IV. ENVIRONMENTAL IMPACT ANALYSIS
I. NOISE

INTRODUCTION

The information and analysis in this section is based on the following report prepared for the proposed project, which is included in Appendix H of this Draft EIR:

- Illingworth & Rodkin, Upper Road Residential Lot Land Division, Ross, California Environmental Noise Assessment, February 22, 2013.

FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise is typically defined as unwanted sound. A typical noise environment consists of a base of steady ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources, such as an occasional aircraft or train passing by to virtually continuous noise sources like traffic on a major highway. Table IV.I-1 below illustrates representative noise levels in the environment and industry.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

- L_{eq} – The equivalent energy noise level is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- L_{dn} – The equivalent noise level for a continuous 24-hour period with a 10-decibel penalty imposed during nighttime and morning hours (10:00 PM to 7:00 AM).

Table IV.I-1
Typical Sound Levels Measured in the Environment and Industry

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50') Pneumatic Drill (50') Freeway (100')	80	Printing Press Plant	
Vacuum Cleaner (10')	70	In Kitchen With Garbage Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100') Large Transformer (200')	50	Department Store	
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: February 23, 2013, Illingworth & Rodkin, Inc.

L_{min} – The minimum instantaneous noise level experienced during a given period of time.

- L_{max} – The maximum instantaneous noise level experienced during a given period of time.
- CNEL – The Community Noise Equivalent Level is a 24-hour average L_{eq} with a 10 dBA "penalty" added to noise during the hours of 10:00 PM to 7:00 AM, and an additional 5 dBA penalty during the hours of 7:00 PM to 10:00 PM to account for noise sensitivity in the evening and nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Day/Night Average Sound Level, L_{dn}*, is a measure of the cumulative noise exposure in a community, with a 10 dB addition to nocturnal (10:00 PM - 7:00 AM) noise levels.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity, above 35 dBA, and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population

is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day, night, or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60–70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet suburban residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate level noise environments are urban residential or semi-commercial areas (typically 55–60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with more noisy urban residential or residential-commercial areas (60–75 dBA) or dense urban or industrial areas (65–80 dBA).

When evaluating changes in 24-hour community noise levels, a difference of 3 dBA is a barely perceptible increase to most people. A 5 dBA increase is readily noticeable, while a difference of 10 dBA would be perceived as a doubling of loudness.

Noise levels from a particular source decline as distance to the receptor increases. Other factors, such as the weather and reflecting or shielding, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer homes is generally more than 30 dBA.

Fundamentals of Environmental Groundborne Vibration

Vibration is sound radiated through the ground. Vibration can result from a source (e.g., train operations, motor vehicles, machinery equipment, etc.) causing the adjacent ground to move, thereby, creating vibration waves that propagate through the soil to the foundations of nearby buildings. This effect is referred to as groundborne vibration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration levels. PPV is defined as the maximum instantaneous peak of the vibration level, while RMS is defined as the square root of the average of the squared amplitude of the level. PPV is typically used for

evaluating potential building damage, while RMS velocity in decibels (VdB) is typically more suitable for evaluating human response.

The background vibration velocity level in residential and commercial areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

METHODOLOGY

Access to the site is via Upper Road from Glenwood Avenue. Four residential lots border the site. Three of the four adjacent residential lots are accessed by a private road, which gives access to Upper Road. The fourth residential lot is accessed directly from Upper Road. Along most of its eastern boundary, the site abuts Natalie Coffin Greene Park. The southwestern and northwestern sides of the park border MMWD lands and an open space parcel owned by the Town of Ross. The existing noise environment at the site and in the vicinity results primarily from traffic on Upper Road.

Illingworth & Rodkin, Inc. (I&R) previously studied the noise environment on the project site and in the surrounding environs in September of 1990, and in November 2002 for noise studies of previously proposed residential uses of the project site. To update the results of the noise measurements and analysis for the current, existing, noise environment in the project vicinity, I&R conducted another continuous 72-hour noise measurement between October 26th to 29th, 2012 and a spot noise measurement at the same locations as in their previous study (Appendix H).

ENVIRONMENTAL SETTING

Nearby Sensitive Receptors

Sensitive receptors are populations that are more susceptible to the effects of noise and vibration than others, such as the elderly and children. Locations that may contain high concentrations of sensitive receptors include long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, child care centers, and libraries. The nearest sensitive receptors to the project site include single-family residential uses on all sides, except for Natalie Coffin Greene Park along the lower part of the site's eastern boundary. These single-family residential uses are identified in Figure III-8 as the 7 Upper Road, 25 Upper Road, 27 Upper Road, and 31 Upper Road lots. The southwestern and northwestern sides of the park border MMWD lands and an open space parcel owned by the Town of Ross.

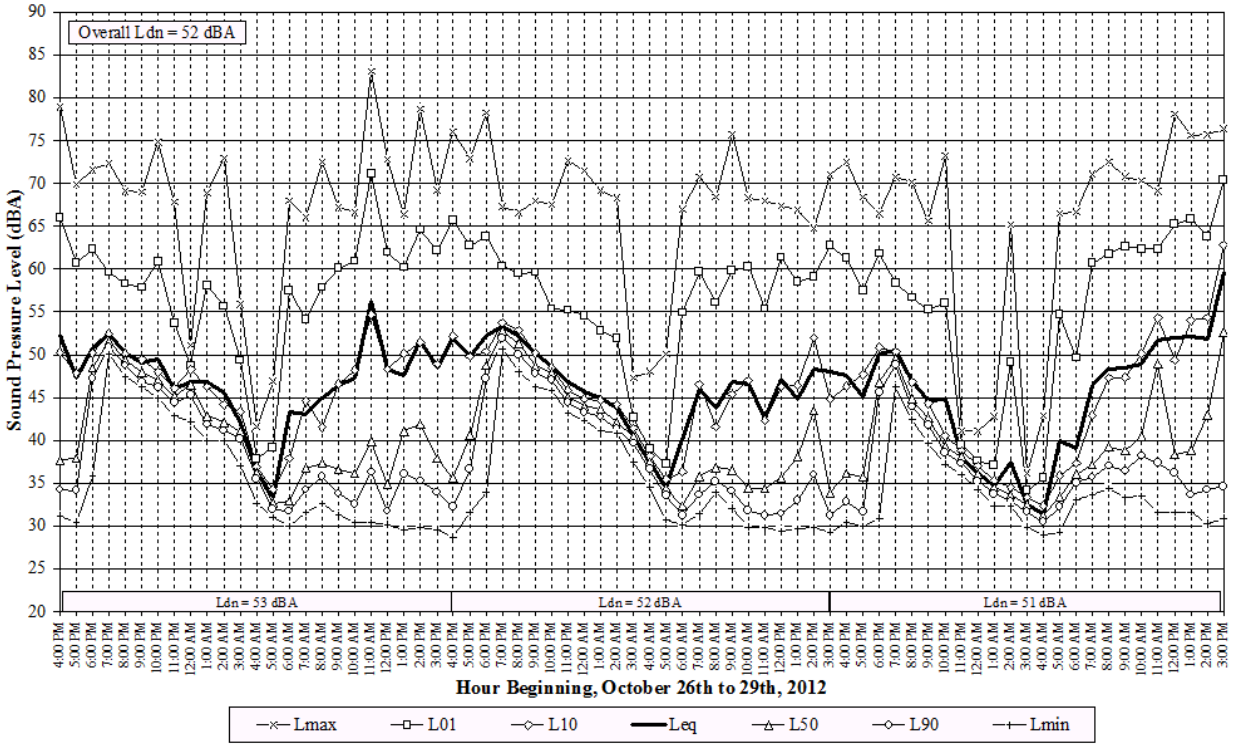
Existing Conditions

The noise environment on the project site and in the surrounding environs was previously studied in September of 1990, and in November 2002 for noise studies of previously proposed residential uses of the project site. For these previous studies, continuous 24-hour noise measurements, and a shorter-term (15 minute) spot noise measurement was made at the same location. The long term measurement during both studies was made 25 feet from the centerline of Upper Road in front of the residence to the southeast of the project site, and the 15 minute spot noise measurements were made at the end of the existing access road on the project site near the end of the currently proposed 20-foot wide private road. The results of the 1990 measurements at the average L_{dn} was 56 dBA at the long term location, varying from a high of 60 dBA L_{dn} during weekdays when a fair amount of construction traffic was present on Upper Road to 55 dBA on weekends and other days when construction and other traffic diminished. The average noise level at the short-term measurement location was 37 dBA. The results of the 2002 measurements indicated that the L_{dn} at 25 feet from the centerline of Upper Road in front of the residence to the southeast was slightly lower than during the 1990 measurement (54 dBA in 2002 vs. 56 dBA in 1990) and the average noise level at the short-term measurement location was 36 dBA.

A review of the 1990 and 2002 sound level data indicated that the only significant variation in the measured levels was due to the presence of insect noise in the evening and late night hours in the warm month of September 1990 measurements versus the colder month of November 2002. The average sound level at the short-term measurement location was also very similar between 1990 and 2002 (37 vs. 36 dBA). Because the differences in these measured levels are within the typical margin of error for environmental noise measurements and may also be the result of increase insect and other woodland noises in September vs. November, the noise environment at the residences adjacent to the site was considered to have remained essentially unchanged from 1990 to 2002.

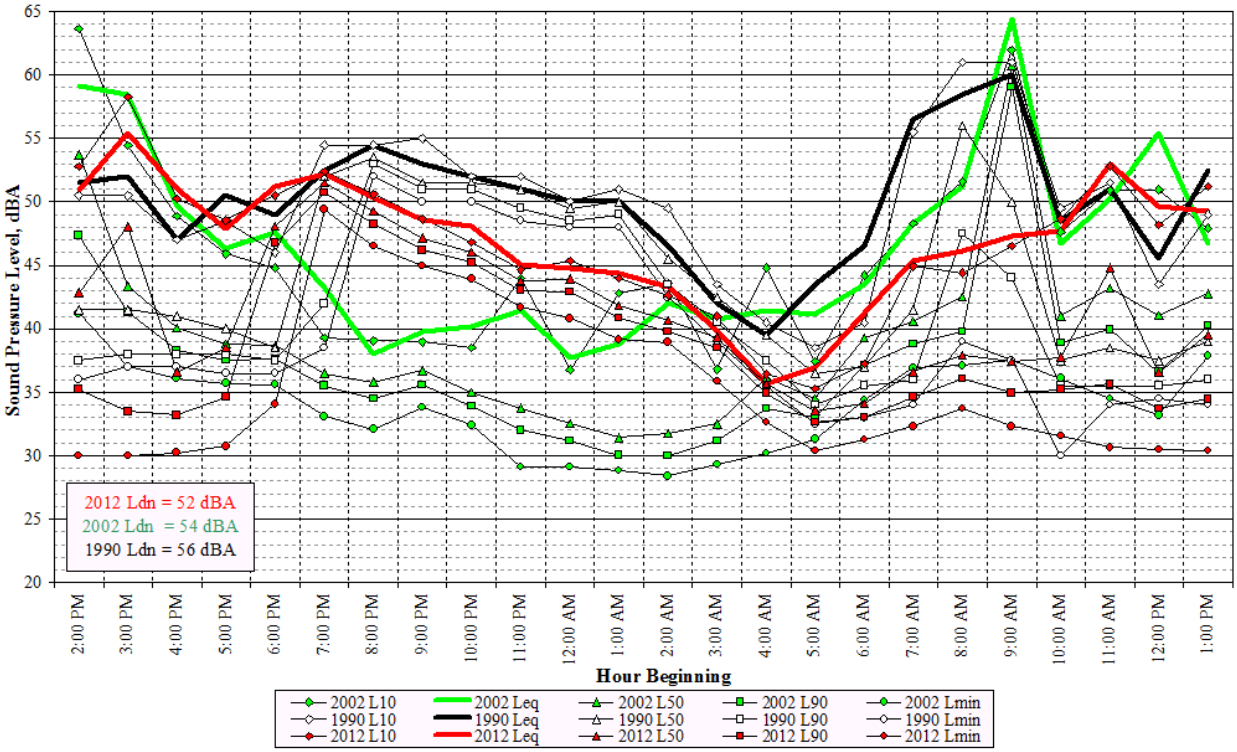
To update the results of the noise measurements and analysis for the current, existing, noise environment in the project vicinity, another continuous 72-hour noise measurement was conducted between October 26th and 29th, 2012 and a spot noise measurement at the same locations as in the previous study. The result of this survey shows that the average L_{dn} at 25 feet from the centerline of Upper Road in front of the residence to the southeast was 52 dBA, with the daily L_{dn} varying from 51 to 53 dBA. The average noise level at the short-term measurement location on October 29th, 2012 was 36 dBA. These long term measurement results are shown in Figure IV.I-1.

Figure IV.I-1
2012 Measure Noise Levels at Location LT-1



The 2012 overall levels are slightly lower than either the 1990 or 2002 measurements (52 dBA average L_{dn} in 2012 vs. 54 dBA in 2002 vs. 56 dBA in 1990). A comparison of the variation in average hourly sound levels at the long-term position for the 2012, 2002, and 1990 measurements is shown in Figure IV.I-2.

Figure IV.I-2
Comparison of 2012, 2002 and 1990 Long-Term Environmental Noise Levels



A review of Figure IV.I-2 shows that while the 1990 and 2002 sound levels only significantly vary between 7 PM and 2 AM, the 1990 and 2012 measurements during this period were similar. As discussed above the variation between 7 PM and 2 AM is likely due to the presence of insect noise during warmer weather (September & October in 1990 and 2012) versus the colder month of November 2002. The average sound level at the short-term measurement location during all measurements was very similar at 37 dBA in 1990, 36 dBA 2002, and 36 dBA in 2012. The difference in these measured levels is within the typical margin of error for environmental noise measurements.

A comparison of the current (2012) measurement results and the previous (2002 & 1990) measurements and analysis shows that the noise environment at the residences adjacent to the site to have remained essentially unchanged from 1990 to 2012. Therefore, the existing L_{dn} noise exposure is considered to be an average L_{dn} of 40 to 41 dBA at the 25 Upper Road property to the south of the site and an L_{dn} of 45 to 46 dBA at the property to the upper northwest of the site, with the Ldn noise exposure at the existing lots further from the road at below 40 dBA due to Upper Road traffic. This average L_{dn} of less than 40 dBA is also representative of the existing sound levels at the residential lots proposed by the project.

By utilizing the long and short term data and taking into account the distance from Upper Road to the residential lots bordering the project site, the L_{dn} noise exposure resulting from Upper Road traffic was calculated at the lots bordering Upper Road. The measured levels were found

to correlate to an average Ldn of 41 dBA at the property to the southeast of the site and an Ldn of 46 dBA at the 25 Upper Road property, with the L_{dn} noise exposure at the existing lots further from the road at below an Ldn of 40 dBA due to Upper Road traffic.

REGULATORY SETTING

The State of California and the Town of Ross have established regulations, plans, and policies that are designed to limit noise exposure at noise sensitive land uses. These include: (1) the State CEQA Guidelines, Appendix G and (2) the Town of Ross' General Plan Noise Element and Municipal Code Zoning Ordinance.

Federal

There are no federal standards that are applicable to the proposed project.

State

The CEQA Guidelines have established the following questions to evaluate the significance of effects of environmental noise attributable to a proposed project.

Would the project result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?
- Exposure of persons to or generation of excessive groundborne vibration or noise levels?
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing 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 airstrip, expose people residing or working in the project area to excessive noise levels?
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels?

CEQA does not define what noise level increase would be considered substantial. Typically, project-generated noise level increases of 3 dBA L_{dn} or greater would be considered significant where exterior noise levels would exceed the normally acceptable noise level standard. Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA L_{dn} or greater would be considered significant.

Local

Town of Ross General Plan Noise Standards

The Noise/Land Use Compatibility Standards contained in Part IV, Section 5.7 of the Town of Ross' 2007-2025 General Plan Noise Element contains noise performance standards for outdoor use areas (i.e. backyards and patios) in residential areas of 55 dBA L_{dn}. Part IV, Section 5.8 of the General Plan limits interior noise levels due to exterior sources to an L_{dn} of 45 dBA and recommends that an interior noise level due to exterior sources of 40 dBA L_{dn} be maintained in bedrooms of new residences. Part IV, Section 5.10 of the General Plan requires mitigation of construction and traffic noise impacts on the ambient noise level in the Town limits.

Municipal Code Noise Standards

The Town of Ross Municipal Code, Title 9, Chapter 9.20, Section 9.20.035 Construction states that:

It is unlawful for any person or construction company within the Town limits to perform any construction operation before 8:00 AM or after 5:00 PM, Monday through Friday of each week and not at any time on Saturday, Sunday, or the other holidays listed in Section 9.20.060; except that:

(1) Work done solely in the interior of a building or structure, the performance of which does not create any noise which is audible from the exterior of the building or structure; or

(2) Work actually physically performed solely by the owner of the property, on Saturday between the hours of 10:00 AM and 4:00 PM and not at any time on Sundays or other holidays.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

A significant impact would be identified for a proposed land use if it would be exposed to noise levels exceeding the Town's established requirements for noise and land use compatibility. These requirements correlate with Appendix G of the State *CEQA Guidelines*. For the proposed project, a significant impact would be identified if the project would be exposed to noise levels exceeding the Town's established guidelines for "satisfactory" noise and land use compatibility.

1. According to CEQA, a significant noise impact would result if noise levels increase substantially at noise-sensitive land uses (e.g., residences). A substantial increase to noise levels would occur if the project resulted in an increase of 5 dBA or greater at noise-sensitive outdoor use areas where noise levels are currently less than 55 dBA L_{dn}.
2. Construction noise levels would be treated somewhat differently because they are temporary. Significant noise impacts would result from construction if noise levels were sufficiently high to

interfere with speech, sleep, or normal residential activities. Construction-related hourly average noise levels received in outdoor use areas of noise-sensitive land uses above 55 dBA during the daytime and 45 dBA at night would be considered significant.

Noise Issues not Further Analyzed

The following issues were addressed in the Initial Study (see Appendix A) and Section IV.A of the Draft SEIR and were determined to result in no impact or a less-than-significant impact and not warrant further analysis:

- 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 Airstrip, Expose People Residing or Working in the Project Area to Excessive Noise Levels; or
- For a Project within the Vicinity of a Private Airstrip, Expose People Residing or Working in the Project Area to Excessive Noise Levels.

Project Impacts and Mitigation Measures

Noise impacts resulting from the proposed development of the site fall into three major categories:

(1) The potential effects of environmental noise on the developability of the proposed residential lots;

(2) Potential increases in noise on surrounding residences resulting from project-generated traffic on the access road; and

(3) Short-term noise impacts on surrounding residences resulting from construction of the project.

Impact NOISE-1: Noise and Land Use Compatibility for the Proposed Residences

The existing and foreseeable future noise exposure on all building sites would be significantly less than an L_{dn} of 55 dBA, meeting the Town of Ross' noise performance standards for outdoor use areas in residential areas. Noise impacts resulting from the existing and future environmental noise exposure on all building sites would therefore be considered to be ***less than significant*** and no mitigation is required.

Impact NOISE-2: Noise from the Proposed Residences, Operation of the Project Access Road and Increased Traffic on Upper Road on Adjacent Residences

The proposed project would place new residential uses in an undeveloped area adjacent to existing residential and quiet open space areas. The occupation and use of the proposed homes is expected to result in the typical noises associated with residential development, including voices of the new residents, home maintenance activities, and perhaps barking dogs and children. Though the auditory content of the new sounds may change noticeably from those currently heard in project areas adjacent to existing residences, the typical sound levels produced by residential uses are expected to result in average daytime sound levels within the

same range as those currently generated by the existing residences adjacent to the project site. Changes in the existing noise environment at adjacent existing residences are expected to increase Ldn levels at these homes by less than 3 dBA. Noise levels in these areas will also to continue to comply with City General Plan Noise Standards. Therefore, the operational noise impact associated with the proposed residences on existing uses in the project area would be ***less than significant*** and no mitigation is required.

When the project is complete, the access road is projected to carry 30 daily vehicles trips with an hourly morning and evening peak hour volumes of three to four vehicles. With consideration of the grade, maximum noise levels generated by individual vehicles climbing up the access road will typically range from 70 to 75 dBA at 25 feet. When vehicles are descending the access road, maximum noise levels would be expected to diminish by 6 to 10 dBA. Given the distance and topographical characteristic of the area, these levels will be significantly lower at the nearest existing residences. Noise modeling using Version 7.0 of the SoundPLAN computer model was employed to calculate noise levels resulting from vehicle operations on the access road at the surrounding uses (Appendix H). SoundPLAN is a three-dimensional ray-tracing program that takes into account the characteristics of the noise source, including its location, size and shape, sound level, and frequency spectrum. The program also accounts for conditions that affect the sound propagation between a noise source and receiver including absorption by the ground and air, effects of intervening barriers (such as buildings) or topography, and reflections from the ground and other surfaces. Model inputs also included the massing of the intervening structures between the noise sources and adjacent residential uses. Neutral atmospheric conditions were assumed for the modeling. The model results indicate that the two existing homes closest to the access road, 25 Upper Road and 7 Upper Road, would be exposed to maximum sound levels due to climbing vehicles of 73 and 66 dBA, respectively. When vehicles are descending the access road maximum noise levels would be between 63 and 68 at the 25 Upper Road residence and between 56 and 61 at the 7 Upper Road residence to the southeast of the site. The noise levels due to ascending and descending vehicles would be no higher than the daily maximum noise levels that currently exist at these off-site homes.

The model results also show that morning and evening peak hour traffic on the access road (three to four vehicles per hour) equally entering and exiting the site (climbing and descending), would produce an hourly L_{eq} of 48 dBA at 25 feet from the roadway centerline. The morning peak hour would likely be composed of descending trips and the afternoon peak hour ascending trips. If this were the case the morning peak hour Leq would be about 42 dBA at 25 feet while the afternoon peak hour would be about 52 dBA at 25 feet. Based on these peak hour levels, the L_{dn} resulting from access road use would be below 45 dBA at the existing residences bordering the project site. This is considered to be a ***less-than-significant*** noise impact and no mitigation is required.

The daily addition of 30 vehicular trips on Upper Road from the proposed project would result in a less than one (1) dBA increase in sound levels at residences along Upper Road. This is considered to be a ***less-than-significant*** noise impact and no mitigation is required.

Impact NOISE-3: Construction Noise Impacts

Access Road and Driveways

Construction of the access road and driveways would temporarily increase noise levels at nearby noise-sensitive receptors by trucks delivering and recovering materials at the site, grading and paving equipment, saws, hammers, the radios and voices of workers, and other typical provisions necessary to construct the access road, driveways and homes on the three residential lots. High noise levels will be generated intermittently when the site is cleared to make room for the access road, driveways and residential pads. The highest construction noise levels would be generated during the grading and paving of the access road and driveways, and lower noise levels occurring during home construction and finishing. Table IV.I-2 lists typical average noise levels at 50 feet from the center of work activity for roadway construction and home building activities.

Table IV.I-2
Typical Ranges of Leq Levels at 50 feet for Construction Phases

Work Phase	Home Building		Roads, Sewers and Trenches	
	I	II	I	II
Ground Clearing	83 dBA	83 dBA	84 dBA	84 dBA
Excavation	88 dBA	75 dBA	88 dBA	78 dBA
Foundations	81 dBA	81 dBA	88 dBA	88 dBA
Erection	81 dBA	65 dBA	79 dBA	78 dBA
Finishing	88 dBA	72 dBA	84 dBA	84 dBA

Notes: I – All pertinent equipment present at the site. II - Minimum required equipment at the site
Source: U.S.E.P.A., Legal Compilation on Noise, Vol.1, p2-104, 1973.

Using the source levels given in Table IV.I-2, the noise levels produced during the excavation, grading and road base placement of the access road and driveways at the adjacent residential uses were modeled using line source inputs into the SoundPLAN model. The results of this modeling indicate that during construction of the northern portion of the access roadway (nearest Upper Road) the average (L_{eq}) noise levels at the adjacent four residences (25 Upper Road, 7 Upper Road, 27 Upper Road and 31 Upper Road Residences) will, respectively, be 89 dBA, 89 dBA, 79 dBA, and 69 dBA. Construction of the central portion of the access road will result in respective average (L_{eq}) noise levels at these residences of 79 dBA, 78 dBA, 78 dBA, and 71 dBA and construction of the southern portion of the access road will result in respective average (Leq) noise levels at these residences of 75 dBA, 72 dBA, 90 dBA, and 77 dBA. Noise levels at other, non-adjacent residences in the area (#4, #29, and #37 Upper Road), would also be somewhat elevated during roadway construction, with average noise levels ranging from 72 to 82 dBA during construction of the northern portion of the access roadway, 71 to 75 dBA during construction of the central portion of the access roadway, and 74 to 78 dBA during construction of the southern portion of the access road.

Based on current project information, construction of the access road and driveways is estimated to take up to six months with up to two months of this period involving the noisiest excavation, grading and paving activities. Even with implementation of Mitigation Measure NOISE-3, the construction access road and driveways is considered to constitute a ***significant unavoidable*** short-term noise impact.

Home Construction on the Residential Lots

Sound PLAN modeling was also employed to evaluate noise levels at the adjacent residences during the construction of the individual homes on the three lots proposed by the project (Appendix H). The results of this modeling indicate that construction on Parcel One (nearest the 7 Upper Road residence) would produce average (L_{eq}) noise levels at the 25 Upper Road, 7 Upper Road, 27 Upper Road and 31 Upper Road residences will, respectively, be 48 dBA, 60 dBA, 51 dBA, and 61 dBA. Construction on Parcel Two (the central parcel) would produce respective average (L_{eq}) noise levels at 25 Upper Road, 7 Upper Road, 27 Upper Road and 31 Upper Road residences of 52 dBA, 54 dBA, 62 dBA, and 67 dBA, and construction on Parcel Three (nearest the 25 Upper Road, 27 Upper Road and 31 Upper Road residences) would produce respective average (L_{eq}) noise levels at the at the 25 Upper Road, 7 Upper Road, 27 Upper Road and 31 Upper Road residences of 53 dBA, 58 dBA, 62 dBA, and 71 dBA. Noise levels at other, non-adjacent residences in the area (#4, #29, and #37 Upper Road), would also be somewhat elevated, with average noise levels ranging from 46 to 50 dBA during Parcel One construction, 51 to 64 dBA during Parcel Two construction, and 57 to 67 dBA during Parcel Three construction.

The timing of individual home construction at the residential parcels is unknown due to the fact that the individual property owners may have different schedules and goals. While it is possible for all homes to be constructed during the same building season, this is considered unlikely considering the expected size and complexity of the individual building projects and differing timetables and objectives of the parcel owners. Even with implementation of Mitigation Measure NOISE-3, this would constitute a ***significant unavoidable*** short-term noise impact.

Mitigation Measure NOISE-3: Construction Noise Impacts

Noise impacts due to construction activities would be reduced by implementing the restrictions on construction operations in the Town's Municipal Code, which prohibits construction activities between the hours of 5:00 PM and 8:00 AM on weekdays and no work on weekends. Because of the proximity to existing residences, it is recommended that construction activities be further restricted by incorporating the following conditions in related construction contract agreements and on building permit plans.

1. *Additional Restrictions on Construction Hours.* The following measures are recommended to limit construction and related activities to the portion of the day when the number of persons in the adjacent residential uses is lowest.

    A. There shall be no startup of construction related machinery or equipment prior to 8:00 AM Monday through Friday.

B. The delivery of materials or equipment to the site shall be limited to weekday (Monday through Friday) non-holiday hours between 8:00 AM and 5:00 PM.

C. Machinery shall not be cleaned past 5:00 PM or serviced past 5:00 PM Monday through Friday.

2. *Posted Construction Hours.* Clearly post construction hours on a sign at the entrance to the construction site.

3. *Construction Equipment Mufflers and Maintenance*. Muffle and maintain all equipment used on-site. All internal combustion engine-driven equipment shall be fitted with mufflers that are in good condition. Good mufflers shall result in non-impact tools generating a maximum noise level of 80 dB when measured at a distance of 50 feet.

4. *Idling Prohibitions.* Prohibit unnecessary idling of internal combustion engines. Equipment shall be turned off when not in use.

5. *Worker Radio Noise.* Prohibit audible construction workers' radios on adjoining properties.

6. *Equipment Location and Shielding.* Locate all stationary noise-generating construction equipment such as air compressors as far as practical from existing nearby residences and other noise-sensitive land uses. Acoustically shield such equipment.

7. *Quiet Equipment Selection.* Select quiet construction equipment, particularly air compressors, whenever possible. (Fit motorized equipment with proper mufflers in good working order and appropriate for the equipment.)

8. *Noise Disturbance Coordinator.* Designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. This individual would most likely be the contractor or a contractor's representative. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the entrance to the construction site, provide it to the Town of Ross Police Chief and Town Manager, and include it in the notice sent to neighbors regarding the construction schedule.

9. *Heavy Equipment Storage.* Heavy equipment, such as paving and grading equipment, shall be stored on-site whenever possible to minimize the need for extra heavy truck trips on local streets.

10. *Backup Alarms.* The contractor shall minimize use of vehicle backup alarms. A common approach to minimizing the use of backup alarms is to design the construction site with a circular flow pattern that minimizes backing up of trucks and other heavy equipment. Another approach to reducing the intrusion of backup alarms is to require all equipment on the site to be equipped with ambient sensitive alarms. With this type of alarm, the alarm sound is automatically adjusted based on the ambient noise.

Implementation of the above measures will limit the overall noise level and contain construction activities to a specified time frame, while also giving any persons disturbed by occasional loud noises an identifiable method of recourse. However, ***significant and unavoidable*** adverse noise impacts will remain during project construction.

CUMULATIVE IMPACTS

The related projects listed in Section III, Project Description, Table III-1, primarily consist of bridge and existing school facility improvements and the implementation of a vegetation management plan and two new water tanks on MMWD lands. With the exception of the MMWD projects, none of the related projects are located adjacent to the project site. Future construction associated with the related projects could result in a cumulatively significant impact with respect to temporary or periodic increases in ambient noise levels. Construction noise is localized in nature and decreases substantially with distance. Consequently, in order to achieve a substantial cumulative increase in construction noise levels, more than one source emitting high levels of construction noise would need to be in close proximity to the proposed project. If one or more of the related projects is under construction at the same time as the proposed project, ***potentially significant*** cumulative construction impacts would be generated to the homes near the project site. Given that the project would result in significant unavoidable construction noise impacts, the project's contribution to cumulative construction noise impacts would be cumulatively considerable. However, cumulative operational noise impacts of the proposed project and the related projects would be ***less than significant*** given the relatively low volume of vehicles generated by the project on a daily basis and the project's less than significant noise impacts related to the use of each home at the project site.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Even after the implementation of Mitigation Measure NOISE-3, the proposed project would still generate ***significant and unavoidable*** construction noise impacts. Project operational noise impacts were found to be ***less than significant*** and therefore no mitigation measures are required.