source in question consists of intermittent single events, the report must address the effects of maximum noise levels in sleeping rooms in terms of possible sleep disturbance.

f) It shall include estimates of noise exposure after the prescribed mitigation measures have been implemented.

g) It shall describe a post-project assessment program, which could be used to evaluate the effectiveness of the proposed mitigation measures.

Policy 9.G.4. The City shall prohibit new development of noise-sensitive land uses in areas exposed to existing or projected levels of noise from transportation noise sources which exceed the levels set out in Table 4.11-7, unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels set out in Table 4.11-7.

Goal 9.H To protect the economic base of the City by preventing incompatible land uses from encroaching upon existing or planned noise-producing uses.

Policy 9.H.1. Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels set out in Table 4.11-7 or the performance standards of Table 4.11-7, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

Policy 9.H.2. Where noise mitigation measures are required to achieve the standards of Tables 4.11-7 and 4.11-8, the emphasis in such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered as a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

Policy 9.H.3. The City shall support the Right-to-Farm Ordinance, especially as it relates to noise emanating from the agricultural operations adjacent to urban uses.

Implementation of the goals and policies above would reduce the impact to a ***less-than-significant*** level.

Mitigation Measure(s)
*None required*

**4.11-2 Construction of new roadways or improvements to existing roadways, and various projects pursuant to the General Plan Update in Noise-Sensitive Areas.**

Development of the land uses and circulation improvements in accordance with the General Plan Update would result in temporary elevated noise levels due to the use of construction machinery. Noise impacts may create adverse impacts if construction is phased so that a site is actively under construction next to dwellings or other sensitive uses that are already occupied.

Construction activities would be carried out in various phases, and each development would create its own noise characteristics. Noise levels surrounding a construction site would therefore vary as work progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and pattern of operation allow noise impacts to be categorized by work phase.

Activities involved in construction would generate maximum noise levels, as indicated in Table 4.11-9, ranging from 85 to 90 dB at a distance of 50 feet. Pile driving activities would generate even higher noise levels. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

**Table 4.11-9**
**Construction Equipment Noise Levels**

| Type of Equipment | $L_{max}$, dB at 50 feet |
|---|---|
| Bulldozers | 87 |
| Heavy Trucks | 88 |
| Backhoe | 85 |
| Pneumatic Tools | 85 |

*Source*: Environmental Noise Pollution, Patrick R. Cunniff, 1977.

The noisiest construction machinery is typically earthmoving equipment, which includes bulldozers, scrapers, and loaders. This equipment is used in site preparation and road building. Typical operating cycles involve one or two minutes of operation at full power followed by three to four minutes at lower power settings. Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours.

Though construction activities would be short-term and would likely occur during normal daytime working hours, the activities would exceed acceptable noise levels, which could interfere with existing noise-sensitive land uses in the vicinity of the construction.

The General Plan Update includes the following goals and policies related to construction-related activities.

Goal 9.G To protect Wheatland residents from the harmful and annoying effects of exposure to excessive noise.

Policy 9.G.5. The noise created by new transportation noise sources shall be mitigated so as not to exceed the levels specified in Table 4.11-8 at outdoor activity areas or interior spaces of existing noise-sensitive land uses.

Policy 9.G.6. New roadway improvement projects will be needed to accommodate development permitted according to the Land Use Diagram. Where existing noise-sensitive uses may be exposed to increased noise levels due to increased roadway capacity and increases in travel speeds associated with roadway improvements, the City will apply the following criteria to determine the significance of increases in noise related to roadway improvement projects:

a) Where existing traffic noise levels are less than 60 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +5 dB Ldn increase in noise levels due to a roadway improvement project will be considered significant; and

b) Where existing traffic noise levels range between 60 and 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +3 dB Ldn increase in noise levels due to a roadway improvement project will be considered significant; and

c) Where existing traffic noise levels are greater than 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +1.5 dB Ldn increase in noise levels due to a roadway improvement project will be considered significant.

Policy 9.G.7. An increase of 3 dB Ldn or greater due to additional traffic volumes is considered a potentially significant impact.

Implementation of the goals and policies above would reduce the impacts to a ***less-than-significant*** level.

Mitigation Measure(s)
*None required*

**4.11-3 Compatibility between Beale Air Force Base and noise-sensitive uses developed within the General Plan Update study area.**

According to the Comprehensive Land Use Plan (CLUP) for Beale Air Force Base (adopted 1987, amended 1992), the 65 dB CNEL noise exposure contours extend into a portion of the Wheatland General Plan study area. Therefore, implementation of the General Plan Update could create new noise-sensitive areas near areas identified as being noise-impacted within the Beale AFB CLUP.

Due to changing operations at Beale since the CLUP Noise Contours were developed, the noise contours shown on Table 4.11-1 may not reflect the current aircraft noise environment in the Wheatland study area. However, significant issues related to the noise produced by aircraft at Beale AFB do exist. As a result of annoyances that occur due to air traffic noise, the base has adopted airport noise contours for various decibel (dB) ranges and appropriate measures to lessen the effects of noise. The main purpose for creating noise contours is to reduce the number of people exposed to noise from aircraft operating from the airport to the lowest level possible. The CLUP states that if development is proposed in areas between the 60 dB and 65 dB Community Noise Equivalency Level (CNEL) noise contours, affected cities and counties should evaluate the impact of aircraft noise on proposed development and consider requiring noise reduction measures, aviation noise easements, and buyer-renter notification. As a result, the CLUP provides a detailed analysis of compatible land uses within 60-65dB, 65-70dB, 70-75dB, 75-80dB, and 80-85dB ranges.

In addition, the requirements of the California Building Code would protect future potential individual residential, commercial, lodging, and school projects exposed to noise due to aircraft flyovers to ensure that all proposed new noise-sensitive land uses would be compatible with both California Noise Insulation Standards (title 24) and the City's local noise standards.

The General Plan Update includes the following goals and policies related to the development of noise-sensitive land uses near the critical Beale AFB noise contours.

Goal 9.H To protect the economic base of the City by preventing incompatible land uses from encroaching upon existing or planned noise-producing uses.

Policy 9.H.4. The City shall work with the Sacramento Area Council of Governments (SACOG) to ensure that City's noise policies and contours are consistent with the Beale Air Force Base Land Use Plan.

Implementation of the goals and policies above would reduce the impact; however, the impact would remain ***potentially significant***.

<u>Mitigation Measure(s)</u>
Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

*4.11-3 The City shall review all development applications on a case-by-case basis for conflicts with the Beale Air Force Base Comprehensive Land Use Plan. If appropriate, adequate measures shall be incorporated into projects in order to prevent exposure to adverse noise levels.*

**4.11-4 Compatibility between railroad noise and noise-sensitive uses developed within the General Plan Update Study Area.**

In order to quantify noise levels generated by the UPRR tracks at the project site, Bollard Acoustical Consultants utilized railroad noise level data collected as part of the Wheatland General Plan Update.

According to noise level measurements and field observations conducted by Bollard Acoustical Consultants, Inc., this line was observed to support approximately 30 train operations in a 24-hour period. Given this level of railroad activity, a measured average railroad Sound Exposure Level (SEL) of 98 dB at the measurement distance of 200 feet, and a random distribution of railroad activity throughout the day and nighttime periods, the Ldn computed for the railroad tracks in Wheatland was 70 dB at a distance of 200 feet from the tracks. Table 4.11-4 shows the distances from the railroad tracks to the 60 and 65 dB Ldn railroad noise contours based on 30 operations per day, and likely variations from that observed number of daily operations.

The General Plan Update includes the relocation of UPRR to the eastern border of the City, where if relocated, appropriate noise reduction design standards would be applied to decrease noise levels near sensitive receptors. Although the General Plan Update does not include recommendations to change railroad location and operations, the proposed Land Use Map and growth management policies, which encourage compact development, increase the likelihood of residential development being located in areas adjacent to the railroad right-of-way. As such, residential land uses may be exposed to greater railroad noise.

The General Plan Update includes the following goals and policies related to the development of noise-sensitive land uses near the UPRR noise contours.

Goal 9.G To protect Wheatland residents from the harmful and annoying effects of exposure to excessive noise.

Policy 9.G.3 Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards of Table 4.11-7 at existing or planned noise-sensitive uses, the City shall require an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design. The acoustical analysis shall meet the following requirements:

a) It shall be the financial responsibility of the applicant.

b) It shall be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics.

c) It shall include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources.

d) It shall include estimates of existing and projected cumulative (20 years) noise levels in terms of Ldn or CNEL and/or the standards of Table 4.11-7, and compare those levels to the policies and standards of this section of the General Plan.

e) It shall recommend appropriate mitigation to achieve compliance with the policies and standards of this section of the General Plan, giving preference to proper site planning and design over mitigation measures which require the construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses. Where the noise source in question consists of intermittent single events, the report must address the effects of maximum noise levels in sleeping rooms in terms of possible sleep disturbance.

f) It shall include estimates of noise exposure after the prescribed mitigation measures have been implemented.

g) It shall describe a post-project assessment program, which could be used to evaluate the effectiveness of the proposed mitigation measures.

Policy 9.G.4. The City shall prohibit new development of noise-sensitive land uses in areas exposed to existing or projected levels of noise from transportation noise sources which exceed the levels set out in Table 4.11-8, unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels set out in Table 4.11-8.

Implementation of the goals and policies above would reduce the impacts to a ***less-than-significant*** level.

<u>Mitigation Measure(s)</u>
*None required*

**4.11-5 Noise impacts associated with increased traffic on City streets resulting from buildout of the General Plan Update Study Area.**

Following cumulative buildout of the General Plan Update, traffic noise levels are predicted to be significantly higher than existing traffic noise levels on several roadways with the General Plan Update study area. The buildout of the General Plan Update study area will result in changes in land uses within the City of Wheatland. Those changes will invariably affect the future (cumulative) ambient noise environment within the City. While it is difficult to project exactly how the ambient noise conditions within the City will change following buildout of the General Plan Update study area, it is known that traffic noise levels will increase on a city-wide basis due to the additional traffic generated by buildout of various land use designations which have yet to be developed. Specifically, Table 4.11-10 shows the projected traffic noise levels at a reference distance of 100 feet from the various roadway centerlines for the cumulative buildout of the City with the proposed General Plan Update land use designations. The presence of sound walls or other shielding reduces absolute traffic noise levels at the shielded areas of noise-sensitive uses, so the Cumulative Traffic Noise levels shown in Table 4.11-10 should be considered conservative.

**Table 4.11-10**
**FHWA-RD-77-108 Highway Traffic Noise Prediction Model Data Inputs, Ldn at 100 feet, and Distances to 60 and 65 dB Ldn Contours – Preferred Plan (2025) Conditions**

| Segment | Roadway Name | Segment Description | ADT | Ldn at 100 feet from centerline | Distance to Ldn Contours in feet | |
|---|---|---|---|---|---|---|
| | | | | | 60 dB Ldn | 65 dB Ldn |
| 1 | Old SR 65 | South of Wheatland to Malone Ext. | 14500 | 62 | 140 | 65 |
| 2 | | Malone Ext. to South Ring Rd. | 12800 | 62 | 129 | 60 |
| 3 | | South Ring Rd. to Main St. | 9000 | 60 | 102 | 47 |
| 4 | | Main St. to Olive | 15500 | 63 | 147 | 68 |
| 5 | | Olive to McDevitt Dr. | 14200 | 62 | 139 | 64 |
| 6 | | McDevitt Dr. to North Ring Rd. | 12300 | 61 | 126 | 58 |
| 7 | | Wheatland Park Dr. to Dairy | 21900 | 64 | 185 | 86 |
| 8 | | North of Dairy (in County) | 27500 | 65 | 215 | 100 |
| 9 | Oakley Lane | Dairy to Ring Rd. | 10200 | 61 | 111 | 52 |
| 10 | | Ring Rd. to New Road 1 | 8000 | 60 | 95 | 44 |
| 11 | | New Road 1 to McDevitt Dr. | 7800 | 60 | 93 | 43 |
| 12 | | McDevitt Dr. to Wheatland Rd. | 10200 | 61 | 111 | 52 |
| 13 | | Wheatland Rd. to South Ring Rd. | 7300 | 59 | 89 | 41 |
| 14 | Southern Ring Rd. | Oakley Ln. to Wheatland Park Dr. | 12000 | 61 | 124 | 57 |
| 15 | | Wheatland Park Dr. to Malone Ext. | 12500 | 62 | 127 | 59 |
| 16 | | Malone Ext. to SR 65 Loop Ramps | 14000 | 62 | 137 | 64 |
| 17 | | SR 65 Loop Ramps to B St. Ext. | 15300 | 62 | 146 | 68 |
| 18 | | B St. Ext. to New Road 4 | 14800 | 62 | 142 | 66 |
| 19 | | New Road 4 to Spenceville Rd. | 19700 | 64 | 172 | 80 |
| 20 | Northern Ring Rd. | New Road 4 to Oakley Ln. | 7500 | 59 | 91 | 42 |
| 21 | | Oakley Ln. to Wheatland Park Dr. | 6400 | 59 | 81 | 38 |
| 22 | | Wheatland Park Dr. to SR 65 | 11700 | 61 | 122 | 57 |
| 23 | | SR 65 to C St. Ext. | 18500 | 63 | 165 | 77 |
| 24 | | C St. Ext. to B St. Ext. | 16000 | 63 | 150 | 70 |
| 25 | | B St. Ext. to Nichols Rd. Ext. | 15,500 | 63 | 147 | 68 |
| 26 | | Nichols Rd. Ext. to Spenceville Rd. | 19,200 | 63 | 169 | 79 |
| 27 | Loops at Southern Crossing | North of South Ring Rd. | 1100 | 51 | 25 | 12 |
| 28 | | South of South Ring Rd. | 8300 | 60 | 97 | 45 |
| 29 | First St. | G St. to Wheatland Park Dr. | 3300 | 56 | 52 | 24 |
| 30 | | G St. to E St. | 3600 | 56 | 55 | 26 |
| 31 | | E St. to SR 65 | 3600 | 56 | 55 | 26 |
| 32 | Wheatland Rd. | West of New Road 2 | 6700 | 59 | 84 | 39 |
| 33 | | New Road 2 to Oakley Ln. | 2800 | 55 | 47 | 22 |
| 34 | | Oakley Ln. to Lewis | 2900 | 55 | 48 | 22 |
| 35 | | Lewis to Wheatland Park Dr. | 1500 | 52 | 31 | 14 |
| 36 | New Road 1 | New Road 2 to Oakley Ln. | 4100 | 57 | 61 | 28 |
| 37 | | Oakley Ln. to Wheatland Park Dr. | 3800 | 56 | 58 | 27 |
| 38 | | Wheatland Park Dr. to SR 65 | 3600 | 56 | 55 | 26 |
| 39 | Main St. | Wheatland Park Dr. to E St. | 1600 | 53 | 32 | 15 |
| 40 | | E St. to Malone | 1500 | 52 | 31 | 14 |
| 41 | Main St. Con'td | Malone to SR 65 | 4700 | 57 | 66 | 31 |
| 42 | | SR 65 to B St. Ext. | 4500 | 57 | 64 | 30 |
| 43 | | B St. Ext. to Spenceville Rd. | 2900 | 55 | 48 | 22 |
| 44 | Malone | Main St. to South Ring Rd. | 4100 | 57 | 61 | 28 |

**Table 4.11-10**
**FHWA-RD-77-108 Highway Traffic Noise Prediction Model Data Inputs, Ldn at 100 feet, and Distances to 60 and 65 dB Ldn Contours – Preferred Plan (2025) Conditions**

| Segment | Roadway Name | Segment Description | ADT | Ldn at 100 feet from centerline | Distance to Ldn Contours in feet | |
|---|---|---|---|---|---|---|
| | | | | | 60 dB Ldn | 65 dB Ldn |
| 45 | | South Ring Rd. to SR 65 | 5400 | 58 | 73 | 34 |
| 46 | Spencville Rd. | Main St. to New Road 4 | 7300 | 59 | 89 | 41 |
| 47 | | New Road 4 to Ring Rd. | 8900 | 60 | 101 | 47 |
| 48 | | Ring Rd. to SR 65 Bypass | 27900 | 65 | 217 | 101 |
| 49 | | SR 65 Bypass Overcrossing | 12900 | 62 | 130 | 60 |
| 50 | | SR 65 Bypass to Jasper | 7100 | 59 | 87 | 41 |
| 51 | | East of Jasper | 2,800 | 55 | 47 | 22 |
| 52 | McDevitt Dr. | New Road 2 to Oakley Ln. | 3200 | 56 | 51 | 24 |
| 53 | | Oakley Ln. to Wheatland Park Dr. | 3100 | 56 | 50 | 23 |
| 54 | | Wheatland Park Dr. to SR 65 | 6300 | 59 | 81 | 37 |
| 55 | | SR 65 to C St. Ext. | 9500 | 60 | 106 | 49 |
| 56 | | C St. Ext. to B St. Ext. | 4300 | 57 | 62 | 29 |
| 57 | | B St. Ext. to Nichols Ext. | 2500 | 55 | 44 | 20 |
| 58 | Nichols | North Ring Rd. to McDevitt | 2400 | 54 | 42 | 20 |
| 59 | | McDevitt to Olive | 2900 | 55 | 48 | 22 |
| 60 | B St. | North Ring Rd. to McDevitt Ext. | 2000 | 54 | 38 | 17 |
| 61 | | McDevitt Ext. to Olive | 1100 | 51 | 25 | 12 |
| 62 | | Olive to Main | 2100 | 54 | 39 | 18 |
| 63 | | Main to South Ring Rd. | 2400 | 54 | 42 | 20 |
| 64 | C St. | North Ring Rd. to McDevitt | 4200 | 57 | 61 | 29 |
| 65 | | McDevitt to Olive | 4900 | 58 | 68 | 32 |
| 66 | New Road 2 | North Ring Rd. to New Road 1 | 1900 | 53 | 36 | 17 |
| 67 | | New Road 1 to McDevitt | 900 | 50 | 22 | 10 |
| 68 | | McDevitt to Wheatland Rd. | 1000 | 51 | 24 | 11 |
| 69 | | Wheatland Rd. to Oakley Ln. | 3000 | 55 | 49 | 23 |
| 70 | New Road 4 | Spenceville to South Ring Rd. | 3300 | 56 | 52 | 24 |
| 71 | | South Ring Rd. to SR 65 Bypass | 2200 | 54 | 40 | 19 |
| 72 | Wheatland Park Dr. | North Ring Rd. to New Road 1 | 5700 | 58 | 75 | 35 |
| 73 | | New Road 1 to McDevitt | 3000 | 55 | 49 | 23 |
| 74 | | McDevitt to Wheatland Rd. | 2500 | 55 | 44 | 20 |
| 75 | | Wheatland Rd. to First St. | 3100 | 56 | 50 | 23 |
| 76 | | First St. to Main St. Ext. | 3,000 | 55 | 49 | 23 |
| 77 | | Main St. Ext. to Ring Rd. | 2,000 | 54 | 38 | 17 |
| 78 | Eastern Wheatland Bypass | South Beale Rd. to Dairy Rd. | 37100 | 73 | 754 | 350 |
| 79 | | Dairy Rd. to Spenceville Rd. | 37500 | 73 | 760 | 353 |
| 80 | | South of Spenceville Rd. | 48100 | 74 | 897 | 416 |

Source: *Annual Average Daily Truck Traffic on the California State Highway System*, Caltrans, 2002, Bollard & Brennan, Inc. and kdANDERSAON Transportation Consultants.

The General Plan Update includes the following goals and policies related to Noise impacts associated with increased traffic on City streets resulting from buildout of the General Plan Update study area:

Goal 9.G To protect Wheatland residents from the harmful and annoying effects of exposure to excessive noise.

Policy 9.G.6. New roadway improvement projects will be needed to accommodate development permitted according to the Land Use Diagram. Where existing noise-sensitive uses may be exposed to increased noise levels due to increased roadway capacity and increases in travel speeds associated with roadway improvements, the City will apply the following criteria to determine the significance of increases in noise related to roadway improvement projects:

a. Where existing traffic noise levels are less than 60 dB $L_{dn}$ at the outdoor activity areas of noise-sensitive uses, a +5 dB $L_{dn}$ increase in noise levels due to a roadway improvement project will be considered significant; and
b. Where existing traffic noise levels range between 60 and 65 dB $L_{dn}$ at the outdoor activity areas of noise-sensitive uses, a +3 dB $L_{dn}$ increase in noise levels due to a roadway improvement project will be considered significant; and
c. Where existing traffic noise levels are greater than 65 dB $L_{dn}$ at the outdoor activity areas of noise-sensitive uses, a + 1.5 dB $L_{dn}$ increase in noise levels due to a roadway improvement project will be considered significant.

Policy 9.G.7. An increase of 3 dB $L_{dn}$ or greater due to additional traffic volumes is considered a potentially significant impact.

The City of Wheatland General Plan Policy 9.G.6 pertains to increased traffic noise levels, which result from capacity enhancing roadway improvement projects. This policy does not appear to be applicable to the general citywide increase in traffic noise levels, which would result from buildout of the City. As a result, dwellings at which the traffic noise levels will exceed the City's noise standards may exist, which are not subject to City review with respect to the satisfaction of the standards of the Noise Element. The implementation of the goals and policies above would minimize the impacts; however not to a *less-than-significant* level. The resultant impact would remain a ***significant*** impact.

<u>Mitigation Measure(s)</u>
Implementation of the following mitigation measure would reduce the impacts, however, not to a *less-than-significant* level. Therefore, a *significant and unavoidable* impact would occur.

4.11-5 *The City shall work to develop a citywide traffic noise abatement program for the express purpose of reducing traffic noise exposure at existing residential uses, which are affected by traffic noise levels in excess of the City's noise level standards. The program should include the following specific aspects for noise abatement consideration where reasonable and feasible:*

1. *Noise barrier retrofits.*
2. *Truck usage restrictions.*
3. *Reduction of speed limits.*
4. *Use of quieter paving materials.*
5. *Building façade sound insulation.*
6. *Traffic calming.*
7. *Additional enforcement of speed limits and exhaust noise laws.*
8. *Signal timing.*

The above measure, whether used individually or collectively, can result in a reduction of traffic noise levels at affected sensitive receptor locations. Nonetheless, despite the implementation of such a noise abatement program, it will be infeasible to ensure that some existing residential uses will not be exposed to future traffic noise levels in excess of the City's noise standards. As a result, this impact is considered *significant and unavoidable* despite the implementation of a Citywide Traffic Noise Abatement Program.

**Endnotes**

[1] City of Wheatland, Wheatland General Plan Update Background Report, July 2004.
[2] Bollard Acoustical Consultants, Inc., Noise Study, December 2005.