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8.5 Noise

8.5.1 Introduction

This section presents an assessment of potential noise impacts resulting from construction and operation of the proposed AES Highgrove Project. Section 8.5.2 presents the fundamentals of acoustics. Section 8.5.3 describes the existing noise environment and the results of an ambient noise survey conducted in the vicinity of the project. Section 8.5.4 presents an environmental analysis, which addresses the potential noise effects during construction and operation, while Section 8.5.5 discusses mitigation measures to ensure no adverse impacts result from noise that may be produced during the construction or operational phases of the project. A description of the LORS applicable to the proposed project is presented in Section 8.5.6. The involved agencies and agency contacts are listed in Section 8.5.7. The permits and permitting schedule are discussed in Section 8.5.8 and Section 8.5.9 includes a list of references.

8.5.2 Fundamentals of Acoustics

Acoustics is the study of sound. Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Acoustical terms used in this subsection are summarized in Table 8.5-1.

TABLE 8.5-1
Definitions of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient level is typically defined by the L_{eq} level.
Background Noise Level	The underlying ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as traffic, typically makeup the background. The background level is generally defined by the L_{90} percentile noise level.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal content, the prevailing ambient noise level as well as the sensitivity of the receiver. The intrusive level is generally defined by the L_{10} percentile noise level.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
A-Weighted Sound Level (dBA)	The sound level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level, on an equal energy basis, during the measurement period.

TABLE 8.5-1
Definitions of Acoustical Terms

Term	Definition
Percentile Noise Level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (e.g., L_{90})
Community Noise Equivalent Level (CNEL)	The energy average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels from 7:00 p.m. to 10:00 p.m. and 10 decibels from 10:00 p.m. to 7:00 a.m.

The most common metric is the overall A-weighted sound level measurement that has been adopted by regulatory bodies worldwide. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound; thus, achieving very good correlation in terms of how to evaluate acceptable and unacceptable sound levels.

A-weighted sound levels are typically measured or presented as equivalent sound pressure level (L_{eq}), which is defined as the average noise level, on an equal energy basis for a stated period of time, and is commonly used to measure steady state sound or noise that is usually dominant. Statistical methods are used to capture the dynamics of a changing acoustical environment. Statistical measurements are typically denoted by $L_{xx,}$ where xx represents the percentile of time the sound level is exceeded. The L_{90} is a measurement that represents the noise level that is exceeded during 90 percent of the measurement period. Similarly, the L_{10} represents the noise level exceeded for 10 percent of the measurement period.

Another metric used in determining the impact of environmental noise is the differences in response that people have to daytime and nighttime noise levels. During the evening and nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are sensitive to intrusive noises. To account for human sensitivity to evening and nighttime noise levels, the Community Noise Equivalent Level (CNEL) was developed. The CNEL is a noise index that accounts for the greater annoyance of noise during the evening and nighttime hours.

CNEL values are calculated by averaging hourly L_{eq} sound levels for a 24-hour period, and apply weighting factors to evening and nighttime L_{eq} values. The weighting factor, which reflects the increased sensitivity to noise during nighttime hours, is added to each hourly L_{eq} sound level before the 24-hour CNEL is calculated. For the purposes of assessing noise, the 24-hour day is divided into three time periods, with the following weightings:

- Daytime: 7 a.m. to 7 p.m. (12 hours) Weighting factor of 0 dB
- Evening: 7 p.m. to 10 p.m. (3 hours) Weighting factor of 5 dB
- Nighttime: 10 p.m. to 7 a.m. (9 hours) Weighting factor of 10 dB

The three time periods are then averaged (on an energy basis) to compute the overall CNEL value. For a continuous noise source, the CNEL value is easily computed by adding 6.7 dB to the overall 24-hour noise level (L_{eq}). For example, if the expected continuous noise level from the power plant was 60.0 dBA, the resulting CNEL from the plant would be 66.7 dBA.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the last category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily due to the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it to the existing or "ambient" environment to which that person has adapted. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

Table 8.5-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 8.5-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels	Example of Representative Noise Environment	Subjective Impression
Shotgun (at shooter's ear)	140	Carrier flight deck	Painfully loud
Civil defense siren (100 ft)	130		
Jet takeoff (200 ft)	120		Threshold of pain
Loud rock music	110	Rock music concert	
Pile driver (50 ft)	100		Very loud
Ambulance siren (100 ft)	90	Boiler room	
Pneumatic drill (50 ft)	80	Noisy restaurant	
Busy traffic; hair dryer	70		Moderately loud
Normal conversation (5 ft)	60	Data processing center	
Light traffic (100 ft); rainfall	50	Private business office	
Bird calls (distant)	40	Average living room library	Quiet
Soft whisper (5 ft); rustling leaves	30	Quiet bedroom	
	20	Recording studio	
Normal breathing	10		Threshold of hearing

Source: Beranek, 1998.

8.5.3 Affected Environment

The proposed power plant site is located at 12700 Taylor Street in the City of Grand Terrace, in southwestern San Bernardino County, California. The proposed power plant site is located within an urban area that is zoned M2 (Industrial) and is the site of a decommissioned 154 MW thermal power plant, formerly owned by Southern California Edison (SCE). The project site is located within 1000 feet of Interstate Highway 215 (I-215), a major 6-lane highway that extends through the Cities of San Bernardino, Grand Terrace and Riverside.

Land uses in the vicinity of the power plant site on the east include agricultural fields, residences, Pico Park, warehouse, a lumber yard, and undeveloped open space lands. To the west, land uses include a motel, a bar, several light industrial businesses, and undeveloped open space lands near the I-215 interchange.

The proposed project site is also within the vicinity of two rail lines: the Burlington Northern Santa Fe Railroad (BNSF) which borders the site on the west, and Union Pacific Railroad (UPRR), directly east of the site. The BNSF Railroad is a major transportation artery for BNSF in the area. Approximately 55 BNSF freight trains and 30 UPRR freight trains can operate on this track over the course of a typical 24-hour day although actual train volumes can vary by day, week, or month (CJUSD, pg 5-51). In addition to the noise generated by the moving trains, locomotive engineers are required to sound a warning signal, which federal regulations require to be at least 96 decibels (96 dBA) 100 feet in front of the train in its direction of travel, to alert motorists and pedestrians to the presence of an approaching train and to avoid accidents at the at-grade crossings, (CJUSD, pg 5-50). Currently there are 95 daily train events, and projections indicate that 220 train events may occur daily by the year 2025 (CJUSD, pg 5-71). Therefore, the presence of the railroad represents a major feature of the existing noise environment in the area.

Sensitive residences in the vicinity of the project include two groups of residences located south and east of the site. Residences east of the project are located approximately 1,850 feet from the center of the proposed plant. Residences southwest of the project, on the south side of Main St., are also located approximately 1,850 feet from the center of the proposed plant.

Another future sensitive receptor includes a proposed high school. The proposed high school, referred to as Colton Joint Unified School District High School #3, would be located east of the project, bordered by Main St. on the south and Taylor St. on the east. The high school is proposed to consist of school buildings for classroom instructional activity as well as sports fields. The school feature that would be located closest to the proposed Highgrove Project is the football stadium, which would be constructed on the east side of Taylor, with the northern end near the current intersection of Taylor and Pico Streets. According to the description of the school facilities contained in the Draft EIR for the proposed school, the classroom building closest to the Highgrove Project would be approximately 1,260 feet southeast of the center of the plant.

A detailed evaluation of the potential noise impacts from construction and operation of the Highgrove Project at the locations of these sensitive receptors is provided below.

8.5.3.1 Ambient Noise Survey

Continuous ambient noise monitoring was conducted at three representative locations to determine the existing noise levels in the vicinity of the project. The monitoring locations selected for evaluation are shown in (Figure 8.5-1) and include the following. Monitoring location R1, located at 17285 Royal Avenue, was selected to represent the group of residences east of the project site; monitoring location R2, in an area currently operated as a lumber yard, was selected to describe ambient noise levels for a general area within the proposed school boundaries; monitoring location R3, located at 28 Highland Avenue, was selected to represent the group of residences southwest of the project site.

Sound level meters deployed at these locations included three Larson Davis 824s. The sound level meters were field calibrated before and after the measurement with a Larson Davis CAL200. All equipment was ANSI Type 1 (precision) and was factory calibrated within the previous 12 months. Winds were generally calm with brief periods up to 10 mph. Daytime temperatures were in the low 90 degrees Fahrenheit (°F) and nighttimes in the mid- to upper-50°F.

The existing noise environment can be characterized by roadway noise, train noise and noise from commercial activities in the vicinity of the site. The noise levels are reflective of the environment's urban character. The hourly results for noise levels L_{eq}, L_{10}, L_{50} and L_{90} are shown in Tables 8.5-3 through 8.5-5.

TABLE 8.5-3
Summary of Hourly Measurements at R1 (dBA)

Date and Time	L_{eq}	L_{10}	L_{50}	L_{90}
5/19/2005 12:00	53	56	52	50
5/19/2005 13:00	50	53	49	42
5/19/2005 14:00	53	55	52	51
5/19/2005 15:00	55	57	53	50
5/19/2005 16:00	57	59	56	53
5/19/2005 17:00	55	57	55	52
5/19/2005 18:00	55	56	54	52
5/19/2005 19:00	52	55	51	45
5/19/2005 20:00	54	55	48	45
5/19/2005 21:00	48	49	44	42
5/19/2005 22:00	51	53	47	43
5/19/2005 23:00	53	54	52	47
5/20/2005 0:00	48	48	42	40
5/20/2005 1:00	51	48	43	40
5/20/2005 2:00	43	44	42	40
5/20/2005 3:00	51	49	43	42

TABLE 8.5-3
Summary of Hourly Measurements at R1 (dBA)

Date and Time	L_{eq}	L_{10}	L_{50}	L_{90}
5/20/2005 4:00	52	48	45	43
5/20/2005 5:00	49	51	47	44
5/20/2005 6:00	51	53	50	48
5/20/2005 7:00	51	52	50	48
5/20/2005 8:00	53	54	51	50
5/20/2005 9:00	54	56	51	50
5/20/2005 10:00	51	53	51	50
5/20/2005 11:00	50	53	46	42
5/20/2005 12:00	57	60	53	50

TABLE 8.5-4
Summary of Hourly Measurements at R2 (dBA)

Date and Time	L_{eq}	L_{10}	L_{50}	L_{90}
5/19/2005 9:00	55	57	51	46
5/19/2005 10:00	60	61	52	46
5/19/2005 11:00	56	57	51	47
5/19/2005 12:00	60	56	51	48
5/19/2005 13:00	60	59	53	50
5/19/2005 14:00	62	63	56	52
5/19/2005 15:00	63	63	56	52
5/19/2005 16:00	59	59	53	50
5/19/2005 17:00	62	56	51	48
5/19/2005 18:00	61	55	50	48
5/19/2005 19:00	65	63	52	49
5/19/2005 20:00	61	58	54	51
5/19/2005 21:00	61	58	54	51
5/19/2005 22:00	60	58	53	51
5/19/2005 23:00	57	54	50	46
5/20/2005 0:00	56	55	49	45
5/20/2005 1:00	52	52	49	45

TABLE 8.5-4
Summary of Hourly Measurements at R2 (dBA)

Date and Time	L_{eq}	L_{10}	L_{50}	L_{90}
5/20/2005 2:00	56	54	48	44
5/20/2005 3:00	57	55	47	43
5/20/2005 4:00	57	54	45	42
5/20/2005 5:00	55	55	47	45
5/20/2005 6:00	56	58	51	48
5/20/2005 7:00	57	59	52	47
5/20/2005 8:00	59	61	51	45
5/20/2005 9:00	58	56	49	44
5/20/2005 10:00	58	57	50	47

TABLE 8.5-5
Summary of Hourly Measurements at R3 (dBA)

Date and Time	L_{eq}	L_{10}	L_{50}	L_{90}
5/19/2005 10:00	56	56	51	47
5/19/2005 11:00	54	56	50	46
5/19/2005 12:00	56	56	49	46
5/19/2005 13:00	53	55	51	47
5/19/2005 14:00	55	56	52	49
5/19/2005 15:00	57	57	53	51
5/19/2005 16:00	54	56	53	51
5/19/2005 17:00	56	56	51	48
5/19/2005 18:00	55	55	50	48
5/19/2005 19:00	59	59	50	48
5/19/2005 20:00	56	54	47	44
5/19/2005 21:00	57	55	47	43
5/19/2005 22:00	59	57	47	43
5/19/2005 23:00	54	51	44	42
5/20/2005 0:00	60	56	45	42
5/20/2005 1:00	52	50	46	41
5/20/2005 2:00	58	54	44	40
5/20/2005 3:00	59	57	46	42

TABLE 8.5-5
Summary of Hourly Measurements at R3 (dBA)

Date and Time	L_{eq}	L_{10}	L_{50}	L_{90}
5/20/2005 4:00	58	56	46	42
5/20/2005 5:00	58	57	49	45
5/20/2005 6:00	57	56	49	46
5/20/2005 7:00	56	58	51	48
5/20/2005 8:00	55	56	51	47
5/20/2005 9:00	56	56	50	46
5/20/2005 10:00	56	57	51	48

8.5.4 Environmental Analysis

This section provides a description of the significance criteria for noise according to the California Environmental Quality Act (CEQA), evaluation criteria established by the CEC for noise evaluations and an assessment of the noise produced by the project during the construction and operational phases of the project.

8.5.4.1 Significance Criteria and Methodology

The California Environmental Quality Act (CEQA) (California Code of regulations, Title 14, Appendix G, Section XI), provides the following guidelines be considered when evaluating whether noise levels produced by the project would cause a significant impact:

- Exposure of people to noise levels in excess of standards established in the local General Plan or noise ordinance
- Exposure of people to excessive ground-borne noise levels or vibration
- Substantial permanent increase in ambient noise levels in the vicinity
- Substantial temporary or periodic increase in ambient noise levels in the project vicinity

CEQA guidelines do not establish any specific numerical thresholds of significance, but rather seek to avoid exposure of persons to "excessive" noise levels or to noise levels that exceed local standards. The evaluation should also distinguish between temporary and periodic increases in ambient noise levels from permanent increases in ambient noise levels. Therefore, in order to establish specific numerical thresholds of significance, an understanding of the noise regulatory framework in the local area as well as a determination of the type and duration of noise elements is warranted.

The California Energy Commission (CEC) Staff has opined that a potential for a significant noise impact exists where the noise of the project exceeds the background noise by 5 dBA or more. To determine whether an increase between 5 and 10 dBA is considered a significant impact, it is important to consider many factors including whether the noise increase occurs

in a non-rural setting, whether it affects a large number of people, and whether the noise is continuous, or short-lived and infrequent.

Based on these guidelines, the following methodology was employed for the purpose of evaluating whether or not the Highgrove Project will result in significant noise impacts.

- Noise from the Highgrove Project was modeled and compared to noise levels at the locations representative of the closest sensitive receptors.
- If the increase in noise is less than or equal to 5 dBA, the increase was determined to be less than significant.
- If the increase in noise is greater than 5 dBA, then the duration frequency and proximity of the potential receptor to the noise source will be further evaluated.

Construction noise is typically insignificant if: (1) the construction activity is temporary, (2) use of heavy equipment and noisy activities is limited to daytime hours, and (3) all feasible noise abatement measures are implemented for noise-producing equipment.

In addition to the proposed development of the high school, the City of Grand Terrace also has plans to develop property to the north of the project into a commercial center. Development of the Outdoor Adventures Center will include the widening and extension of Taylor Street which will ultimately connect to Barton Avenue. With these proposed developments, it is anticipated that the project area will experience increases in daytime ambient noise levels even without construction of the Highgrove Project. Therefore, instead of comparing the Highgrove Project's expected noise level to the noise levels obtained from field measurements of existing noise, noise generated by the Project was compared to the ambient noise expected after the high school is constructed. The expected ambient levels of operation of the high school were taken directly from the High School EIR noise analysis. For residential uses, the project was compared to measured nighttime ambient noise levels.

8.5.4.2 Construction Impacts

This subsection addresses the various components of construction noise and vibration for each of the sensitive receptors.

8.5.4.2.1 Worker Exposure to Noise

Construction workers at the project site were considered to be sensitive receptors for noise impact evaluation. Worker exposure levels during construction of the project will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Hearing protection will be available for workers and visitors to use as needed throughout the duration of the construction period. A Hearing Protection Plan, which complies with Cal-OSHA requirements, will be incorporated into the Health and Safety Plan.

8.5.4.2.2 Plant Construction Noise

Construction of the project is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities. The noise level will vary during the construction period, depending upon the construction phase. Construction of power plants can generally be divided into five phases that use different types of construction equipment.

The five phases are: (1) demolition, site preparation, and excavation; (2) concrete pouring; (3) steel erection; (4) mechanical; and (5) clean-up (Miller et al., 1978).

Both the USEPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities extensively (USEPA, 1971; Barnes et al., 1976). Since specific information on types, quantities, and operating schedules of construction equipment is not available at this point in project development, information from these documents for similarly sized industrial projects will be used. Use of this data, which is between 21 and 26 years old, is conservative since the evolution of construction equipment has been toward quieter designs to protect operators from exposure to high noise levels.

The loudest equipment types generally operating at a site during each phase of construction are presented in Table 8.5-6. The composite average or equivalent site noise level, representing noise from all equipment, is also presented in the table for each phase.

TABLE 8.5-6
Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level (dBA) at 50 feet	Composite Site Noise Level (dBA) at 50 feet
Demolition, Site Clearing, and Excavation	Dump truck Backhoe	91 85	89
Concrete Pouring	Truck Concrete mixer	91 85	78
Steel Erection	Derrick crane Jack hammer	88 88	87
Mechanical	Derrick crane Pneumatic tools	88 86	87
Cleanup	Rock drill Truck	98 91	89

Source: USEPA, 1971; Barnes et al., 1976.

Average or equivalent construction noise levels projected at various distances from the site are presented in Table 8.5-7. These results are conservative since the only attenuating mechanism considered was divergence of the sound waves in open air. Shielding effects of intervening structures are not included in the calculations. The construction noise may be audible at the nearest residences but the noisiest construction activities will be confined to the daytime hours. Table 8.5-8 presents noise levels from common construction equipment at various distances.

TABLE 8.5-7
Average Construction Noise Levels at Various Distances

Construction Phase	Sound Pressure Level (dBA)		
	375 feet	1,500 feet	3,000 feet
Demolition, Site Clearing, and Excavation	71	59	53
Concrete Pouring	60	48	42
Steel Erection	69	57	51
Mechanical	69	57	51
Clean-Up	71	59	53

TABLE 8.5-8
Noise Levels from Common Construction Equipment at Various Distances

Construction Equipment	Typical Sound Pressure Level (dBA)		
	50 feet	375 feet	1,500 feet
Pile drivers (20,000-32,000 ft-lbs./blow)	104	86	74
Dozer (250-700 hp)	88	70	58
Front end loader (6-15 cu. yds.)	88	70	58
Trucks (200-400 hp)	86	68	56
Grader (13 to 16 ft. blade)	85	67	55
Shovels (2-5 cu. yds.)	84	66	54
Portable generators (50-200 kW)	84	66	54
Derrick crane (11-20 tons)	83	65	53
Mobile crane (11-20 tons)	83	65	53
Concrete pumps (30-150 cu. yds.)	81	63	51
Tractor (3/4 to 2 cu. Yds.)	80	62	50
Unquieted paving breaker	80	62	50
Quieted paving breaker	73	55	43

Noise generated during the testing and commissioning phase of the project is not expected to be substantially different from that produced during normal full-load operation. Starts and abrupt stops are more frequent during this period, but on the whole they are usually short-lived.

8.5.4.2.3 Construction Vibration

Construction vibrations can be divided into three classes, based on the wave form and its source:

Wave form: Impact	Example source: impact pile driver or blasting
Wave form: Steady state	Example source: vibratory pile driver
Wave form: Pseudo steady state	Example source: double acting pile hammer

Pile driving is not anticipated to be required at this site. Until a site-specific geotechnical report is prepared, however, it is not certain whether or not pile driving will be needed. If needed, pile driving will be limited to daytime work hours to reduce any noise impacts to the surrounding environment.

8.5.4.3 Operational Impacts

This subsection describes the expected noise impacts from operation of the plant on plant workers, residents and on school activities.

8.5.4.3.1 Worker Exposure to Operational Noise

The OSHA Guidelines, which were designed to protect workers from excessive noise levels, represent the threshold of significance for workers. To ensure worker protection, various components will be specified not to exceed near-field maximum noise levels of 90 dBA at 3 feet (or 85 dBA at 3 feet where available as a vendor standard). Since there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA, such as inside acoustical enclosures. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source. The project will comply with all applicable OSHA and Cal-OSHA hearing conservation regulations; therefore, the impact to workers is considered less than significant.

8.5.4.3.2 Plant Operation Noise Levels

A noise model of the proposed facility has been developed using source input levels derived from manufacturers' data and field surveys of similar equipment. The noise levels to be produced by the plant during operation have been estimated for each of the monitoring locations. The noise levels represent the anticipated steady-state noise level from the plant with essentially all equipment operating.

The LMS100 gas turbine technology is new. Current noise estimates are derived from test stand equipment. It is anticipated that the field measurements from the first standard unit, available later this year, will document lower noise levels. Therefore, the predicted levels presented here are considered conservative and noise levels are anticipated to be decrease as better acoustical data becomes available.

The noise analysis employed standard acoustical engineering methods. The noise model, CADNA/A by DataKustik Gmbed H of Munich, Germany is very sophisticated and enables

one to fully model complex industrial plants. The sound propagation factors used in the model have been adopted from ISO 9613-2, *Acoustics – Sound Attenuation During Propagation Outdoors* and VDI 2714, *Outdoor Sound Propagation*. The model divides the proposed facility into a list of individual point and area noise sources representing each piece of equipment producing a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based either on field measurements of similar equipment made at other existing plants, data supplied by manufacturers, or information found in the technical literature. Using these standard sound power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after considering losses from distance, air absorption, blockages, etc. The sum of all these individual levels represents the total plant noise level predicted at the modeling point.

The sound power levels, by octave band, used in the model are summarized in Table 8.5-9. As stated previously, predicted noise levels established by the gas turbine vendor for the LMS100 technology are preliminary. These values are considered to be conservative and it is anticipated that vendor field tests to be conducted in the near future will result in a reduction of these levels.

TABLE 8.5-9
Octave Band Sound Power Levels Used to Model Operations, dB (Flat)

	Octave Band Center Frequency, Hz									
Plant Component	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
Stacks	125	115	109	101	92	85	84	93	77	99
SCR Duct Walls	116	104	103	104	99	90	87	84	65	100
LMS100 Combustion Turbine Generator	119	118	118	109	103	100	99	104	97	110
Fuel Gas Compressors	115	116	112	109	110	111	109	109	108	115
Transformers	108	111	105	105	100	94	91	88	88	102
Cooling Towers	110	104	101	99	96	96	92	88	81	100

Note: Data reflects best available preliminary noise data from General Electric.

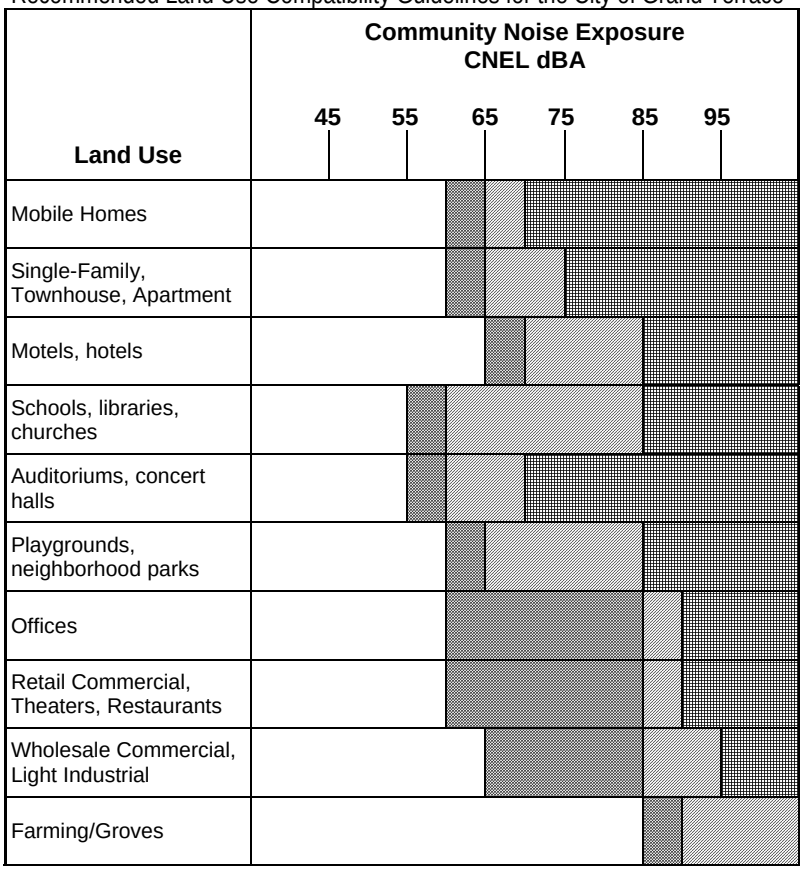
The following sections describe the predicted noise levels at each sensitive receptor, the applicable threshold of significance and the potential for noise impacts.

Proposed High School

To evaluate whether the Highgrove Project's operational noise levels would impact the proposed high school, the project's noise levels were compared to the thresholds established in the School's EIR and the City of Grand Terrace's requirements for schools and playgrounds. The school outdoor activities are associated with the outdoor sports fields and physical education classes; indoor activities include classroom instructional activity. The City of Grand Terrace General Plan Noise Element discuses the effects of noise exposure on the population and sets land use compatibility goals aimed at protecting its residences from undo noise. The City of Grand Terrace establishes interior and exterior noise standards for land use, shown in Table 8.5-10. According to the City's Noise Standards the maximum

permissible CNEL at the school buildings is 60 dBA and the maximum permissible CNEL for the play and sports fields is 65 dBA.

TABLE 8.5-10
Recommended Land Use Compatibility Guidelines for the City of Grand Terrace



Source: City of Grand Terrace General Plan.

INTERPRETATION

Clearly Acceptable

The noise exposure is such that the activities associated with the land use may be carried out with essentially no interference from aircraft noise. (Residential areas: both indoor and outdoor noise environment)

Normally Acceptable

The noise exposure is great enough to be of some concern, but common building constructions will make the indoor environment acceptable, even for sleeping quarters. (Residential areas: the outdoor environment will be reasonably pleasant for recreation and play).

Normally Unacceptable

The noise exposure is significantly more severe, so that unusual and costly building constructions are necessary to ensure adequate performance of activities. (Residential areas: barriers must be erected between the site and prominent noise sources to make the outdoor environment tolerable.)

Clearly Unacceptable

The noise exposure at the site is so severe that construction costs to make the indoor environment acceptable for performance of activities would be prohibitive. (Residential areas: the outdoor environment would be intolerable for normal residential use.)

Unlike the Leq metric, the CNEL noise metric is based on 24 hours of measurement. CNEL also differs from Leq in that it applies a time-weighted factor designed to emphasize noise events that occur during the evening and nighttime hours (when quiet time and sleep disturbance are a typical concern). Noise occurring during the daytime period (7 a.m. to 7 p.m.) receives no penalty. Noise produced during the evening time (7 p.m. to 10 p.m.) is penalized by 5 dBA, while nighttime (10 p.m. to 7 a.m.) noise is penalized by 10 dBA. Therefore, a CNEL of 65 dBA is complied with when the daytime noise level is less than or equal to 65 dBA, the evening noise level is less than or equal to 60 dBA and the nighttime level is less than or equal to 55 dBA. The L_{dn} noise metric is similar to the CNEL metric except the period from 7 p.m. to 10 p.m. receives no penalty. Both the CNEL and Ldn metrics yield approximately the same 24- hour value (within 1 dBA) with the CNEL being the more restrictive, i.e., the higher of the two.

Because educational activities would not occur during the evening or nighttime at the proposed school, the Colton Unified School District adopted in its EIR an Leq-12 standard of

65 dBA for determining whether the school site and students would be exposed to significant noise levels. An Leq-12 is an Leq that is averaged over 12 daytime hours (from 7 a.m. to 7 p.m.). The EIR states that this noise metric has been adopted by numerous cities for those land uses (such as schools), which are not in use or considered noise-sensitive during the evening or nighttime hours because they are not occupied (CJUSD, pg 5-48).

The noise generated by the Project, as predicted by the modeling, is 56 dBA at the corner of the closest main building to the project (approximately 1,260 feet measured in a southeast direction from the center of the project.). This noise level is likely conservative in that it does not take into account any potential shielding from any offsite structures (such as the football stadium). This level is below the City General Plan daytime CNEL of 60 dBA for schools and below the 65 dBA Leq-12 significance threshold adopted by the School District. The maximum noise predicted at the northwest corner of the football stadium (the corner nearest the proposed project) is 63 dBA. This noise level is also below the City General Plan daytime 65 CNEL for outdoor playgrounds and below the 65 dBA Leq-12 standard adopted by the School District. Therefore, the Highgrove Project will not create noise levels during operation that would violate any standard adopted by either the City of Grand Terrace or the Colton Joint Unified School District for either the school buildings or outdoor sports fields.

In addition, the Highgrove Project will not expose students and school employees to noise levels that significantly exceed the noise predicted by outdoor school activities themselves. According to the high school EIR, sport field activities are estimated to result in 64 dBA Leq at a distance of 50 feet and stadium noise is anticipated to vary between 58 and 65 dBA Leq at a distance of 500 feet. This is equivalent to between 78 and 85 dBA Leq at a distance of 50 feet using the same 6 dBA per doubling of distance used in the high school EIR. As indicated above, at the football stadium the maximum operational noise anticipated from the Highgrove Project is 63 dBA, resulting in an increase of not more than 3 dBA. Therefore, the Highgrove Project is not anticipated to result in significant impacts at the stadium or sports fields.

Further, according to mitigation measure 5.5-1 of the School EIR, the School District will incorporate acoustical features in the design of classroom buildings to ensure that interior noise from passing trains will not disturb instructional learning inside the classroom. The design features will reduce an 85 dBA train horn to interior levels below 45 dBA. Noise levels from the Highgrove project are predicted to be 56 dBA at the exterior of the nearest school building. Therefore, with the noise attenuation features to be incorporated into classroom design, operational noise from the Highgrove Project will also be less than 45 dBA inside the classrooms. Therefore, the Highgrove Project will not impact the interior noise thresholds established in the high school EIR for instructional learning.

Residences

The City of Grand Terrace General Plan Noise Element establishes the maximum acceptable CNEL for single-family residences as 65 dBA. Applying the maximum nighttime penalty of 10 dBA would result in an allowable noise level of 55 dBA Leq. The noise level predicted by operation of the Highgrove Project would be 51 dBA at monitoring location R1 (a residential receptor to the east) and 52 dBA at monitoring location R3 (a residential receptor south of the project). Both predicted noise levels are below the acceptable noise level required by the

City General Plan. Using this methodology, the Highgrove Project would not have significant noise impacts at the closest residential receptors.

The Highgrove Project is designed to be a peaking facility, which by definition means, that it is likely to operate only during periods when electricity demand is highest. To assess potential impacts of noise exposure to residents at the locations of the nearest residential receptors, an assessment of plant operational noise levels produced during times when the residents are most likely to be occupying their homes was conducted. Operation between the hours of 10 p.m. and 6 a.m. is expected to be extremely unlikely and would most likely occur only during emergency conditions.

The noise monitoring data reflect the diurnal nature of the urban noise environment resulting from rail and roadway traffic patterns. Because of the urban character and the associated traffic, the L50 metric is the appropriate standard to characterize the ambient conditions that currently exist at the residences. The average L50 during the hours of 6 a.m. to 10 p.m. (which incorporates the period of time that the plant would most likely operate) at R1 is 51 dBA and at R3 is 50 dBA. The predicted noise level from operation of the Highgrove Project at R1 is 51 dBA and at R3 is 52 dBA, which results in no change in ambient noise levels at R1 and an insignificant increase of 2 dBA at R3.

It is extremely unlikely that a peaking facility such as the Highgrove Project would operate between the hours of 10 p.m. and 6 a.m. If the all three units were dispatched during this time, it is expected to only be due to emergency conditions experienced within the regional electrical system. The average L50 during the nighttime hours of 10 p.m. to 6 a.m. at R1 is 45 dBA and at R3 is 46 dBA. As discussed above, in the extremely unlikely event that the project was dispatched at full load (i.e., all 3 units operating) during this time period, noise levels attributable to the project are predicted to be 51 dBA at R1 and 52 dBA at R3, or 6 dBA above existing ambient levels at both locations. Therefore, these impacts are considered to be less than significant. Further, as stated previously, operation is only expected to occur rarely, if at all, during this period of time.

8.5.4.3.3 Tonal Noise

At the monitoring locations modeled here, no significant tones are anticipated. That is not to say that audible tones are impossible—certain sources within the plant such as the combustion turbine inlets, transformers, pump motors, cooling tower fan gearboxes, etc. have been known to sometimes produce significant tones. It is the Applicant's intention to anticipate the potential for audible tones in the design and specification of the plant's equipment and take necessary steps to prevent sources from emitting tones that might be disturbing at the nearest receptors.

8.5.4.3.4 Ground and Airborne Vibration

The proposed project is primarily driven by gas turbines exhausting into a selective catalytic reduction (SCR) duct and a stack silencer. These very large ducts reduce low frequency noise, which is mainly the source of airborne induced vibration of structures.

The equipment that would be used in the proposed project is well balanced and is designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems are installed in the equipment to ensure that the equipment

remains balanced. Should an imbalance occur, the event would be detected and the equipment would automatically shutdown to prevent damage.

8.5.5 Mitigation Measures

To minimize noise from operation of the Highgrove Project, the following measures have been incorporated into the plant design:

- A berm and wall around the eastern and part of the northern portion of the site;
- A barrier around the fuel gas compressors
- Stack silencing
- Combustion turbine enclosure

As discussed above, the sound level data for the gas turbine is preliminary because the LMS 100 CTG is new technology without the benefit of a long operating history and noise measurement data. Prior to construction of the Highgrove Project, it is anticipated that additional noise monitoring data will be available from the gas turbine vendor and is expected to demonstrate that the noise levels used in the above analysis are conservative.

The following additional mitigation measures are proposed for the project to ensure no adverse noise impacts occur as a result of operation or construction.

8.5.5.1 Noise Mitigation Measure #1

The project owner shall establish a telephone number for use by the public to report any significant undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project-owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

8.5.5.2 Noise Mitigation Measure #2

Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all legitimate project-related noise complaints.

The project owner, or authorized agent, shall:

- Use the Noise Complaint Resolution Form typically suggested by CEC or functionally equivalent procedure to document and respond to each noise complaint
- Attempt to contact the person(s) making the noise complaint within 24 hours
- Conduct an investigation to attempt to determine the source of noise related to the complaint
- If the noise complaint is legitimate, take all feasible measures to reduce the noise at its source

8.5.5.3 Noise Mitigation Measure #3

Noisy construction work at the plant site (that causes offsite annoyance as evidenced by the filing of a legitimate noise complaint) shall be restricted to the 7:00 a.m. to 10:00 p.m. time period. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

8.5.6 Laws, Ordinances, Regulations, and Standards

The LORS that apply to noise produced during construction and operation of the project are summarized in Table 8.5-11.

TABLE 8.5-11
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Federal Offsite:		
USEPA	Guidelines for state and local governments.	Subsection 8.5.6.1.1.
Federal Onsite:		
OSHA	Exposure of workers over 8-hour shift limited to 90 dBA.	Subsections 8.5.6.1.2, 8.5.4.2.1, and 8.5.4.3.1. Also see Subsection 8.7, Worker Safety
State Onsite:		
Cal/OSHA 8 CCR Article 105 Sections 095 et seq.	Exposure of workers over 8-hour shift limited to 90 dBA.	Subsections 8.6.3.2.1, 8.5.4.2.1, and 8.5.4.3.1. Also see Subsection 8.7, Worker Safety
State Offsite:		
Calif. Vehicle Code Sections 23130 and 23130.5	Regulates vehicle noise limits on California highways.	Delivery trucks and other vehicles will meet Code requirements.
Local		
California Government Code Section 65302	Requires local government to prepare plans that contain noise provisions.	City of Grand Terrace, Subsection 8.5.6.3.
City of Grand Terrace - General Plan	The General Plan provides quantitative compatibility goals and policy	Subsections 8.5.6.3.1
City of Grand Terrace - Noise Ordinance	Restricts hours of construction equipment operation between 10 p.m. and 7 a.m. when such activities result in loud or excessive noise at a residence.	Subsections 8.5.6.3.1
Riverside County Code-Chapter 15.04	Limits hours of construction within ¼ mile of a residence to between 6 a.m. and 6 p.m.	Subsections 8.5.6.3.2
City of Riverside	Establishes limits for the hours of construction	Subsections 8.5.6.3.3

8.5.6.1 Federal

8.5.6.1.1 USEPA

Guidelines are available from the USEPA (1974) to assist state and local government entities in development of state and local LORS for noise. Because there are local LORS that apply to this project, the USEPA guidelines are not applicable.

8.5.6.1.2 OSHA

Onsite noise levels are regulated, in a sense, through the Occupational Safety and Health Act of 1970 (OSHA). The noise exposure level of workers is regulated at 90 dBA, over an 8-hour work shift to protect hearing (29 Code of Federal Regulations [CFR] 1910.95). Onsite noise levels will generally be in the 70- to 85-dBA range. Areas above 85 dBA will be posted as high noise level areas and hearing protection will be required. The power plant will implement a hearing conservation program for applicable employees and maintain exposure levels below 90 dBA.

8.5.6.2 State of California

8.5.6.2.1 Cal-OSHA

The California Department of Industrial Relations, Division of Occupational Safety and Health enforces California Occupational Safety and Health Administration (Cal-OSHA) regulations, which are the same as the federal OSHA regulations described previously. The regulations are contained in Title 8 of the California Code of Regulations (CCR), General Industrial Safety Orders, Article 105, Control of Noise Exposure, Sections 5095, et seq.

8.5.6.2.2 California Vehicle Code

Noise limits for highway vehicles are regulated under the California Vehicle Code, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office.

8.5.6.3 Local

The California State Planning Law (California Government Code Section 65302) requires that all cities, counties, and entities (such as multi-city port authorities) prepare and adopt a General Plan to guide community change. The City of Grand Terrace would have jurisdiction over enforcing its noise standards over activities that occur at the site including operation. The City of Grand Terrace, the County of Riverside and the City of Riverside would also have jurisdiction over noise related to construction of the portions of the proposed natural gas pipeline that run within each of its respective boundaries.

8.5.6.3.1 City of Grand Terrace

Construction

Chapter 8.108, Noise, of the Grand Terrace City Code restricts the hours of construction as follows: "The operation or use between the hours of ten p.m. and seven a.m. of any pile driver, steam shovel, pneumatic hammers, derrick, steam or electric hoist, power driven saw, fork lifts, milling equipment, other tools or apparatus the use of which is attended by loud and excessive noise, or the movement of tractors, tractor trucks, or large trucks on property adjacent to residences is prohibited." The Highgrove Project will comply with this

requirement by restricting such noisy construction activity at the project site to the hours of 7 a.m. to 10 p.m.

Operation

The City of Grand Terrace's General Plan Noise Element establishes acceptable noise levels as shown in Table 8.5-10. For single-family, townhouse and apartments the maximum normally acceptable level is 65 dBA CNEL. For school buildings, the maximum normally acceptable level is 60 dBA CNEL. For playgrounds and outdoor play fields the maximum normally acceptable level is 65 dBA CNEL.

School

The project will comply with the 60 dBA CNEL limit established for the school because predicted noise levels at monitoring location 2, near a main building closest to the project, will be 56 dBA. During the times the school is occupied (7 a.m. to 7 p.m.), this level is equivalent to a 56 CNEL.

School Outdoor Playfields

The project will comply with the 65 dBA CNEL limit for the school outdoor playfields because its predicted noise levels at the football stadium and nearby playfields will be less than 65 dBA. For times the football stadium, which is located closest to the project, is occupied (7 a.m. to 7p.m.) the project noise levels would be less than 65 CNEL. For times the football stadium is occupied after 7 p.m. (i.e., during football games) the noise from the football stadium is predicted to be greater than the noise generated from the Highgrove Project, in the unanticipated event the plant is operated during evening hours

Residences

The project will comply with the 65 CNEL for the residences because during the quietest hours of the night (10 p.m. to 7 a.m.) the equivalent noise standard would be 55 dBA applying the highest nighttime penalty of 10 dBA. The project noise is predicted to be below 55 dBA at both R1 and R2.

8.5.6.3.2 Riverside County

Since Riverside County does not have jurisdiction over the power plant site, Riverside County LORS relating to stationary sources are not addressed. However, since a portion of the natural gas pipeline will be constructed within Riverside County, a discussion of those noise restrictions applicable to construction of that portion of the pipeline is warranted.

Chapter 15.04, Buildings and Construction: General Provisions, Administration and Enforcement, of the Riverside County Code restricts the hours of construction as follows: "Whenever a construction site is within one-quarter of a mile of an occupied residence or residences, no construction activities shall be undertaken between the hours of 6 p.m. and 6 a.m. during the months of June through September and between the hours of 6 p.m. and 6 a.m. during the months of October through May. Exceptions to these standards shall be allowed only with the written consent of the building official." The Highgrove Project will comply with the above restriction by limiting construction of the gas pipeline in those locations where the pipeline is within one-quarter mile of a residence to the hours between 6 a.m. and 6 p.m.

8.5.6.3.3 The City of Riverside

Since the City of Riverside does not have jurisdiction over the power plant site, The City of Riverside LORS relating to stationary sources will not be discussed. However, since a portion of the natural gas pipeline will be constructed within the City of Riverside, a discussion of those noise restrictions applicable to construction of that portion of the pipeline is warranted.

Construction noise is prohibited between the hours of 7:00 p.m. and 7:00 a.m. on weekdays and between 5 p.m. and 8 a.m. on Saturdays, or at any time on Sunday or federal holidays such that the sound therefrom creates a noise disturbance across a residential or commercial property line or at any time exceeds the maximum permitted noise level for the underlying land use category, except for emergency work or by variance. The Highgrove Project will comply with the above restriction by limiting construction of the gas pipeline in those locations of the City of Riverside to the hours of 7 a.m. and 7 p.m. on weekdays and to 8 a.m. to 5 p.m. on Saturdays.

8.5.7 Involved Agencies and Agency Contacts

Agency contacts relative to noise issues are presented in Table 8.5-12.

TABLE 8.5-12
Involved Agencies and Agency Contacts

Agency	Contact/Title	Telephone
Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92313-5295	Gary Koontz/Community Development Director	(909) 430-2225

8.5.8 Permits Required and Permit Schedule

No permits are required for noise; therefore, there is no permit schedule.

8.5.9 References

Barnes, J.D., L.N. Miller, and E.W. Wood. 1976. *Prediction of Noise from Power Plant Construction.* Bolt Beranek and Newman, Inc., Cambridge, Massachusetts. Prepared for Empire State Electric Energy Research Corporation, Schenectady, New York.

Beranek, L. L. 1998. *Noise and Vibration Control.* Institute of Noise Control Engineering. McGraw Hill.

California Energy Commission. 2002. Final Staff Assessment. Potrero Power Plant Unit 7 Project. Noise. Testimony of Jim Buntin.

International Organization for Standardization. 1996. *Acoustics – Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation.* ISO 9613-2, Geneva, Switzerland.

Miller, Laymon N., et al. 1984. *Electric Power Plant Environmental Noise Guide*, 2nd Edition, Edison Electric Institute, New York.

Miller, L. N., E. W. Wood, R. M. Hoover, A. R. Thompson, and S. L. Thompson, and S. L. Paterson. 1978. *Electric Power Plant Environmental Noise Guide*, Vol. 1. Bolt, Beranek & Newman, Inc. Cambridge, MA. Prepared for the Edison Electric Institute, New York, NY.

U.S. Environmental Protection Agency (USEPA). 1971. *Noise from Construction Equipment and Operations, US Building Equipment, and Home Appliances*. Prepared by Bolt, Beranek & Newman, Inc. for USEPA Office of Noise Abatement and Control, Washington, DC.

Colton Joint Unified School District (CJUSD). 2005. Environmental Impact Report, Grand Terrace Educational Facility, September.

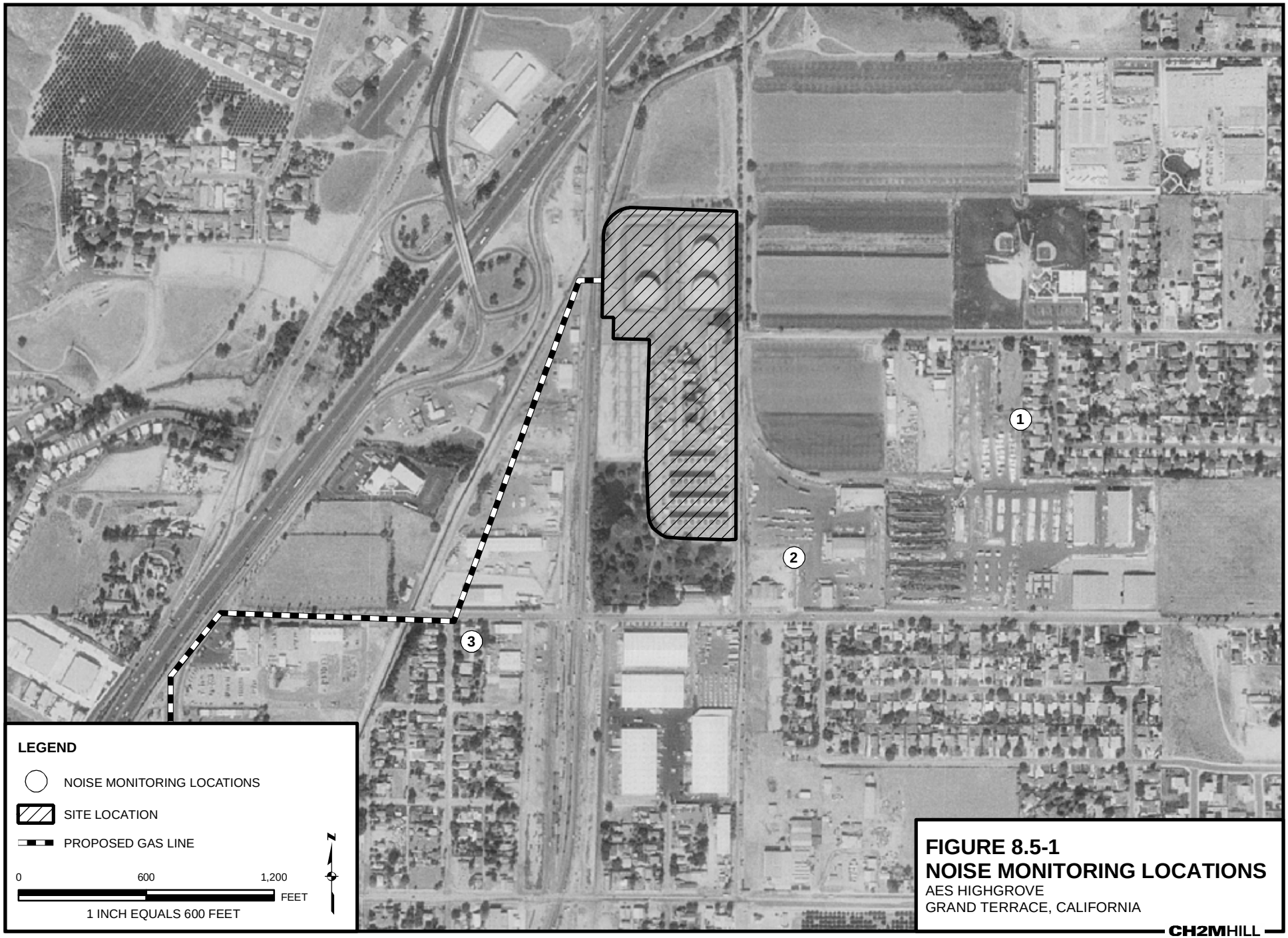


FIGURE 8.5-1
NOISE MONITORING LOCATIONS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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8.6 Public Health

8.6.1 Introduction

This subsection presents the methodology and results of a human health risk assessment performed to assess potential impacts and public exposure associated with airborne emissions from the construction and routine operation of the AES Highgrove Project. Subsection 8.6.2 lists the applicable laws, ordinances, regulations, and standards (LORS); Subsection 8.6.3 describes the affected environment. Subsection 8.6.4 provides an analysis of construction and operational impacts of the power plant and associated facilities, and Subsection 8.6.5 identifies mitigation measures. Subsection 8.6.6 provides the references cited or used in preparing this subsection.

Air will be the dominant pathway for public exposure to chemical substances released by the project. Emissions to the air will consist primarily of combustion by-products produced by the natural gas-fired combustion turbines, and particulate emissions from the cooling towers. Potential health risks from combustion and cooling tower emissions will occur almost entirely by direct inhalation. However, to be conservative, additional pathways were included in the health risk modeling. The risk assessment was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA), South Coast Air Quality Management District (SCAQMD), and the California Air Resources Board (CARB).

Emissions of criteria pollutants will adhere to National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) as discussed in the Ambient Air Quality section (see Subsection 8.1, Air Quality). The proposed facility also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under SCAQMD rules. Offsets will be required for emissions of criteria pollutants that exceed specified thresholds to ensure that the project will not result in an increase in total emissions in the vicinity. Air dispersion modeling results (presented in the Ambient Air Quality section, Subsection 8.1) show that project emissions will not cause or contribute to the violation of ambient air quality standards (either NAAQS or CAAQS) for those pollutants for which the area is designated as attainment. These standards are intended to protect the general public with a wide margin of safety. Therefore, the project is not anticipated to have a significant impact on public health from emissions of criteria pollutants. For those criteria pollutants (and their precursor pollutants) where the ambient air quality standards are not in attainment, mitigation will be provided to reduce the impacts to less than significant levels. Human health risks potentially associated with accidental releases of stored acutely hazardous materials at the proposed facility (aqueous ammonia) are discussed in Subsection 8.12.

8.6.2 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this subsection. The relevant LORS that affect public health and are applicable to this project are identified in Table 8.6-1. Table 8.6-1 also summarizes the primary agencies responsible for public health, the general category of the public health concern regulated by each of the agencies, and the conformity of the project to each of the LORS applicable to public health.

Points of contact with the primary agencies responsible for public health are identified in Table 8.6-2.

TABLE 8.6-1
Summary of Primary Regulatory Jurisdiction for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of risk assessment as per California Air Pollution Control Officers Association guidelines, toxic contaminants do not exceed thresholds that require exposure warnings (see Subsection 8.6.3.2).
40 CFR Part 68 (Risk Management Plan) and Health and Safety Code Sections 25531 to 25541	Public exposure to regulated substances	U.S. Environmental Protection Agency (USEPA) Region IX City of Grand Terrace, Environmental Health Department	The facility will not be subject to Title 40 Code of Federal Regulations (CFR) Part 68 requirements because the quantities of regulated substances stored or handled will be below the threshold quantities. An offsite consequence analysis has been performed to assess potential risks from release of regulated substances (Subsection 8.6.3.4).
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants from existing sources	CARB OEHHA	Based on results of risk assessment as per OEHHA and CARB guidelines, toxic contaminants do not exceed acceptable levels (Subsection 8.6.3.3).
SCAQMD Rule 402 Health and Safety Code Section 41700	Public exposure to toxic air contaminants	SCAQMD	Subsection 8.1.5.5.3 (Air Quality Consistency with Regulatory Requirements).
SCAQMD Rule 1401	Public exposure to toxic air contaminants	SCAQMD	The results of the human health risk assessment are below significance levels (Subsection 8.6.3.3).
SCAQMD Rule 1404	Prohibits the use of hexavalent chromium as a water treatment chemical in cooling towers	SCAQMD	No hexavalent chromium will be used by the project.

TABLE 8.6-2
Summary of Agency Contacts for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Regulatory Contact
40 CFR Part 68 Health and Safety Code Sections 44360 to 44366 SCAQMD Rule 402 Health and Safety Code Section 41700	Public exposure to air pollutants	USEPA Region IX	Gerardo Rios USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974
		CARB	Michael Tollstrup Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
		SCAQMD	John Yee South Coast Air Quality Mgmt District 21865 Copley Drive Diamond Bar, CA 91765 (909) 396-2531
Health and Safety Code Sections 44360 to 44366	Public exposure to toxic air contaminants from existing sources	OEHHA	Cynthia Oshita or Susan Long Office of Environmental Health and Hazard Assessment 1001 I Street Sacramento, CA (916) 445-6900
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	San Bernardino County Fire Department	Doug Snyder San Bernardino County Fire Department (909) 386-8401
SCAQMD Rule 402 Health and Safety Code Section 41700	Public exposure to toxic air contaminants	SCAQMD	John Yee
SCAQMD Rule 1401	Public exposure to toxic air contaminants	SCAQMD	John Yee
SCAQMD Rule 1404	Prohibits the use of hexavalent chromium as a water treatment chemical in cooling towers	SCAQMD	John Yee

8.6.3 Affected Environment

The Highgrove Project will be located at 12700 Taylor Street in an industrially zoned area the City of Grand Terrace, San Bernardino County. Surrounding land uses are described in Subsection 8.4, Land Use. Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure (such as schools, daycare facilities, convalescent centers, or hospitals). Sensitive receptors in the vicinity of the Project Site are shown in Figure 8.6-1a. The nearest sensitive receptor is a proposed high school

being sited across Taylor Street approximately 1,000 feet to the south of the Project Site. Appendix 8.6A also includes the location, name, and coordinates for the sensitive receptors within a 6-mile radius of the Project Site. Further description of sensitive receptors within a 6-mile radius of the Project Site is presented in Hazardous Materials Handling, Subsection 8.12.3. Churches and parks within a 3-mile radius of the Project Site are shown on Figure 8.6-1b.

Figure 8.6-2 shows the U.S. Geological Survey 7.5-minute quadrangle maps within a 10-mile radius of the Project Site. Five copies of the maps are being provided to California Energy Commission staff.

8.6.4 Environmental Analysis

8.6.4.1 Significance Criteria

8.6.4.1.1 Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10 in 1 million due to a project is considered to be a significant impact on public health. For example, the 10-in-1-million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

8.6.4.1.2 Non-Cancer Risk

Non-cancer health effects can be either chronic or acute. In determining potential non-cancer health risks (chronic and acute) from air toxics, it is assumed there is a dose of the chemical of concern below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indexes for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this health risk assessment, all hazard quotients were summed regardless of target organ.

This method leads to a conservative (upper bound) assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated April 2005.

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the duration of exposure is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

8.6.4.2 Construction/Demolition Phase Impacts

The construction/demolition phase of the Project is expected to take approximately 14 months, with the first 5 months of this period scheduled for demolition of existing facilities. No significant public health effects are expected during the construction/demolition phase. Strict construction/demolition practices that incorporate safety and compliance with applicable LORS will be followed (see Subsection 8.6.2). In addition, mitigation measures to reduce air emissions from construction impacts will be implemented as described in Subsection 8.1.

Temporary emissions from construction/demolition-related activities are discussed in Subsection 8.1. Ambient air modeling for particulate matter less than 10 microns in diameter (PM_{10}), carbon monoxide, sulfur dioxide (SO_2), and nitrogen oxide (NO_X) was performed as described in Subsection 8.1. Construction/demolition related emissions are temporary and localized, resulting in no long-term impacts to the public.

8.6.4.3 Operational Phase Impacts

Environmental consequences potentially associated with the project are potential human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed facility include ammonia, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion turbines.

The chemical substances potentially emitted into the air are listed in Table 8.6-3.

TABLE 8.6-3
Chemical Substances Potentially Emitted to the Air from the Highgrove Project

Criteria Pollutants

- Carbon monoxide
- Oxides of nitrogen
- Particulate matter

Noncriteria Pollutants (Toxic Pollutants)

- Ammonia
- Acetaldehyde
- Acrolein
- 1,3-Butadiene
- Benzene
- Ethylbenzene
- Formaldehyde
- Naphthalene
- Propylene oxide
- Toluene
- Xylene

Noncriteria Pollutants (Continued)

- PAHs
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(k)fluoranthene
  - Chrysene
  - Dibenz(a,h)anthracene
  - Indeno(1,2,3-cd)pyrene

8.6.4.4 Chemical Substances of Potential Concern in Ambient Air

For the purpose of determining the potential maximum ambient concentrations of chemical substances that may be emitted, Highgrove Project chemical substance emissions were modeled with the combustion turbines operated at base load at an ambient temperature of 30 degrees Fahrenheit (°F). Although the project is proposing to operate 15 hours per day, 365 days per year, to be even more conservative, this assessment assumed 8,760 hours of turbine operations per year. As the cooling towers are using groundwater, no chemical substances are expected from the water source (other than particulate matter, which is addressed as a criteria pollutant in Subsection 8.1). These operating conditions represent the maximum emissions profile for the Highgrove Project.

Potential impacts associated with air emissions of chemical substances of potential concern from the proposed facility were addressed in a health risk assessment, presented in Appendix 8.6B. The risk assessment was prepared using guidelines developed under the SCAQMD's July 2005 Risk Assessments Procedures for Rules 1401 and 212 Version 7 (SCAQMD, 2005a). For detailed risk assessment, such as the assessment prepared in this evaluation, these procedures include the SCAQMD July 2005 Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) (SCAQMD, 2005b). Those guidelines supplement the Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2003) and the CARB Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk (CARB, 2003). The chemical substances of concern that were addressed in the assessment are listed in Table 8.6-4, along with their respective published OEHHA health-effect values.

TABLE 8.6-4
Risk Assessment Health Values for Substances of Potential Concern

	Cancer Risk		Non-cancer Effects	
Compound	Inhalation Cancer Potency (mg/kg-day)	Oral Slope Factor $(\mu g/m^3)^{-1}$	Chronic Inhalation Reference Exposure Level ($\mu g/m^3$)	Acute Inhalation Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	1.0 E-2	--	9.00E+00	--
Acrolein	--	--	6.0 E-02	1.9E-01
Ammonia	--	--	2.0E+02	3.2E+03
Benzene	1.0E-01		6.0E+01	1.3E+03
1,3-Butadiene	6.0E-01		2.0E+01	--
Ethylbenzene	--	--	2.0E+03	--
Formaldehyde	2.1E-02		3.0E+00	9.4E+01
Naphthalene	1.2E-01	--	9.0E+00	--
PAHs	3.9E+00	1.2E+01	--	--
Propylene oxide	1.3E-02		3.0E+01	3.1E+03
Toluene	--	--	3.0E+02	3.7E+04
Xylene	--	--	7.0E+02	2.2E+04

Source: OEHHA/CARB, 2005

mg/kg-day = milligrams per kilogram per day
$\mu g/m^3$ = micrograms per cubic meter

Emissions of substances of potential concern that may be associated with the proposed facility (gas-fired turbines) were estimated using emission factors approved by the SCAQMD, with the exception of PAH emissions. The PAH emission factor was based on source test results from two discrete tests conducted at the Delta Energy Center facility. It should be noted that the Delta Energy Center facility does not incorporate an oxidation catalyst system that would be expected to result in some reduction in organic compound emissions. Emissions from the stormwater oil/water separator are not included in this analysis because they are estimated to be negligible.

Concentrations of these substances in ambient air associated with the potential emissions were estimated using the SCAQMD-approved HARP software package. HARP includes the USEPA's ISCST3 dispersion model, which estimates both short-term and long-term average ambient concentrations at receptor locations for use in a risk assessment. To estimate ambient concentrations, ISCST3 accounts for site-specific terrain, meteorological conditions and emissions parameters (such as stack exit velocities and temperatures). Health risks potentially associated with the estimated concentrations of chemical substances in ambient air were characterized in terms of excess lifetime cancer risks (for substances listed by OEHHA as cancer causing), or comparison with reference exposure levels for non-cancer health effects (for substances listed by OEHHA with non-cancer causing effects).

The term maximum exposed individual (MEI) [1] is taken from OEHHA risk assessment guidelines (OEHHA, 2003) and refers to an maximum exposed individual – resident (MEIR) or maximum exposed individual – worker (MEIW) that is located at the point where the highest ambient concentrations of modeled chemical substances associated with facility emissions are predicted. Cancer risk and non-cancer health hazard were estimated for both the MEIR and MEIW based on the modeled ambient concentrations of substances of potential concern.

For the purposes of this evaluation, it was assumed that each modeled receptor location could potentially be either a residential location, or a worker location. This highly conservative assumption neglects the fact that certain locations are suitable for residents only or for workers only, and some physical locations are not occupied at length at all (i.e., steep slopes or roadways.)

Where the zone of impact, including the region surrounding the modeled facility, shows a potential maximum added lifetime cancer risk (all pathways, 70-year exposure) of 1 in 1 million or greater, OEHHA risk assessment guidelines (OEHHA, 2003) require that cancer risk and non-cancer health hazard values at each sensitive receptor within the zone of impact be estimated. For non-carcinogens, the zone of impact is defined as the area surrounding the modeled facility that has a potential hazard index of greater than or equal to one-half.

The evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations for the MEI with RELs. The REL is a concentration in ambient air at or below which no adverse health effects are anticipated. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is the hazard quotient. Inhalation cancer potency, oral slope factor values, and RELs used to characterize health risks associated with modeled impacts were obtained from the Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values (OEHHA/CARB, 2005).

This health risk assessment included potential health impacts from inhalation, skin contact, and oral pathways, as required by OEHHA guidelines. Additionally, this assessment included highly-conservative assumptions such as a 70-year exposure duration for residential receptors and a 40-year exposure duration for commercial/industrial receptors. Additional conservative assumptions included extremely high exposure rates such as the 95th percentile breathing rate of 393 liters of air/kg-day were included.

8.6.4.4.1 Potential Health Risks Associated with Chemical Substances in Ambient Air

Modeling showed that the MEIR excess lifetime cancer risk was 0.339 in 1 million, and the MEIW excess lifetime cancer risk was 0.0648 in 1million. Excess lifetime cancer risks less than (10 in 1 million) are unlikely to represent public health impacts that require additional controls of facility emissions.

For residential receptors, formaldehyde and PAH emissions have the highest potential to contribute to the cancer impact; however, the contribution is less than 0.2 in 1 million for

[1] The terms MEI, MEIR, and MEIW refer to a receptor location of maximum ambient exposure and do not incorporate a reference to cancer risk or to non-cancer acute or chronic exposures. In the SCAQMD, Rules 1401 and 1402 refer to Maximum Individual Cancer Risk which, by OEHHA terminology, would be termed the MEI for cancer effects.

formaldehyde and less than 0.11 in 1 million for PAHs. The dominant exposure pathway for formaldehyde is inhalation and the dominant exposure pathway for PAHs is ingestion. Other substances each contribute less than 0.011 in 1 million at the MEIR.

The hazard index for acute noncarcinogenic substances was 0.0954. The hazard indexes for chronic non-carcinogenic substances were 0.0198 for both the MEIR and MEIW.

Because the maximum cancer risk estimated in this evaluation was far less than 1 for both the MEIR and MEIW and because the hazard indexes for chronic and acute exposure to non-carcinogenic substances was also far below one-half, there is no zone of impact and OEHHA risk assessment guidelines (OEHHA, 2003) do not require an analysis of the potential risk levels at sensitive receptor locations and public health impacts are less than significant.

Proposed High School. For the sake of completeness, this evaluation includes the modeled potential maximum health impacts at the proposed high school being sited across Taylor Street approximately 1,000 feet to the southeast of the Project Site. Modeling showed that the MEIR excess lifetime (70-year) cancer risk within the proposed school property boundary was 0.0192 in 1million. The hazard index for chronic non-carcinogenic substances was 0.000928 calculated over a 70-year exposure period. The hazard index for acute non-carcinogenic substances was 0.00213. HARP results that detail the health risks associated with emissions to the air are presented in Appendix 8.6B. Thus, public health impacts at the school are also less than significant for students and teachers/staff.

8.6.4.5 Hazardous Materials

Hazardous materials will be used and stored at the facility. The quantities of hazardous materials proposed to be stored onsite and a description of their uses are presented in Subsection 8.12, Hazardous Materials Handling. Use of hazardous materials at the proposed facility will be in accordance with standard practices for their storage and management. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate offsite could result in potential impacts to the public.

The California Health and Safety Code Sections 25531 to 25541 and Title 40 CFR Part 68 under the Clean Air Act establish emergency response planning requirements for some of the hazardous materials to be used and stored at the facility. The hazardous materials regulated under these LORS are termed "regulated substances." These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a regulated substance. The only regulated substance to be used at the facility above California regulatory thresholds is aqueous ammonia. This regulated substance when released may generate hazardous gases that could migrate offsite.

An offsite consequence analysis (OCA) was performed to assess potential risks to humans at various distances from the site if a release of aqueous ammonia were to occur (see Appendix 8.12A). The results of the OCA showed that the offsite concentrations at any fence line would not exceed either the California Energy Commission's stringent 75 parts per million (ppm) ammonia significance level, or the Emergency Response Planning Guideline, Level 2 (ERPG 2) level of 150 ppm. Therefore, no public health impacts are expected from the storage and use of regulated substances at the Highgrove Project.

8.6.4.6 Operation Odors

Small amounts of ammonia used to control NO_x emissions may escape up the exhaust stack but would not produce operational odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be less than 5 ppm. After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable. Therefore, potential ammonia emissions are not expected to create objectionable odors.

8.6.5 Mitigation Measures

8.6.5.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the emission sources, which will include the use of only natural gas in the combustion turbines.

The proposed project location is in an area that is designated by the state as nonattainment for ozone, carbon monoxide[2], and particulate matter. Therefore, all increases in emissions of NO_x, VOCs, carbon monoxide, PM_{10}, and oxides of sulfur must be fully offset if emissions exceed specified trigger limits. The combination of using BACT and providing emission offsets will result in no net increase in criteria pollutants. Therefore, further mitigation of emissions is not required to protect public health.

8.6.5.2 Chemical Substances of Potential Concern in Ambient Air

Emissions of chemical substances of potential concern into the air will be minimized through the use of natural gas as the only fuel at the proposed facility. As a result of the HARP analysis, no significant public health risk is expected. Therefore, no mitigation is proposed.

8.6.5.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in Subsection 8.12, Hazardous Materials Handling. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. The Highgrove Project has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The Highgrove Project will include the following design features:

- Curbs, berms, and/or concrete pits will be provided where accidental release of chemicals may occur.
- A fire protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of the aqueous ammonia storage system will be in accordance with applicable LORS.

[2] A request for redesignation from nonattainment to attainment was issued by SCAQMD in July 2005.

An RMP for the facility will be prepared prior to commencement of facility operations. The RMP will estimate the risk presented by handling aqueous ammonia at the facility. The RMP will include a hazard analysis, offsite consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment, (2) safe operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for AES Highgrove, LLC, personnel will include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either an oily waste collection sump or to the wastewater neutralization tank. Also, piping and tanks exposed to potential traffic hazards will be protected by traffic barriers.

8.6.6 References

California Air Resources Board (CARB). 2003. Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk.

Office of Environmental Health and Hazard Assessment (OEHHA). 2003. Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments.

Office of Environmental Health and Hazard Assessment/California Air Resources Board (OEHHA/CARB). 2005. Consolidated Table of OEHHA/CARB Approved Risk Assessment Health Values. (http://arbis.arb.ca.gov/toxics/healthval/contable.pdf)

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South Coast Air Quality Management District (SCAQMD). 2005b. Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588). July.

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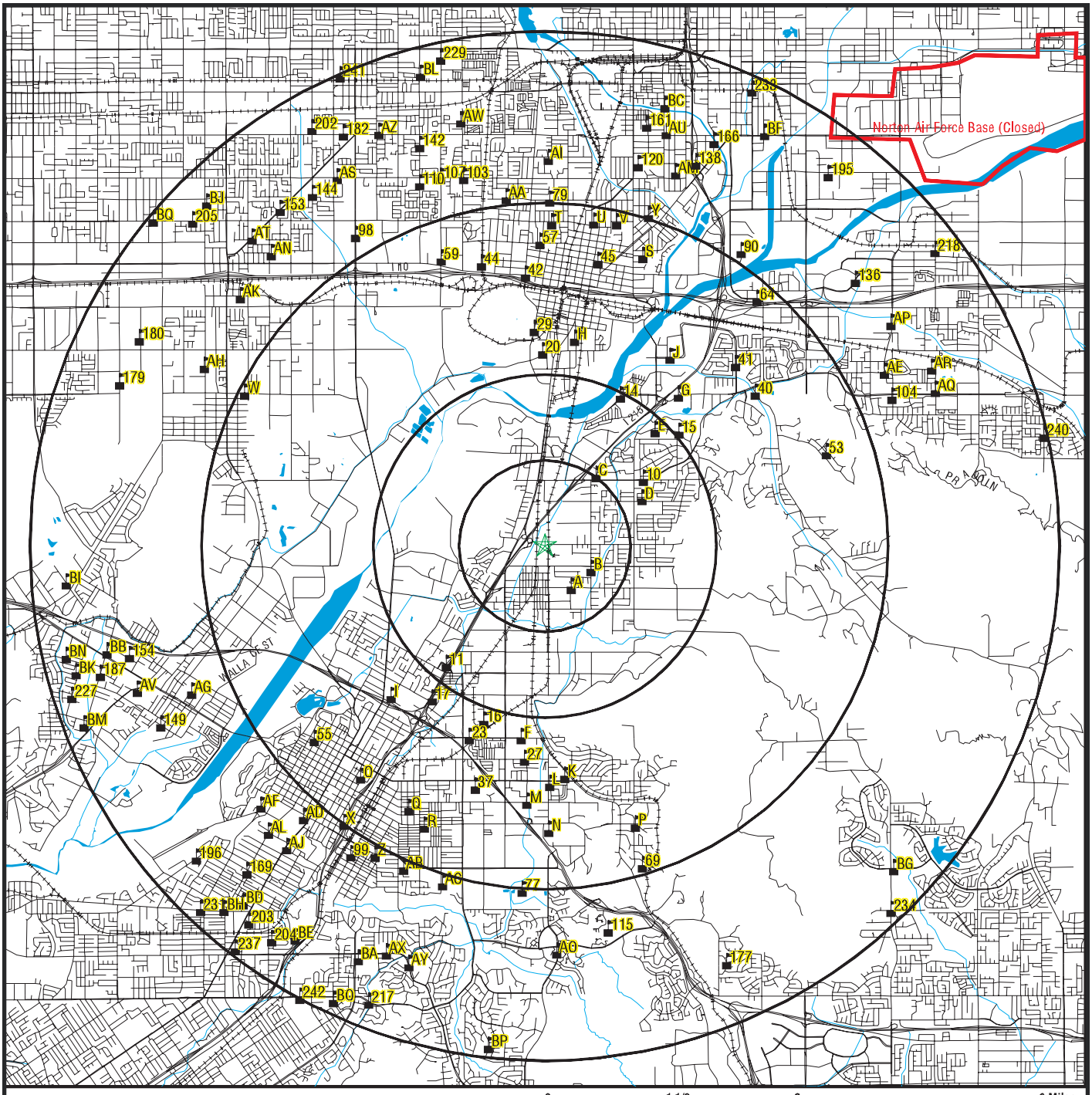

SOURCE: ENVIRONMENTAL DATA RESOURCES, 2006 (SEE APPENDIX 8.6A)

FIGURE 8.6-1a
SENSITIVE RECEPTORS WITHIN 6 MILES OF AES HIGHROVE SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

IS022006001RDD_22 (3/1/06)

CH2MHILL

LEGEND

- CHURCH
- PARK
- PROPOSED GAS LINE
- SITE LOCATION
- 3-MILE BUFFER

CHURCHES

1 ABC Hispanic Baptist Church
2 Azure Hills 7th Day Adventist
3 Blue Mountain Christian Center
4 Calvary the Brook
5 Christ Apostolic Church
6 Christ the Redeemer Church
7 Christian Fellowship
8 Church of Jesus Christ of LDS
9 Come As You are Christian
10 Cup of Life Ministries
11 Echoes of Love Ministry
12 Family of God Church
13 Foursquare Church of Colton
14 Free-Way Missionary Baptist Church
15 Grand View Baptist Church
16 Grand Terrace Foursquare Church
17 Highgrove United Methodist Church
18 Iglesia Christian Rios De Agua
19 Iglesia Apostolica De La Fe
20 Immanuel Baptist Temple
21 Ismailia Cultural Center
22 Jehovah's Witnessess
23 Loma Linda Korean Church
24 Mision Esmirna Revelation 2:8
25 Matich Brothers
26 Praise Temple Christian Flwshp
27 Rialton Second LDS Ward
28 Salvation Christian Ministries
29 San Salvador Catholic Church
30 San Salvador Catholic Church
31 Shekinah Glory Temple
32 Sisters of St Benedict
33 South Colton Church of Christ
34 St Mina Church
35 Terrace Crest Baptist Church

PARKS

36 Reid Park
37 AB Brown Sports Complex
38 Fairmount Park
39 Mount Vernon Park
40 Highland Park
41 Pico Park
42 Grand Terrace Park
43 Veterans Park
44 Fiesta Village
45 Box Springs Mountain Park
46 Agua Mansa Cementery

N

0 3,500 7,000
Feet

FIGURE 8.6-1b
SENSITIVE RECEPTORS WITHIN A 3-MILE RADIUS FROM PROJECT SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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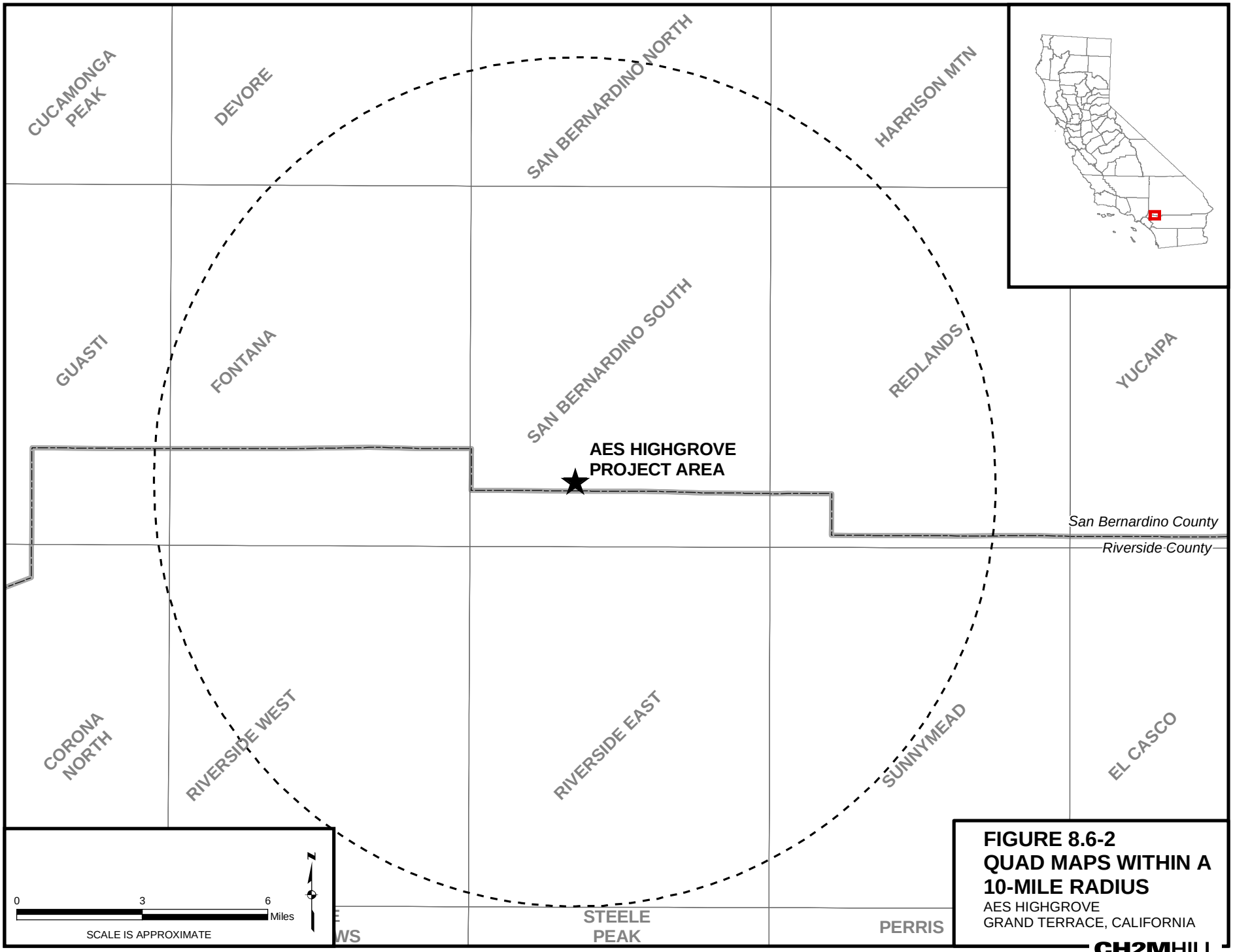

FIGURE 8.6-2
QUAD MAPS WITHIN A 10-MILE RADIUS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_6-2_QUAD.MXD 3/22/2006 10:20:18

8.7 Worker Health and Safety

8.7.1 Introduction

This subsection summarizes the health and safety issues that may be encountered during the construction and operation of the proposed AES Highgrove Project. The proposed Highgrove Project is located in San Bernardino County, in the City of Grand Terrace. In addition to the construction and operation of the Highgrove Project, the project will include demolition of existing equipment located on the Generating Station Property and relocation of the Highgrove Substation controls from the Generating Station Property to a location within the fenceline of the existing Highgrove Substation. Please see Section 2.0, Project Description for a detailed discussion of each component of the project.

This subsection contains worker safety information including the laws, ordinances, regulations, and standards (LORS) that apply to this project along with specific sections outlining the safety training programs and general health and safety programs that will be prepared and implemented for this project, the methods to control the anticipated hazards, fire protection information, and general information on permitting agencies and contacts.

8.7.2 Laws, Ordinances, Regulations, and Standards

The demolition and construction activities and operation of Highgrove Project will be conducted in accordance with all applicable LORS. Tables 8.7-1 through 8.7-4 summarize the LORS relating to worker health and safety. Table 8.7-1 provides a summary of federal LORS; Table 8.7-2 summarizes the state LORS; Table 8.7-3 lists the local (County) LORS; and Table 8.7-4 provides a summary of the applicable national consensus standards.

TABLE 8.7-1
Federal Laws, Ordinances, Regulations, and Standards

Law, Ordinance, Regulation, or Standard	Applicability
Title 29 Code of Federal Regulations (CFR) Part 1910*	Contains the minimum occupational safety and health standards for general industry in the United States
Title 29 CFR Part 1926 [a]	Contains the minimum occupational safety and health standards for the construction industry in the United States

* Primary laws and regulations governing worker health and safety in California are provided in Table 8.7-2. These regulations are for reference and apply as referenced by California occupational safety and health regulations. Where a particular situation is not addressed by those regulations, the CFR will be consulted for guidance.

TABLE 8.7-2
State Laws, Ordinances, Regulations, and Standards

Law, Ordinance, Regulation, or Standard	Applicability
California Occupational Safety and Health Act, 1970	Establishes minimum safety and health standards for construction and general industry operations in California
8 California Code of Regulations (CCR) 339	Requires list of hazardous chemicals relating to the Hazardous Substance Information and Training Act

TABLE 8.7-2
State Laws, Ordinances, Regulations, and Standards

Law, Ordinance, Regulation, or Standard	Applicability
8 CCR 450	Addresses hazards associated with pressurized vessels
8 CCR 750	Addresses hazards associated with high-pressure steam
8 CCR 1509	Addresses requirements for construction, accident, and prevention plans
8 CCR 1509, et seq., and 1684, et seq.	Addresses construction hazards, including head, hand, and foot injuries and noise and electrical shock
8 CCR 1528, et seq., and 3380, et seq.	Requirements for personal protective equipment (PPE)
8 CCR 1597, et seq., and 1590, et seq.	Requirements addressing the hazards associated with traffic accidents and earth-moving
8 CCR 1604, et seq.	Requirements for construction hoist equipment
8 CCR 1620, et seq., and 1723, et seq.	Addresses miscellaneous hazards
8 CCR 1709, et seq.	Requirements for steel reinforcing, concrete pouring, and structural steel erection operations
8 CCR 1920, et seq.	Requirements for fire protection systems
8 CCR 2300, et seq., and 2320, et seq.	Requirements for addressing low-voltage electrical hazards
8 CCR 2395, et seq.	Addresses electrical installation requirements
8 CCR 2700, et seq.	Addresses high-voltage electrical hazards
8 CCR 3200, et seq., and 5139, et seq.	Requirements for control of hazardous substances
8 CCR 3203, et seq.	Requirements for operational accident prevention programs
8 CCR 3270, et seq., and 3209, et seq.	Requirements for evacuation plans and procedures
8 CCR 3301, et seq.	Requirements for addressing miscellaneous hazards, including hot pipes, hot surfaces, compressed air systems, relief valves, enclosed areas containing flammable or hazardous materials, rotation equipment, pipelines, and vehicle-loading dock operations.
8 CCR 3360, et seq.	Addresses requirements for sanitary conditions
8 CCR 3511, et seq., and 3555, et seq.	Requirements for addressing hazards associated with stationary engines, compressors, and portable, pneumatic, and electrically powered tools
8 CCR 3649, et seq., and 3700, et seq.	Requirements for addressing hazards associated with field vehicles
8 CCR 3940, et seq.	Requirements for addressing hazards associated with power transmission, compressed air, and gas equipment
8 CCR 5109, et seq.	Requirements for addressing construction accident and prevention programs
8 CCR 5110, et. seq.	Requirements for the implementation of an ergonomics program
8 CCR 5139, et seq.	Requirements for addressing hazards associated with welding, sandblasting, grinding, and spray-coating

TABLE 8.7-2
State Laws, Ordinances, Regulations, and Standards

Law, Ordinance, Regulation, or Standard	Applicability
8 CCR 5150, et seq.	Requirements for confined space entry
8 CCR 5160, et seq.	Requirements for addressing hot, flammable, poisonous, corrosive, and irritant substances
8 CCR 5192, et seq.	Requirements for conducting emergency response operations
8 CCR 5194, et seq.	Requirements for employee exposure to dusts, fumes, mists, vapors, and gases
8 CCR 5405, et seq.; 5426, et seq.; 5465, et seq.; 5500, et seq.; 5521, et seq.; 5545, et seq.; 5554, et seq.; 5565, et seq.; 5583, et seq.; and 5606, et seq.	Requirements for flammable liquids, gases, and vapors
8 CCR 5583, et seq.	Requirements for design, construction, and installation of venting, diking, valving, and supports
8 CCR 6150, et seq.; 6151, et seq.; 6165, et seq.; 6170, et seq.; and 6175, et seq.	Provides fire protection requirements
24 CCR 3 et seq.	Incorporates current addition of Uniform Building Code
8 CCR, Part 6	Provides health and safety requirements for working with tanks and boilers
La Follette Bill (Health and Safety Code Section 25500, et seq.)	Requires that every new or modified facility that handles, treats, stores, or disposes of more than the threshold quantity of any of the listed acutely hazardous materials prepare and maintain an RMP
Health and Safety Code Sections 25500 through 25541	Requires the preparation of a Hazardous Material Business Plan that details emergency response plans for a hazardous materials emergency at the facility

TABLE 8.7-3
Local Laws, Ordinances, Regulations, and Standards

Law, Ordinance, Regulation, or Standard	Applicability
Required by San Bernardino County:	
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies
Emergency Response Plan	Allows response agency to integrate the plant's emergency response activities into any response actions
Business Plan	Provides response agency with overview of the plant's purpose and operations
Risk Management Plan (Certified Unified Program Agency [CUPA], administered by the County)	Provides response agency with detailed review of risks and hazards located at the plant site and mitigation implemented to control risks or hazards.

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
Uniform Fire Code, Article 80	Addresses the prevention, control and mitigation of dangerous conditions related to storage, dispensing, use, and handling of hazardous materials and information needed by emergency response personnel
National Fire Protection Association (NFPA) 10, Standard for Portable Fire Extinguishers	Requirements for selection, placement, inspection, maintenance, and employee training for portable fire extinguishers
NFPA 11, Standard for Low Expansion Foam and Combined Agent Systems	Requirements for installation and use of low-expansion foam and combined agent systems
NFPA 11A, Standard for Medium and High Expansion Foam Systems	Requirements for installation and use of medium- and high-expansion foam systems
NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	Requirements for installation and use of carbon dioxide extinguishing systems
NFPA 13, Standard for Installation of Sprinkler Systems	Guidelines for selection and installation of fire sprinkler systems
NFPA 13A, Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems	Guidance for inspection, testing, and maintenance of sprinkler systems
NFPA 14, Standard for the Installation of Standpipe and Hose Systems	Guidelines for selection and installation of standpipe and hose systems
NFPA 15, Standard for Water Spray Fixed Systems	Guidelines for selection and installation of water spray fixed systems
NFPA 17, Standard for Dry Chemical Extinguishing Systems	Guidance for selection and use of dry chemical extinguishing systems
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps	Guidance for selection and installation of centrifugal fire pumps
NFPA 22, Standard for Water Tanks for Private Fire Protection	Requirements for water tanks for private fire protection
NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances	Requirements for private fire service mains and their appurtenances
NFPA 26, Recommended Practice for the Supervision of Valves Controlling Water Supplies	Supervision guidance for valves controlling water supplies
NFPA 30, Flammable and Combustible Liquid Code	Requirements for storage and use of flammable and combustible liquids
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	Fire protection requirements for installation and use of combustion engines and gas turbines
NFPA 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites	Fire protection requirements for hydrogen systems
NFPA 54, National Fuel Gas Code	Fire protection requirements for use of fuel gases
NFPA 59A, Standard for the Storage and Handling of Liquefied Petroleum Gases	Requirements for storage and handling of liquefied petroleum gases
NFPA 68, Guide for Explosion Venting	Guidance in design of facilities for explosion venting

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
NFPA 70, National Electric Code	Guidance on safe selection and design, installation, maintenance, and construction of electrical systems
NFPA 70B, Recommended Practice for Electrical Equipment Maintenance	Guidance on electrical equipment maintenance
NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces	Employee safety requirements for working with electrical equipment
NFPA 71, Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems	Requirements for installation, maintenance, and use of central station signaling systems
NFPA 72A, Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service	Requirements for installation, maintenance, and use of local protective signaling systems
NFPA 72E, Standard on Automatic Fire Detection	Requirements for automatic fire detection
NFPA 72F, Standard for the Installation, Maintenance and Use of Emergency Voice/Alarm of Communication Systems	Requirements for installation, maintenance, and use of emergency and alarm communications systems
NFPA 72H, Guide for Testing Procedures for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems	Testing procedures for types of signaling systems anticipated for facility
NFPA 75, Standard for the Protection of Electronic Computer/Data Processing Equipment	Requirements for fire protection systems used to protect computer systems
NFPA 78, Lightning Protection Code	Lightning protection requirements
NFPA 80, Standard for Fire Doors and Windows	Requirements for fire doors and windows
NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems	Requirements for installation of air conditioning and ventilating systems
NFPA 101, Code for Safety to Life from Fire in Buildings and Structures	Requirements for design of means of exiting the facility
NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants	Guidelines for testing and marking of fire hydrants
NFPA 850, Recommended Practice for Fire Protection for Fossil Fuel Steam Electric Generating Plants	Requirements for fire protection in fossil-fuel steam electric generating plants
NFPA 1961, Standard for Fire Hose	Specifications for fire hoses
NFPA 1962, Standard for the Care, Maintenance, and Use of Fire Hose Including Connections and Nozzles	Requirements for care, maintenance, and use of fire hose
NFPA 1963, Standard for Screw Threads and Gaskets for Fire Hose Connections	Specifications for fire hose connections
American National Standards Institute/American Society for Mechanical Engineers (ANSI/ASME), Boiler and Pressure Vessel Code	Specifications and requirements for pressure vessels
ANSI, B31.2, Fuel Gas Piping	Specifications and requirements for fuel gas piping

8.7.3 Setting

The generating facility will consist of three combustion turbine generators (CTGs), each equipped with water injection capability to reduce oxides of nitrogen (NO_x) emissions, a catalyst housing containing catalysts to further reduce NO_x and carbon monoxide (CO) emissions, mechanical-draft cooling towers for each CTG and associated support equipment providing a total net generating capacity of approximately 300 megawatts (MW).

8.7.4 Impacts

8.7.4.1 Environmental Checklist

The CEQA Environmental Checklist does not have specific questions for worker health and safety. Related questions are addressed in the Hazardous Materials Management and Noise checklists.

8.7.4.2 Discussion of Impacts

During this project, workers will be exposed to demolition, construction and plant operation safety hazards. To evaluate these hazards and control measures, a hazard analysis has been prepared. The analysis identifies the hazards anticipated during demolition and construction as well ass operation and indicates which safety programs should be developed and implemented to mitigate and appropriately manage those hazards. The hazard analysis prepared for construction and demolition activities is outlined in Table 8.7-5; the hazard analysis prepared for plant operation is outlined in Table 8.7-6. Since the types of hazards anticipated during plant demolition, construction and operation are similar, there is considerable duplication between the tables.

8.7.4.2.1 Overview of Hazards and Related Programs and Training

Programs are overall plans that set forth the method or methods that will be followed to achieve particular health and safety objectives. For example, the Fire Protection and Prevention Program will describe what has to be done to protect against and prevent fires. This will include equipment required, such as alarm systems and firefighting equipment, and procedures to follow to protect against fires. The Emergency Action Program/Plan will describe escape procedures, rescue and medical procedures, alarm and communication systems, and response procedures for very hazardous materials that can migrate, such as ammonia. The programs or plans are contained in written documents that are usually kept at specific locations within the facility.

Each program or plan will contain training requirements that are translated into detailed training courses. These courses are taught to plant construction and operating personnel as needed. For example, all plant operating personnel will receive training in escape procedures under the Emergency Action Program/Plan, but only those working with flammables or involved with welding/cutting operations will receive training under the Fire Protection and Prevention Program.

Tables 8.7-5 and 8.7-6, which list construction and operation activities and associated hazards, also show (under the "Control" column) the program designed to reduce the occurrence of each hazard. The training courses derived from these programs and the employees who are required to receive the training are also listed.

TABLE 8.7-5
Construction and Demolition Hazard Analysis

Activity	Hazard*	Control*
Motor vehicle and heavy equipment use	Employee injury and property damage from collisions between people and equipment	Motor Vehicle and Heavy Equipment Safety Program
Forklift operation	Same as heavy equipment	Forklift Operation Program
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Excavation/Trenching Program
Working at elevated locations	Falls from the same level and elevated areas	Fall Prevention Program Scaffolding/Ladder Safety Program Articulating Boom Platforms Program
Use of cranes and derricks	Property damage from falling loads Employee injuries from falling loads Injuries and property damage from contact with crane or derrick	Crane and Material Handling Program
Working with flammable and combustible liquids	Fire/spills	Fire Protection and Prevention Program Housekeeping and Material Handling and Storage Program
Hot work (including cutting and welding)	Employee injury and property damage from fire Exposure to fumes during cutting and welding Ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Safety Program Respiratory Protection Program Employee Exposure Monitoring Program Personal Protective Equipment Program Fire Protection and Prevention Program
Inspection and maintenance of temporary systems used during construction activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Electrical Safety Program
Working on electrical equipment and systems	Employee contact with live electricity and energized equipment	Electrical Safety Program Personal Protective Equipment Program
Exposure to Hazardous Waste	Personnel who are working with or have the potential to be exposed to contaminated soil, groundwater or debris during construction	Hazardous Waste Program
Confined space entry	Employee injury from physical and chemical hazards	Permit-Required Confined Space Entry Program
General and demolition construction activities	Employee injury from hand and portable power tools	Hand and Portable Power Tool Safety Program Personal Protective Equipment Program

TABLE 8.7-5
Construction and Demolition Hazard Analysis

Activity	Hazard*	Control*
General and demolition construction activities	Employee injury/property damage from inadequate walking and work surfaces	Housekeeping and Material Handling and Storage Program
General construction and demolition activities	Employee exposure to occupational noise	Hearing Conservation Program Personal Protective Equipment Program
General and demolition construction activities	Employee injury from improper lifting and carrying of materials and equipment	Back Injury Prevention Program
General and demolition construction activity	Employee injury to head, eye/face, hand, body, foot, and skin	Personal Protective Equipment Program
General and demolition construction activity	Employee exposure to hazardous gases, vapors, dusts, and fumes	Hazard Communication Program Respiratory Protection Program Personal Protective Equipment Program Air Monitoring Program
General and demolition construction activity	Employee exposure to various hazards Reporting of hazardous conditions during construction	Injury and Illness Prevention Program Injury and Illness Prevention Program
General and demolition construction activity	Heat and cold stress	Heat and Cold Stress Monitoring and Control Program
Construction and testing of high-pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Pressure Vessel and Pipeline Safety Program Electrical Safety Program

* The hazards and hazard controls provided are generic to construction activities. During various phases of construction, a hazard analysis will be performed to evaluate the hazards and develop appropriate controls.

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control*
Motor vehicle and heavy equipment use	Employee injury and property damage from collisions between people and equipment	Motor Vehicle and Heavy Equipment Safety Program
Forklift operations	Same as heavy equipment	Forklift Operation Program
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Excavation/Trenching Program
Working at elevated locations	Falls from the same level and elevated areas	Fall Protection Program Scaffolding/Ladder Safety Program

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control*
Use of cranes or derricks	Property damage from falling loads	Crane and Material Handling Program
	Employee injuries from falling loads	
	Injuries and property damage from contact with crane or derrick	
Working with flammable and combustible liquids	Fire/spills	Fire Protection and Prevention Program
Working with hazardous materials	Employee injury due to ingestion, inhalation, dermal contact	Hazard Communication Program
Hot work (including cutting and welding)	Employee injury and property damage from fire	Hot Work Safety Program
	Exposure to fumes during cutting and welding	Respiratory Protection Program
	Ocular exposure to ultraviolet and infrared radiation during cutting and welding	Employee Exposure Monitoring Program
		Personal Protective Equipment Program
		Fire Protection and Prevention Program
Troubleshooting and maintenance of plant systems and general operational activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Electrical Safety Program
Working on electrical equipment and systems	Employee contact with live electricity	Electrical Safety Program
		Personal Protective Equipment Program
Confined space entry	Employee injury from physical and chemical hazards	Permit-Required Confined Space Entry Program
General plant operation activities	Employee injuries from hand and portable power tools	Hand and Portable Power Tool Safety Program
		Personal Protective Equipment Program
General plant operation activities	Employee injury and property damage from inadequate walking and work surfaces	Housekeeping and Material Handling and Storage Program
General plant operation activities	Employee overexposure to occupational noise	Hearing Conservation Program
		Personal Protective Equipment Program
General plant operation activities	Employee injury from improper lifting and carrying of materials and equipment	Back Injury Prevention Program
General plant operation activities	Employee injury and property damage from unsafe driving	Safe Driving Program
General plant operation activities	Employee overexposure to hazardous gases, vapors, dusts, and fumes	Hazard Communication Program
		Respiratory Protection Program
		Personal Protective Equipment Program
		Employee Exposure Monitoring Program

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control*
General plant operation activities	Reporting and repair of hazardous conditions	Injury and Illness Prevention Program
General plant operation activities	Heat and cold stress	Heat and Cold Stress Monitoring and Control Program
General plant operation activities	Ergonomic injuries	Ergonomic Awareness Program
Maintenance and repair of high-pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Pressure Vessel and Pipeline Safety Program Electrical Safety Program
Ammonia storage	Ammonia release	Emergency Action Program/Plan Risk Management Plan (See Subsection 8.12 and Table 8.7-3)

* The hazard and hazard controls provided are generic to operational activities. This hazard analysis may have to be updated if plant operations change or new equipment is added that was not considered during this evaluation.

8.7.4.3 Health and Safety Programs

To protect the safety and health of workers during the demolition, construction and operation of the Highgrove Project, health and safety programs designed to mitigate hazards and comply with applicable regulations will be implemented. Periodic audits will be performed by qualified individuals to determine whether proper work practices are being used to mitigate hazardous conditions and to evaluate regulatory compliance.

The following subsections contain information on the anticipated content of the health and safety programs.

8.7.4.3.1 Construction and Demolition Health and Safety Program

The Injury and Illness Prevention Program, Fire Protection and Prevention Program, Personal Protective Equipment Program, Emergency Action Program/Plan, and Construction Safety Programs that will be implemented during demolition and project construction are outlined below.

Injury and Illness Prevention Program

- Philosophy and safety commitment
- Safety leadership and responsibilities
- Accountability
- Specific core safety processes (see Components of the Construction Safety Program)
- Employee communication
- Planning "job hazard analysis and pre-task"
- Compliance with work rules and safe work practices
- Measurement of compliance and effectiveness of prevention methods
- Communication of performance and implementation of necessary improvements
- Training and other communication requirements

Fire Protection and Prevention Program

- General requirements
- Housekeeping and proper material storage
- Employee alarm/communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control and containment
- Flammable and combustible liquid storage
- Use of flammable and combustible liquids
- Dispensing and disposal of flammable liquids
- Service and refueling areas
- Training

Personal Protective Equipment Program

- Personal protective devices
- Head protection
- Eye/face protection
- Body protection
- Hand protection
- Foot protection
- Skin Protection
- Fall protection
- High-voltage protection
- Respiratory protection
- Hearing protection
- Hazard analysis
- Training

Emergency Action Program/Plan

Emergency procedures for the protection of personnel, equipment, the environment, and materials

- Fire and emergency reporting procedures
- Response actions for accidents involving personnel and or property
- Bomb threats
- Site assembly and emergency evacuation route procedures
- Natural disasters response

Reporting and notification procedures for emergencies; contacts, including offsite and local authorities

- Alarm and communication systems
- Spill response, prevention, and control action plan
- Emergency response equipment
- Emergency personnel (response team) responsibilities and notification roster
- Training requirements

Construction Safety Programs

Motor Vehicle and Heavy Equipment Safety Program

- Operation and maintenance of vehicles
- Inspection
- PPE
- Training

Forklift Operation Program

- Trained and certified operators
- Fueling operations
- Safe operating parameters
- Training

Excavation/Trenching Program

- Shoring, sloping, and benching requirements
- California Occupational Safety and Health Administration (Cal-OSHA) permit requirements
- Inspection
- Air monitoring
- Access and egress

Fall Protection Program

- Evaluation of fall hazards
- Protection devices
- Training

Scaffolding/Ladder Safety Program

- Construction and inspection of equipment
- Proper use
- Training

Articulating Boom Platforms Program

- Inspection of equipment
- Load ratings
- Safe operating parameters
- Operator training

Crane and Material Handling Program

- Certified and licensed operators
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Training

Hazardous Waste Program

- Evaluation of hazard
- Training
- Air monitoring
- Medical surveillance
- Health and Safety Plan preparation

Hot Work Safety Program
- Welding and cutting procedures
- Fire watch
- Hot work permit
- PPE
- Training

Employee Exposure Monitoring Program
- Exposure evaluation
- Monitoring requirements
- Reporting of results
- Medical surveillance
- Training

Electrical Safety Program
- Grounding procedure
- Lock-out/tag-out (LO/TO) procedures
- Overhead and underground utilities
- Utility clearance
- Training

Permit-Required Confined Space Entry Program
- Air monitoring and ventilation requirements
- Rescue procedures
- LO/TO and blocking, blinding, and blanking requirements
- Permit completion
- Training

Hand and Portable Power Tool Safety Program
- Guarding and proper operation
- Training

Housekeeping and Material Handling and Storage Program
- Storage requirements
- Walkways and work surfaces
- Equipment handling requirements
- Training

Hearing Conservation Program
- Identifying high-noise environments
- Exposure monitoring
- Medical surveillance requirements
- Hearing protective devices
- Training

Back Injury Prevention Program
- Proper lifting and material handling procedures
- Training

Hazard Communication Program

- Labeling requirements
- Storage and handling
- Material Safety Data Sheets (MSDS)
- Chemical inventory
- Training

Respiratory Protection Program

- Selection and use
- Storage
- Fit testing
- Medical requirements
- Inspection and repair
- Training

Heat and Cold Stress Monitoring and Control Program

- Monitoring requirements
- Prevention and control

Pressure Vessel and Pipeline Safety Program

- Line-breaking program
- Equipment inspection and maintenance
- Blocking, bleeding, and blanking
- Training

8.7.4.3.2 Operations Health and Safety Program

Upon completion of plant construction and commencement of plant operations, the construction safety and health program will transition into an operations-oriented program reflecting the hazards and controls necessary during operation. A comprehensive Safety Management System (SMS), which includes periodic internal safety audits, will be implemented. SMS outlines for the operations-oriented Injury and Illness Prevention Program, Fire Protection and Prevention Program, Emergency Action Program/Plan, PPE Program, and Plant Operation Safety Program are provided below.

Injury and Illness Prevention Program

- Personnel with the responsibility and authority for implementing the plan
- Safety and health policy
- Work rules and safe work practices
- System for ensuring that employees comply with safe work practices
- Employee communications
- Identification and evaluation of workplace hazards

Methods and/or procedures for correcting unsafe or unhealthy conditions, work practices, and work procedures in a timely manner based on the severity of the hazards

- Specific safety procedures (see Plant Operation Safety Program)
- Training and instruction

Fire Protection and Prevention Program

- General requirements
- Fire hazard inventory, including ignition sources and mitigation
- Housekeeping and proper materials storage
- Employee alarm/communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control
- Flammable and combustible liquid storage
- Use of flammable and combustible liquids
- Dispensing and disposal of liquids
- Training
- Personnel to contact for information on plan contents

Emergency Action Program/Plan (Part of the Risk Management Plan)

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed
- Rescue and medical duties for those employees performing rescue and medical duties
- Fire and emergency reporting procedures
- Alarm and communication system
- Personnel to contact for information on plan contents
- Response procedure for ammonia release
- Training requirements

Personal Protective Equipment Program

- Hazard analysis and prescription of PPE
- Personal protective devices
- Head protection
- Eye and face protection
- Body protection
- Hand protection
- Foot protection
- Skin Protection
- Sanitation
- Safety belts and life lines for fall protection
- Protection for electric shock
- Medical services and first aid/bloodborne pathogens
- Respiratory protective equipment
- Hearing protection
- Training

Plant Operation Safety Program

Motor Vehicle and Heavy Equipment Safety Program

- Operation and Maintenance of Vehicles
- Inspection
- Personal Protective Equipment
- Training

Forklift Operation Program

- Trained and certified operators
- Fueling operations
- Safe operating parameters
- Training

Excavation/Trenching Program

- Shoring, sloping, and benching requirements
- Cal-OSHA permit requirements
- Inspection
- Air monitoring
- Access and egress

Fall Protection Program

- Evaluation of fall hazards
- Protection devices
- Training

Scaffolding/Ladder Safety Program

- Construction and inspection of equipment
- Proper use
- Training

Articulating Boom Platforms Program

- Inspection of equipment
- Load ratings
- Safe operating parameters
- Operator training

Crane and Material Handling Program

- Certified and licensed operators
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Training

Hot Work Safety Program

- Welding and cutting procedures
- Fire watch
- Hot work permit
- PPE
- Training

Workplace Ergonomics Program
- Identification of personnel at risk
- Evaluation of personnel
- Workplace and job activity modifications
- Training

Employee Exposure Monitoring Program
- Exposure evaluation
- Monitoring requirements
- Reporting of results
- Medical surveillance
- Training

Electrical Safety Program
- Grounding procedure
- LO/TO procedures
- Overhead and underground utilities
- Utility clearance
- Training

Permit-Required Confined Space Entry Program
- Air monitoring and ventilation requirements
- Rescue procedures
- LO/TO and blocking, blinding, and blanking requirements
- Permit completion
- Training

Hand and Portable Power Tool Safety Program
- Guarding and proper operation
- Training

Housekeeping and Material Handling and Storage Program
- Storage requirements
- Walkways and work surfaces
- Equipment handling requirements
- Training

Hearing Conservation Program
- Identifying high-noise environments
- Exposure monitoring
- Medical surveillance requirements
- Hearing protective devices
- Training

Back Injury Prevention Program
- Proper lifting and material handling procedures
- Training

Hazard Communication Program

- Labeling requirements
- Storage and handling
- MSDS
- Chemical inventory
- Training

Respiratory Protection Program

- Selection and use
- Storage
- Fit testing
- Medical requirements
- Inspection and repair
- Training

Heat and Cold Stress Monitoring and Control Program

- Monitoring requirements
- Prevention and control

Pressure Vessel and Pipeline Safety Program

- Line-breaking policy
- Equipment inspection and maintenance
- Blocking, bleeding, and blanking
- Communication
- Training

Safe Driving Program

- Inspection and maintenance
- Training

8.7.4.4 Safety Training Programs

To ensure that employees recognize and understand how to protect themselves from potential hazards during this project, comprehensive training programs for demolition, construction and operation will be implemented as indicated in Tables 8.7-7 and 8.7-8. As indicated above, each safety procedure developed to control and mitigate potential site hazards will require some form of training. Training will be delivered in various ways, depending on the requirements of Cal-OSHA standards, the complexity of the topic, the characteristics of the workforce, and the degree of risk associated with each of the identified hazards.

TABLE 8.7-7
Construction Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Program/Plan	All
Personal Protective Equipment Training	All
Motor Vehicle and Heavy Equipment Safety Training	Employees working on, near, or with heavy equipment or vehicles
Forklift Operation Training	Employees operating forklifts
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Fall Protection Training	Employees working at heights greater than 6 feet or required to use fall protection
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Crane Safety Training	Employees supervising or performing crane operations
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gases
Hazard Communication Training	All
Hazardous Waste	Employees handling or excavating hazardous waste
Hot Work Safety Training	Employees performing hot work
Fire Prevention and Protection Training	Employees performing hot work
Electrical Safety Training	Employees performing LO/TO or working on systems that require LO/TO activities
Electrical Safety Training	Employees required to work on electrical systems and equipment, or use electrical equipment and cords
Permit-Required Confined Space Entry Training	Employees required to supervise or perform confined space entry activities
Hand and Portable Power Tool Safety Training	Employees that will be operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees that are exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Training	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All

TABLE 8.7-8
Operations Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Plan	All
Personal Protective Equipment Training	All
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Fall Protection Training	Employees required to use fall protection
Forklift Operator Training	Employees operating forklifts
Crane Safety Training	Employees supervising or performing crane operations
Workplace Ergonomics	All
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gasses
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing LO/TO
Electrical Safety	Employees required to work on electrical systems and equipment
Permit-Required Confined Space Entry	Employees required to supervise or perform confined space entry
Hand and Portable Power Tool Safety Training	Employees that will be operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Hazard Communication Training	All
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Program	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All
First Aid, CPR, AED and Bloodborne Pathogen Training	All

8.7.4.5 Fire Protection

Two fire departments are located in close proximity to the project site. The Highgrove Fire Station is located 1 mile southeast of the project sire and the anticipated response time to the site is 4 minutes. The Grand Terrace Fire Station is located 1.7 miles northeast of the site and the anticipated response time is 5 minutes.

8.7.5 Involved Agencies and Agency Contacts

Several agencies are involved to ensure protection of worker health and safety. Agency contacts relative to worker health and safety and fire are shown in Table 8.7-9.

TABLE 8.7-9
Agency Contacts

Agency	Contact Information
San Bernardino County Emergency Services	2524 Mulberry St Riverside, CA 92501 (951) 782-4174
San Bernardino County Environmental Health Department	4065 County Circle Dr Riverside, CA 92503 (951) 358-5172
San Bernardino County Fire Departments	Highgrove Fire Station 469 Center Street Riverside, CA 92507 (951) 686-2105
	Grand Terrace Fire Department 22582 City Center Ct. Grand Terrace, CA 92313 (909) 825-0221
Cal-OSHA – San Bernardino	464 W. 4th St. Suite 332 San Bernardino 92401 (909) 383-4321 (enforcement) (909) 383-4567 (consultation)

8.7.6 Permits Required and Permit Schedule

Table 8.7-10 lists applicable permits related to the protection of worker health and safety for Highgrove certification. The activities covered and application requirements to obtain each permit are provided.

All permits noted in Table 8.7-10 may be obtained from any Cal-OSHA district or field office as needed. Notification requirements are listed as 24 hours because the permits may be required at several points in the construction of the plant or during operations, no specific permitting schedule is provided.

TABLE 8.7-10
Health and Safety Permits

Permit or Approval	Schedule	Applicability	Contact
Trenching and excavation permit	Submit completed permit application to any Cal-OSHA district or field office prior to commencing construction.	Trenches and excavations of more than 5 feet that personnel are required to enter, or Construction of buildings, structures, scaffolding, or falsework more than 3 stories high, or Demolition of any building or structure or dismantling of scaffolding or falsework more than 3 stories high	Any Cal-OSHA district or field office
Permit to erect a fixed tower crane	Submit completed permit application to any Cal-OSHA district or field office at least 24 hours prior to initiation of activity.	Required to erect, climb, or dismantle fixed tower cranes Completion of erection of tower crane and commencement of operation, or Climbing of the tower crane, or Dismantling of the tower crane	Any Cal-OSHA district or field office

Application for Certification

AES Highgrove Project

submitted to

California Energy Commission

submitted by AES Highgrove, LLC,
a wholly owned subsidiary of the AES Corporation

May 2006

The Global Power Company
Lighting up California

Volume 1

EY042006001SAC

AES Highgrove, LLC

May 25, 2006

Mr. B.B. Blevins
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Dear Mr. Blevins:

In accordance with the provisions of Title 20, California Code of Regulations, AES Highgrove, LLC (AES Highgrove) hereby submits this Application for Certification seeking authority to construct and operate the AES Highgrove Project, a 300 megawatt, natural gas-fired power plant to be located in the City of Grand Terrace, California.

As an officer of AES Highgrove, LLC, I hereby attest, under penalty of perjury, that the contents of this application are truthful and accurate to the best of my knowledge.

Dated this 25th day of May, 2006.

Sincerely,

Julie Way
President
AES Highgrove, LLC

690 Studebaker Rd., Long Beach, California 90803 (562) 493-7891 Fax (562) 493-7320

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Acronyms and Abbreviations

µg/m^3	micrograms per cubic meter
°F	degree Fahrenheit
AC	alternating current
ACHP	Advisory Council on Historic Preservation
AFC	Application for Certification
afy	acre-feet per year
AGS	Alamitos Generating Station
AHPA	Archaeological and Historic Preservation Act
ANSI	American National Standards Institute
APE	Affected Project Environment
API	American Petroleum Institute
APLIC	Avian Power Line Interaction Committee
ASME	American Society of Mechanical Engineers
B.P.	before present
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
BOE	Board of Education
CAAQS	California Ambient Air Quality Standards
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDC	California Department of Conservation
CDFG	California Department of Fish and Game

CDOGGR	California Division of Oil, Gas and Geothermal Resources
CDPD	cellular digital pocket data
CEC	California Energy Commission
CEDD	California Employment Development Department
CEM	continuous emission monitor
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CHRIS	California Historical Resources Information System
CHU	Critical Habitat Unit
CJUSD	Colton Joint Unified School District
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRS	Cultural Resources Specialist
CSC	California species of special concern
CTG	combustion turbine generator
CUPA	Certified Unified Program Agency
CVC	California Vehicle Code
CWA	Clean Water Act
dB	decibels
dBA	decibels, A-weighted
DC	direct current
DCS	distributed control system
DLE	dry low emissions

DLN	dry low-NO_x
DOF	Department of Finance
EAF	equivalent availability factor
EDBR	Economic Development Background Report
EDI	electro deionization
EDPSG	Economic Development/Public Services Group
EIR	Environmental Impact Review
EMF	electromagnetic field
EMWD	Eastern Municipal Water District
ERPG	Emergency Response Planning Guideline
ERPG-2	Maximum airborne concentration below which nearly all individuals could be exposed for up to 2 hours without developing irreversible or serious health effects
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FMMP	Farmland Mapping and Monitoring Program
g	gravity
g/m^2/year	grams per square meter per year
GO	General Order (of CPUC)
gpd	gallons per day
gpm	gallons per minute
GWh	gigawatt hours
HBGS	Huntington Beach Generating Station
HCP	Habitat Conservation Plan
HDD	horizontal directional drilling
HHV	higher heating value
HSP	Health and Safety Plan
Hz	hertz
I-215	Interstate 215
I/O	input/output

km	kilometer
kV	kilovolt
kV/m	kilovolts per meter
L_{90}	noise level that is exceeded during 90 percent of the measurement period
L_{eq}	equivalent noise level
L_n	percentile noise level
LO/TO	lock-out/tag-out
LORS	laws, ordinances, regulations, and standards
LOS	level of service
m	meter
mA	milliamperes
MEI	Maximum Exposed Individual
MEIR	Maximum Exposed Individual—Resident
MEIW	Maximum Exposed Individual—Worker
mG	milligauss
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mgd	million gallons per day
MLD	Most Likely Descendant
Mmax	maximum moment magnitude
MMBtu/hr	million British thermal units per hour
mph	miles per hour
MRZ	Mineral Resource Zone
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheets
MSHCP	Multi Species Habitat Conservation Plan
MUTCD	Manual of Uniform Traffic Control Devices
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission

NCCP	Natural Communities Conservation Plan
NFPA	National Fire Protection Association
NH_3	ammonia
NHPA	National Historic Preservation Act
NO_x	oxides of nitrogen
NPCA	Notice of Proposed Construction or Alteration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSCR	non-selective catalytic reduction
NWP	Nationwide Permit
O&M	operations and maintenance
OAC	Outdoor Adventures Center
OCA	offsite consequence analysis
OEHHA	Office of Environmental Health Hazard Assessment
OSD	Official Soil Descriptions
OSHA	Occupational Safety and Health Act
PAH	polycyclic aromatic hydrocarbons
PCS	plant control system
PEIR	Programmatic Environmental Impact Report
PGA	peak ground acceleration
PM_{10}	particulate matter less than 10 microns in equivalent diameter
PPE	personal protective equipment
ppm	parts per million
ppmvd	parts per million by volume, dry
PRC	Public Resources Code
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
RCRMC	Riverside County Regional Medical Center
REL	reference exposure level
RHWC	Riverside Highland Water Company

RI-TVI	radio interference and television interference
RIX	Rapid Infiltration and Extraction
RMP	Risk Management Plan
RO	reverse osmosis
ROG	reactive organic gases
ROW	right-of-way
RPA	Registered Professional Archaeologist
RTA	Riverside Transit Agency
RTP	Regional Transportation Plan
RUSLE2	Revised Universal Soil Loss Equation
RWQCB	Regional Water Quality Control Board
S&HC	Street and Highways Code
SAA	Streambed Alteration Agreement
SARI	Santa Ana Regional Interceptor
SAWPA	Santa Ana Watershed Project Authority
SBMWD	City of San Bernardino Municipal Water Department
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCR	selective catalytic reduction
SHPO	State Historic Preservation Officer
SLR	San Luis Rey
SMS	Safety Management System
SNA	Significant Natural Area
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxides
SoCalGas	Southern California Gas Company
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan

SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TMP	Traffic Management Plan
TSP	total suspended particulate matter
U2A	EC&C Technologies Incorporated Urea to Ammonia system
UCR	University of California at Riverside
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USNPS	U.S. Department of the Interior, National Park Service
VOC	volatile organic compound
WATCH	Work Area Traffic Control Handbook
WEAP	worker environmental awareness program
WEAT	worker environmental awareness training
WGCEP	Working Group on California Earthquake Potential
WMWD	Western Municipal Water District
WQCP	Water Quality Control Plant
WRP	Water Reclamation Plant
WWTP	Wastewater Treatment Plant

8.8 Socioeconomics

8.8.1 Introduction

This subsection discusses the environmental setting, regional and local impacts, and mitigation measures associated with the socioeconomic aspects of the AES Highgrove Project. Subsection 8.8.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to socioeconomics. Subsection 8.8.3 describes the environment that may be affected by construction and operation of the Highgrove Project. Subsection 8.8.4 identifies environmental impacts from development of the power plant, and Subsection 8.8.5 discusses cumulative impacts. Environmental Justice issues are discussed in Subsection 8.8.6. Mitigation measures are discussed in Subsection 8.8.7. Subsection 8.8.8 presents the agencies involved and provides agency contacts. Subsection 8.8.9 presents the required permits and permitting schedule. Subsection 8.8.10 provides references used to prepare this subsection.

The Project Site is located at 12700 Taylor Street in the City of Grand Terrace, San Bernardino County. It is the site of Southern California Edison's (SCE) former Highgrove Generating Station. The existing facility will be demolished, and development of the Highgrove Project will take place on the former Tank Farm Property. For this project, the region of influence is the San Bernardino and Riverside Counties.

Though the Project Site is in the City of Grand Terrace, the gas line corridor crosses unincorporated areas of Riverside County and the City of Riverside. Land use in the vicinity is irrigated and non-irrigated agricultural, light industry and warehousing, railroad tracks border the site on the east and west, and an irrigation canal runs along the west border. Rural residential uses and urban land uses are located to the north and west of the site.

8.8.2 Laws, Ordinances, Regulations, and Standards

A summary of the LORS applicable to the project and a reference to the subsection of this document addressing the project's conformance to them are presented in Table 8.8-1.

8.8.2.1 Federal

Civil Rights Act of 1964, Public Law 88-352, 78 Stat. 241 (codified as amended in various sections of 42 U.S.C.) Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national origin by all federal agencies or activities receiving federal financial assistance.

Executive Order 12898, "Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations," requires the U.S. Environmental Protection Agency (USEPA) and other federal agencies to identify and address whether adverse human health or environmental effects are likely to fall disproportionately on minority and/or low-income members of the community. Applies only to federal agencies, not agencies receiving federal funds.

TABLE 8.8-1
Laws, Ordinances, Regulations, and Standards Applicable to Socioeconomics

LORS	Purpose	Applicability	Conformance
Federal			
Civil Rights Act of 1964	Prohibits discrimination on the basis of race, color, or national origin.	Applies to all federal agencies and agencies receiving federal funds.	Subsection 8.8.6
Executive Order 12898	Avoid disproportionate impacts to minority and low-income members of the community.	Applies only to federal agencies. Does not apply to agencies receiving federal funds.	Subsection 8.8.6
State			
Government Code Sections 65996-65997	Establishes that the levy of a fee for construction of an industrial facility be considered mitigating impacts on school facilities.	Colton Joint Unified School District charges a one-time assessment fee to mitigate potential school impacts.	Subsection 8.8.7
Education Code Section 17620	Allows a school district to levy a fee against any construction within the boundaries of the district for the purpose of funding construction of school facilities.	Colton Joint Unified School District charges a one-time assessment fee to mitigate potential school impacts.	Subsection 8.8.7
Local			
San Bernardino County General Plan, Economic Development Background Report	To increase job creation through business expansion.	Encourages industry to locate in the County to create jobs	Subsections 8.8.2.3.1, 8.8.3.3, and 8.8.3.4

8.8.2.2 State

Government Code Sections 65996 and 65997 provides the exclusive methods of considering and mitigating impacts on school facilities that might occur as a result of the development of real property.

Education Code Section 17620, listed in Government Code Section 65997 as an approved mitigation method, allows school districts to levy a fee or other requirement against any construction within the boundaries of the school district for the purpose of funding construction of school facilities.

8.8.2.3 Local

8.8.2.3.1 San Bernardino County

San Bernardino County General Plan's (June 2005) Economic Development Background Report (EDBR), which was prepared as the basis for the Economic Development Element of the General Plan, calls for the promotion of infrastructure development that would result in increased employment through business expansion. The EDBR states that the Valley Planning Region (which includes the proposed Project Site) is just entering Stage 3 of the three-stage pattern of development. Stage 3 is where an area is capable of attracting high end workers and companies.

The Economic Development Sub-Group of the Economic Development/Public Services Group (EDPSG) is charged with providing comprehensive services and a variety of programs to attract new industry to the County. The ultimate goal of the EDPSG is to maximize employment opportunities and increase capital investment in the County.

Locating the Highgrove facility in San Bernardino County is consistent with these county goals.

8.8.2.3.2 Riverside County

The Riverside County General Plan (2003) does not have a specific economic development element.

8.8.2.3.3 City of Grand Terrace

The City of Grand Terrace General Plan (December 1988) does not have a specific economic development element.

8.8.3 Affected Environment

8.8.3.1 Population

San Bernardino County is bordered on the north by Inyo County, to the south by Riverside County, to the west by Los Angeles and Kern counties, and the east by the state of Arizona. There are 24 incorporated cities in San Bernardino County including Fontana, Ontario, Rancho Cucamonga, and San Bernardino.

During the 1990s, San Bernardino County's population increased at an average annual rate of 1.30 percent, while that of the City of Grand Terrace increased by 1.89 percent (California Department of Finance [DOF], 2005a). In both cases, the growth was greater in the second half of the decade than during the first half. The average annual growth rate for the 2000-2005 period was 1.3 percent for the City and 2.6 percent for the County. The county's growth rate during this period exceeded the State's (1.7 percent). San Bernardino County and California are expected to have their greatest population growth from 2000 to 2010. The City of Grand Terrace, with an estimated January 1, 2005, population of 12,392, is the third smallest city in the county. Historical population data for the City of Grand Terrace and San Bernardino County are summarized in Table 8.8-2. Annual average compounded population growth rates are summarized in Table 8.8-3.

TABLE 8.8-2
Historical and Projected Populations

Area	1990	1995	2000	2010(p)	2020(p)	2030(p)
City of Grand Terrace	10,946	12,200	11,626	N/A	N/A	N/A
San Bernardino County	1,418,380	1,573,900	1,709,434	2,133,377	2,456,089	2,762,307
Riverside County	1,170,413	1,355,571	1,553,902	2,165,148	2,675,648	3,180,411
California	29,758,213	31,617,000	33,871,648	39,246,767	43,851,741	48,110,671

Source: DOF, 2005a.
Note: Populations rounded to nearest 100.
(p) projected
N/A not available

TABLE 8.8-3
Historical and Projected Annual Average Compounded Population Growth Rates

Area	1990-1995 Percent	1995-2000 Percent	2000-2010 Percent	2010-2020 Percent	2020-2030 Percent
City of Grand Terrace	2.19	-0.96	N/A	N/A	N/A
San Bernardino County	2.10	1.67	2.24	1.42	1.18
Riverside County	2.98	2.77	3.37	2.14	1.74
California	1.22	1.39	1.48	1.12	0.93

Source: CH2M HILL
N/A = not available

Tables 8.8-2 and 8.8-3 also show the historical and projected population estimates and average annual growth rates in Riverside County. During the 1990s, Riverside County's population increased at an average annual rate of 2.8 percent, whereas the State of California grew at an annual rate of 1.0 percent. Based on population projections by the DOF, Riverside County and California are expected to have their greatest population growth from 2000 to 2010. Historically, the County's growth rate has been increasing at a slightly higher rate than that of the state. However, population growth in the future is expected to decline.

Tables 8.8-4 and 8.8-5 (provided at the end of this subsection) show the minority and Hispanic, as well as the low-income, distribution for the census tracts that are within a 6-mile radius of the Highgrove Project. The minority and income data are from the 2000 U.S. Census data. Of the overall total population within the 6-mile radius, approximately 67 percent are minority, 47 percent are of Hispanic origin[1], and 20 percent are low-income.

Of the 74 census tracts, only 20 have minority populations that are below 50 percent while about half (34) the tracts have Hispanic population distribution below 50 percent. With respect to income, only 2 of the census tracts have low income population distributions above 50 percent.

Using the 2000 census blocks to more accurately portray those within the 6-mile radius, the minority and Hispanic origin population remain approximately 67 and 47 percent, respectively. Similarly, using the 2000 census block groups to more accurately portray those within the 6-mile radius, the low-income population remains approximately 20 percent. (See Appendix 8.8A for more information on demographics at the smaller census block group and census block levels.)

Figures 8.8-1 and 8.8-2 (figures are located at the end of this subsection) show the percent distribution of minority and low-income populations by 2000 census blocks and census block groups within a 6-mile radius of the proposed Project Site.

[1] Hispanics or Latinos are those people who classified themselves in one of the specific Spanish, Hispanic, or Latino categories listed on the Census 2000 questionnaire—"Mexican, Mexican Am., Chicano," "Puerto Rican," or "Cuban"—as well as those who indicate that they are "other Spanish/Hispanic/Latino." People who identify their origin as "other Spanish/Hispanic/Latino" may be of any race. Thus, the percent Hispanic should not be added to percentages for racial (i.e., minority) categories.

8.8.3.2 Housing

As shown in Table 8.8-6, housing stock for San Bernardino County as of January 1, 2005, was 645,639 units. Single-family homes accounted for 480,059 units, multiple family dwellings accounted for 122,669 units, and mobile homes accounted for 42,911 units (DOF, 2005b). New housing authorizations for San Bernardino County in 2004 totaled 30,361 units; about 83 percent were single-family units and 17 percent were multi-family units. These authorizations were valued at $5,179 million (DOF, 2005c). The median sales price of existing single family homes in October 2005 in San Bernardino County was $394,840 (Business Wire, 2005). San Bernardino County's vacancy rate has improved a little between 1990 and 2005 (from 14.4 percent to 11.9 percent). Since the vacancy rate is higher than the federal standard of 5 percent, it indicates that housing within the County is not in short supply.

TABLE 8.8-6
Housing Estimates by City and County, January 1, 2005

Area	Total Units	Single Family	Multi-Family	Mobile Homes	Percent Vacant
City of Grand Terrace	4,495	3,075	1,170	250	5.3
San Bernardino County	645,639	480,059	122,669	42,911	11.9
Riverside County	690,075	491,488	115,058	83,529	13.31
California	12,945,237	8,345,494	4,018,486	581,257	5.9

Source: DOF, 2005b.

As of January 1, 2005, Riverside County had 690,075 housing units, of which 491,488 were single-family homes, 115,058 were multiple family homes and 83,529 were mobile homes (Table 8.8-6). The vacancy rate for Riverside County was 13.31 percent, a figure that is much higher than the federal standard of 5 percent. Thus, housing within the county is not in short supply.

The City of Grand Terrace has a vacancy rate that is slightly above the federal 5 percent standard. Thus, housing shortages are not a problem in San Bernardino County and Grand Terrace.

8.8.3.3 Economy and Employment

Between 1999 and 2004, employment in San Bernardino County increased by 95,100 jobs or about 18 percent. This 18 percent increase is about five times greater than California's net increase (3.6 percent) during that same period (California Employment Development Department [CEDD], 2005a). As shown in Table 8.8-7, construction, retail trade, services, and transportation, warehousing and utilities experienced the largest increases in employment. Although employment in construction increased substantially between 1999 and 2004, the contribution of this sector to the San Bernardino County economy remained relatively small, between 5 and 7 percent. Employment losses were experienced in the agriculture and the natural resources and mining sectors.

TABLE 8.8-7
Employment Distribution in San Bernardino County, 1999 to 2004

	1999		2004		1999-2004	
Industry	**Number of Employees**	**Employment Share (%)**	**Number of Employees**	**Employment Share (%)**	**Percentage Change (%)**	**Average Annual Compound Growth Rate (%)**
Agriculture	4,100	1	3,300	1	-20	-4.2
Natural resources, mining	800	0	700	0	-13	-2.6
Construction	28,000	5	41,100	7	47	8.0
Manufacturing	65,800	13	68,800	11	5	0.9
Wholesale trade	22,400	4	27,600	4	23	4.3
Retail trade	64,500	12	76,200	12	18	3.4
Transportation, warehousing, and utilities	34,600	7	40,800	7	18	3.4
Information	7,300	1	6,800	1	-7	-1.4
Financial activities	19,100	4	24,600	4	29	5.2
Services	167,200	32	209,600	34	25	4.6
Government	104,900	20	114,300	19	9	1.7
Total employment	**518,700**	**100**	**613,800**	**100**	**18**	**3.4**

Source: CEDD, 2005a.

San Bernardino County is in the Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA), which is comprised of the counties of Riverside and San Bernardino. Between 1999 and 2004, employment in the Riverside-San Bernardino-Ontario MSA increased by 208,500 jobs or about 22 percent. This 22 percent increase is almost six times greater than California's net increase (3.6 percent) during that same period (CEDD, 2005a). As shown in Table 8.8-8, agriculture and the natural resources and mining sectors were the only sectors that experienced a decline in employment. Although employment in construction increased substantially (55 percent) between 1999 and 2004, the contribution of this sector to the Riverside-San Bernardino-Ontario MSA only increased by two percentage points from 7 percent in 1999 to 9 percent in 2004.

TABLE 8.8-8
Employment Distribution in Riverside-San Bernardino-Ontario MSA, 1999 to 2004

	1999		2004		1999-2004	
Industry	**Number of Employees**	**Employment Share (%)**	**Number of Employees**	**Employment Share (%)**	**Percentage Change (%)**	**Average Annual Compound Growth Rate (%)**
Agriculture	21,300	2	18,800	2	-12	-2.5
Natural resources, mining	1,300	0	1,200	0	-8	-1.6
Construction	71,700	7	110,800	9	55	9.1
Manufacturing	115,300	12	120,000	10	4	0.8
Wholesale trade	34,900	4	44,400	4	27	4.9
Retail trade	121,800	13	151,800	13	25	4.5
Transportation, warehousing, and utilities	44,800	5	54,300	5	21	3.9
Information	12,800	1	13,800	1	8	1.5
Financial activities	34,800	4	45,300	4	30	5.4
Services	318,500	33	396,900	34	25	4.5
Government	183,100	19	211,500	18	16	2.9
Total employment	**960,300**	**100**	**1,168,800**	**100**	**22**	**4.0**

Source: CEDD, 2005a.

Table 8.8-9 provides more detail on the characteristics of the regional labor force. It shows 2004 employment data for Riverside-San Bernardino-Ontario MSA, San Bernardino County and the City of Grand Terrace compared to California. Riverside-San Bernardino-Ontario MSA, San Bernardino County and the City of Grand Terrace have unemployment rates that are lower than the state average. The unemployment rate in the City of Grand Terrace (3.0 percent) is one of the lowest in the state. CEDD does not project future unemployment rates.

TABLE 8.8-9
Employment Data, 2004

Area	Labor Force	Employment	Unemployment	Unemployment Rate (%)
City of Grand Terrace	7,300	7,100	200	3.0%
San Bernardino County	837,300	790,200	47,100	5.6%
Riverside-San Bernardino-Ontario MSA	1,647,900	1,554,000	93,900	5.7%
California	17,552,300	16,459,900	1,092,400	6.2%

Source: CEDD, 2005b.

8.8.3.4 Fiscal Resources

The local agencies with taxing power include San Bernardino County and the City of Grand Terrace. San Bernardino County's estimated summary of expenditures and revenues are presented in Table 8.8-10. The County's revenues have shown steady growth from year-to-year. From fiscal year (FY) 2003 to FY 2004, revenues grew 2.8 percent. From FY 2004 to FY 2005, the revenues continued to grow almost 7 percent (6.9 percent). The major source of revenues for the county are the Intergovernmental Revenues (about 60 percent), followed by Charges for Current Services (about 15 percent) and taxes (about 14 percent). Revenue from property taxes comprises about 7 percent of the County's total revenue.

TABLE 8.8-10
San Bernardino County Revenues and Expenditures by Fund ($ Thousands)

	FY 2003	FY 2004	FY 2005
Expenditures			
General fund	$1,742,443	$1,809,123	$1,869,999
Restricted general fund	$10,676	$28,997	$2,559
Transportation	$42,851	$39,863	$59,944
County Library	$11,698	$12,106	$11,599
Economic and community development	$25,072	$20,275	$40,455
Aging and adult services	$859	$844	$3,738
Job and employment services	$16,438	$14,451	$16,863
AB 75 Tobacco Tax Program	$3,608	$1,743	$1,756
Special aviation	$5,734	$2,849	$21,866
Local Law Enforcement Block Grant	$249	$250	$424
Sheriff's special projects	$12,413	$14,463	$18,121
Special transportation	$15,355	$12,664	$12,447
Headstart/preschool services	$37,310	$38,203	$38,940
Micrographic fees	$4,198	$5,638	$5,316
Capital improvements	$35,265	$17,902	$48,052
Assessor AB 818 project	$2,183	$2,174	$2,180
Drug forfeiture/hazardous waste awards	$5,678	$4,248	$4,862
Habitat Conservation Program	$5	$3	$0
Substance abuse and crime prevention	$5,902	$5,787	$6,004
AB 212 teacher stipends	$656	$608	$600
General Plan Update	$1,022	$1,048	$1,000
Regional Parks Prop 12 Project	$27	$416	$3,052
Regional Parks Prop 40 Project	$0	$213	$5,664
Museum special projects	$10	$56	$10

TABLE 8.8-10
San Bernardino County Revenues and Expenditures by Fund ($ Thousands)

	FY 2003	FY 2004	FY 2005
Mental Health Patient Fund	$1	-$4	$2
ARMC Telemedicine	$0	$0	$0
Registration fee projects	$112	$112	$130
Cajon Dump Site cleanup	$6	$82	$0
State bio-terrorism	$994	$2,272	$2,451
Central courthouse seismic retrofit	$1,065	$1,050	$1,050
Courthouse facilities - excess 25%	$1,118	$1,352	$1,270
Central courthouse - surcharge	$533	$1,127	$1,132
Tobacco settlement agreement	$21,931	$18,471	$18,596
Boating grant - Moabi Regional	$208	$2	$1,155
County trail system	$158	$3,117	$4,998
Forensic pathology grant	$0	$0	$0
Survey monument preservation	$111	$132	$125
County Fish and Game	$9	$17	$15
Off-highway vehicle license fees	$39	$44	$40
CALIFORNIA GRAZING FEES	$9	$158	$9
Birth and death certificate surcharge fees	$149	$148	$151
DUI/PC 1000 Program	$121	$106	$111
South Coast Air Quality Management District	$356	$446	$395
Benefits Administration charges	-$293	$942	$2,196
State - NNA Carryover Program	$2,263	$1,000	$1,525
Just/Muni Alcohol and Drug Prevention	$439	$385	$420
Domestic violence/child abuse	$489	$393	$167
Marriage License Fee Program	$296	$285	$137
Performance-based fines	$0	$0	$40
Federal Forest Reserve Title III	$66	$67	$65
Census 2000	$0	$0	$0
Disaster Recovery Fund	$0	$375	$0
Glen Helen Amphitheater	$909	$960	$1,133
Blockbuster Pavilion improvements	$30	$47	$30
Chino Open Space Project	$970	$971	$826
Juvenile Justice Program	$6,081	$5,313	$5,544

TABLE 8.8-10
San Bernardino County Revenues and Expenditures by Fund ($ Thousands)

	FY 2003	FY 2004	FY 2005
Vector Control Program	$1,542	$1,679	$1,700
County Redevelopment Agency	$7,596	$8,582	$7,496
Park maintenance and repairs	$1,120	$1,357	$180
Calico Marketing Services	$380	$364	$382
Total Expenditures	**$2,028,457**	**$2,085,275**	**$2,228,919**
Revenues			
Taxes	$269,822	$305,873	$315,655
Property taxes	$138,835	$153,114	$157,801
Sales taxes	$115,982	$132,389	$137,885
Other taxes	$15,005	$20,369	$19,968
Licenses, permits, and franchises	$16,623	$18,569	$20,497
Fines, forfeitures, and penalties	$14,403	$11,987	$11,692
Revenue from use of money and property	$32,694	$30,008	$31,842
Intergovernmental revenues	$1,268,626	$1,266,418	$1,366,877
Charges for current services	$292,256	$328,327	$335,484
Other revenues	$53,366	$43,756	$44,119
Other financing sources	$80,666	$80,336	$102,753
Total Revenue	**$2,028,457**	**$2,391,148**	**$2,544,574**

Source: San Bernardino County, 2006.
Numbers may not add up due to independent rounding.
[a] Not yet adopted.

As shown in Table 8.8-11, the General Fund revenue for the City of Grand Terrace has been growing steadily over the last few fiscal years. Although no particular revenue item has consistently been responsible for the observed growth during this period, taxes have continued to be the major contributor to the City's revenues. Tax revenues have averaged 27 percent of the City's General Fund revenues during the period shown in Table 8.8-11. Tax revenues from sales, property, and businesses contribute about 16 percent, 9 percent and 2 percent, respectively, of the overall General Fund revenues.

TABLE 8.8-11
City of Grand Terrace General Fund Revenues and Expenditures ($)

	FY 2002-2003	FY 2003-2004	FY 2004-2005	FY 2005-2006
Expenditures				
Salaries and benefits	1,708,546	1,864,574	1,971,417	2,089,231
Maintenance/supplies/contractual services	1,793,917	1,815,852	2,080,231	2,066,213
Revenue transfers out	29,537	34,907	27,825	32,222
Equipment purchases	88,375	100,918	27,212	23,628
Capital improvements and facilities maintenance	28,330	50,330	467,223	458,755
Lease payments	26,253	26,644	25,555	282,701
General fund contribution transfer	15,000	31,327	4,836	10,000
Aid/city grants - CDBG	15,863	79,254	0	0
To reserves	343,624	518,998	66,522	427,773
Total expenditures	**4,049,445**	**4,522,804**	**4,670,821**	**5,390,523**
Revenues				
Taxes	1,101,127	1,358,084	1,349,564	1,292,442
Taxes - property taxes	421,917	450,657	434,978	457,108
Taxes – business	91,686	92,875	94,433	91,915
Taxes – sales	587,524	814,552	820,153	743,419
Franchise tax	383,501	441,883	426,999	437,944
Licenses and permits	84,082	183,814	118,759	240,794
Fines, forfeitures, and penalties	21,008	23,560	29,031	26,526
Interest income	42,913	31,842	55,177	28,500
Rents and concessions	5,288	8,153	21,462	15,540
Intergovernmental	740,794	665,129	842,752	700,381
Service charges	914,282	986,871	1,046,906	1,051,818
Recoveries	5,200	5,203	5,200	5,200
Other revenues	145,212	88,525	100,520	364,823
Sale of property	0	8,600	3,995	490,000
Previous year fund balance and reserves	0	0	0	0
Indirect overhead cost transfers in	606,038	721,140	670,456	736,555
Total Revenue	**4,049,445**	**4,522,804**	**4,670,821**	**5,390,523**

Source: Ronnow, 2005.
Numbers may not add up due to independent rounding.

8.8.3.5 Education

There are a total of 33 elementary, high school, and unified school districts in San Bernardino County. The Project Site is within the boundaries of the Colton Joint Unified School District, which has a total of 28 elementary, middle and high schools. The closest schools to the Project Site include Grand Terrace Elementary School (12066 Vivienda Avenue), Terrace View Elementary School (22731 Grand Terrace Rd.) and Terrace Hills Middle School (22579 Deberry Street). Current, as well as historical, enrollment figures for the combined Colton Joint Unified School District (which includes the above three schools) are presented in Table 8.8-12. As shown in the table, the current enrollment levels for the School District have decreased by 135 students (or 0.5 percent) over the prior year while the combined enrollment in the four schools serving Grand Terrace have declined (about 2 percent, or 133 students) from what they were in the 2004-05 school year. Only the senior year (12th Grade) shows a significant increase in enrollment over the prior year. The School District has proposed to develop a new high school in the City of Grand Terrace, across Taylor Street from the project. Development of this high school will reduce overcrowding in the high school grades.

TABLE 8.8-12
Current and Projected Enrollment by Grade

	Colton Joint Unified School District			Grand Terrace ES, Terrace View ES, Terrace Hills MS, and Colton HS combined		
Grade Level	**Enrollment (2003-04)**	**Enrollment (2004-05)**	**Current Enrollment (2005-06)**	**Enrollment (2003-04)**	**Enrollment (2004-05)**	**Current Enrollment (2005-06)**
Kindergarten	1,878	1,867	1,817	206	189	162
First	1,957	2,002	1,939	229	224	201
Second	2,004	1,955	1,978	217	222	214
Third	2,033	2,001	1,895	236	227	213
Fourth	2,080	2,068	2,012	225	235	224
Fifth	2,117	2,091	2,077	221	228	234
Sixth	2,052	2,116	2,106	224	237	216
Seventh	2,012	2,040	2,031	531	562	519
Eighth	2,058	1,961	1,986	525	500	529
Ninth	2,048	1,963	1,827	955	957	945
Tenth	1,844	1,846	1,863	896	918	874
Eleventh	1,466	1,632	1,647	750	800	809
Twelfth	1,374	1,388	1,619	691	658	686
Ungraded	13	2	0	5	2	0
TOTAL	**24,936**	**24,932**	**24,797**	**5,911**	**5,959**	**5,826**

Source: Educational Data Partnership, 2006; Huntimer, 2006.
ES, MS, HS = Elementary School, Middle School, High School.

8.8.3.6 Public Services and Facilities

This subsection describes public services in the project area.

8.8.3.6.1 Law Enforcement

The San Bernardino County Sheriff's Office is headquartered at 655 East 3rd Street in San Bernardino. The proposed Project Site comes under the jurisdiction of the San Bernardino County Sheriff's Office. The Sheriff's Office is the contractor for all police services within the City of Grand Terrace.

The Sheriff's Office serves a number of small cities and the unincorporated areas in San Bernardino County, including the City of Grand Terrace. The Sheriff's Office has an office in the City of Grand Terrace and not a station. The Loma Linda or Central Station (both contacted through the main Sheriff's Office located at 3rd St. in San Bernardino) would respond to an emergency from the proposed Project Site. Response time to an emergency from the Project Site is expected to be 4 minutes or less (Guerra, 2005).

The California Highway Patrol is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation, and the management of hazardous materials spill incidents.

8.8.3.6.2 Fire Protection

The Project Site is within the San Bernardino County Fire Department jurisdiction since the City of Grand Terrace contracts with the San Bernardino County Fire Department. Fire Station No. 23, located at 22582 City Center Court in Grand Terrace is the nearest station to the Project Site. Station No. 23 has 1 fire engine, 1 brush engine, 1 heavy rescue truck and 1 squad truck (a pickup truck used for basic life support equipment). The station is manned by three shifts comprised of a captain and 2 firefighters. The nearest station that would come to the aid of Station No. 23 would be that from City of Colton Fire Department. Station No. 23 will respond to a call from the site in approximately 2 to 3 minutes (Sewel, 2006).

8.8.3.6.3 Emergency Response

In San Bernardino County the County Fire Department is the Certified Unified Program Agency. The response to emergency releases of hazardous material or waste is a combined County-wide effort between this Department and 20 other City and District departments who have all agreed to participate in what we call the San Bernardino County Inter-Agency Hazardous Materials Response Team. The entire interagency team consists of roughly 110 members (10 REHS and the rest firefighters) and is a full Level A response team, capable of handling all types of CBRN responses (including aqueous ammonia). The response time to an emergency call from the Project Site is approximately 30 minutes during business hours and about an hour after business hours (Ashbaker, 2005).

8.8.3.6.4 Hospitals

The closest hospital with an emergency room to the Project Site is the Riverside Community Hospital. The Riverside Community Hospital, located at 4445 Magnolia Avenue in Riverside, is a 300-bed hospital with over 400 physicians on staff and over 1,400 employees and is approximately 5 miles from the proposed Project Site. The emergency room at Riverside Community Hospital is designated as a Level II[2] trauma center that provides immediate, specialized care to accident victims and victims of sudden illness. Specialty

[2] Level II has 24-hour neuro/open heart/all other surgeries

services at the hospital include intensive care unit, emergency/trauma, labor and delivery, cardiac care, orthopedics, surgery, and transplant.

Riverside County Regional Medical Center (RCRMC) located at 26520 Cactus Avenue in Moreno Valley is about 18 miles from the proposed Project Site. RCRMC is a 364-bed hospital with single patient rooms and has the capacity to manage 200,000 patient visits in specialty outpatient clinics. There are approximately 1,700 employees and staff at the hospital. RCRMC has 60 specialty clinics on site, integrated with 10 primary outpatient community health clinics located geographically throughout the county. The specialty clinics include surgery, orthopedics, pediatrics, oncology, neurosurgery, infectious diseases, etc. RCRMC has a Level II Adult and Pediatric Emergency Room/Trauma Unit which has the capacity to manage 100,000 patient visits annually and is capable of handling most life threatening traumas. The facility also offers a helipad (located adjacent to the Trauma Center).

The other hospitals with emergency rooms are the Corona Regional Medical Center and the Corona Industrial Urgent Care in Corona (about 19 miles from the Project Site).

8.8.3.7 Utilities

This subsection describes utilities in the area.

8.8.3.7.1 Electricity and Gas

The project will interconnect to SCE's electrical distribution system via SCE's Highgrove Substation, which is located adjacent to the Project Site. Gas will be delivered by Southern California Gas Company (SoCalGas) from its distribution system. With the construction of a 7-mile gas line, SoCalGas will have adequate capacity to serve the project. Gas supply is described in Section 6.0.

8.8.3.7.2 Water and Wastewater

The potable water will be provided via a new pipeline approximately 1,300 feet long, (8 to 12 inches diameter) connecting to an existing Riverside Highland Water Company water main located in Taylor Street. The water supply is described further in Section 7.0.

Industrial wastewater will be sent to the Santa Ana Regional Interceptor brine line by truck transport for disposal.

8.8.3.7.3 Sewer

Sanitary wastewater will be discharged into the City's sewer main located on Taylor Street.

8.8.4 Environmental Analysis

This subsection assesses the potential environmental impacts of the project and linears.

8.8.4.1 Potential Environmental Impacts

Local environmental impacts were determined by comparing project demands during construction and operation with the socioeconomic resources of the project area (i.e., San Bernardino County). A proposed power generating facility could impact employment, population, housing, public services and utilities, and/or schools. Impacts could be local and/or regional, though most impacts would tend to be more regional than local. It is anticipated that the project will not have any significant adverse impacts on the socio-economic environment, but it will have significant socioeconomic benefits to the local community.

8.8.4.2 Significance Criteria

The criteria used to determine the significance of project-related socioeconomic impacts are as suggested in the California Environmental Quality Act (CEQA) Checklist. Project-related impacts are determined to be significant if they:

- Induce substantial growth or concentration of population
- Displace a large number of people or existing housing
- Result in substantial adverse environmental impacts associated with the provision of utility services
- Result in substantial adverse physical impacts associated with the provision of public services

Other impacts may be significant if they cause substantial change in community interaction patterns, social organization, social structures, or social institutions; substantial conflict with community attitudes, values, or perceptions; or substantial inequities in the distribution of project cost and benefit.

8.8.4.3 Construction Impacts

The project will include demolition of existing structures and construction of the new plant. Accordingly, the impacts of both construction and demolition are discussed in this application. Demolition is expected to occur during the first 5 month of the project with demolition only activities occurring in the first 3 months before actual construction commences. Actual construction will take place over approximately 14 months, from second quarter 2007 to second quarter 2008. Plant testing is planned to commence in the second quarter of 2008, and commercial operation is expected to commence by third quarter 2008.

8.8.4.3.1 Demolition and Construction Workforces

The primary trades in demand will include boilermakers, carpenters, electricians, ironworkers, laborers, millwrights, operators, and pipefitters. Table 8.8-13 provides an estimate of demolition and construction personnel requirements for the plant and linear facilities (including the potable water line). Total personnel requirements during demolition will be approximately 75 person-months, or 6.3 person-years. Total personnel requirements during construction will be approximately 1,005 person-months, or 84 person-years. Personnel requirements during demolition and construction will peak at approximately 147 workers in months 6 and 7 of the construction period. Average personnel per month is 77.

Available skilled labor in San Bernardino County was evaluated by surveying the Building and Trades Council (Table 8.8-14) and contacting CEDD (Table 8.8-15). Both sources show that the workforce in San Bernardino County will be adequate to fulfill the Highgrove Project's labor requirements for construction. Therefore, project construction will not place an undue burden on the local workforce. In addition, as shown in Tables 8.8-7 and 8.8-8, the construction workforce has been growing at average annual rate of 9 percent per year within the County and 10 percent per year within the Riverside-San Bernardino-Ontario MSA. Thus, if growth continues at this rate, the Highgrove Project is not likely to result in a significant construction impact.

TABLE 8.8-13
Plant Construction Personnel for by Discipline

Job Category	Months After Notice to Proceed														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**Totals**
Demolition															
Laborers	3	3	3	3	3										15
Operating Engineers	2	2	2	2	2										10
Teamsters	8	8	8	8	8										40
Total Manual Staff	13	13	13	13	13										65
Total Contractor Staff	2	2	2	2	2										10
Total Demolition Staff	**15**	**15**	**15**	**15**	**15**										**75**
Plant															
Insulation Workers				0	0	0	0	0	4	4	4	4	4	2	22
Boilermakers				0	0	0	6	6	6	6	6	6	0	0	36
Carpenters				4	6	8	8	10	8	8	8	6	4	0	70
Electricians				4	4	6	12	12	12	12	12	8	4	4	90
Ironworkers				4	8	8	8	6	4	4	4	4	0	0	50
Laborers				4	6	6	8	10	10	10	10	6	6	0	76
Millwrights				0	0	6	8	8	6	6	6	4	2	2	48
Operating Engineers				4	4	4	4	4	4	4	4	3	3	1	39
Painters				0	0	0	0	2	2	2	2	4	4	4	20
Pipefitters				2	4	6	8	8	10	10	10	8	8	4	78
Linemen				0	0	6	6	6	6	6	6	4	0	0	40
Craft Subtotal				22	32	50	68	72	72	72	72	57	35	17	569
Construction Manager				1	1	1	1	1	1	1	1	1	1	1	11

TABLE 8.8-13
Plant Construction Personnel for by Discipline

Job Category	Months After Notice to Proceed														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**Totals**
Field Engineer				2	2	3	3	3	3	3	3	3	3	2	30
Document Control Clerical				1	1	1	1	1	1	1	1	1	1	1	11
Commissioning Group				0	0	0	2	2	2	2	2	4	4	4	22
Staff Subtotal				4	4	5	7	7	7	7	7	9	9	8	74
Total Plant Staff				**26**	**36**	**55**	**75**	**79**	**79**	**79**	**79**	**66**	**44**	**25**	**643**
Natural Gas Pipeline															
Laborers				16	16	20	20	20	4						96
Operating Engineers				8	8	12	12	12	2						54
Painters				0	0	0	0	0	4						4
Pipefitters				16	16	20	20	20	4						96
Surveyors				4	4	4	4	0	0						16
Teamsters				8	8	8	8	8	4						44
Total Manual Staff				52	60	64	64	60	18						318
Total Contractor Staff				8	8	8	8	8	4						44
Total Gas Pipeline Staff				**60**	**68**	**72**	**72**	**68**	**22**						**362**
TOTAL WORKFORCE	**15**	**15**	**15**	**101**	**119**	**127**	**147**	**147**	**101**	**79**	**79**	**66**	**44**	**25**	**1,080**

TABLE 8.8-14
Labor Union Contacts

Labor Union	Contact	Phone Number
San Bernardino, Riverside Building Trades Council	Philip Eckert	(951) 684-1040

TABLE 8.8-15
Available Labor by Skill in Riverside and San Bernardino Counties, 2002 to 2012

Occupational Title	Annual Averages		Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
	2002	2012			
Carpenters	15,170	22,120	6,950	45.8	3.8
Cement Masons and Concrete Finishers	3,950	6,030	2,080	52.7	4.3
Painters, Construction and Maintenance	2,880	4,260	1,380	47.9	4.0
Sheet Metal Workers	2,980	3,930	950	31.9	2.8
Electricians	5,170	6,980	1,810	35.0	3.0
Welders, Cutters, Solderers and Brazers	3,200	4,210	1,010	31.6	2.8
Industrial Truck and Tractor Operators	8,170	11,550	3,380	41.4	3.5
Operating Engineers	4,330	5,450	1,120	25.9	2.3
Helpers, Laborers	4,080	5,610	1,530	37.5	3.2
Plumbers, Pipefitters, and Steamfitters	12,720	17,980	5,260	41.4	3.5
Administrative Services Managers	4,320	5,600	1,280	29.6	2.6
Mechanical Engineers	1,740	2,280	540	31.0	2.7
Electrical Engineers	940	1,100	160	17.0	1.6
Engineering Technicians	350	380	30	8.6	0.8
Plant and System Operators	2,580	3,600	1,020	39.5	3.4

Source: CEDD, 2005c.

8.8.4.3.2 Population Impacts

It is anticipated that most of the construction workforce will be drawn from the Inland Empire area (San Bernardino and Riverside Counties) as well as other counties in the southern California, if necessary. Most workers are expected to commute to the Project Site, and therefore will not contribute to an increase in the population of the area.

8.8.4.3.3 Housing Impacts

Most of the construction workforce will have to commute to the Project Site daily since there is only one hotel/motel within the City of Grand Terrace. However, there are 6,738 hotel/motel rooms in the Cities of Riverside and San Bernardino that are available to

accommodate workers from outside the area who may choose to commute to the Project Site on a workweek basis (Cates, 2006). The Cities of Riverside and San Bernardino are about 5 miles and 8 miles, respectively from the City of Grand Terrace. The average room rate in 2005 for these hotel/motel rooms in the cities of Riverside and San Bernardino was $68.70 per night and the occupancy rates for these hotels/motels was 71.1 percent. As a result, construction of the proposed project is not expected to increase the demand for housing in Grand Terrace.

8.8.4.3.4 Impacts to the Local Economy and Employment

The cost of materials and supplies (excluding the combustion turbine generators, heat recovery steam generators, and most other large equipment) required by the project is estimated at $180 million to $220 million (in 2005 dollars). The estimated value of materials and supplies that will be purchased locally during construction is $4 million to $8 million.

The Highgrove Project will provide about $12 million (in 2005 dollars) in construction payroll, at an average salary of $75 per hour (including benefits). The anticipated payroll for employees, as well as the purchase of materials and supplies during the construction period, will have a slight beneficial impact on the area. Assuming, conservatively, that 60 percent of the construction workforce will reside in San Bernardino County, it is expected that approximately $7.2 million will stay in the local area. These additional funds will cause a temporary beneficial impact by creating the potential for other employment opportunities for local workers in other service areas, such as transportation and retail.

Indirect and Induced Economic Impacts from Construction

Construction activity would result in secondary economic impacts (indirect and induced impacts) within San Bernardino County. Secondary employment effects would include indirect and induced employment due to the purchase of goods and services by firms involved with construction, and induced employment due to construction workers spending their income within the county. In addition to these secondary employment impacts, there are indirect and induced income effects arising from construction.

Indirect and induced impacts were estimated using an IMPLAN Input-Output model of San Bernardino County. IMPLAN is an economic modeling software program. The estimated indirect and induced employment within San Bernardino County would be 120 and 85 jobs, respectively. These additional jobs result from the $8[3] million in local construction expenditures as well as approximately $5.05 million in spending by local construction workers. The $5.05 million represents the disposable portion of the annual construction payroll (here assumed to be 70 percent of $7.21 million). Assuming an average direct construction employment of 77, the employment multiplier associated with the construction phase of the project is approximately 3.7 (i.e., [77 + 120 + 85]/77). This project construction phase employment multiplier is based on a Type SAM model.

Indirect and induced income impacts were estimated at $3,812,100 and $2,582,500, respectively. Assuming a total annual local construction expenditure (payroll, materials and supplies) of $14.06 million ($7.21 million in payroll + $6.86 million in materials and supplies), the project construction phase income multiplier based on a Type SAM model is approximately 1.5 (i.e., [$14,064,300 + $3,812,100 + $2,582,500]/$ 14,064,300).

[3] The $8 million was adjusted to an annual estimate since the construction duration exceeds a year and the IMPLAN I-O evaluates impacts on an annual basis. Thus, the $8 million in expenditures became $6.86 million ($8,000,000/(14/12)).

Assuming that annual local construction expenditures are $4 million instead of $8 million results in indirect and induced employment estimates within San Bernardino County of 60 and 70 jobs, respectively. Based on the same average construction employment of 77, the construction phase employment multiplier is approximately 2.7.

Indirect and induced income impacts based on the total annual construction expenditure of $10.64 million ($7.21 million in payroll + $3.43[4] million in materials and supplies) were estimated at $1,906,000 and $2,131,900, respectively. Based on these estimates, the construction phase income multiplier was estimated at 1.4.

8.8.4.3.5 Fiscal Impacts

The Highgrove Project's initial capital cost is estimated to be between $180 million and $220 million (in 2005 dollars). The estimated value of materials and supplies that will be purchased locally (within San Bernardino County) during construction is between $4 million and $8 million. The effect on fiscal resources during construction will be from sales taxes realized on equipment and materials purchased in the County and from sales taxes from expenditures. The sales tax rate in San Bernardino County is 7.75 percent (as of October 1, 2005). Of this, 6.25 percent goes to the state; 0.25 percent goes to the County; one percent goes to the place of sale; and 0.5 percent goes to the special districts (California Board of Education [BOE], 2005). The total local sales tax expected to be generated during construction is $310,000 to $620,000 (i.e., 7.75 percent of local sales).

8.8.4.3.6 Impacts on Education

The schools in the Colton Joint Unified School District are currently considered overcrowded and are expected to continue to be at or beyond capacity (Huntimer, 2006). If there are additional students, the school district will enroll them as required by law but there are no planned expansions or new constructions for the next two years that could ease the current congestion other than the proposed high school on Taylor and Main streets, across from the power plant.

Construction of the Highgrove Project will not cause significant population changes or housing impacts to the region. Most employees will commute to the site from areas within the County or from neighboring Riverside County, as opposed to relocating to the area. As a result, project construction will not cause any significant increase in demand for school services.

8.8.4.3.7 Impacts on Public Services and Facilities

The construction phases of the project may have minor impacts on police, fire, or hazardous materials handling resources. The Sheriff's department indicated that impacts during the construction phase of the project would be minimal (Guerra, 2005). The Fire Department doesn't anticipate any significant impacts during the construction phase of the project (Huddleston, 2006). Copies of the records of conversation with the Sheriff and Fire departments are included in Appendix 8.8B. Project construction is not expected to create significant adverse impacts on medical resources in the area since minor injuries could be treated at the Valley Riverside Community Hospital in Riverside or the Riverside County Regional Medical Center in Moreno Valley. Both of these facilities have trauma centers.

[4] The $4 million was adjusted to an annual estimate since the construction duration exceeds a year and the IMPLAN I-O evaluates impacts on an annual basis. Thus, the $4 million in expenditures became $3.43 million ($4,000,000/(14/12)).

8.8.4.3.8 Impacts on Utilities

Project construction will not make significant adverse demands on local water, sanitary sewer, electricity, or natural gas. Impacts will involve the extension of existing utility lines. Water requirements for construction are relatively insignificant. Given the number of workers and temporary duration of the construction period the impacts on the local sanitary sewer system would not be significant.

8.8.4.4 Operational Impacts

8.8.4.4.1 Operational Workforce

The proposed Highgrove Project is expected to begin commercial operation in June 2007. It is expected to employ up to 13 full-time employees. Anticipated job classifications are shown in Table 8.8-16. The entire permanent workforce is expected to commute from within San Bernardino County.

TABLE 8.8-16
Typical Plant Operation Workforce

Department	Personnel	Shift	Workdays
Operations	7 Operating Technicians 1 Instrument and Controls Technician	Rotating 12-hour shift, 2 operators per shift, 2 relief operators	6-7 days a week
Maintenance	2 Maintenance Technicians	Standard 8-hour days	5 days a week (Maintenance technicians will also work unscheduled days and hours as required [weekends])
Administration	3 Administrators (1 Plant Manager, 1 Assistant Plant Manager/Engineer, 1 Administrative Assistant)	Standard 8-hour days	5 days a week, with additional coverage as required

Facility employees will be drawn from the local workforce and from existing Applicant staff. Consequently, only a slight increase in population is anticipated as a result of this project. There will be no significant impact on local employment.

8.8.4.4.2 Population Impacts

Some of the operational workforce may be drawn from the local population. However, it is anticipated that most of the operational workforce will be drawn from the cities of Riverside and San Bernardino in San Bernardino County as well as parts of Riverside County or other neighboring counties.

8.8.4.4.3 Housing Impacts

Due to the few operations staff, significant impacts to housing are not anticipated. Hiring preferences will be given to workers living within the City of Grand Terrace and San Bernardino County, thus minimizing the need for new housing. Based on the housing vacancy data in Table 8.8-6, there are approximately 237 available housing units within the City limits. Thus, some employees who need to relocate could choose to live within the City

or within the County. Some may even want to have a new home built. However, the new demand for housing would not be significant.

8.8.4.4.4 Impacts to the Local Economy and Employment

The Highgrove Project will generate a small, permanent beneficial impact by creating employment opportunities for local workers through local expenditures for materials, such as office supplies and services. The average salary per operations employee is expected to be $80,000 per year, excluding benefits. For the assumed average of 13 full-time employees, this will result in an operation payroll of $1.04 million per year (in 2005 dollars). There will be an annual operations and maintenance budget of approximately $350,000 to $600,000 (in 2005 dollars), all of which is estimated to be spent locally, (i.e., within San Bernardino County). These additional jobs and spending will generate other employment opportunities and spending in the City of Grand Terrace and San Bernardino County area. The addition of 13 full-time jobs would not significantly reduce unemployment rates.

Indirect and induced Economic Impacts from Operation

The operation of the proposed project would result in indirect and induced economic impacts that would occur within San Bernardino County depending on the point of sale. These indirect and induced impacts represent permanent increases in the county's economic variables. The indirect and induced impacts would result from annual expenditures on payroll as well as those on operations and maintenance (O&M).

Estimated indirect and induced employment within San Bernardino County would be 2 and 9 permanent jobs, respectively. These additional 10 jobs result from the $1,640,000 ($1,040,000 in payroll, $600,000 million in operations and maintenance) in annual operational budget. The operational phase employment multiplier is estimated at 1.9 (i.e., [13 + 2 + 9]/13) and is based on a Type SAM multiplier.

Indirect and induced income impacts are estimated at $106,900 and $268,000, respectively. The income multiplier associated with the operational phase of the project is approximately 1.1 (i.e., [$1,640,000 + $106,900 + $268,000]/$1,640,000) and is based on a Type SAM model.

Assuming that annual local O&M expenditures are $350,000 instead of $600,000 results in indirect and induced employment estimates within San Bernardino County of 1 and 9 jobs, respectively. Based on the same average construction employment of 13, the operation phase employment multiplier is approximately 1.8.

Indirect and induced income impacts based on the total annual operations expenditure of $1,390,000 ($1,040,000 in payroll + $350,000 in operations and maintenance) were estimated at $62,340 and $257,470, respectively. Based on these estimates, the operation phase income multiplier was estimated at 1.3.

8.8.4.4.5 Fiscal Impacts

The annual operations and maintenance budget is expected to be approximately $350,000 to $600,000 (in 2005 dollars), all of which is assumed would be spent locally within San Bernardino County. As stated in the impacts to the economy subsection, the Highgrove Project will bring about $12 million in operational payroll to the region.

During operations, additional sales tax revenues will be obtained by the City of Grand Terrace and San Bernardino County. Increased payroll will be $12 million annually, and

additional O&M expenses spent locally will be approximately $350,000 to $600,000 annually. Based on the assumed local O&M expenditures of $350,000 to $600,000, the estimated sales taxes will be approximately between $27,125 and $46,500. Of this amount, the place of sale will receive between $3,500 and $6,000 in sales tax revenue.

The Highgrove Project is expected to bring both sales tax and property tax revenue to San Bernardino County. For power plants producing 50 megawatts (MW) or more, the California State Board of Equalization has jurisdiction over the valuation of a power-generating facility for property tax purposes. For power-generating facility producing less than 50 MW, the county has jurisdiction over the valuation (Endler, 2005). Because the Highgrove Project is a 300-MW power-generating facility, BOE will assess property value using the unitary roll. Assuming a capital cost of $180 million to $220 million, the assessed property tax value is estimated to be between $1.98 million to $2.24 million per year. Since the property taxes are collected at the city level, their disbursement is also at the city level.

The City will not realize the $1.98 million to $2.24 million in annual property tax revenue until construction is completed. About 80 percent (or 79.65 percent) of the property tax would go to the City of Grand Terrace Redevelopment Agency, 2.59 percent go to the County General Fund, 10.36 percent to schools, 3.09 percent goes to Special Districts, 4.06 percent goes to the city and the remaining 0.25 percent goes to County Library (Wright, 2006). Therefore, approximately $1,657,500 ($1.98 million * 0.8371[5]) to $2,025,800 ($2.24 million * 0.8371) will be paid to the City of Grand Terrace for use by the Redevelopment Agency and the City. (There are specific restrictions on the use of Redevelopment Agency funds). However, of this amount, about $80,400 to $98,300 will be paid into the City's general fund. In FY 2005-06, the City's general fund revenues were estimated at $5.4 million. Of this amount, $457,000 was in property tax. The addition of another $80,400 to $98,300 in property tax revenues represent about a 17 to 23 percent increase in the City's property tax revenues. Thus, the additional revenues would have a ***significant beneficial impact*** to the City.

During the latest fiscal year, 2004-05, the City Redevelopment Agency's gross total revenue was $5,386,918 (Ronnow, 2006). Therefore, the addition of about $2 million per year to the Redevelopment Agency would increase its gross revenue by more than one-third. Thus, the project would also have a ***significant beneficial impact*** upon the Redevelopment Agency.

8.8.4.4.6 Impacts on Education

The schools in the Colton Joint Unified School District are currently overcrowded. Even assuming that most of the 12 operational employees end up residing within the City of Grand Terrace, the Highgrove Project is not expected to create any significant adverse impacts to the local school system. Assuming an average family size of 3.30 persons per household for San Bernardino County (DOF, 2005b) would imply the addition of approximately 13 children to the local schools. This would constitute less than one (0.2) percent increase in school enrollment. In addition, current school enrollment is 135 students less than last year's enrollment, so the addition of 13 students will not cause enrollment levels to exceed historic levels. Although minor adverse impacts could occur, any development (industrial or residential) within the Colton Joint Unified School District boundaries is currently charged a

[5] 79.65% for the City Redevelopment Agency plus 4.06% for the City.

one-time assessment fee of $0.36 per square foot of principal building area (Huntimer, 2006). Based on 14,400 square feet of occupied structures, AES Highgrove, LLC, will pay $5,184 in school impact fees as full mitigation for potential school impacts.

8.8.4.4.7 Impacts on Public Services and Facilities

Project operations will not make significant demands on public services or facilities even if all of the 12 operational employees decide to reside in the City of Grand Terrace. The Sheriff's department did not express any concerns about needing increased services during plan operations (Guerra, 2005). Fire protection for the plant will be supplied by connection to the City's fire protection system, which is provided by the Riverside Highland Water Company The Fire Department does not anticipate any impacts to its services during plant operations (Huddleston, 2006). Copies of the records of conversation with the Sheriff and Fire departments are included in Appendix 8.8B. Project operations would not create significant adverse impacts on medical resources in the area due to the safety record of power plants and few operations staff.

8.8.4.4.8 Impacts on Utilities

Project operations will not have significant adverse demands on local water, sanitary sewer, electricity, or natural gas because adequate supply and capacity currently exist.

8.8.5 Cumulative Impacts

Cumulative socioeconomic impacts could occur if the construction schedules for additional large projects overlap creating a demand for construction workers that exceeds the capacity of the local labor force; thus, creating an influx of construction workers that would result in impacts to local housing, schools, and/or public services.

The Land Use section (Subsection 8.4) identifies the following projects planned for the City of Grand Terrace:

- The Outdoor Adventure Center, including Taylor Street widening and Commerce Way extension
- The planned high school across the street from the Project Site
- The Town Square Shopping Center on Barton between Canal Street and Michigan Avenue

In addition several projects were identified for Riverside City and County. The larger ones included the construction of two reservoirs, construction of the Riverside Energy Resource Center (a 96-MW power plant), and a multiple purpose building, office, and classroom space and to expand a convalescent hospital. No construction schedules were provided for any of the projects in the City or County of Riverside. However, it is known that the Riverside Energy Resource Center was recently completed with an expected on-line date of May 2006 (California Energy Commission, 2006).

Of those projects in the City of Grand Terrace, no schedule is provided for the Town Square Shopping Center. From discussions with the City of Grand Terrace, the Outdoor Adventures Center development is scheduled to begin construction in early 2007, and is expected to last approximately 2 years. The School District has indicated that construction of the high school is scheduled to begin by the end of summer 2006 and be open for instruction beginning fall

of 2008. The construction schedules of these two projects will overlap with the construction of the Highgrove Project. Although construction of the power plant will require some crafts that are not required by the other two projects, there are many crafts that will be required of all three developments such as plumbers, carpenters, electricians, painters, etc.

The Outdoor Adventures Center Specific Plan Environmental Impact Report (City of Grand Terrace, 2004) indicates that 965 jobs would be created during construction. The high school's Environmental Impact Report only mentions that "construction activities would generate an estimated 40 to 50 workers' trips per day" (Colton Joint Unified School District, 2005). Assuming two workers per vehicle, the high school construction would require 100 workers at peak. As shown in Table 8.8-13, AES Highgrove, LLC, predicts a peak workforce of 147 workers. Therefore, the combined workforce required for these three projects is 1,212 workers.

As shown in Tables 8.8-7 and 8.8-8, the 2004 construction workforce for San Bernardino and Riverside counties was 151,900 workers. The peak workforce for the three projects is expected to be 1,212 workers, or about 0.8 percent of the available workforce. Since construction of these three projects would require less than one percent of the construction workforce, their overlapping schedules will not create a cumulative impact.

8.8.6 Environmental Justice

President Clinton's Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations" was signed on February 11, 1994. The purpose of this Executive Order is to identify and address whether adverse human health or environmental effects are likely to fall disproportionately on minority and/or low-income members of the community.

The federal guidelines set forth a three-step screening process:

1. Identify which impacts of the project are high and adverse
2. Determine if minority or low-income populations exist within the high and adverse impact zones
3. Examine the spatial distribution of high and adverse impact areas to determine if these impacts are likely to fall disproportionately on the minority and/or low-income population

According to the guidelines established by USEPA to assist federal agencies to develop strategies to address this circumstance, a minority and/or low-income population exists if the minority and/or low-income population percentage of the affected area is 50 percent or more of the area's general population. The guidance suggests using two or three standard deviations above the mean as a quantitative measure of disparate effects.

A screening-level analysis of Environmental Justice is presented in Appendix 8.8A. According to that analysis, this project does not create high and adverse impacts. Therefore, there are no environmental impacts that are likely to fall disproportionately on minority and/or low-income members of the community.

8.8.7 Mitigation Measures

1. The Applicant will pay the one-time statutory development fee as required at the time of filing for an in-lieu building permit with the City, which would include school impact fees.

2. The Applicant will provide onsite security and work with local law enforcement to address the need for any additional support during the construction phase.

8.8.8 Involved Agencies and Agency Contacts

Table 8.8-17 provides a list of agencies and contact persons of potentially responsible agencies. Copies of records of conversation are provided in Appendix 8.8B.

TABLE 8.8-17
Agencies and Agency Contacts for Highgrove Project Socioeconomics

Agency	Contact/Title	Phone Number	Address
City of Grand Terrace	Larry Ronnow, Finance Director	(909) 430-2214	Grand Terrace City Hall 22795 Barton Road Grand Terrace, CA 92313
San Bernardino County Assessor's Office	Eric Endler Appraiser II	(909) 387-0194	172 West 3rd Street San Bernardino, CA 92415
San Bernardino County Auditor-Controller-Treasurer	Bob Wright Property Tax Manager, Property Tax Division	(909) 386-8829	222 West Hospitality Lane San Bernardino, CA 92415
Colton Joint Unified School District	Chella Huntimer, Admin. Assistant I, Facilities Planning and Construction Department	(909) 580-5000	1212 Valencia Drive Colton, CA 92324
San Bernardino County Sheriff's Department	Hector Guerra, Lieutenant	(909) 387-3545	655 E. 3rd Street San Bernardino, CA 92415
San Bernardino County Fire Department	Kevin Sewel, Firefighter	(909) 825-0221	22592 City Center Court Grand Terrace, CA 92392
San Bernardino County Fire Department	Mike Huddleston, Fire Prevention Supervisor	(909) 386-8411	620 South "E" Street San Bernardino, CA 92415
San Bernardino County Fire Department	Joe Ashbaker Supervisor, Emergency Response Unit	(909) 386-8401	San Bernardino County Fire Department Hazardous Materials Division 620 South "E" Street San Bernardino, CA 92415

8.8.9 Permits and Permitting Schedule

Permits dealing with the effects on public services are addressed as part of the building permit process. For example, school development fees are typically collected when the Applicant pays in-lieu building permit fees to the City. These permits are addressed in Table 8.4-4 in the Land Use section. No permits are required to comply with the socioeconomic impacts of the project.

8.8.10 References

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TABLE 8.8-4
Distribution of Minority and Hispanic Population by Census Tracts Within a 6-Mile Radius

Tract	Population	Non-Hispanic White	Minority	Percent Minority	Hispanic Origin	Percent Hispanic Origin
06065040302	6,484	3,336	3,148	48.6	2,220	34.2
06065040303	2,526	992	1,534	60.7	1,347	53.3
06071002603	17,896	3,484	14,412	80.5	10,233	57.2
06071002601	5,030	1,655	3,375	67.1	2,883	57.3
06065031200	6,504	3,651	2,853	43.9	2,128	32.7
06065030601	4,324	3,123	1,201	27.8	408	9.4
06065030602	3,478	2,659	819	23.5	384	11.0
06065042208	2,471	1,998	473	19.1	209	8.5
06065042207	2,561	1,905	656	25.6	260	10.2
06065042205	8,164	4,875	3,289	40.3	1,321	16.2
06065030800	6,402	3,971	2,431	38.0	1,662	26.0
06065040202	2,501	1,402	1,099	43.9	855	34.2
06065040201	4,356	1,744	2,612	60.0	2,077	47.7
06065040301	6,634	2,138	4,496	67.8	3,933	59.3
06065031100	4,638	2,988	1,650	35.6	1,015	21.9
06065030700	5,463	3,566	1,897	34.7	1,198	21.9
06065030300	4,845	2,138	2,707	55.9	1,789	36.9
06065040203	3,785	818	2,967	78.4	2,708	71.5
06065040204	3,508	474	3,034	86.5	2,605	74.3
06065030200	4,682	2,822	1,860	39.7	1,302	27.8
06065040100	8,005	2,266	5,739	71.7	4,675	58.4
06071003300	9,943	2,987	6,956	70.0	5,904	59.4
06065030603	2,841	2,359	482	17.0	266	9.4
06065030400	5,966	555	5,411	90.7	4,308	72.2
06065030501	4,529	531	3,998	88.3	2,614	57.7
06065030503	4,325	368	3,957	91.5	3,560	82.3
06065030100	7,907	2,514	5,393	68.2	4,385	55.5
06065030502	2,103	190	1,913	91.0	1,769	84.1
06065042206	5,190	2,785	2,405	46.3	768	14.8
06065042211	3,571	807	2,764	77.4	797	22.3
06065042202	1,626	467	1,159	71.3	367	22.6
06065042213	5,033	2,734	2,299	45.7	865	17.2

TABLE 8.8-4
Distribution of Minority and Hispanic Population by Census Tracts Within a 6-Mile Radius

Tract	Population	Non-Hispanic White	Minority	Percent Minority	Hispanic Origin	Percent Hispanic Origin
06065042209	3,124	1,164	1,960	62.7	1,091	34.9
06065042210	4,019	1,227	2,792	69.5	1,266	31.5
06065042300	5,903	2,077	3,826	64.8	3,104	52.6
06071004000	12,760	3,665	9,095	71.3	8,274	64.8
06071007106	3,979	2,281	1,698	42.7	1,178	29.6
06071007107	2,609	935	1,674	64.2	1,020	39.1
06071006900	2,929	153	2,776	94.8	2,532	86.4
06071006800	889	229	660	74.2	581	65.4
06071007000	7,150	985	6,165	86.2	5,667	79.3
06065042505	3,224	687	2,537	78.7	1,865	57.8
06065042212	6,218	2,620	3,598	57.9	1,905	30.6
06065042214	5,822	2,868	2,954	50.7	1,464	25.1
06065042409	3,230	1,188	2,042	63.2	1,228	38.0
06065042410	4,563	1,698	2,865	62.8	1,110	24.3
06071007104	4,085	2,630	1,455	35.6	830	20.3
06071007105	2,841	1,398	1,443	50.8	604	21.3
06071007108	2,064	694	1,370	66.4	589	28.5
06071007102	10,567	4,394	6,173	58.4	2,955	28.0
06071006000	1,523	216	1,307	85.8	994	65.3
06071007200	6,800	1,631	5,169	76.0	2,684	39.5
06071007301	12,160	4,998	7,162	58.9	2,796	23.0
06065042412	3,931	2,280	1,651	42.0	769	19.6
06071007302	7,987	4,171	3,816	47.8	865	10.8
06071007800	4,051	2,304	1,747	43.1	732	18.1
06071003403	3,656	1,241	2,415	66.1	2,137	58.5
06071003602	12,652	2,870	9,782	77.3	7,525	59.5
06071003501	13,569	2,380	11,189	82.5	7,695	56.7
06071003601	17,548	3,582	13,966	79.6	10,035	57.2
06071003700	3,362	725	2,637	78.4	2,055	61.1
06071003900	4,680	1,193	3,487	74.5	2,982	63.7
06071004401	3,700	924	2,776	75.0	2,135	57.7
06071003800	13,498	2,730	10,768	79.8	6,203	46.0

TABLE 8.8-4
Distribution of Minority and Hispanic Population by Census Tracts Within a 6-Mile Radius

Tract	Population	Non-Hispanic White	Minority	Percent Minority	Hispanic Origin	Percent Hispanic Origin
06071006600	12,546	2,159	10,387	82.8	9,226	73.5
06071004402	9,604	1,966	7,638	79.5	5,740	59.8
06071006700	4,065	481	3,584	88.2	3,450	84.9
06071004900	6,807	643	6,164	90.6	5,543	81.4
06071004300	8,313	793	7,520	90.5	5,203	62.6
06071005000	1,831	191	1,640	89.6	1,547	84.5
06071005700	1,188	352	836	70.4	498	41.9
06071005900	1,189	209	980	82.4	873	73.4
06071005800	3,538	424	3,114	88.0	2,272	64.2
06071006500	6,688	1,395	5,293	79.1	3,625	54.2
Total	**418,153**	**139,053**	**279,100**	**66.7**	**195,662**	**46.8**

Source: 2000 Census.

Note: Hispanics or Latinos are those people who classified themselves in one of the specific Spanish, Hispanic, or Latino categories listed on the Census 2000 questionnaire—"Mexican, Mexican Am., Chicano," "Puerto Rican," or "Cuban"—as well as those who indicate that they are "other Spanish/Hispanic/Latino." People who identify their origin as "other Spanish/Hispanic/Latino" may be of any race. Thus, the percent Hispanic should not be added to percentages for racial (i.e., minority) categories.

TABLE 8.8-5
Distribution of Low Income Population by Census Tracts Within a 6-Mile Radius

Tract	Total Population*	Income Below Poverty Level	Percent Low-Income
06065040302	6,410	435	6.8
06065040303	2,545	455	17.9
06071002603	17,842	1,337	7.5
06071002601	4,904	809	16.5
06065031200	6,257	720	11.5
06065030601	4,307	142	3.3
06065030602	3,293	299	9.1
06065042208	2,402	56	2.3
06065042207	2,472	69	2.8
06065042205	8,161	375	4.6
06065030800	6,392	765	12.0
06065040202	2,317	342	14.8
06065040201	4,411	733	16.6
06065040301	6,603	1,462	22.1
06065031100	4,418	404	9.1
06065030700	5,411	1,106	20.4
06065030300	3,670	1,278	34.8
06065040203	3,745	1,289	34.4
06065040204	3,454	1,234	35.7
06065030200	4,664	820	17.6
06065040100	7,813	1,508	19.3
06071003300	9,816	2,337	23.8
06065030603	2,983	177	5.9
06065030400	5,944	1,744	29.3
06065030501	4,432	1,566	35.3
06065030503	4,325	1,760	40.7
06065030100	7,859	1,503	19.1
06065030502	2,028	679	33.5
06065042206	5,186	1,069	20.6
06065042211	3,571	2,400	67.2
06065042202	653	198	30.3
06065042213	4,022	570	14.2

TABLE 8.8-5
Distribution of Low Income Population by Census Tracts Within a 6-Mile Radius

Tract	Total Population*	Income Below Poverty Level	Percent Low-Income
06065042209	2,993	952	31.8
06065042210	4,045	1,409	34.8
06065042300	6,029	1,456	24.1
06071004000	12,653	3,225	25.5
06071007106	3,941	205	5.2
06071007107	2,511	486	19.4
06071006900	2,937	905	30.8
06071006800	856	262	30.6
06071007000	7,123	2,210	31.0
06065042505	3,201	1,096	34.2
06065042212	6,230	452	7.3
06065042214	5,806	325	5.6
06065042409	3,144	347	11.0
06065042410	4,543	133	2.9
06071007104	4,035	163	4.0
06071007105	2,862	210	7.3
06071007108	2,127	316	14.9
06071007102	10,326	1,497	14.5
06071006000	1,587	348	21.9
06071007200	6,683	1,720	25.7
06071007301	11,916	2,663	22.3
06065042412	3,810	200	5.2
06071007302	7,698	416	5.4
06071007800	4,051	417	10.3
06071003403	3,656	516	14.1
06071003602	12,556	1,763	14.0
06071003501	13,476	2,580	19.1
06071003601	17,226	3,441	20.0
06071003700	3,253	847	26.0
06071003900	4,651	570	12.3
06071004401	3,700	716	19.4
06071003800	13,344	2,472	18.5

TABLE 8.8-5
Distribution of Low Income Population by Census Tracts Within a 6-Mile Radius

Tract	Total Population*	Income Below Poverty Level	Percent Low-Income
06071006600	12,478	2,308	18.5
06071004402	9,497	1,930	20.3
06071006700	4,040	623	15.4
06071004900	6,774	2,572	38.0
06071004300	8,232	1,933	23.5
06071005000	1,782	481	27.0
06071005700	1,147	459	40.0
06071005900	1,142	488	42.7
06071005800	3,476	1,904	54.8
06071006500	5,751	2,392	41.6
Total	**409,598**	**79,049**	**19.3**

Source: 2000 Census.
* Population numbers are only those for whom poverty was determined and exclude full-time college students.

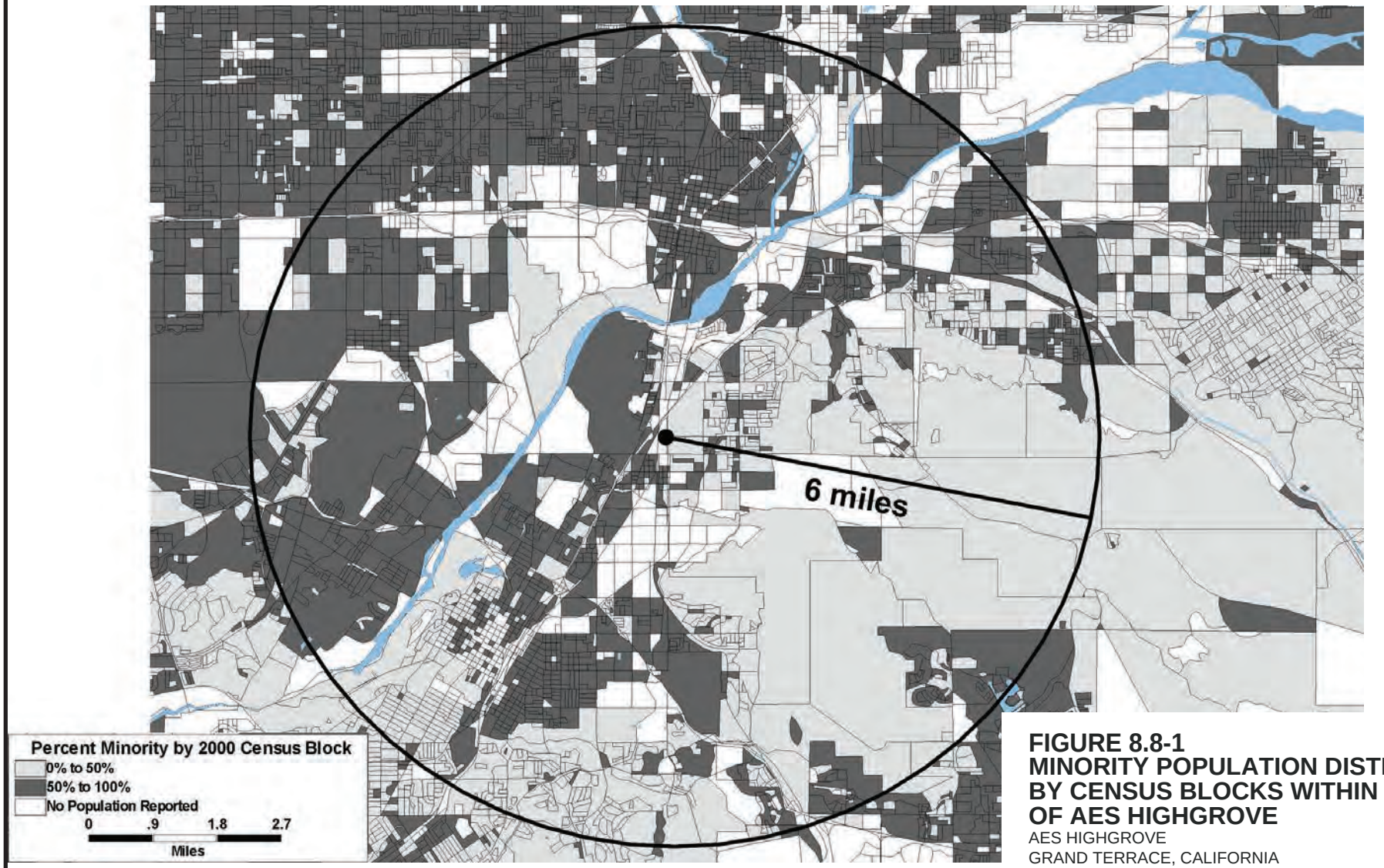

FIGURE 8.8-1
MINORITY POPULATION DISTRIBUTION BY CENSUS BLOCKS WITHIN 6 MILES OF AES HIGHGROVE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

WB022006009SAC figure_8_8_1.ai 05-18-06 tdaus

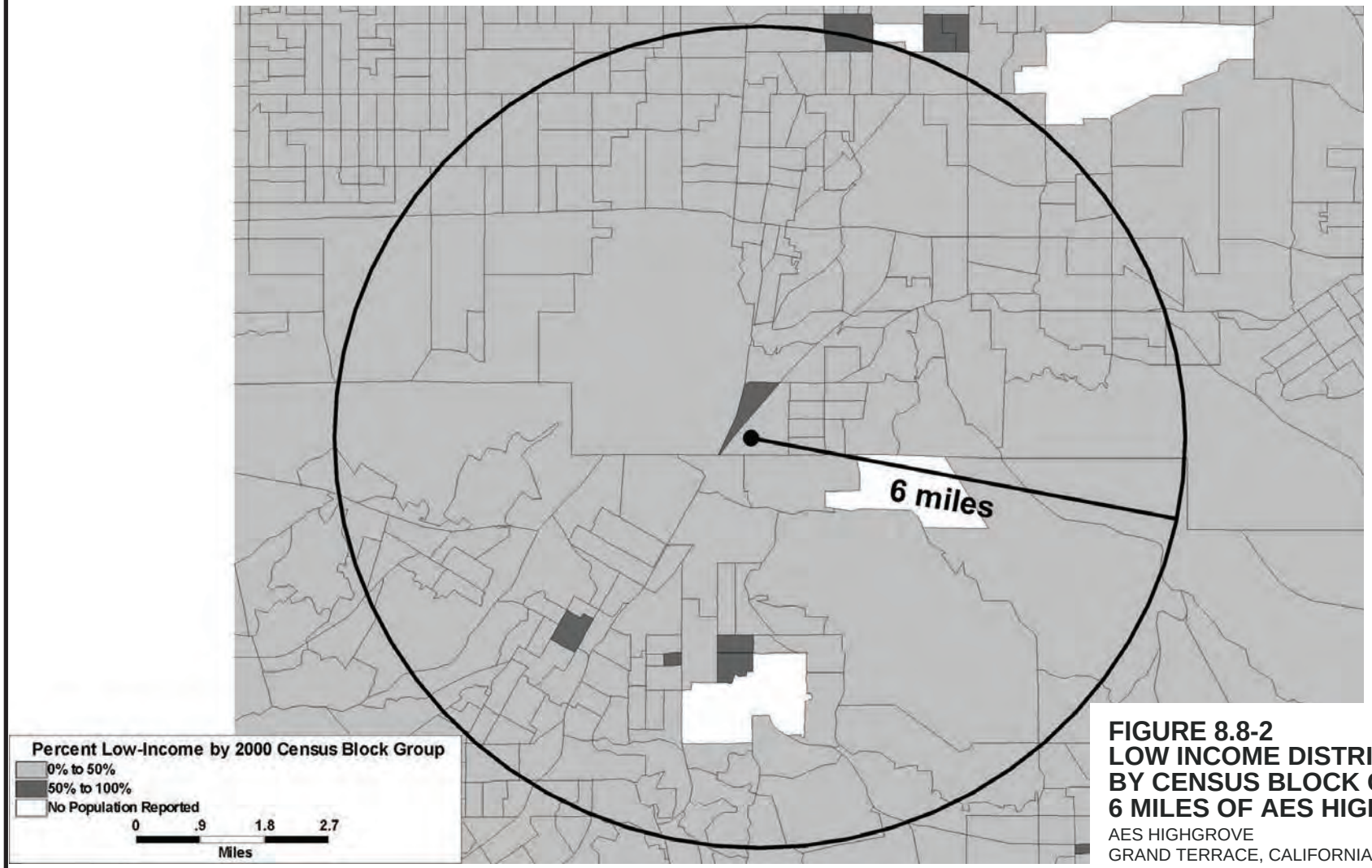

FIGURE 8.8-2
LOW INCOME DISTRIBUTION BY CENSUS BLOCK GROUPS WITHIN 6 MILES OF AES HIGHGROVE

AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

WB022006009SAC figure_8_8_2.ai 05-11-06 tdaus

8.9 Agriculture and Soils

8.9.1 Introduction

This subsection describes the potential environmental effects on agriculture and soils from the proposed AES Highgrove Project. Potential impacts are assessed for the site construction and operation. Existing onsite groundwater wells will be used to provide process and cooling water. Process water will be disposed of offsite. A potable water line exists within Taylor Street on the eastern boundary of the site and connection to that line would serve as a backup water source. Connections for overhead power transmission lines would require approximately 600 feet of new 115-kV transmission line with the new towers being constructed onsite. Natural gas service would be supplied by a proposed 7-mile natural gas supply pipeline extending from the western side of the power plant site southward into Riverside County.

Subsection 8.9.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to agriculture and soils. Subsection 8.9.3 describes the existing environment that could be affected, including agricultural use and soil types. Subsection 8.9.4 identifies potential environmental effects, if any, from project development, and Subsection 8.9.5 presents mitigation measures. Subsection 8.9.6 describes the required permits and provides agency contacts. Subsection 8.9.7 provides the references used to develop this subsection.

8.9.2 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local LORS applicable to agriculture and soils are discussed below and summarized in Table 8.9-1.

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards Applicable to Agricultural and Soil Resources

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Section Explaining Conformance)
Federal	Federal Water Pollution Control Act of 1972: Clean Water Act of 1977 (including 1987 amendments).	Regulates stormwater discharge from construction and industrial activities	RWQCB – Central Valley Region under State Water Resources Control Board	Subsections 8.9.2.1 and 8.9.4.2.
Federal	Natural Resources Conservation Service (1983), *National Engineering Handbook*, Sections 2 and 3.	Standards for soil conservation	Natural Resources Conservation Service	Subsections 8.9.2.1 and 8.9.5.
State	Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code 13260-13269: 23 CCR Chapter 9.	Regulates stormwater discharge	California Energy Commission (CEC) and the Central Valley Region under State Water Resources Control Board	Subsections 8.9.2.2 and 8.9.4.2.

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards Applicable to Agricultural and Soil Resources

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Section Explaining Conformance)
Local	Zoning Code, Title 18 of the City of Grand Terrace Municipal Code, August 2001.	Describes land use designations and associated municipal codes including Agricultural Overlay Districts	City of Grand Terrace Planning and Community Development	Subsection 8.9.2.3.
Local	City of Grand Terrace Municipal Code	Regulates grading, erosion and sediment control for construction projects within City limits	City of Grand Terrace Planning and Community Development; Building and Safety; Engineering	Subsection 8.9.2.3.
Local	San Bernardino County Development Code, 1990	Describes local policies for agricultural and soil resources in unincorporated portions of county	Planning Commission Board of Supervisors Planning Department Agricultural Commissioner	Subsection 8.9.2.3.
Local	California Land Conservation (Williamson) Act of 1965	Provides financial incentives for conservation of agricultural lands	County Assessor Planning Department Planning Commission Board of Supervisors	Subsection 8.9.2.3.
Local	Riverside County Ordinance 457	Describes requirements for grading and encroachment permits	Building and Safety Department	Subsection 8.9.2.3.
Local	City of Riverside Municipal Code: Title 13 (Streets and Sidewalks); Title 14 (Public Utilities); and Title 17 (Grading)	Describes requirements for encroachment and utility easements, street opening permits, and general and specific permits	Planning Department and Public Works Department	Subsection 8.9.2.3.

8.9.2.1 Federal

8.9.2.1.1 Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977 The Federal Water Pollution Control Act of 1972, commonly referred to as the Clean Water Act (CWA) following amendment in 1977, establishes requirements for discharges of stormwater or waste water from any point source that would affect the beneficial uses of waters of the United States. The State Water Resources Control Board adopted one statewide National Pollution Discharge Elimination System (NPDES) General Permit that would apply to storm water discharges associated with construction, industrial, and municipal activities. The Regional Water Quality Control Board (RWQCB) is the administering agency for the NPDES permit program. The CWA's primary effect on agriculture and soils within the project area consist of control of soil erosion and sedimentation during construction, including the preparation and execution of erosion and sedimentation control plans and measures for any soil disturbance during construction.

8.9.2.1.2 USDA Engineering Standards The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), *National Engineering Handbook*, 1983, Sections 2 and 3 provide standards for soil conservation during planning, design, and construction activities. The project would need to conform to these standards during grading and construction to limit soil erosion.

8.9.2.2 State

8.9.2.2.1 California Porter-Cologne Water Quality Control Act The California Water Code requires protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The discharge of soil into surface waters resulting from land disturbance may require filing a report of waste discharge (see Water Code Section 13260a).

8.9.2.3 Local

The City of Grand Terrace has established an ordinance for grading, erosion, and sediment control. This ordinance establishes permitting requirements and exemptions for general earthwork operations, sediment transport, and erosion control activities that can cause the discharge of pollutants into stormwater systems or watercourses.

The San Bernardino County General Plan and Development Code include elements describing policies and goals pertaining to agricultural land and conversion issues. These regulations do not apply to the Highgrove Project because the site and linear facilities (except the gas line) are within the incorporated portions of the City of Grand Terrace. Furthermore, the existing site is a former power plant and the proposed offsite linear features would not require any conversion of agricultural lands that would affect properties currently under a Williamson Act agreement.

The Riverside County Building and Safety Department is the lead agency for grading permits and for encroachment permits within Riverside County. Project plans are reviewed within the Building and Safety Department for approval of the grading permit (Yonos, 2005; Chan, 2005). When the projects may affect public rights-of-way, the project plans are forwarded to the Transportation and Land Management Department for review and approval of the encroachment permit (Yonos, 2005; Fletcher, 2005).

The City of Riverside Planning Department and Public Works Departments are the lead agencies for grading, street opening, and encroachment permits within the city. Project plans are reviewed within both of these departments, which are responsible for permit approvals. Decisions about whether a General Permit or Specific Permit are required are based on a review of the plans by the City Surveyor, who determines which city-owned facilities might be impacted (Young, 2005).

8.9.3 Environmental Setting

The Project Site is located within the City of Grand Terrace in an urban area that is zoned for Industrial use [M2] and has been mostly developed for commercial/light industrial uses. The Project Site is located between two rail lines, the Burlington Northern Santa Fe Railway (BNSF) to the west and the Union Pacific Railroad (UPRR) to the east. The property is bounded on the south by the Cage Park Property (a private park owned by AES Highgrove, LLC); on the west by theBNSF RR; on the east by Taylor Street, and on the north by land adjacent to Interstate 215 (I-215). The Project Site is the site of Southern California Edison's (SCE's) former Highgrove Generating Station, and consists of approximately 17.7 acres, as further described in Section 2, Project Description. The project will include demolition of the existing generation equipment and construction of the new facility. The new facility will be constructed on a parcel north of the generating equipment that once contained fuel oil tanks used for storage of fuel ("Tank Farm Property"). The 9.8 acre parcel on which the new facility will be constructed will comprise the Tank Farm Property and a small portion of land from the Generating Station Property (upon completion of a parcel split and lot-line adjustment).

An open drainage ditch located near the northern boundary of the Tank Farm Property conveys ephemeral or seasonal water flows from a culvert beneath Taylor Street and discharges to manhole #6, which drains to a tributary of the Santa Ana River.

The Highgrove Generating Station site includes four existing operational water supply wells. SCE owns a 3.1-acre electrical switchyard adjacent to the Project Site to which the new power plant would connect through approximately 600 feet of new 115-kV overhead transmission line. A potable water main is located about 1,300 feet south of the site in Main Street and would serve as a backup water source in addition to supplying domestic water needs and fire suppression. Natural gas will be supplied by an approximately 7-mile-long, 12-inch-diameter natural gas pipeline that would extend from the west side of the plant south into Riverside County. Because the gas line route will following existing roadways or other developed rights-of-way, the proposed project will not affect agricultural lands in the project area.

Agricultural land currently exists just east and northeast of the proposed site and extends approximately 800 feet north of the site to Van Buren Street and approximately 1,500 feet eastward to developed urban areas of Grand Terrace. These agricultural fields, currently used for row crop production, are not zoned as part of the Agricultural Overlay District of San Bernardino County and will be part of a proposed high school development plan for the properties along the east side of Taylor Street across from the Project Site. More information on the proposed high school is provided in Subsection 8.4, Land Use. Soil survey mapping units characterizing the types and distribution of soils within the project area, as shown on Figure 8.9-1, are taken from the Soil Survey of San Bernardino County, Southwestern Part,

California (NRCS, 1980) and Soil Survey of Western Riverside Area, California (NRCS, 1971). The electronic shape files for these mapping units were downloaded from the NRCS web site. Detailed soil descriptions were developed from the soil survey publications (NRCS, 1971, 1980) and from the Official Soil Descriptions (OSD) web page (NRCS, 2005). Important farmland designations for the soil mapping units were taken from the Soil Candidate Listings for San Bernardino and Riverside counties from the Farmland Mapping and Monitoring Program (California Department of Conservation [CDC] 2005a, 2005b, 1995).

Data for the affected environment are summarized and presented below:

- Soil types within 1 mile of the site boundaries are identified in Figure 8.9-1. Soil types along the proposed natural gas supply pipeline are identified in Figure 8.9-2.
- Table 8.9-2 summarizes the characteristics of each of the individual soil mapping units identified on Figures 8.9-1 and 8.9-2. The table summarizes depth, texture, drainage, permeability, erosion hazard rating, land capability classification, and fertility as an indicator of its revegetation potential.
- Figures 8.9-3 and 8.9-4 show "Important Farmlands" as defined by the CDC (CDC, 2002) within 1mile of the site boundaries and along the proposed natural gas supply pipeline. The farmland mapping designated specific areas as follows: Prime Farmland; Farmland of Statewide Importance; Unique Farmland, Farmlands of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land.
- Soil series designated as "Prime Farmland" (or Farmland of Statewide Importance) are also listed in Table 8.9-2.

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
San Bernardino County Soil Mapping Units (NRCS, 1980)	
GtC	**Greenfield sandy loam – slope class (2 to 9%)** • Prime Farmland • Well drained • Deep soils, gently sloping to moderately sloping • Formed on alluvial fans in moderately coarse textured granitic alluvium • Sandy loam surface, subsoil, and substratum • Permeability is moderately rapid (2.0 to 6.0 inches/hour) • Runoff is medium • Water erosion hazard is moderate if soil is unprotected • Soils are slightly acidic in surface and subsoil and neutral in substratum • Low shrink-swell potential • Capability Class IIe-1 irrigated • Taxonomic class: Coarse-loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 1,200 to 3,400 feet

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
HaC	**Hanford coarse sandy loam – slope class (2 to 9%)** • Prime Farmland • Well drained • Deep soils, gently sloping to moderately sloping • Formed on alluvial fans in recent granitic alluvium • Sandy loam surface, subsurface, and substratum • Permeability is moderately rapid (2.0 to 6.0 inches/hour) • Runoff is slow • Water erosion hazard is slight if soil is unprotected • Soils are slightly acidic to neutral throughout • Low shrink-swell potential • Capability Class IIe-1 irrigated • Taxonomic class: Coarse-loamy, mixed, non-acid, thermic Typic Xerorthents • Elevation range from 1,000 to 1,800 feet
HaD	**Hanford coarse sandy loam – slope class (9 to 15%)** Similar characteristics as noted above with the following differences: • Farmland of Statewide Importance • Strongly sloping soils on fans and terraces with short side slopes • Runoff is medium • Water erosion hazard is medium to high if soil is unprotected • Capability Class IIIe-1 irrigated
MoC	**Monserate sandy loam – slope class (2 to 9%)** The Project Site is located entirely within this soil mapping unit. • Farmland of Statewide Importance • Moderately well drained • Deep soils, gently sloping to moderately sloping • Formed in granitic alluvium on alluvial fans and terraces • Sandy loam surface and clay subsoil over indurated hardpan underlain by a coarse sandy loam substratum • Permeability is moderately slow in surface and substratum (2.0 to 6.0 inches/hour), slow in subsoil (0.2 to 0.6 inch/hour); very slow in hardpan (<0.06 inch/hour) • Runoff is medium • Water erosion hazard is slight to moderate if soil is unprotected • Soils are slightly acidic in surface, neutral in subsoil, and slightly alkaline below • Low shrink-swell potential in surface and substratum; moderate in subsoil • Capability Class IIIe-8 irrigated • Taxonomic class: Fine loamy, mixed, thermic Typic Durixeralfs • Elevation range from 800 to 1,200 feet

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
RmC	**Ramona sandy loam - slope class (2 to 9%)** • Prime Farmland • Well drained • Deep soils, gently sloping to moderately sloping • Formed in granitic alluvium on alluvial fans and terraces • Sandy loam surface over loam/clay loam subsoil and sandy loam substratum • Permeability is moderately slow (2.0 to 6.0 inches/hour in surface and substratum and 0.2 to 0.6 inch/hour in subsoil) • Runoff is medium • Water erosion hazard is moderate if soil is unprotected • Soils are slightly acidic in surface and neutral below • Low shrink-swell potential in surface and substratum; moderate in subsoil • Capability Class IIe-1 irrigated • Taxonomic class: Fine loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 1,000 to 3,000 feet
ShF	**Saugus sandy loam – slope class (30 to 50%)** The gas supply pipeline within Grand Terrace passes through this soil mapping unit. • Not listed as an Important Farmland soil • Well drained • Deep soils, steeply sloped • Formed on uplands in weakly consolidated sediment • Sandy loam surface and loam subsurface over weakly consolidated sediment in substratum • Permeability is moderate in surface (2.0 to 6.0 inches/hour) and slow in subsoil (0.6 to 2.0 inches/hour) • Runoff is rapid • Water erosion hazard is moderate to high if soil is unprotected • Soils are neutral in surface and slightly acidic below • Low shrink-swell potential in surface and moderate in subsoil • Capability Class VIIe-1 dryland • Taxonomic class: Coarse-loamy, mixed, non-acid, thermic Typic Xerorthents • Elevation range from 1,200 to 2,500 feet
Vr	**Vista-Rock outcrop complex – slope class (30 to 50%)** Soil properties given below pertain to the Vista series • Not listed as an Important Farmland soil • Well drained • Shallow to moderately deep soils over granitic rock, steeply sloped • Formed on upland foothills in material weathered from granitic rock • Sandy loam surface and subsoil over decomposed granitic subsurface • Permeability is moderately rapid (2.0 to 6.0 inches/hours) • Runoff is medium to rapid • Water erosion hazard is moderate • Slightly acidic surface soils becoming neutral with increasing depth • Low shrink-swell potential • Capability class VIIe-1 dryland • Taxonomic class: Coarse-loamy, mixed, superactive, thermic, Typic Haploxerepts • Elevation range from 1,200 to 3,500 feet

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
Riverside County Soil Mapping Units (NRCS, 1971)	
Note: All the following soil mapping units are along the proposed natural gas supply pipeline route.	
AoA	**Arlington fine sandy loam, deep – slope class (0 to 2%)** • Prime Farmland • Well drained • Deep soils over a weakly cemented layer • Formed on alluvial fans and terraces in alluvium dominantly from granitic rocks • Fine sandy loam surface and subsurface over weakly cemented alluvium substratum • Permeability is slow • Runoff is slow • Water erosion hazard is slight • Natural fertility is moderate • Slightly acidic to mildly alkaline surface; neutral to mildly alkaline subsoil and substratum • Capability Class IIs-8 irrigated • Taxonomic class: Coarse-loamy, mixed, thermic Haplic Durixeralfs • Elevation range from 500 to 2,000 feet
AoC	**Arlington fine sandy loam, deep – slope class (2 to 8%)** Similar characteristics as noted above with the following differences: • Also a Prime Farmland soil • Runoff is medium • Water erosion hazard is moderate • Capability Class IIIe-1 irrigated
ApB	**Arlington loam, deep, slope class (0 to 5%)** Similar characteristics as noted above with the following differences: • Farmland of Statewide Importance • Loamy surface texture • Runoff is slow to medium • Water erosion hazard is slight to moderate • Capability Class IIIe-8 irrigated
ArB	**Arlington loam, deep, slope class (5 to 15%)** Similar characteristics as noted above with the following differences: • Prime Farmland • Capability Class IIe-1 irrigated • Water erosion hazard is slight to moderate
ArD	**Arlington loam, deep, slope class (5 to 15%)** Similar characteristics as noted above with the following differences: • Not listed as an Important Farmland soil • Runoff is medium • Water erosion hazard is moderate

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
BuC2	**Buren fine sandy loam, eroded – slope class (2 to 8%)** • Farmland of Statewide Importance • Moderately well drained • Moderately deep soils over a weakly cemented pan layer • Formed on alluvial fans and terraces in alluvium from mixed sources • Sandy loam surface and loam subsurface over weakly cemented loam substratum • Permeability is moderately slow • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderately high • Slightly acidic to moderately alkaline surface; neutral to moderately alkaline subsoil; moderately alkaline substratum • Capability Class IIIe-8 irrigated • Taxonomic class: Fine-loamy, mixed, thermic Haplic Durixeralfs • Elevation range from 700 to 3,000 feet
BuD2	**Buren fine sandy loam, eroded, slope class (8 to 15%)** Similar characteristics as noted above with the following differences: • Not listed as an Important Farmland soil • Loamy surface texture • Runoff is medium • Water erosion hazard is high • Capability Class IIIe-1 irrigated
FaD2	**Fallbrook sandy loam, eroded, slope class (8 to 15%)** • Farmland of Statewide Importance • Well drained • Shallow soils (approximately 2 feet) over a weathered bedrock • Formed in uplands on soils developed from granodiorite and tonalite • Sandy loam surface and loam to clay loam or sandy clay loam subsurface over weathered granodiorite or tonalite • Permeability is moderate • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderate • Slightly acidic to neutral surface; neutral subsoil; slightly acidic to neutral substratum • Capability Class IVe-1 irrigated • Taxonomic class: Fine-loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 700 to 3,500 feet
FaE2	**Fallbrook sandy loam, eroded, slope class (15 to 25%)** Similar characteristics as noted above with the following differences: • Not listed as an Important Farmland soil • Runoff is rapid • Water erosion hazard is high

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
GyC2	**Greenfield sandy loam, eroded – slope class (2 to 8%)** • Prime Farmland • Well drained • Deep soils • Formed on alluvial fans and terraces in alluvium dominantly from granitic materials • Sandy loam surface and subsurface over loam substratum • Permeability is moderate • Runoff is slow to medium • Water erosion hazard is slight to moderate • Natural fertility is high • Neutral surface, slightly acidic to mildly alkaline subsoil • Capability Class IIe-1 irrigated • Taxonomic class: Coarse-loamy, mixed, thermic Typic Haploxeralfs • Elevation range from 600 to 3,500 feet
HcA	**Hanford coarse sandy loam, slope class (0 to 2%)** • Prime Farmland • Well drained and somewhat excessively drained • Deep soils • Formed on alluvial fans in alluvium dominantly from granitic materials • Coarse or fine sandy loam surface over loamy sand subsurface • Permeability is moderately rapid • Runoff is slow • Water erosion hazard is slight • Natural fertility is moderate • Slightly acidic surface and slightly acidic to neutral substratum • Capability Class IIs-4 irrigated • Taxonomic class: Coarse-loamy, mixed, nonacid, thermic Typic Xerorthents • Elevation range from 700 to 2,500 feet
HcC	**Hanford coarse sandy loam – slope class (2 to 8%)** Similar characteristics as noted above with the following differences: • Also a Prime Farmland soil • Runoff is slow to medium • Water erosion hazard is slight to moderate • Capability Class IIe-1 irrigated
HgA	**Hanford fine sandy loam, slope class (0 to 2%)** Similar characteristics as noted above with the following differences: • Also a Prime Farmland soil • Fine sandy loam surface texture • Runoff is slow • Capability Class I-1 irrigated

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
MaB2	**Madera fine sandy loam, eroded, slope class (2 to 5%)** • Farmland of Statewide Importance • Well drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on dissected terraces and old alluvial fans in alluvium dominantly from granitic materials • Sandy loam surface and clay subsoil over indurated hardpan • Permeability is very slow • Runoff is slow to medium • Water erosion hazard is slight to moderate • Natural fertility is moderate • Slightly acidic to neutral surface over strongly alkaline subsurface • Capability Class IIIe-3 irrigated • Taxonomic class: Fine, montmorillonitic, thermic Typic Durixeralfs • Elevation range from 600 to 1,600 feet
MmB	**Monserate sandy loam – slope class (0 to 5%)** • Farmland of Statewide Importance • Well drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on terraces and old alluvial fans in alluvium dominantly from granitic materials • Sandy loam surface and sandy clay loam subsoil over hardpan underlain by loamy sand substratum • Permeability is moderately slow above the nearly impervious pan layer • Runoff is slow • Water erosion hazard is slight • Natural fertility is moderate • Slightly acidic to neutral surface and subsurface over a mildly alkaline subsoil • Capability Class IIIe-8 irrigated • Taxonomic class: Fine loamy, mixed, thermic Typic Durixeralfs • Elevation range from 700 to 2,500 feet
MoC	**Mottsville loamy sand – slope class (0 to 5%)** • Prime Farmland • Excessively drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on alluvial fans and valley fills in alluvium dominantly from igneous materials • Loamy sand surface and subsoil over loamy coarse sand substratum • Permeability is rapid • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderate • Slightly acidic to neutral throughout profile • Capability Class IIIs-4 irrigated • Taxonomic class: Sandy, mixed, mesic Torriorthentic Haploxeralfs • Elevation range from 3,500 to 6,000 feet
RsC	**Riverwash** • Not listed as an Important Farmland soil • Slopes of 0 to 8 percent in valley fills and on alluvial fans • Variable drainage • Depth is variable but generally 20 to 60 inches or more • Formed in the beds of the major streams or larger creeks • Sandy, gravelly, or cobbly textures • Slightly acidic to neutral throughout profile • Capability Class VIIIw-4 dryland

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
TeG	**Terrrace escarpments** • Not listed as an Important Farmland soil • Slopes of 30 to 75 percent • Formed in variable alluvium on terraces or barrancas • Unaltered alluvial outwash from granite, gabbro, metamorphosed sandstone, sandstone, or mica-schists • Variable drainage with soil profiles that are commonly truncated • May have exposed 'rim-pan', gravel, cobblestones, stones, or large boulders in variable quantities • Slightly acidic to neutral throughout profile • Capability Class VIIe-1 dryland
VsF2	**Vista coarse sandy loam, eroded, slope class (15 to 35%)** • Not listed as an Important Farmland soil • Well drained • Shallow soil over a cemented hardpan layer with cementation decreasing with depth • Formed on uplands from weathered granite and granodiorite • Coarse sandy loam surface and gravelly coarse sandy loam subsurface over weathered granite or granodiorite • Permeability is moderately rapid • Runoff is medium • Water erosion hazard is moderate • Natural fertility is moderate • Medium to slightly acidic surface and slightly acidic to neutral subsurface over weathered bedrock subsoil • Capability Class VIe-1 dryland • Taxonomic class: Coarse loamy, mixed, thermic Typic Xerochrepts • Elevation range from 1,000 to 3,500 feet

Notes:

Soil characteristics are based on soil mapping provided in the published soil surveys (NRCS, 1971, 1980) and a review of corresponding OSDs.

Soil map units described above are limited to those mapped by the NRCS in the vicinity (i.e., within 1 mile) of the project property boundaries or directly on the proposed natural gas supply pipeline route.

Important Farmland soils taken from the Farmland Mapping and Monitoring Program (FMMP) Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for San Bernardino County and for Riverside County (both updated August 23, 2005).

8.9.3.1 Agricultural Land Uses within the Study Area

As previously mentioned, there are some agricultural fields on the east side of Taylor Street across from the Highgrove property that are currently farmed for row crops. These fields extend eastward toward the proposed alignment for Commerce Way beyond which are dense urban (industrial and residential) developments. The fields extend northward from existing industrial properties on the north side of Main Street and are bounded on the north by Van Buren Street. These agricultural fields are not mapped within the San Bernardino County Agricultural Overlay District (City of Grand Terrace, 1988, 2001) but are planned for conversion to a sports complex/playing fields associated with a proposed high school development for the properties along the east side of Taylor Street and the proposed Outdoor Adventure Center.

Other lands associated with agricultural use include orchards that are found along the natural gas supply pipeline route. One orchard property is found in Riverside on the east side of Iowa Avenue between Columbia Avenue and Marlborough Avenue, and runs beside the proposed pipeline route for approximately 600 feet. Other orchards, associated with the University of California at Riverside (UCR), are found along both sides of Iowa Street (extending south about 0.38 mile from Everton Place to Martin Luther King Boulevard), then west about 0.5 mile along Martin Luther King Boulevard, then south about 0.22 mile along Canyon Crest Drive. The 7-mile-long natural gas supply pipeline will follow existing roadways or other rights-of-way. For these reasons, there will be no direct impacts to agricultural lands resulting from the proposed Highgrove Project.

8.9.3.2 Soil Types within the Study Area

Table 8.9-2 provides the physical and chemical properties of the soil mapping units that are found in the vicinity of the proposed Project Site (i.e., within 1 mile of the property boundaries) and along the 7-mile natural gas supply pipeline. As shown on Figure 8.9-1, the entire Project Site is within a single soil mapping unit [**MoC**] Monserate sandy loam (2 to 9 percent slopes).

As shown on Figures 8.9-1 and 8.9-2, the natural gas supply pipeline would extend through to 50 percent slopes) within San Bernardino County. In Riverside County, the 19 soil mapping units traversed by the natural gas pipeline include 5 phases of the Arlington sandy loam/loam series (**AoA, AoC, ApB, ArB,** and **ArC**); 2 phases of the Buren fine sandy loam series (**BuC2** and **BuD2**); 2 phases of the Fallbrook sandy loam series (**FaD2** and **FaE2**); and 3 phases of the Hanford sandy loam series (**HcA, HcC,** and **HgA**), in addition to the following single soil series mapping units:

- [**GyC2**] Greenfield sandy loam, eroded (2 to 8 percent slopes);
- [**MaB2**] Madera fine sandy loam, eroded (2 to 8 percent slopes);
- [**MmB**] Monserate sandy loam (0 to 5 percent slopes);
- [**MoC**] Mottsville loamy sand (0 to 5 percent slopes);
- [**RsC**] Riverwash (0 to 8 percent slopes);
- [**TeG**] Terrace Escarpments (30 to 50 percent slopes); and
- [**VsF2**] Vista coarse sandy loam, eroded (15 to 35 percent slopes)

8.9.3.3 Important Farmlands within the Study Area

The designations of Important Farmlands in the project vicinity and along the 7-mile natural gas supply pipeline are shown on Figures 8.9-3 and 8.9-4 (CDC, 2002) and are also summarized in Table 8.9-2. These maps are derived from information provided from the Farmland Mapping and Monitoring Program administered by the Division of Land Resource Protection in the CDC.

The Important Farmlands Map (Figure 8.9-2) shows that the Project Site and most of the area within the 1-mile buffer is mapped as [D] Urban and Built Up Land. The next largest area within this buffer is the Loma Hills to the west that are mapped as [G] Grazing Land. An area mapped as [X] Other Land is located north and northeast of the Project Site along the southeast side of Interstate 395.

There are 3 types of Important Farmlands mapped within the 1-mile buffer that represent a relatively small proportion of the total area. The largest part of these Important Farmlands occurs to the south in Riverside County and include (in decreasing order): Prime Farmlands; Farmland of Local Importance; and Farmland of Statewide Importance. The agricultural fields just east of the Project Site are mapped as Prime Farmlands and Farmland of Statewide Importance. The other Important Farmlands are located well away from the Project Site west of Interstate 395 in San Bernardino County, or along the southern boundary of the nearby City of Highgrove, in Riverside County.

Along the proposed natural gas supply pipeline route, the majority of land (74 percent) is classified as [D] Urban and Built-up Land. The orchards associated with the UCR campus are classified as [P] Prime Farmland and constitute approximately 13 percent of the total pipeline length. The remaining 13 percent of the pipeline length is comprised of [X] Other Land and is found to the south of the UCR orchards and near the southern end of the proposed pipeline route.

Statistics from inventories of important farmlands in San Bernardino and Riverside counties in 2004 indicate that there were approximately 501,142 total acres of land classified as Prime Farmland, Farmlands of Statewide Importance, Unique Farmlands, or Farmlands of Local Significance (CDC, 2005c. Of these, San Bernardino County had 34,674 acres compared to 466,468 acres for Riverside County. There were net declines in important farmlands from the year 2002 to 2004 with an 8.9 percent decline (3,406 acres) in San Bernardino County and a 2.7 percent decline (12,810 acres) in Riverside County. Increases during the same time period in lands classified as Urban and Built-up Land were larger than the net losses in all agricultural lands (important farmlands plus grazing lands) for both counties during the 2002 to 2004 period.

As previously noted, the proposed project will not result in the conversion of any agricultural land because the pipeline will follow existing roadways and rights-of-way.

8.9.3.4 Soil Loss and Erosion

The factors that have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils composed of large proportions of fine sands. The soils found in the Project Site and along the gas supply pipeline features are mostly level or follow roadways that are currently paved or otherwise covered by existing facilities.

In general, the soil types at the Project Site and along most of the gas supply pipeline, as indicated by the NRCS mapping (1971, 1980), have surface soil conditions that are relatively coarse grained (loamy sand, sandy loam, very fine sandy loam, or loam). The soil types and the slopes could have a relatively high potential for water and wind erosion. However, the erosion potential is lowered by the fact that the proposed areas where construction activities will occur is surrounded by other developed properties and buildings that will limit locally-significant ground-level winds that could lead to excessive wind erosion, and steep slopes are generally not present.

The majority of the Project Site will be located in an area that was formerly occupied by large oil tanks. Because the tanks were below grade to provide separate retention basins, the site is about 3 to 6 feet below the surrounding grade and includes a separating berm that will be removed. The southern portion of the site (the area where the former power plant is

located) is nearly level due to previous grading associated with the former facility. Site grading will be required to allow the transition from the current ground surface to the lower tank basin grades. It is also expected that the previous site grading and construction activities has likely removed much of the original native surface soils and replaced them with compacted, structural fill to create suitable bearing surfaces for the former electrical facilities. Compacted structural fill would be expected to have lower susceptibility to wind and water erosion than the original native soils. Given the previous site development, nearly level topography, and the planned use of construction best management practices (BMPs), the overall potential for soil loss at the Project Site is slight. Despite the relatively low potential for soil loss with the use of BMPs, estimates for soil losses by water and wind erosion are provided in the following subsections.

BMPs will be used to minimize erosion at the site during construction. These measures typically include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Water erosion will be minimized or mitigated through the use of sediment barriers and wind erosion potential will be reduced significantly by keeping soil moist or by covering soil piles with mulch or other wind protection barriers. These temporary measures would be removed from the site after the completion of construction. The final state of the site during operations will be completely paved or otherwise covered with facilities or landscaping so that soil erosion losses at that point would be negligible.

8.9.3.4.1 Water Erosion The water erosion hazard designations for soils in the project area are listed in Table 8.9-2. The water erosion hazard level ascribed to the Monserate sandy loam soil mapping unit on which the project is located is slight to moderate, indicating that water erosion hazard is likely to be minimal. This erosion hazard rating is associated with the sandy loam surface soils (if they are left exposed) and not the clay subsoil or indurated hardpan that underlies them. The moderate erosion hazard is also likely to be associated with unprotected natural soils with slopes near the high end of the 2 to 9 percent slope class.

The potential soil loss by water erosion for the project was estimated using the Revised Universal Soil Loss Equation (RUSLE2) software downloaded from the web site at [http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm]. Soil loss was calculated as tons/acre/year by the program and then multiplied by the site acreage and assumed construction period to get total soil loss in tons for the project duration. The estimated potential soil loss by water erosion is summarized in Table 8.9-3.

The estimate of soil loss by water erosion using the RUSLE2 software is based upon the rainfall erosivity (R-factors) developed from the 2-year, 6-hour point precipitation frequency data (upper limit of the 90 percent confidence interval) from the nearest National Weather Service station to the Project Site[1]. Area-specific soil mapping information was downloaded for both San Bernardino and Riverside counties.

[1] On line at: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

TABLE 8.9-3
Estimated Soil Loss from Water Erosion [WPSAC please reformat for landscape to avoid truncation]

			Estimates Using Revised Universal Soil Loss Equation[a]		
Feature	**Activity**	**Duration (months)[b]**	**Soil Loss (tons) without BMPs**	**Soil Loss (tons) with BMPs**	**Soil Loss (tons/yr) No Project**
Site (18 acres)	Demolition	5	97.5	2.8	0.44
	Grading	2	84.0	1.1	0.17
	Construction	10	195.0	5.6	0.87
Gas Pipeline (4.34 acres)	Grading/excavation	6	2012	25.7	3.25
Total Project (site and pipeline corridor, 22.34 acres)	All activities listed above	14	2389	35.2	4.73

Notes:

a. Soil losses (tons/acre/year) are estimated using RUSLE2 software available on line [http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm].

- The soil mapping unit data specific to each county were downloaded directly from the above-cited on line source.
- Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the nearest National Weather Service station to the Project Site [on line at http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html].
- Estimates of actual soil losses use the RUSLE2 soil loss times the duration and the affected area. The No Project Alternative estimate does not have a specific duration so loss is given as tons/year.

b. The estimate of total project time is derived from the construction schedule shown in Table 8.8-8 and includes a 2-month overlap of the demolition, construction, and grading phases.

Project Assumptions as follows:

- The portion of the site that will be disturbed is 18 acres which includes the Project Site, laydown area, and grading in former tanks storage area.
- The pipeline trench is estimated at 5-foot width over its entire length and the estimate of soil loss along pipeline is integrated over entire 7.16-mile length.

RUSLE2 Assumptions as follows:

100-ft slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class. Rock cover percent estimated to be zero throughout project area.

Construction/Demolition soil losses assume the following inputs: Management - Bare ground; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Grading soil losses assume the following inputs: Management - Bare ground/rough surface; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Construction with BMP soil losses assume the following inputs: Management - Silt fence; Contouring - Perfect, no row grade; Diversion/terracing - None; Strips and Barriers - 2 fences, 1 at end of RUSLE slope.

No Project soil losses assume the following inputs: Management - Dense grass, not harvested; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

It was assumed that 18 acres of the Project Site would be disturbed for demolition, re-grading, laydown area, and plant construction. For the gas pipeline, it was assumed that a 5-foot-wide trench would be needed for the 12-inch-diameter pipeline over the entire 7-mile length.

For the various activities, the following RUSLE2 assumptions were used:

- A 100-foot slope length was used with the slope estimates as the mid-point between the highest and lowest values of the slope class.
- Rock cover percent was assumed to be zero throughout the project area.
- For **Construction/Demolition** activities, the Management input was considered to be 'Bare ground;' the Contouring input was considered to be 'None, rows up and down hill;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was 'None.'
- For **Grading** activities, the Management input was considered to be 'Bare ground/rough surface;' the Contouring input was considered to be 'None, rows up and down hill;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was 'None.'
- For **Construction with BMPs**, the Management input was considered to be 'Silt fence;' the Contouring input was considered to be 'Perfect, no row grade;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was '2 fences, 1 and the end of the RUSLE2 slope.'
- For the **No Project** soil loss estimate, the Management input was considered to be 'Dense grass, not harvested;' the Contouring input was considered to be 'None, rows up and down hill;' the Diversion/terracing input was 'None;' and the Strips and Barriers input was 'None.'

As shown in Table 8.9-3, if no construction BMPs were employed, the soil losses by water erosion during the project construction phases are estimated to be approximately 376.5 tons at the Project Site and 2,012 tons along the gas supply pipeline. Employing the basic soil erosion control BMP of silt fencing reduces these estimates by 97.5 percent to 9.5 tons at the Project Site and 99 percent to 25.7 tons along the gas supply pipeline, respectively. Additional use of BMPs would be expected to further reduce soil losses by water erosion to near insignificant levels. Some of the BMPs are described in the Draft Construction Stormwater Pollution Prevent Plan, contained in Appendix 8.14xx.

8.9.3.4.2 Wind Erosion The wind erosion hazard rating was not provided for the soil mapping units described in the soil surveys (NRCS 1971, 1980), and so, are not included in Table 8.9-2. The potential for wind erosion of surface material for the project was estimated by calculating the total suspended particulates that could be emitted from active grading activities and the wind erosion of exposed soil. The total site area and grading duration were multiplied by emission factors to estimate the total suspended particulate matter (TSP) emitted from the site.

Fugitive dust from site grading was calculated using the default particulate matter less than 10 microns in equivalent diameter (PM_{10}) emission factor used in Jones and Stokes (2003) and the ratio of fugitive TSP to PM_{10} published by the Bay Area Air Quality Management

District (BAAQMD, 2005). Fugitive dust resulting from the wind erosion of exposed soil was calculated using the emission factor in AP-42 (Table 11.9-4 in BAAQMD, 2005).

Mitigation measures, such as watering exposed surfaces, are used to reduce PM_{10} emissions during construction activities. The PM_{10} reduction efficiencies are taken from the South Coast Air Quality Management District (SCAQMD) CEQA Handbook (1993) and were used to estimate the effectiveness of the mitigation measures. Table 8.9-4 summarizes the mitigation measures and PM_{10} efficiencies applied to the emission calculations.

TABLE 8.9-4
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency	Efficiency Applied
Water active sites at least twice daily	34-68%	50%
Enclose, cover, water twice daily, or apply non-toxic soil binders, according to manufacturer's specifications, to exposed piles (i.e., gravel, sand, dirt) with 5 percent or greater silt content	30-74%	50%

Source: SCAQMD, 1993 (Table 11-4).

Table 8.9-5 summarizes the estimated unmitigated and mitigated TSP emissions from the site and along the gas pipeline from grading and the wind erosion of exposed soil. Without mitigation, the maximum predicted erosion of material from the site with implementation of mitigation measures is estimated at 8.64 tons over the course of the project construction cycle. This estimate is reduced to approximately 4.32 tons by implementing basic mitigation measures (i.e., silt fences). These estimates are extremely conservative because they make use of emission rates for a generalized soil rather than for specific soil properties and assume the worse-case for blowing conditions.

TABLE 8.9-5
Estimated Unmitigated and Mitigated TSP Emissions from the Site and Along the Gas Pipeline

Emission Source	Area	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
Project Site	18 acres	2	6.60	3.30
Gas pipeline	0.181 acre per 1/24th segment	6	0.20	0.10
Wind Blown Dust:				
Plant Site	6 acres	2	0.38	0.19
Laydown Area	1/2 of 5 acres	8	0.79	0.40
Storage Tank Area	7 acres	3	0.67	0.33

TABLE 8.9-5
Estimated Unmitigated and Mitigated TSP Emissions from the Site and Along the Gas Pipeline

Emission Source	Area	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Estimated Total			**8.64**	**4.32**

Assumptions:

Assumes grading for entire site will be completed in a 2-month period overlapping the end of site demolition and plant construction.

The natural gas pipeline will be trenched within or adjacent to existing paved roadways and that a 5-ft wide trench will be adequate. It is expected that excavation and grading along the pipeline will be done in segments. The wind loss estimates are based upon1/24th segments (each 0.1808 acre) and that one segment will be open at all times during the entire 6-month construction window.

These estimates assume that wind erosion will occur only on exposed portions of the site and that plant site will be covered within 2 months after completion of grading; half of the soil area may be exposed through the 10-month construction window; and the storage tank area will have some temporary or permanent protection within 3 months after completion of grading.

Data Sources:

PM10 Emission Factor Source: Jones and Stokes URBEMIS2002 User's Guide, May 2003.

PM10 to TSP Conversion Factor Source: BAAQMD, 2005;

SCAQMD, 1993 (Table 11-4 for mitigation efficiency rates, as summarized in Table 8.9-4)

8.9.3.5 Other Significant Soil Characteristics

A significant soil characteristic concerning the proposed project is the potential for expansive clays in subsurface soils in the [**MoC**] Monserate sandy loam soil unit. This soil characteristic can pose a potential problem for construction of foundations and onsite pipelines because of the potential for soil movement due to shrink/swell characteristics. It is likely that unsuitable expansive clay soils have already been removed from the site where previous power generating facilities were constructed; however, there is a potential for these soils to occur in areas of the property that were not previously excavated. Construction problems with expansive clays can be avoided by backfilling those clayey portions of excavations for foundations, footings, or pipeline runs with a suitable, imported fill that has a low capacity for shrink/swell.

While the shrink/swell potential of different soil mapping units was not provided in the Riverside County soil survey (NRCS, 1971), it is expected that expansive subsurface soils could be encountered in any of the soils grouped into the 'Alfisol' soil order, where clayey subsurface layers occur. These would include all the soils listed in Table 8.9-2 for Riverside County except for the [**HcA, HcC,** and **HgA**] Hanford and [**VsF2**] Vista series soils, [**RsC**] Riverwash, and [**TeG**] Terrace escarpments.

Shallow soils over weathered bedrock or cemented hardpan, is another soil characteristic that could increase the difficulty and costs of excavation. This characteristic could be significant for the soil mapping unit underlying the Project Site, [**MoC**] Monserate sandy loam, as well as the following soil mapping units along the proposed gas pipeline route: [**FaD2** and **FaE2**] Fallbrook sandy loam, eroded; [**MaB2**] Madera fine sandy loam, eroded; [**MmB**] Monserate sandy loam; [**MoC**] Mottsville loamy sand; and [**VsF2**] Vista coarse sandy loam, eroded. Excavations within the [**TeG**] Terrace escarpment soil mapping units could also encounter a significant proportion of boulders that could also increase the difficulty and costs of excavation.

The [**MoC**] Monserate sandy loam soil mapping unit is a well drained soil, as are other soil units in the immediate project vicinity. There are no soils mapped in the project area that are classified as somewhat poorly or poorly drained, which could indicate hydric soil conditions. However, the drainage ditch near the northern site boundary and the stormwater detention basin within the park area in the southern portion of the site could be considered as jurisdictional wetlands if they satisfy U.S. Army Corps of Engineers criteria for wetland vegetation, hydrology, and soils or are linked to 'Waters of the U.S.' However, neither of these features will be affected by the project construction.

While the drainage class of the [**RsC**] Riverwash soil mapping unit was listed as variable, it is likely that this area is subject to regular (periodic) flooding and has a high probability of being a jurisdictional 'Waters of the U.S.' A pipeline crossing of this type of soil mapping unit could also require a Section 404 permit and may also be subject to a Streambed Alteration Agreement (Section 1601 permit) from the California Department of Fish and Game (see Subsection 8.2, Biological Resources).

Overall inherent soil fertility in the project area is indicated to be moderate to moderately high. However, in developed urban areas there is a strong possibility that much of the native surface soils have been mixed by grading or replaced with structural fill. For this reason, it is not possible to assess the actual soil fertility in the project area. To assure suitable soil fertility for revegetation success in the project area, it may be necessary to stockpile excavated topsoil; to add soil amendments to low fertility soils; or to import a suitable amended topsoil material.

8.9.4 Potential Environmental Analysis

The following subsections describe the potential environmental effects on agricultural production and soils during the construction and operation phases of the project. The potential for impacts to agricultural and soils resources were evaluated with respect to the criteria described in the Appendix G checklist of CEQA. An impact is considered potentially significant if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps for the Farmland Mapping and Monitoring Program by the California Resources Agency to non-agricultural use
- Conflict with existing zoning for agricultural use or a Williamson Act contract
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion

8.9.4.1 Impacts on Agricultural Soils

Construction of the project will be limited to the previously developed property. With the exception of the gas line and the potable water line, the linears are located adjacent to the site. The natural gas supply pipeline will be almost entirely limited to existing roadways and rights-of-way. As such, the proposed project will not remove any land from agriculture.

8.9.4.2 Construction

Project construction could potentially cause increased compaction of onsite soils in areas needed for facilities such as foundations, footings or onsite pipelines. In addition, the proposed project could result in a slight increase in soil erosion by water or wind. If this impact is not controlled, it could possibly increase the sediment load within surface waters downstream of the construction site or adversely impact local air quality from fugitive dust.

Construction of the Project Site would result in temporary soil compaction in parking, trailer, and laydown areas, and require potential dust control and erosion control measures. Approximately 18 acres on the site would be affected, almost all of which, has been previously impacted by the prior power plant development.

The amount of grading and filling will be determined by the need to smooth the transition from the current ground surface and the lower tank basins. Another factor affecting the grading and filling will be the amount of potentially unsuitable foundation material that might be encountered in the subsoil as it pertains to the site layout. Any excavated soils not reused during construction at the site would be managed or removed to prevent subsequent erosion and sedimentation issues.

Construction along the gas supply pipeline would involve excavation of soil materials from the pipeline trench, temporary stockpiling of these soil materials adjacent or nearby to the trench, compaction of soils placed beneath and above the installed pipeline, and temporary and permanent erosion control. Temporary stockpiling of excavated soil materials will segregate fertile topsoil from the subsoil so it can be reused for revegetation of the completed pipeline ground surface. Unsuitable pipeline bedding materials, such as expansive soils, will be removed and replaced with structural fill with suitable compaction and load bearing properties. Any excavated soils not reused during construction along the pipeline would be managed or removed to prevent subsequent erosion and sedimentation issues. As previously described, the proposed pipeline route will follow existing developed railroad and roadway rights-of-way.

The proposed construction will incorporate BMPs to the extent feasible and will follow appropriate plans to limit soil erosion and sedimentation. Because all plant construction will be limited to the previously developed Highgrove Generating Station site, and because the gas supply pipeline construction will follow existing developed rights-of-way, the proposed construction of the project will have a less than significant impact on soil resources and no impact on agricultural land use.

8.9.4.3 Operation

Project operation would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during project operation would be limited to existing paved roads. Standard operating activities would not involve the disruption of soil. Impacts to soil from project operations would be less than significant.

8.9.4.4 Effects of Generating Facility Emissions on Soil-Vegetation Systems

There is a concern in some areas that emissions from the generating facility, principally nitrogen (NO_x) from the combustors or drift from the cooling towers, would have an adverse effect on soil-vegetation systems in the project vicinity. This is principally a concern

where environments that are highly sensitive to nutrients or salts, such as serpentine habitats, are downwind of the project.

In the case of the Highgrove Project, the dominant land uses downwind of the project are developed urban areas with limited areas in use for agriculture. There are no serpentine habitats in the project area. The addition of small amounts of nitrogen to agricultural areas would be insignificant within the context of fertilizers, herbicides, and pesticides typically used.

8.9.4.5 Cumulative Effects

The Project Site is located in the City of Grand Terrace in San Bernardino County. The site is current zoned for [M2] Industrial uses and has been previously developed for use for electrical power generation. For this reason, the potential cumulative impact of the project is considered to be less than significant to soil resources and will have no impact on agricultural resources.

8.9.5 Mitigation Measures

Erosion control measures would be required during construction to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that could adversely affect local surface water or air quality. Temporary erosion control measures would be installed before construction begins, maintained and evaluated during construction, and then, would be removed from the site after the completion of construction.

8.9.5.1 Temporary Erosion Control Measures

Temporary erosion control measures would be implemented before construction begins, and would be evaluated and maintained during construction. These measures typically include revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Vegetation is the most efficient form of erosion control because it keeps the soil in place and maintains the landscape over the long-term. Vegetation reduces erosion by absorbing raindrop impact energy and holding soil in place with fibrous roots. It also reduces runoff volume by decreasing erosive velocities and increasing infiltration into the soil.

Disturbed areas would be revegetated with rapidly growing restoration groundcover or landscaping materials as soon as possible after construction, with vehicle traffic kept out of revegetated areas. Physical stabilization, such as temporary erosion control matting, may be required depending on the time of year revegetation is performed. If required, revegetation of non-landscaped areas disturbed by construction of the linear facilities would be accomplished using locally prevalent, fast-growing plant species compatible with adjacent existing plant species.

During construction of the project, dust erosion control measures would be implemented to minimize the wind-blown erosion of soil from the site. Water of a quality equal to or better than either existing surface runoff or irrigation water would be sprayed on the soil in construction areas to control dust.

Sediment barriers, such as straw bales, sand bags, or silt fences, slow runoff and trap sediment. Sediment barriers are generally placed below disturbed areas, at the base of

exposed slopes, and along streets and property lines below the disturbed area. Sediment barriers are often placed work areas to prevent migration to sensitive areas, such as wetlands, creeks, or storm drains, to prevent contamination by sediment-laden surface water run-off.

The site construction will occur on previously developed land whose separate portions are relatively level; therefore, it is not considered necessary to place barriers around the entire property boundary. However, some barriers would be placed in locations where offsite drainage could occur to prevent sediment from leaving the site. Barriers and other sedimentation control measures would be used to prevent runoff into storm drains or surface water channels located near the site. If used, straw bales would be properly installed (staked and keyed), then removed or used as mulch after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary due to the level topography and surrounding paved areas. Any soil stockpiles would be stabilized and covered if left onsite for long periods of time, including placement of sediment barriers around the base of the stockpile.

8.9.5.2 Permanent Erosion Control Measures

Permanent erosion control measures on the site could include drainage and infiltration systems, detention basins, slope stabilization, and long-term revegetation or landscaping. Revegetation or landscaping would follow from planting for short-term erosion control.

A mitigation monitoring plan will be developed in conjunction with CEC staff to set performance standards and monitor the effectiveness of mitigation measures. This plan will address the timing and methods for monitoring plant establishment, as well as reporting and response requirements.

8.9.6 Permits and Agency Contacts

Permits required for the project, the responsible agencies, and proposed schedule are shown in Table 8.9-6.

TABLE 8.9-6
Permits and Agency Contacts for Agriculture and Soils

Permit or Approval	Schedule	Agency Contact	Applicability
City of Grand Terrace Grading Permit	At least 90 days prior to construction	John Lampe or Rich Shield, Planners Planning and Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92324 909-430-2256	Grading of site surface
City of Riverside Encroachment Permit for Utility Easement	Prior to Construction	Dirk Jenkins, Senior Planner Planning Department City Of Riverside 3900 Main Street Riverside, CA 92522 951-826-5371	Utility encroachments in public roadways and rights-of way

TABLE 8.9-6
Permits and Agency Contacts for Agriculture and Soils

Permit or Approval	Schedule	Agency Contact	Applicability
City of Riverside Street Opening Permit and General or Specific Permit	Prior to Construction	Don Young, Plan Check Engineer Public Works Department City Of Riverside 3900 Main Street Riverside, CA 92522 951-826-5341	Excavations within roadways and utility encroachments across existing City facilities (e.g., water or utility)
Riverside County Grading Plan Approval and Permit	3 months prior to construction	Loi Chan, Grading Plan Reviewer Riverside County Building and Safety Department 4080 Lemon Street, 9th Floor Riverside, CA 92501 951-955-9622	Grading for projects in unincorporated parts of Riverside County
Riverside County Plan review and encroachment permit	3 months prior to construction	Eric Fletcher, Riverside County Transportation and Land Management Department 4080 Lemon Street, 9th Floor Riverside, CA 92501 951-955-6761	Grading or trenching in a public rights-of- way in unincorporated parts of Riverside County
Construction Activity, Stormwater and NPDES Permit	Prior to construction	Michelle Beckwith Santa Ana Regional Water Quality Control Board 3737 Main Street Suite 500 Riverside, CA 92501-3339 951-320-6396	Regulation of stormwater discharge from site and linear facilities during construction

8.9.7 References

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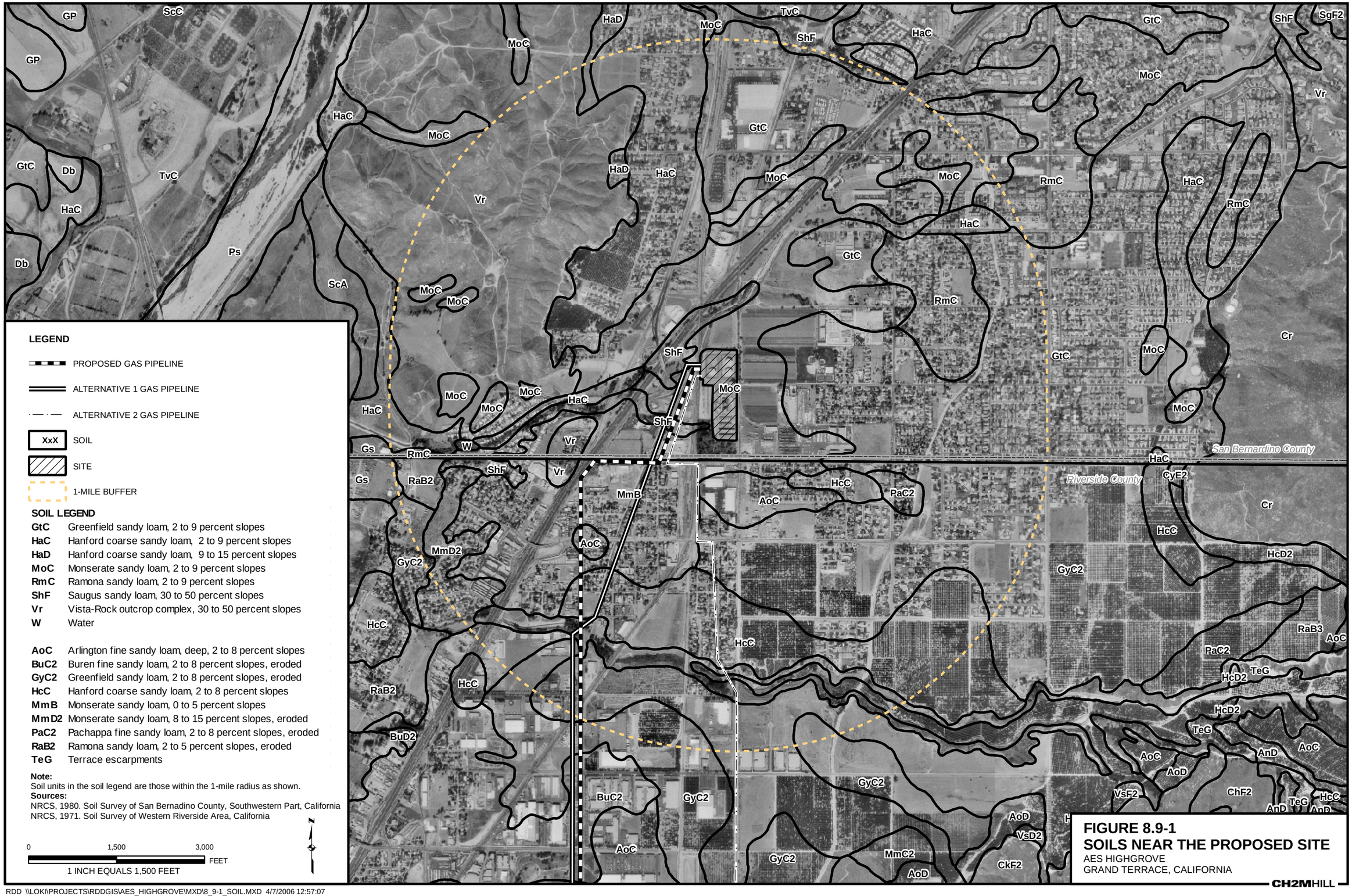

FIGURE 8.9-1
SOILS NEAR THE PROPOSED SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_9-1_SOIL.MXD 4/7/2006 12:57:07

LEGEND

- PROPOSED GAS PIPELINE
- ALTERNATIVE 1 GAS PIPELINE
- ALTERNATIVE 2 GAS PIPELINE
- XxX SOIL
- SITE

SOIL LEGEND

AoA	Arlington fine sandy loam, deep, 0 to 2 percent slopes
AoC	Arlington fine sandy loam, deep, 2 to 8 percent slopes
ApB	Arlington loam, deep, 0 to 5 percent slopes
ArB	Arlington loam, deep, 0 to 5 percent slopes
ArD	Arlington loam, deep, 5 to 15 percent slopes
BuC2	Buren fine sandy loam, 2 to 8 percent slopes, eroded
BuD2	Buren fine sandy loam, 8 to 15 percent slopes, eroded
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded
FaE2	Fallbrook sandy loam, 15 to 25 percent slopes, eroded
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded
HcA	Hanford loamy fine sand, 0 to 8 percent slopes
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes
HgA	Hanford fine sandy loam, 0 to 2 percent slopes
MaB2	Madera fine sandy loam, 2 to 5 percent slopes, eroded
MmB	Monserate sandy loam, 0 to 5 percent slopes, eroded
MoC*	Mottsville loamy sand, 2 to 8 percent slopes
RsC	River wash
TeG	Terrrace escarpments
VsF2	Vista coarse sandy loam, 15 to 35 percent slopes, eroded

Notes:
1. Soil units in the soil legend are those found along the proposed gas supply pipeline route within Riverside County only.

2. Soil mapping unit descriptions for soils within San Bernardino County are shown on Figure 8.9-1.

* The soil mapping unit symbol "MoC" has a different designation between the Soil Survey of Western Riverside County (NRCS, 1971) and the Soil Survey of San Bernardino County (NRCS, 1980)

Source:
NRCS,1971. Soil Survey of Western Riverside Area, California

0 2,100 4,200 FEET

1 INCH EQUALS 2,100 FEET

N

FIGURE 8.9-2
SOILS ALONG THE GAS SUPPLY PIPELINE AND ALTERNATIVE CORRIDORS

AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_9-2_SOIL_GASLINE.MXD 5/2/2006 14:53:33

FIGURE 8.9-3
IMPORTANT FARMLANDS NEAR THE PROPOSED SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_9-3_FMMP.MXD 4/7/2006 13:03:14

City of Grand Terrace

San Bernardino County

Riverside County

MAIN STREET

Highgrove

IOWA STREET

City of Riverside

MARTIN LUTHER KING JR. BLVD.

CANYON CREST DRIVE

LEGEND

- PROPOSED GAS PIPELINE
- SITE
- D URBAN AND BUILT UP LAND
- G GRAZING LAND
- L FARMLAND OF LOCAL IMPORTANCE
- P PRIME FARMLAND
- S FARMLAND OF STATEWIDE IMPORTANCE
- X OTHER LAND

Source: FMMP, 2002

0 2,100 4,200 FEET

1 INCH EQUALS 2,100 FEET

N

FIGURE 8.9-4
IMPORTANT FARMLANDS ALONG THE GAS SUPPLY PIPELINE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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8.10 Traffic and Transportation

8.10.1 Introduction

This subsection assesses transportation impacts associated with the construction of the proposed project. The analysis primarily quantifies impacts on roadways expected during demolition, construction and operation of the proposed project. The main impacts are the addition of approximately 246 daily vehicles (including construction workers and trucks) and lane/road closures due to gas pipeline construction. Additional transportation factors examined in this subsection include pedestrian and bicyclist impacts, safety, goods movement, and any potential impacts to air, rail, and waterborne transportation networks.

Descriptions of existing transportation facilities in proximity of the proposed project and an analysis of the proposed project's potential impacts on the existing transportation network are provided. The roadway analysis examines the worst-case scenario during construction activities (which would occur for a 2-month duration) to the local study area roadways. The operation of the proposed project would include relatively few permanent employees (less than 15 employees, or 30 daily trips). Once these 30 trips are distributed on the street network, traffic impacts would be immeasurable due to the relatively low volume of traffic generated.

Information sources include the General Plan of the County of Riverside, the General Plan of the City of Riverside, the General Plan of the City of Grand Terrace, the Outdoor Adventures Center (OAC) Final Environmental Impact Report, the California Department of Transportation (Caltrans), and field observations. This subsection also discusses applicable laws, ordinances, regulations, and standards (LORS) relevant to the potential transportation impacts caused by the proposed project.

8.10.2 Laws, Ordinances, Regulations, and Standards

LORS related to traffic and transportation are summarized in the following subsections.

8.10.2.1 Federal

- Title 49, Code of Federal Regulations (CFR), Sections 171-177 (49 CFR 171-177), governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- 49 CFR 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways.
- 49 CFR 397.9, the Hazardous Materials Transportation Act of 1974, directs the U.S. Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials.

8.10.2.2 State

State laws that apply to this project include the following sections of the California Vehicle Code (CVC), unless specified otherwise:

- California Street and Highways Code (S&HC), Sections 660, 670, 1450, 1460 et seq., 1470, and 1480, regulates right-of-way encroachment and granting of permits for encroachments on state and county roads.
- Sections 13369, 15275, and 15278 address the licensing of drivers and classifications of licenses required to operate particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are addressed.
- Sections 25160 et seq. address the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, routes used, and restrictions. CVC Section 31303 requires hazardous materials to be transported on state or interstate highways that offer the shortest overall transit time possible.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. CVC Section 32105 requires shippers of inhalation or explosive materials to contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook specifying approved routes.
- Sections 34000-34121 establish special requirements for transporting flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11 regulate the safe operation of vehicles, including those used to transport hazardous materials.
- S&HC, Sections 117 and 660-72, and CVC, Sections 35780 et seq., require permits to transport oversized loads on county roads. California S&HC Sections 117 and 660 to 711 requires permits for any construction, maintenance, or repair involving encroachment on state highway rights-of-way. CVC Section 35780 requires approval for a permit to transport oversized or excessive loads over state highways
- California State Planning Law, Government Code Section 65302, requires each city and county to adopt a General Plan, consisting of seven mandatory elements, to guide its physical development. Section 65302(b) requires that a circulation element be one of the mandatory elements.

- All construction in the public right-of-way will need to comply with the Manual of Traffic Controls for Construction and Maintenance of Work Zones (Caltrans, 1996).
- Caltrans weight and load limitations for state highways apply to all state and local roadways. The weight and load limitations are specified in the CVC Sections 35550 to 35559. The following provisions, from the CVC, apply to all roadways and are therefore applicable to this project.

  General Provisions:

  – The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.

  – The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

  Vehicles with Trailers or Semi-trailers:

  – The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds.

8.10.2.3 Local

The transportation elements of local plans that are applicable to the project are policies of the City of Grand Terrace, County of San Bernardino, County of Riverside, and City of Riverside.

8.10.2.3.1 City of Grand Terrace Objectives

1. Plan, provide, and maintain an integrated vehicular circulation system to accommodate projected local and regional needs.
2. Develop a vehicular circulation system consistent with accepted standards of transportation engineering safety, with sensitivity to adjoining land uses.
3. Establish, develop, and promote systems and amenities for alternative travel modes including bicycle, pedestrians and transit.
4. Take proactive measures to ensure that the City's residential neighborhoods are not adversely affected by excessive traffic and are more livable and pedestrian friendly.
5. The City will ensure that the Master Plan of Streets and Highways Circulation System is completed by utilization of a variety of means to fund the construction of these improvements which are described below. In addition, the City will pursue alternative means to fund ongoing maintenance and safety enhancement of the circulation infrastructure.

8.10.2.3.2 County of San Bernardino Policies

The General Plan for the County of San Bernardino, transportation and circulation element sets forth policies that are applicable to the project. Specific, relevant policies set forth in the General Plan are as follows:

CI 4.3 Strive to achieve Level of Service "C" on all County roadways. Through the review of new development proposals, ensure that traffic impacts, including cumulative impacts, are properly addressed and mitigated to maintain Level of Service "C" on the County's circulation system.

CI 5.2 Protect and increase the designed roadway capacity of all vehicular thoroughfares and highways.

CI 6.1 Require safe and efficient pedestrian and bicycle facilities in residential, commercial, industrial and institutional developments to facilitate access to public and private facilities and to reduce vehicular trips. Install bicycle lanes and sidewalks on existing and future roadways, where appropriate and as funding is available

CI 8.6 Ensure that future developments have no less than two points of access for emergency evacuation and for emergency vehicles, in the event of wildland fires and other natural disasters.

8.10.2.3.3 County of Riverside Policies

County of Riverside, transportation and circulation element sets forth policies that are applicable to the project. They are as follows:

As the County continues to grow, transportation demand management and systems management will be necessary to preserve and increase available roadway "capacity." Level of Service (LOS) standards are used to assess the performance of a street or highway system and the capacity of a roadway.

An important goal when planning the transportation system is to maintain acceptable levels of service along the federal and state highways and the local roadway network. To accomplish this, the Caltrans, Riverside County Transportation Commission, the County, and local agencies adopt minimum levels of service to determine future infrastructure needs. Riverside County must provide and maintain a highway system with adequate capacity and acceptable levels of service to accommodate projected travel demands associated with the build out of the Land Use Element. This can be accomplished by establishing minimum service levels for the designated street and conventional state highway system. Strategies that result in improvements to the transportation system, coupled with local job creation, will allow County residents to have access to a wide range of job opportunities within reasonable commute times.

Specific policies set forth in the County of Riverside General Plan are as follows:

C 2.1 Maintain the following countywide target Levels of Service:

> LOS "C" along all County maintained roads and conventional state highways. As an exception, LOS "D" may be allowed in Community Development areas, only at intersections of any combination of Secondary Highways, Major Highways,

Arterials, Urban Arterials, Expressways, conventional state highways or freeway ramp intersections.

LOS "E" may be allowed in designated community centers to the extent that it would support transit-oriented development and walkable communities.

C 2.2 Apply level of service standards to new development via a program establishing traffic study guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development.

C 2.3 Traffic studies prepared for development entitlements (tracts, plot plans, public use permits, conditional use permits, etc.) Shall identify project related traffic impacts and determine the "significance" of such impacts in compliance with CEQA.

C 2.4 The direct project related traffic impacts of new development proposals shall be mitigated via conditions of approval requiring the construction of any improvements identified as necessary to meet level of service standards.

C 2.5 The cumulative and indirect traffic impacts of development may be mitigated through the payment of various impact mitigation fees such as County Development Impact Fees, Road and Bridge Benefit District Fees, and Transportation Uniform Mitigation Fees to the extent that these programs provide funding for the improvement of facilities impacted by development.

C 2.6 Accelerate the construction of transportation infrastructure in the Highway 79 Policy Area. The County shall require that all new development projects demonstrate adequate transportation infrastructure capacity to accommodate the added traffic growth. The County shall coordinate with cities adjacent to the policy area to accelerate the usable revenue flow of existing funding programs, thus assuring that transportation infrastructure is in place when needed.

C 2.7 Establish a program to reduce overall trip generation in the Highway 79 Policy Area by creating a trip cap on residential development within this policy area which would result in a net reduction in overall trip generation of 70,000 vehicle trip per day from that which would be anticipated from the General Plan Land Use designations as currently recommended. The policy would generally require all new residential developments proposals within the Highway 79 Policy Area to reduce trip generation proportionally, and require that residential projects demonstrate adequate transportation infrastructure capacity to accommodate the added growth.

8.10.2.3.4 City of Riverside Policies

Policy CCM-2.1: Complete the Master Plan of Roadways shown on Master Plan of Roadways.

Policy CCM-2.2: Balance the need for free traffic flow with economic realities and environmental and aesthetic considerations, such that streets are designed to handle normal traffic flows with tolerances to allow for potential short-term delays at peak-flow hours.

Policy CCM-2.3: Maintain LOS D or better on Arterial Streets wherever possible. At key locations, such as City Arterials that are used by regional freeway bypass

traffic and at heavily traveled freeway interchanges, allow LOS E at peak hours as the acceptable standard on a case-by-case basis.

Policy CCM-2.4: Minimize the occurrence of streets operating at LOS F.

Policy CCM-2.5: Review and update street standards as necessary to current capacity and safety practices.

Policy CCM-2.6: Consider all alternatives for increasing street capacity before widening is recommended for streets within existing neighborhoods.

Policy CCM-2.7: Limit driveway and local street access on Arterial Streets to maintain a desired quality of traffic flow. Wherever possible, consolidate driveways and implement access controls during redevelopment of adjacent parcels.

Policy CCM-2.8: Design street improvements considering the effect on aesthetic character and livability of residential neighborhoods, along with traffic engineering criteria.

Policy CCM-2.9: Design all street improvement projects in a comprehensive fashion to include consideration of street trees, pedestrian walkways, bicycle lanes, equestrian pathways, signing, lighting, noise and air quality wherever any of these factors are applicable.

Policy CCM-2.10: Emphasize the landscaping of parkways and boulevards.

Policy CCM-2.11: Consider the use of special design traffic control devices which reflect the historic or aesthetic character of the neighborhoods in which they are located.

Policy CCM-2.12: Consider connecting Local Streets at strategic locations to accommodate residential neighborhood traffic movement, provided such connections do not encourage diversion of regional trips, do not impact sensitive environments, or do not disrupt the character of residential neighborhoods.

Policy CCM-2.13: Support the establishment of additional east-west connections southerly of Van Buren Boulevard between Barton Road and Washington Street.

Policy CCM-2.14: Ensure that intersection improvements on Victoria Avenue are limited to areas where Level of Service is below the City standard of D. Allow only the minimum necessary improvements in recognition of Victoria Avenue's historic character.

8.10.2.4 Compliance with Laws, Ordinances, Regulations, and Standards

All applicable LORS and administering agencies are summarized subsequently. Table 8.10-1 describes how the project will comply with all LORS pertaining to traffic and transportation impacts.

TABLE 8.10-1
Laws, Ordinances, Regulations, and Standards Applicable to Traffic and Transportation

Authority	Administering Agency	Requirements	Compliance
49 CFR, Section 171-177 and 350-300 Chapter II, Subchapter C and Chapter III, Subchapter B	U.S. Department of Transportation and Caltrans	Requires proper handling and storage of hazardous materials during transportation.	Project and transportation will comply with all standards for the transportation of hazardous materials.
CVC §31300 et seq.	Caltrans	Requires transporters to meet proper storage and handling standards for transporting hazardous materials on public roads.	Transporters will comply with standards for transportation of hazardous materials on state highways during construction and operations. The project will conform to CVC §31303 by requiring that shippers of hazardous materials use the shortest route possible to and from the site.
CVC §§31600 – 31620	Caltrans	Regulates the transportation of explosive materials.	The project will conform to CVC 31600 - 31620.
CVC §§32000 – 32053	Caltrans	Regulates the licensing of carriers of hazardous materials and includes noticing requirements.	The project will conform to CVC 32000 - 32053.
CVC §§32100 - 32109 and 32105.	Caltrans	Establishes special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. Requires that shippers of inhalation or explosive materials contact the CHP and apply for a Hazardous Material Transportation License.	The project will conform by requiring shippers of inhalation or explosive materials to contact the CHP and obtain a Hazardous Materials Transportation License.
CVC §§34000 –34121.	Caltrans	Establishes special requirements for the transportation of flammable and combustible liquids over public roads and highways.	The project will conform to CVC §§34000 - 34121.
CVC §§34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5 and 34510-11.	Caltrans	Regulates the safe operation of vehicles, including those used to transport hazardous materials.	The project will conform to these sections in the CVC.
CVC §§35550-35559	Caltrans	Regulates weight and load limitations.	The project will conform to these sections in the CVC.
CVC §§25160 et seq.	Caltrans	Addresses the safe transport of hazardous materials.	The project will conform to these sections in CVC.

TABLE 8.10-1
Laws, Ordinances, Regulations, and Standards Applicable to Traffic and Transportation

Authority	Administering Agency	Requirements	Compliance
CVC §§2500-2505.	Caltrans	Authorizes the issuance of licenses by the Commissioner of the CHP for the transportation of hazardous materials including explosives.	The project will conform to these sections in the CVC.
CVC §§13369, 15275, and 15278.	Caltrans	Addresses the licensing of drivers and classifications of licenses required for the operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are required.	The project will conform to these sections in the CVC.
S&HC §§117, 660-711	Caltrans	Requires permits from Caltrans for any roadway encroachment during truck transportation and delivery.	Encroachment permits will be obtained by transporters, as required.
CVC §35780; S&HC §660-711; 21 CCR 1411.1-11411.6	Caltrans	Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.	Transportation permits will be obtained by transporters for all overloads, as required.
S&HC §§660, 670, 1450, 1460 *et seq.*, 1470, and 1480	Caltrans	Regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.	The project will conform to these sections in the CVC.
California State Planning Law, Government Code Section 65302	Caltrans	Project must conform to the General Plan.	Project will comply with General Plan.

CCR California Code of Regulations
CFR Code of Federal Regulations
CVC California Vehicle Code
S&HC California Streets and Highways Code

8.10.3 Affected Environment

8.10.3.1 Project Description

The AES Highgrove Project will be a nominal 300-megawatt (MW) peaking facility consisting of three natural-gas-fired turbines and associated equipment. The Highgrove project will connect to Southern California Edison's (SCE) electrical transmission system via the adjacent 115-kV Highgrove Substation. The Highgrove Project will be located on approximately 9.8 acres of land. The site is located in an industrially zoned area of the City of Grand Terrace, San Bernardino County, California.

The project will also include approximately 7 miles of new 12-inch-diameter natural gas pipeline. The gas pipeline alignment is located primarily in Riverside County and will be constructed within surface streets within the jurisdiction of City of Grand Terrace and the City of Riverside. Figure 8.10-1 shows the location of the generating facility site and water supply line.

8.10.3.1.1 Project Site Access

The site is located on 12700 Taylor Street, on the northwest corner of the intersection of Taylor Street and Main Street. Primary access to the site will be provided via an existing entrance from Taylor Street, which was used to access the existing Highgrove Generating Station.

Figure 8.10-2 illustrates the regional location of the Highgrove project site and its relative transportation and transit facilities. The surrounding land uses of the plant site are primarily lumber yards and storage facilities. The proposed facility would result in additional traffic that includes both passenger vehicles related to construction workers and permanent employees, and delivery vehicles transporting commercial equipment, as well as potential impacts related to street closures associated with pipeline installation.

8.10.3.1.2 Gas Pipeline

The Applicant considered several alternative gas pipeline routes. This analysis focuses solely on the preferred gas pipeline route. Figure 8.10-3 illustrates the proposed and alternative gas pipeline routes.

The proposed approximately 7-mile-long, 12-inch natural gas line from the Highgrove Project to Southern California Gas Company's (SoCalGas) Line 2001 would exit the west side of the power plant and follow the Riverside Canal southwest to Main Street. It would turn west on Main Street to Iowa Street and head south on Iowa Street to Martin Luther King Boulevard. It would turn east on Martin Luther King Boulevard to Canyon Crest Drive. On Canyon Crest Drive, the line would head south and end at Via Vista Drive where it would connect into Line 2001.

8.10.3.2 Existing Transportation Facilities

The proposed project lies near primary transportation corridors that traverse the southern part of San Bernardino County and northern part of Riverside County. While the proposed project in is San Bernardino County, most of the affected transportation facilities are in Riverside County. Major freeways in proximity to the proposed Highgrove project site include Interstate 215 (I-215), State Route 91 (SR 91), and SR 60.

8.10.3.2.1 Interstate 215

I-215 is an alternate route to I-15 between Temecula and San Bernardino. It is a generally north-south freeway facility. It merges with Interstate 15 in Temecula to the south of the project and in San Bernardino to the north. It goes through Murrieta, Sun City, Perris, Moreno Valley, Highgrove, Grand Terrace, San Bernardino and Highland. I-215 is comprised of four to six lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, I-215 carries an average of 150,500 vehicles per day in the vicinity of the project site (post mile 45.01).

8.10.3.2.2 State Route 91

SR 91 is a major east-west freeway connecting Los Angeles, Orange and Riverside counties. SR 91 is comprised of four to six lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, SR 91 carries an average of 160,000 vehicles per day in the vicinity of the project site (post mile 21.66). Access to and from SR 91 in the vicinity of the project site is via I-215.

8.10.3.2.3 State Route 60

SR 60 is a major east-west freeway connecting Los Angeles and Riverside County. SR 60 is comprised of six to eight lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, SR 60 carries an average of 128,000 vehicles per day in the vicinity of the project site (post mile 12.21). Access to and from SR 60 in the vicinity of the project site is via I-215.

Local Roadway Facilities

Riverside has an extensive street grid system that connects the proposed project to neighboring communities, and the major freeways described above.

Roadways within the study area that provide access to the plant site and gas pipeline include: Main Street, Taylor Street, Iowa Avenue, Center Street, Chicago Avenue, Marlborough Avenue, Martin Luther King Boulevard, Canyon Crest Drive, and Alessandro Boulevard. These roadways are briefly described below, while Figure 8.10-3 shows the arrangement of the local roadway network in the vicinity of the project site.

Alessandro Boulevard

Alessandro Boulevard is a four-lane roadway with raised median and turn bays in the center. It has bike lanes on both sides of the road. The speed limit within the project area is 55 miles per hour (mph). Adjacent land use is residential.

Canyon Crest Drive

Canyon Crest Drive is a two- to four-lane north-south roadway. The speed limit varies from 25 mph to 45 mph. It has a striped median or raised median with turn bays along the roadway. Adjacent land use is mostly residential. It has signalized intersections with Blaine, Linden, Martin Luther King Junior Boulevard, El Cerrito, Central, Country Club, Via Vista, and Alessandro Boulevard.

Center Street

Center Street is the border between Riverside and San Bernardino counties. It is a four-lane east-west roadway with a signalized intersection at Iowa Avenue in the project vicinity. It has a striped median and sidewalks. Abutting land use is mostly residential, with some commercial land use near the intersection of Prospect Avenue. It has a railroad crossing

within the project limit. Speed limit on Iowa Avenue is 40 mph. Daily traffic volumes on Center Street are approximately 5,000 vehicles per day.

Chicago Avenue

Chicago Avenue is a four-lane north-south roadway with a 45 mph speed limit. It has a raised or striped median on different segments of the street. It has sidewalk, parking, and bike lane on different segments along the road. It has signalized intersections at Blaine, Spruce, Alessandro, Ransom, Country Club, Central, Martin Luther King Boulevard, and University Avenue.

Iowa Avenue

Iowa Avenue is a major north-south roadway in the project vicinity, starting in the City of Grand Terrace and continuing south into the City of Riverside Most of Iowa Avenue has five lanes with a center turn lane. It has sidewalks and bike lanes on different segments of the road. It has signalized intersections at Columbia, Palmyrita Avenue, Center Street, Marlborough Avenue, Spruce Street, Blaine, Linden, and Martin Luther King Boulevard in the project vicinity. The abutting land use is mix of office, Industrial, and residential. The speed limit on Iowa is 45 to 50 mph. Daily traffic volumes on Iowa Avenue range from 15,000 to 19,000 vehicles per day.

Main Street

Main Street is a two lane east-west roadway with parking on both sides of the streets. The abutting land use is industrial. There are two rail crossings on Main Street in the project vicinity. Existing (2001) traffic volumes on Main Street range from 1600 to 3100 vehicles per day (City of Grand Terrace, Traffic Flow Map).

Marlborough Avenue

Marlborough Avenue is a east-west two-lane facility with signalized intersections at Iowa and Chicago avenues. Adjacent land use is mostly industrial or office complex. It has head-in parking on the segment between Iowa and Chicago for the adjacent Hunter Park. East of the railroad crossing, Marlborough Avenue is a narrow segment (approximately 20 feet wide) with no shoulder and no parking.

Martin Luther King Boulevard

Martin Luther King Boulevard is a four-lane east-west roadway. It has raised median and bike lane on both sides of the road. It has signalized intersections at Canyon Crest, Iowa, and Chicago. Abutting land use is open fields, parking lots and agricultural.

Taylor Street

Taylor Street is a two-lane north-south roadway that is the primary access to the plant site. It currently ends at Pico Street, just north of Main Street, in the City of Grand Terrace. It has a striped median. Abutting land use is industrial.

8.10.3.3 Pedestrian/Bicycle Facilities

Riverside County's bikeway system is included as part of the County's circulation system. Planned bicycle routes are shown on the Bikeways and Trails Plan. Riverside County uses three types of bike path classifications:

- Class I - Provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross-flow minimized.

- Class II - Provides a striped lane for one-way bike travel on a street or highway.
- Class III - On-road, signed bicycle routes with no separate lanes.

Pedestrian facilities include sidewalks, walkways, bridges, crosswalks, signals, illumination, and benches, among other items. Pedestrian facilities provide a vital link between many other modes of travel and can make up a considerable portion of short-range trips made in the community. Where such facilities exist, people will be much more likely to make shorter trips by walking rather than by vehicle. Pedestrian facilities also provide a vital link for commuters who use other transportation facilities such as rail, bus, and park-n-rides. Without adequate pedestrian facilities, many commuters may be forced to utilize an automobile because of difficult or unsafe conditions that exist at their origin or destination. Pedestrian facilities within the immediate vicinity of schools and recreational facilities are important components of the non-motorized transportation system. Such facilities, typically in the form of sidewalks, are provided where they are appropriate and enhance the safety of those who choose to walk to and from their destination.

8.10.3.4 Public Transportation

Due to the interrelationship of urban and rural activities (employment, housing and services), and the low average density of existing land uses, the private automobile is the dominant mode of travel in the project vicinity. The public transit system alternatives for Riverside County include: fixed route public transit systems, common bus carriers, AMTRAK (intercity rail service), Metrolink (commuter rail service), and other local agency transit and paratransit services. Concentrated growth and increased job creation will require a regional and local linkage system between communities in the County. The public transportation system can facilitate those linkages, and help to shape future growth patterns.

8.10.3.4.1 Inter and Intra-County/Subregional Systems

The Riverside Transit Agency (RTA) operates fixed bus routes providing public transit service throughout a 2,500-square-mile area of western Riverside County. RTA's fixed routes have been designed to establish transportation connections between all cities and unincorporated communities in western Riverside County. RTA currently operates full-size buses, mini-buses, vans, and trolleys. The system carries approximately 6.4 million passengers annually, which is approximately 18,000 passengers per day. RTA also provides service to San Bernardino and Orange counties.

Sun Line Transit Agency (Sun Line) also provides public transit services in the project vicinity. The service area covers 928 square miles. Sun Line operates fixed routes, serving over 3 million passengers annually. All of Sun Line's buses are equipped with front-mounted bicycle racks; and overall, the system carries over 6,000 bicycles per month. Sun Line also operates the Sun Dial System, which provides curb-to-curb demand responsive (dial-a-ride) service for members of the community requiring such assistance.

8.10.3.4.2 Paratransit Service

The County supports reliable, efficient, and effective paratransit service by encouraging development of service systems that satisfy the transit needs of the elderly and physically handicapped. Paratransit services are transportation services such as car pooling, van pooling, taxi service, and dial-a-ride programs.

8.10.3.4.3 Fixed Route Transit Service

The County supports fixed-route, scheduled bus services that have convenient access to major population, economic, institutional, recreation, community, and activity centers. Fixed route transit services include urban and suburban rail, and bus systems. These services operate on regular schedules along a designated route, and can be used as additional transportation alternatives within the County. The closest public transit service route to the plant site is on Michigan Avenue. RTA Route 25 goes through Michigan Avenue and Center Street. Omnitrans Route 200 goes through Michigan Avenue. However, there are several RTA routes along the gas pipeline alignment. RTA operates public service buses on Center Street, Iowa Avenue, Chicago Avenue, Blaine, University Avenue, Martin Luther King Boulevard, Canyon Crest Drive, and Alessandro Boulevard.

8.10.3.5 Rail Traffic

The freight rail system within the County is vital to the economy of the county. This system provides movement for goods within and outside of the County's jurisdiction. Riverside County will continue to support operation of passenger and freight rail systems that offer efficient, safe, convenient, and economical transport of County residents and commodities. The proposed California high-speed rail system will directly serve residents and businesses in Riverside County, enabling the County to compete in the global economy.

8.10.3.5.1 AMTRAK

The closest AMTRAK station to the project is in the Downtown of the City of Riverside. This station provides connecting AMTRAK service to points west including Los Angeles, and to points east including Tucson, Arizona; and El Paso, Texas. AMTRAK provides bus connections to and from other Riverside County areas to the San Bernardino AMTRAK station on a daily basis.

8.10.3.5.2 Metrolink

Metrolink's Riverside Line provides commuter rail train service between Riverside and Los Angeles. Metrolink currently has multiple stations located in Riverside County including: Pedley Station, Riverside-Downtown Station, Riverside-La Sierra Station, and West Corona Station. Long-term plans call for an extension of the Riverside Transit Corridor, in accordance with performance standards, along the San Jacinto branch line to the City of Hemet. Riverside Downtown Station is closest Metrolink Station to the project site.

8.10.3.5.3 Freight Rail

The Union Pacific and the Burlington Northern Santa Fe Railroads provide freight service in Riverside County, connecting the County with major markets within California and other destinations north and east. Both agencies have rail tracks just east and west of the project site.

8.10.3.6 Air Traffic

The provision of general aviation facilities and services that meet the needs of the residents of Riverside County is an important component of the County's transportation system. To meet these needs, the County must facilitate coordination of County airport plans with aviation planning conducted by the State, the County Economic Development Agency, and local agencies related to transportation, land use, and financing. Airports used by County residents and businesses are tied into the regional air transportation system.

8.10.3.6.1 Aviation Facilities

There are two regional aviation facilities that are close to the Highgrove project site: Palm Springs International Airport, Ontario International Airport (San Bernardino County). Palm Springs International Airport is located in Riverside County, but Ontario International airport is closer to the facility (approximately 20 miles to the west). In addition to the regional air passenger airport facilities, the March Inland Port/Air Reserve Base is located in Riverside County along I-215 near Perris. This airport provides regional air cargo service and also continues to function as the Air Reserve Base in Riverside County. There are three other local airports close to the project site. Those are Hemet-Ryan airport, Riverside Municipal Airport and French Valley airport.

8.10.3.6.2 Air Cargo

Air cargo is the fastest growing method of transporting goods in and out of the southern California region, and is expected to continue to increase at a faster rate than passenger air service. Trucking, rail, and air cargo operations in this area make it one of the larger multi-modal freight management and distribution complexes in the nation. Land development is occurring in support of these functions, extending into the Mira Loma and Norco areas of Riverside County. The March Air Reserve Base is currently a joint use status land use. The Air Reserve Base will gradually reduce the military use of this facility and begin to increase the amount of goods and cargo that can be accommodated at this site. As the amount of goods transported into this area via the March Air Reserve Base increases, so does the potential to establish viable land uses that can make use of this facility This area can be used to accommodate the increased growth in goods movement, with the potential to become a passenger airport.

8.10.3.7 Transportation Improvements

8.10.3.7.1 Local Comprehensive Transportation Plans

The Regional Transportation Plan (RTP) is a multi-modal, long-range planning document prepared by the Southern California Association of Governments (SCAG), in coordination with federal, state, and other regional, sub-regional, and local agencies in southern California.

The RTP includes programs and policies for congestion management, transit, bicycles and pedestrians, roadways, freight, and finances. The RTP is prepared every 3 years and reflects the current future horizon based on a 20-year projection of needs.

The RTP's primary use is as a regional long-range plan for federally funded transportation projects. It also serves as a comprehensive, coordinated transportation plan for all governmental jurisdictions within the region.

Each agency responsible for transportation, such as local cities, counties, and Caltrans, has different transportation implementation responsibilities under the RTP. The RTP relies on the plans and policies governing circulation and transportation in each county to identify the region's future multi-modal transportation system.

According to the RTP and the general plans of the cities and county, there are no planned transportation improvements on the surface streets adjacent to the proposed gas line route.

8.10.3.7.2 Other Future Plans and Projects

A Specific Plan for the development of the OAC (a commercial development) was approved in 2004 for the land just north and northwest of the proposed project. Construction is expected to start in January, 2007. Grading, streets, and utilities will all be installed as part of the initial phase, which will take approximately one year to complete. Actual building construction will occur over approximately 2 years.

As part of that project, Taylor Street, Commerce Way, and Van Buren will all be extended from their current termini. Taylor Street will be extended to Commerce Way (to the north), and built to its ultimate cross-section width (84 feet) as a secondary highway. The Environmental Impact Report for the OAC Specific Plan also lists a series of intersection improvements required to provide acceptable operations in the opening year and 2030. A total of 13 intersections were identified, and specific widening projects (added lanes and reconstructed interchanges) were listed. However, the improvements will be phased as future traffic impact study reports are submitted with development plans.

The specific improvements listed for the intersections nearest to the proposed project are as follows:

- Iowa Avenue/Main Street: A new traffic signal would be installed at the intersection before the OAC is opened. Future (2030) improvements are to add northbound through lanes, a southbound left-turn and through lane, and a westbound free right-turn lane.
- Taylor Street/Main Street: A new traffic signal would be installed at the intersection before the OAC is opened. Future (2030) improvements are to add a southbound free right-turn lane and an eastbound left-turn lane.
- Northbound and southbound I-215/Iowa Avenue ramp terminal intersections: Reconstructed interchanges are needed for opening year (2006) conditions. Also, the Environmental Impact Report indicates that the City of Grand Terrace is proposing new ramps for northbound I-215 at the terminus of De Barry Street. The existing southbound ramps at Barton Road would also be used for the OAC.

There are also plans to build a new high school on the site of existing lumberyards, just east of the Highgrove project site on the other side of the Taylor Street. Roadway infrastructure improvements associated with the projects will affect roadways in the project area. Both projects also have the potential to add traffic to local streets.

8.10.4 Environmental Analysis

This subsection discusses potential environmental impacts of the proposed project. Potential traffic impacts during construction of the plant as well as plant operations after construction have been analyzed.

Project area reconnaissance was performed by CH2M HILL in May 2005 to examine the proposed project area, document roadway characteristics, identify physical constraints, and assess general traffic conditions.

8.10.4.1 Significance Criteria

Significance criteria were developed based on guidance from Appendix G of the CEQA Guidelines. The guidelines identify significant impacts to be caused by a project if it results in an increase in traffic that is substantial relative to the amount of existing traffic, the capacity of the surrounding roadway network and the criteria used by the City of Grand Terrace, County of Riverside, and the City of Riverside.

8.10.4.1.1 City of Grand Terrace Significance Criteria

The maximum acceptable LOS for City's Master Plan of Streets and Highways is LOS C. However, intersections at freeway ramps may have LOS D in peak travel hours. LOS is defined using daily traffic volumes. For four-lane arterials, the volume differences between LOS grades are approximately 4,000 vehicles per day (for divided highways) and 2500 vehicles per day (for undivided). For two-lane arterials, the differences are approximately 1,250 vehicles per day. In other words, the addition of 1,250 vehicles per day on a two-lane arterial would degrade LOS one level.

8.10.4.1.2 County of Riverside Significance Criteria

The following are the significance criteria related to transportation used by the Riverside County Planning Department for the determination of impacts associated with a proposed project:

C 2.1 Maintain the following countywide target Levels of Service:

LOS "C" along all county-maintained roads and conventional state highways. As an exception, LOS "D" may be allowed in Community Development areas, only at intersections of any combination of Secondary Highways, Major Highways, Arterials, Urban Arterials, Expressways, and conventional state highways or freeway ramp intersections.

LOS "E" may be allowed in designated community centers to the extent that it would support transit-oriented development and walkable communities.

C 2.2 Apply level of service standards to new development via a program establishing traffic study guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development.

C 2.3 Traffic studies prepared for development entitlements (tracts, plot plans, public use permits, conditional use permits, etc.) shall identify project-related traffic impacts and determine the "significance" of such impacts in compliance with CEQA.

C 2.4 The direct project-related traffic impacts of new development proposals shall be mitigated via conditions of approval requiring the construction of any improvements identified as necessary to meet level of service standards.

8.10.4.1.3 City of Riverside Significance Criteria

The Riverside City's guidance is that it will "strive to maintain LOS D or better on arterial streets wherever possible. At some key locations, such as City arterial roadways which are used as a freeway bypass by regional through traffic and at heavily traveled freeway interchanges, LOS E may be acceptable as determined on a case-by-case basis. Locations that may warrant the LOS E standard include portions of Arlington Avenue/Alessandro Boulevard, Van Buren Boulevard throughout the City, portions of La Sierra Avenue and

selected freeway interchanges. A higher standard, such as LOS C or better, may be adopted for Local and Collector streets in residential areas. The City recognizes that along key freeway-feeder segments during peak commute hours, LOS F may be expected due to regional travel patterns. Arterials will be designed with sufficient capacity to accommodate anticipated traffic based on intensity of existing and planned land uses while discouraging additional non-local cut-through traffic on City streets."

8.10.4.1.4 Summary

Based on the significance criteria noted above, a degradation of LOS may be considered a significant impact, particularly for operations at LOS D or worse. However, since only limited traffic data are available (in most cases, daily volumes), a more appropriate criterion for this project is the addition of a significant volume of traffic. Using the City of Grand Terrace's LOS standards, a degradation of one LOS level on an arterial would require adding 1,250 to 4,000 vehicles per day, or 125 to 400 vehicles in the peak hour. For a 6-lane freeway, the criterion is 12,000 vehicles per day or 1,200 vehicles in the peak hour (both directions). Therefore, additional volume was used as the significance criterion for traffic, following the CEQA guidance to consider an increase in traffic that is substantial relative to existing levels.

Other construction-related impacts may be considered significant if they reduce access or safety for vehicles, pedestrians, bicyclists, or transit riders. In these cases, significance is evaluated using judgment and standards of the profession for construction.

8.10.4.2 Summary of Construction Phase Impacts

8.10.4.2.1 Impacts from Plant Construction

Daily weekday traffic operations were evaluated during construction for the local roadway network adjacent to the project site. The peak hour analysis examined the worst-case scenario of the impact of 147 daily employees during construction of the project.

Trip Generation

Demolition of the old plant and construction of the proposed plant is anticipated to begin in mid-2007 and last approximately 14 months. A peak workforce of approximately 147 workers per day over a 2-month period during months 7 and 8 of construction is expected.

Construction would generally be scheduled to occur between 6:30 a.m. and 5:00 p.m., 5 days a week, although additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Based on the regular schedule, most worker trips to the plant site would occur during the a.m. (inbound to site) and p.m. (outbound from site) peak commute hours. The delivery of construction materials and the hauling of materials from the Highgrove project site would also occur during the day, but not during the peak hours. During the peak construction period, using an average vehicle occupancy factor of 1.3 persons per vehicle for commuting, construction workers would generate an estimated 226 daily trips, 113 a.m. peak hour trips, and 113 p.m. peak hour trips. During this period, approximately 20 truck trips would occur, with no truck trips occurring during the a.m. and p.m. peak commute periods.

Trip Distribution

Trip distribution percentages for the construction employees are based on assumptions of regional demographics of construction workers, and recent surveys of the project site (i.e., drive-by windshield surveys). The construction worker trip distribution has been

determined to be: 25 percent within the City of Grand Terrace, Loma Linda and Highgrove area (local trips); 25 percent from north in San Bernardino County (Rialto, Colton, San Bernardino cities); and the remaining 50 percent from southern and western parts of Riverside County.

To arrive at the project site, construction worker trips from San Bernardino County would use southbound I-215 and exit on Iowa Avenue and proceed to Taylor Street. Trips from southern points of Riverside County would use SR 60/I-215 or SR 91, and exit on Center Street/Highgrove. Trips from within the City would use Main Street to reach the plant location.

Traffic Assignment

Based on the assumptions described above, the maximum additional traffic on most of the freeway segments (e.g., SR 60, I-215, or SR 91) would be approximately 28 vehicle trips in the peak hour. Up to 56 trips may be added to SR 91 during the peak hour. This represents no more than one to two percent of the total traffic, which would not have a significant impact on LOS. Using the significance criteria previously described, the number of additional trips in the peak hour (28 to 56) is well below the threshold value of 1,200 vehicles in the peak hour (or 600 vehicles in one direction).

On the arterials, the greatest additional volume of traffic would be on Main and Taylor streets. Up to 113 trips will be added to the peak hour. Since both of these streets have very low traffic volumes (Main Street is operating at LOS A per City of Grand Terrace standards), the impacts are less than significant.

One other potential impact is a conflict with school traffic. Construction would generally be scheduled to occur between 6:30 a.m. and 3:30 p.m. so workers traveling for their shifts would be driving before and after these times. Arrival for work will not present conflicts with most school trips, but the end of the afternoon shift could occur during some school traffic. The closest existing school is Highgrove Elementary School (at Center Street and Garfield Avenue), about 3,000 feet southeast of the Highgrove project site. Also a new high school is planned across Taylor Street from the plant site. The high school is planned to begin construction during the summer of 2006, and to start sessions in the fall of 2008. If construction of the power plant is not completed before school sessions begin, work shifts will be scheduled to avoid conflict with afternoon school traffic.

Summary

Project construction would result in short-term increases in vehicle trips by construction vehicular activities and construction workers. Because the volumes of traffic are low, this impact will be less than significant, with the possible exception of afternoon high school traffic.

8.10.4.2.2 Construction Impacts from Pipeline Construction

The horizontal alignment for the gas pipeline has been designed with traffic impacts in mind. Where possible, the line will be installed in locations where the traffic impacts of construction will be minimized. On arterials, the critical impact locations are often signalized intersections, main thoroughfare, and associated on- and off-ramps, related to lane closures at these areas, which may have the greatest impact on capacity.

Trenching for gas pipeline construction will necessitate temporary lane closures and would reduce the number of lanes for an estimated 150 to 300 feet at a time. It is expected that the

contractor will use temporary trench paving, and repaving may occur over longer stretches (i.e., several days of trenching may occur before repaving is completed on a particular section).

The work area will be delineated with lane closure devices approved by Caltrans traffic standards or other approved traffic control standard per governing agency request, such as *Manual of Uniform Traffic Control Devices* (MUTCD) and *Work Area Traffic Control Handbook* (WATCH).

However, these considerations will need to be balanced with other issues, including existing utilities, construction cost and time, and gas pipeline installation requirements. Therefore, there is the potential for traffic impacts for constructing some elements of the gas pipeline. More details on the specifics of the impacts cannot be determined until the horizontal alignment of the pipeline is identified. However, the general impacts from the pipeline construction are summarized below:

Project construction within existing streets would reduce the number of, or the available width of, travel lanes on roads, resulting in temporary disruption of traffic flows and increases in traffic congestion. These impacts are potentially significant. With the implementation of proposed mitigation measures, these impacts will be mitigated to less-than-significant levels.

Project construction within or across streets would affect emergency access, and access to local land uses. These impacts are anticipated to be less-than-significant, and would be further reduced with the implementation of the proposed mitigation measures.

Also, note that work crews associated with pipeline construction, and materials deliveries to the pipeline sites would result in a small number of trips throughout the study area network. The construction crew for the gas pipeline facilities would be staged in appropriate areas adjacent to pipeline construction activities. The impacts of this relatively small number of trips are less than significant.

8.10.4.3 Parking Facilities

Construction of the proposed project would not impact on-street parking. An approximately 7.5-acre area inside the project site will be used as a lay down area (staging, and construction worker parking lot) to meet the construction worker parking demand. The gas pipeline would reduce some available parking adjacent to their construction location. However it will not be significant since it will be temporary.

When completed, the project would contain adequate onsite parking to accommodate the permanent 15 employees. Street parking spaces would not be eliminated as part of the proposed project. Therefore, no significant impacts to parking are anticipated.

8.10.4.4 Public Transportation

There are no bus stops or any other public transit stations close to the Highgrove project site. There will be no impacts to public transit from the plant construction. However the public transit routes along the gas pipeline will be impacted by the construction. The impacts may include closing down bus stops temporarily. The minimal number of employees that might use public transport during construction and during operation would not cause any significant impact to the local public transportation system.

Project construction could temporarily disrupt bus service along the pipe line route. These impacts are anticipated to be less-than-significant, and would be further reduced with the implementation of the proposed mitigation measures.

8.10.4.5 Goods Movement

Construction and operation of the proposed project would not impact adjacent freight rail lines, and air or shipping routes. Therefore, the project would not have a significant impact on goods movement.

8.10.4.6 Safety

The roadways in the vicinity of the proposed Highgrove project site would continue to provide adequate sight distances. Truck traffic within the area would continue to use designated truck routes to access the proposed project site. In addition, the project site is located in an industrial zone.

Project construction within roadways and railroad rights-of-way would temporarily increase the potential for accidents. These impacts are anticipated to be less-than-significant, and would be further reduced with the implementation of the proposed mitigation measures.

Impacts to vehicle, pedestrian, and bicycle safety as a result of construction and operation of the project would be less-than-significant.

8.10.4.7 Air, Rail, and Waterborne Traffic

The proposed project would have no impacts on air, rail, or waterborne traffic.

8.10.4.8 Hazardous Materials Transport

Construction of the proposed project would generate hazardous wastes consisting primarily of batteries, asbestos containing materials, and various liquid wastes (e.g., cleaning solutions, solvents, paint and antifreeze). Contaminated soils could also be generated in the pre-construction or site preparation phase and would be transported as hazardous materials or hazardous waste (see Subsection 8.13). Transport route arrangements would be required with Caltrans officials for permitting and escort, as applicable. Generally, only small quantities of hazardous materials will be used during the construction period, as described in Subsection 8.12, Hazardous Materials Handling. They may include gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. Because of the small quantities of hazardous materials involved, shipments will likely be consolidated. Multiple truck deliveries of hazardous materials during construction are unlikely. During construction, a minimal number of truck trips per month will be required to haul waste for disposal. Because the transport of hazardous wastes will be conducted in accordance with the relevant transportation regulations, no significant impact is expected.

Operation of the project would result in the generation of additional wastes including lubricants, water treatment chemicals, herbicides and pesticides, and sludge. In addition, operation of the project will require transportation of aqueous ammonia, a regulated substance. Aqueous ammonia will be delivered to the plant by truck transport using designated truck routes. Small quantities of sulfuric acid and various other hazardous materials will also be used in project operations, as described in Subsection 8.12. According to Division 13, Section 31303 of

the CVC, the transportation of regulated substances and hazardous materials will be on the state or interstate highways that offer the shortest overall transit time possible.

Aqueous ammonia is considered a potential inhalation hazard. Division 14.3, Section 32105 of the CVC specifies that unless there is not an alternative route, every driver of a vehicle transporting inhalation hazards shall avoid, by prearrangement of routes, driving into or through heavily populated areas, congested thoroughfares, or places where crowds are assembled.

The truck loading area will be located within the project site. The use of 19 percent aqueous ammonia will require approximately 14 deliveries of ammonia per year, or 28 truck trips per year. This would conservatively equate to a maximum of 4 deliveries per month during peak periods, or 8 truck trips per peak month (inbound and outbound). These occasional truck trips would generally occur at night or during weekends to avoid school hours. If the plant uses lower concentrations of aqueous ammonia, more frequent delivery would be required.

Table 8.10-2 summarizes expected truck trips for the project, including delivery of hazardous materials and removal of wastes. There will be a maximum of ten truck trips per day, with an average of two or less truck trips per day to the project site. For further information on the management of hazardous materials and waste products, see Subsections 8.12 and 8.13, respectively.

TABLE 8.10-2
Estimated Truck Traffic at the Facility During Operation

Delivery Type	Number and Occurrence of Trucks
Aqueous ammonia	4 per month during peak use
Sulfuric acid	2 per month
Cleaning chemicals	1 per month
Trash pickup	1 per week
Lubricating oil	4 per year
Lubricating oil filters	4 per year
Laboratory analysis waste	4 per year
Oily rags	4 per year
Oil absorbents	4 per year
Water treatment chemicals	Up to 4 per week

Additionally, transporters of inhalation hazardous or explosive materials must contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook that will specify the routes approved to ship inhalation hazardous or explosive materials. The exact route of the inhalation or explosive material shipment will not be determined until the shipper contacts the CHP and applies for a license. Transportation impacts related to hazardous materials associated with power plant operations will not be significant since deliveries of hazardous materials will be limited. Delivery of these materials will occur over prearranged routes and will be in compliance with all LORS governing the safe transportation of hazardous materials.

Standards for the transport of hazardous materials are contained in the Code of Federal Regulations, Title 49 and enforced by the U.S. Department of Transportation. Additionally, the State of California has promulgated rules for hazardous waste transport that can be found in the California Code of Regulations, Title 26. Additional regulations for the transportation of hazardous materials are outlined in the California Vehicle Code (Sections 2500-505, 12804-804.5, 31300, 3400, and 34500-501). The two state agencies with primary responsibility for enforcing federal and state regulations governing the transportation of hazardous wastes are the CHP and Caltrans. Transport of hazardous materials to and from the project site will comply with all applicable requirements.

For those materials that require offsite removal, a licensed hazardous waste transporter would move these substances to one of three Class I hazardous waste landfills in proximity to the project site. The hazardous material carrying trucks should use the shortest possible route between freeway and the plant site and avoid residential area as much as possible. With that objective, the trucks carrying hazardous material should get on I-215 using the shortest route and then use SR 91, SR 60, I-215 based on its destination. The directions for traveling between the project site and I-215 are given below. All deliveries of hazardous materials will use these routes.

From northbound I-215 to project site: Take the Center Street/Highgrove exit. Then turn off into East La Cadena Drive, turn right on West Main Street. Turn left on Taylor Street to reach the project site.

From southbound I-215 to project site: Take the Iowa Avenue exit, turn right, cross I-215 and head south on S. Iowa Avenue. Turn left on West Main Street. Turn left on Taylor Street to reach the project site.

From project site to northbound I-215: Start on Taylor Street, turn right on West Main Street, Turn right on Iowa Avenue, keep on the right lane to continue on to the on ramp to northbound I-215

From project site to southbound I-215: Start on Taylor Street, turn right on West Main Street, Turn right on Iowa Avenue, keep on the center lane, turn left on the frontage road at the southbound ramp intersection, continue on southbound frontage road to southbound ramp and on to southbound I-215.

The major highways and interstates that would be used to carry hazardous wastes from the project site to the appropriate landfills contain adequate capacity to accommodate these vehicle trips. Hauling would be carried out in accordance with local, state, and federal regulations that include the Resource Conservation and Recovery Act (42 U.S. Code 6901 et seq.), the California Integrated Waste Management Act (Public Resources Code Sections 40000 et seq.), and the Department of Public Health of the counties of San Bernardino and Riverside.

In addition, the federal government prescribes regulations for transporting hazardous materials. These regulations are described in the Code of Federal Regulations, Title 49, Part 171. These laws and ordinances place requirements on various aspects of hazardous waste hauling, from materials handling to vehicle signs, to ensure public safety. Transporting and handling of chemicals and wastes are discussed in Subsection 8.12, Hazardous Materials Handling, including the transport of ammonia.

8.10.4.10 Operational Impacts

When completed, the operational phase of the proposed project would generate approximately 15 additional employees, or 30 daily trips. In addition, during operation the plant will average two truck trips per hour. Every hour the concentrated brine wastewater will be trucked to the Santa Ana Regional Interceptor brine line for disposal then return to the plant to switch tanks. The permanent addition of 15 employees for plant operations and two truck trips per hour would result in a less-than-significant impact, as their traffic volumes would be immeasurable in terms of roadway capacity.

8.10.5 Cumulative Impacts

The construction of the proposed Grand Terrace Educational Facility (i.e., high school) will likely occur in the same approximate time frame as the proposed project. Cumulative transportation impacts may result from trips by construction workers for both projects on the same roadways at the same time.

Construction of the proposed high school would generate various levels of truck and automobile traffic throughout the duration of the construction phase, which is expected to take approximately 28 months. The construction-related traffic includes construction workers traveling to and from the site as well as trucks hauling construction materials to the site and demolition/excavation material away from the site. The construction activities would generate approximately 20 truck trips per day to deliver construction material and approximately 10 truck trips per day to remove demolition material from the site. The truck trips would be spread out throughout the workday and would generally occur during non-peak traffic periods. Even coupled with the truck trips for the proposed project, this level of construction-related traffic would not result in a significant cumulative traffic impact on the study area roadway network.

The construction activities for the Grand Terrace Educational Facility would also generate an estimated 40 to 50 workers' trips per day. Table 8.10-3 summarizes the total daily workforce related vehicle trips from both construction projects.

TABLE 8.10-3
Total Daily Workforce-Related Vehicle Trip Generation During Construction

Type of Construction	Workers' Trips	Truck Trips	Total Trips
Highgrove Project	226	20	246
Grand Terrace Educational Facility	50	30	80
Total	276	50	326

With the two projects a total of 163 trips will be added to the area roadway network during the a.m. and p.m. peak hours. For the freeways (SR 91 and I-215), the number of additional trips in the peak hour is below the threshold value of 1,200 vehicles per hour in the peak hour (or 600 vehicles in one direction). For the surface streets, up to 128 trips will be added to the peak hour. The construction worker trips for the proposed high school construction are expected to occur on several intersections that will also be used by the construction work force of the proposed project:

- I-215 Southbound Ramps at Iowa Avenue

- I-215 Northbound Ramps at Iowa Avenue
- Iowa Avenue at Main Street
- Iowa Avenue at Center Street
- Taylor Street at Main Street

Since most of these streets have very low traffic volumes (Main Street is operating at LOS A per City of Grand Terrace standards), the cumulative impacts are less than significant.

Cumulative impacts associated with the OAC are much more significant during the operation of the OAC. The Specific Plan for the proposed OAC has an estimated daily traffic volume of 29,879 trips, including 1,454 during the morning peak hour and 2,154 during the evening peak hour. OAC daily traffic volumes are projected to be 3,800 vehicles/day on Iowa Avenue (south of Main Street), 7,800 vehicles/day on Taylor Street (between Iowa Avenue and Main Street) and 8,100 vehicles/day on Taylor Street (north of Main Street).

Operations at Taylor Street/Main Street are not predicted to change significantly with the proposed OAC. However, operations at Iowa Avenue/Main Street are expected to degrade from LOS E to LOS F in the a.m. peak. In the p.m. peak, the intersection will remain at LOS F, but the additional traffic from the OAC will increase the delay substantially. However, improvements are proposed (as part of the OAC mitigation measures) at both intersections. Specifically, new traffic signals will improve operations. The new signals were only analyzed for 2030 (with other improvements), but both intersections are projected to operate at LOS C or better.

Since there are specific improvements at these intersections that will be constructed before the OAC opens, the relatively low traffic volumes associated with the proposed project (163 daily trips) will not be significant. Specifically, new traffic signals will improve operations, so that the construction trips associated with the proposed projects will result in cumulative impacts that are less than significant.

8.10.6 Mitigation Measures

To minimize construction-related impacts, the construction contractor will prepare a construction traffic control plan and construction management plan, also known as a Traffic Management Plan (TMP). The TMP will address timing of heavy equipment and building material deliveries, potential street and/or lane closures associated with pipeline installation, signing, lighting, traffic control device placement, and establishing work hours outside of peak traffic periods. Details on the specific mitigation measures described in this subsection will be documented fully in the TMP.

8.10.6.1 Construction Impacts from Power Plant

As noted in Subsection 8.10.4.2, construction of proposed project would add a moderate amount of traffic to state routes and local roadways during the peak construction period. However, because existing roadway capacity is adequate, these project-related traffic increases will not result in significant impacts. In order to avoid potential impacts of construction traffic that may coincide with afternoon school traffic, the project will develop a construction traffic control plan in coordination with the school officials. That construction traffic control plan will be specifically tailored to address the specific impacts associated with each stage of construction of the power plant and the actual occupancy date of the school.

8.10.6.2 Construction Impacts from Gas Pipeline Construction

This subsection outlines some general strategies and requirements for minimizing the traffic and roadway impacts of gas pipeline construction. In general, Riverside County and the affected cities require an encroachment permit and the permit application specifies some requirements for traffic control. Some of the information in this document reflects on those guidelines, but the City/County will have the final word on requirements for traffic control with the permit submittal.

To minimize construction-related impacts, the following measures will be implemented (and documented in the TMP):

8.10.6.2.1 Traffic Control Standards

All temporary signing, lighting, and traffic control devices during construction should conform to the applicable standards. These include the MUTCD, the WATCH handbook, and the California Joint Utility Traffic Control Committee published Work Area Protection and Traffic Control Manual.

8.10.6.2.2 Construction Work Hours

In general, Riverside County and the affected cities allow construction work on a case-by-case basis. During periods where construction is not allowed, trenches must be plated over to permit use of all travel lanes. Work hours and allowable noise limits will be described in the encroachment permit, as issued by the Encroachment Permit Section of the County of Riverside or affected city.

The specific hours for construction will be determined on a case-by-case basis, in consultation with the County. Any variations in the working hours will be determined with consideration given to impacts to residents and the general public kept to a minimum. Consideration of impacts and justification for those requests will be provided prior to request.

8.10.6.2.3 Traffic Control Standards

All temporary signing, lighting, and traffic control devices during construction should conform to applicable standards (primarily the California Supplement of the MUTCD).

8.10.6.2.4 Lane Closures

The number of travel lanes during all hours of the day (peak, off-peak, and overnight) should be sufficient to meet expected traffic volumes at the construction site. The minimum width of a traffic lane that needs to be maintained is 12 feet (3.6 meters) in each direction. If a required lane closure results in a single (bi-directional) lane of traffic during construction, the remaining lane should be at least 12 feet (3.6 meters) wide. Specific requirements for temporary lane widths and approval for narrower lanes should be obtained during preparation of the Traffic Control Plan.

One traffic lane will remain open at all times on all affected roadways. Full closures of major roadways are not planned. When traffic in both directions must use a single lane, two flagmen will be stationed at both ends of the construction zone to safely direct traffic.

Vehicle access would be restored at the end of each work day through the use of steel trench plates or trench backfilling.

8.10.6.2.5 Driveway Access

The contractor shall develop construction plans defining in detail how driveway access restrictions will be minimized. Any blockages of individual driveways must be described in the traffic control plans. Based on the estimated work pace of up to 300 feet per day, project construction would occur for about one day in front of an individual property on affected roads. Operations must be coordinated with all business and property owners along city streets and state highways, within the limits of contract work, for temporary driveway closures at least ten days prior to performing work that will block access points. The contractor shall provide alternate access to properties, at the property/business owner's approval. In areas where a residence or business has two access points, one access would be open to traffic at all times. In cases where the inconvenience is not minor, such as with an active business that is dependent on one driveway, the work could be scheduled during nighttime hours. Temporary closure of driveways shall only take place during nighttime between 10:00 p.m. and 6:00 a.m.

8.10.6.2.6 Emergency Access

Emergency response service providers shall be notified at least one month in advance of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness in addition to being provided a copy of detour plans filed with the city or county. Emergency response service providers include police and fire departments and ambulance companies. In no circumstance should the only access to a developed area be cut off for any period of time. Alternate routes must be available, or provisions must be made for temporary emergency providers to be stationed inside the cut-off area. The Traffic Control Plan shall include details regarding emergency service coordination and procedures, and copies shall be provided to all relevant service providers.

8.10.6.2.7 Parking

Along streets where parking will be temporarily lost, the contractor will be required to post notices of closures prior to construction. Signs should indicate that parking will be removed during construction, and specify the duration of the construction period. Permits for parking restrictions must be obtained from the County (Encroachment Permit Section, 951-955-6785). For the day of disruption, residents and business employees typically would park on the other side of the street and walk around the construction area to their homes and workplaces.

8.10.6.2.8 Public Transit

Along streets where bus stops will need to be temporarily closed, the contractor will need to post notices of closure per the city or county's requirement. The public transit service agency may post notice of bus stop closure at their websites.

8.10.6.2.9 Surface Restoration

In general, any construction activities impacting existing surfaces or roadway components (roadway pavements, signing and striping, traffic signals and detectors, driveways, islands, curbs and gutters, sidewalks, medians, and landscaping) shall be mitigated by restoring the facility to its original condition (before construction). While there is no restriction on the length of a section to be repaved, the contractor must provide sufficient capacity for traffic.

Pavement restoration shall meet or exceed the county/city's standard specifications (or Caltrans' standard specifications, with the county/city's specifications taking precedence).

The project Standard Details will outline specifics on pavement restoration. Contract documents will provide details on paving, curb and gutter, signing and striping, detectors, sidewalks, medians and landscaping, and other surface elements.

8.10.6.2.10 General Construction and Traffic Control Requirements

The following general construction and traffic control requirements will allow the required traffic movements to occur with minimum interruption. For the majority of the alignment, at least one through lane of traffic in the direction adjacent to construction is required. Full road closures, where required during construction, will require detour routing.

Minimum Lane Width for all traffic lanes shall be 12 feet (3.6 meters). In addition to a 12-foot (3.6-meter) minimum width, a 2-foot (0.6-meter) buffer shall be maintained between the edge of traveled lane and any traffic control devices including, but are not limited to, concrete barriers, delineators, construction barrels, cones and curb and gutter. Specific requirements for temporary lane widths along roadways where 12-foot wide traffic lanes cannot be achieved will be obtained from the local agencies.

Temporary Concrete Barrier with proper end treatment shall be provided whenever a lateral safety clearance of 10 feet or less between edge of traveled lane and edge of trench is not obtainable.

Reduction of the Speed Limit by 10 mph from the posted speed limit shall be in place during all hours that traffic control is in place.

Flaggers shall be included when only one lane is available for two-way traffic. Two flagmen will be stationed at both ends of the construction zone to safely direct traffic.

Sidewalk Closure will be accomplished by following typical signing requirements.

8.10.6.3 Operations and Maintenance Phase

The operations- and maintenance-related traffic associated with the project is considered to be minimal. State routes and local roadways have adequate capacity to accommodate operations-related traffic. Consequently, no operations-related mitigation measures are required.

8.10.7 Involved Agencies and Agency Contacts

The relevant agencies and appropriate contacts are shown in Table 8.10-4.

TABLE 8.10-4
Agency Contacts

Agency	Contact/Title	Telephone
City of Grand Terrace, Planning Department	Michelle Boustedt 22795 Barton Road Grand Terrace, CA 92313	(909) 430-2247
City of Riverside Planning Department	Transportation Planner 3900 Main Street Riverside, CA 92522	(951) 826-5371
County of Riverside Traffic Operations Section	J. R. Morgan 2950 Washington Street Riverside, CA 92504	(951) 955-6815

8.10.8 Permits and Permitting Schedule

The short duration of the construction, in conjunction with the minute permanent addition of 24 trips, impose a relatively insignificant addition to existing traffic levels. The relevant permits required for work performed within city/county streets in project vicinity are identified in Table 8.10-5.

TABLE 8.10-5
Required Permits

Responsible Agency	Permit/Approval	Schedule
County of Riverside, Encroachment Permit Section	Encroachment Permit	4 weeks
City of Grand Terrace| Public Works Department	Encroachment Permit	2-3 weeks
City of Riverside Public Works Department	Encroachment Permit	72 hours

8.10.9 References

California Department of Transportation (Caltrans). 1996. Traffic Manual, Chapter 5, Manual of Traffic Controls for Construction and Maintenance Work Zones.

California Department of Transportation (Caltrans). 1998. Traffic and Vehicle Systems Data Unit, (website: http:llwww.dot.ca.govlhq/traffops/saferesr/trafdata/index.htm).

California Department of Transportation (Caltrans). 2002. Standard Plans. June.

California Resources Agency. 1999. CEQA: The California Environmental Quality Act - Statutes and Guidelines. Amended March 29, 1999.

Colton Joint Unified School District. 2005. Draft Grand Terrace Educational Facility Environmental Impact Report. September.

Grand Terrace, City of. 1998. Planning Department. General Plan, Transportation Element. Adopted June.

Riverside, City of. Department of Public Works. 2005. Regulations for Construction Permits/Street Opening Permits.

Riverside, City of. Planning Department. 2005. General Plan, Transportation Element.

Riverside County Encroachment Permit Section. 2005. Road Closure Requirements and Procedures.

Riverside County Planning Department. 2002. General Plan, Transportation Element.

Lilburn Corporation. 2004. Outdoor Adventures Center Specific Plan. Final Environment Impact Report. May 6.

Transportation Research Board. 2000. Highway Capacity Manual, Special Report 209.

City of Grand Terrace

San Bernardino County

Riverside County

MAIN STREET

Highgrove

IOWA STREET

City of Riverside

MARTIN LUTHER KING JR. BLVD.

CANYON CREST DRIVE

LEGEND

SITE

PROPOSED GAS PIPELINE

POTABLE WATER SUPPLY

0 2,100 4,200 FEET

1 INCH EQUALS 2,100 FEET

N

FIGURE 8.10-1
AES HIGHGROVE PROJECT SITE AND LINEAR FACILITIES LOCATION MAP
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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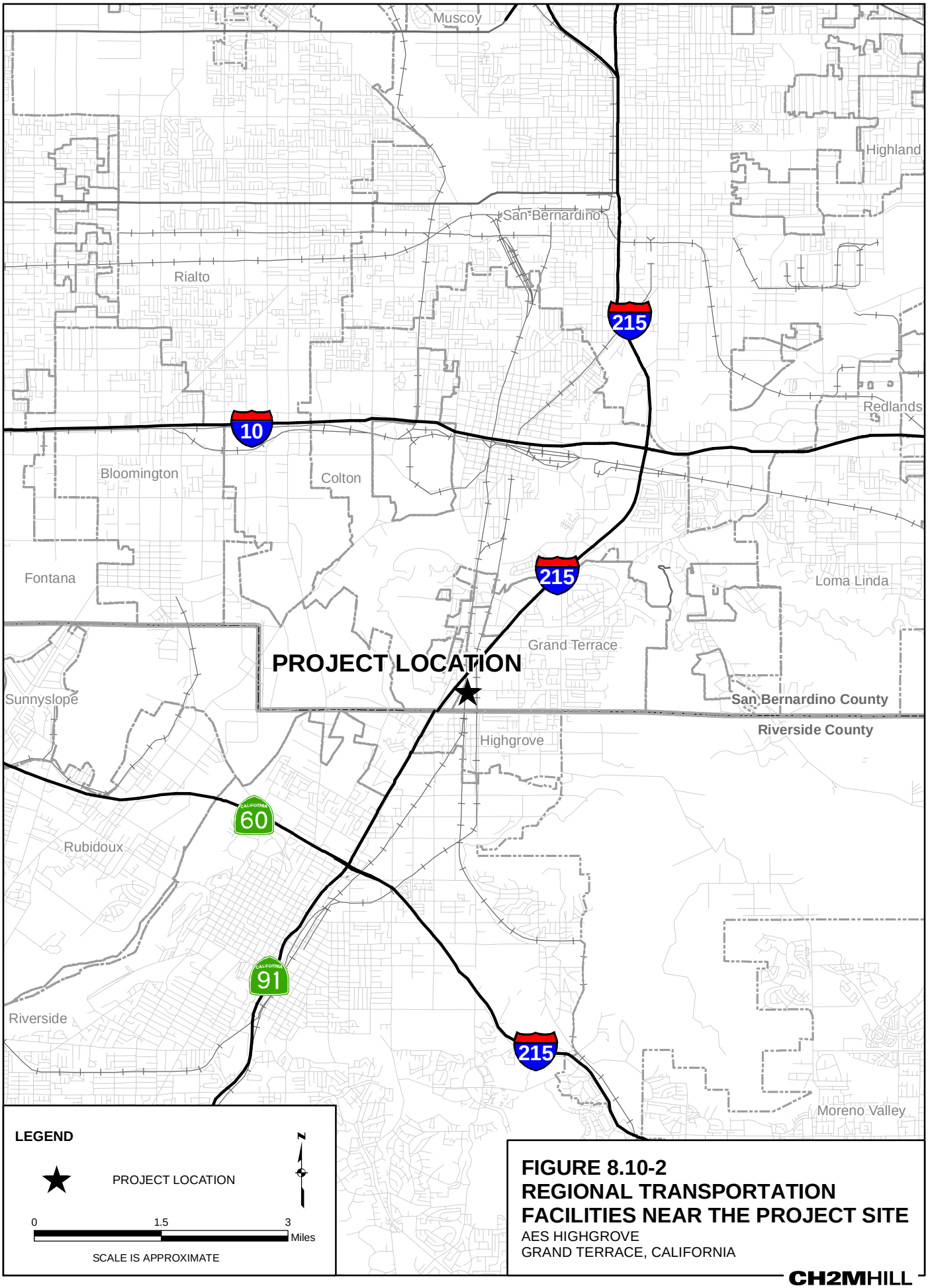

FIGURE 8.10-2
REGIONAL TRANSPORTATION FACILITIES NEAR THE PROJECT SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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