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	Noncriteria Pollutants (Continued)
Carbon monoxide	PAHs
Oxides of nitrogen	Benzo(a)anthracene
Particulate matter	Benzo(a)pyrene
	Benzo(b)fluoranthene
Noncriteria Pollutants (Toxic Pollutants)	Benzo(k)fluoranthene
	Chrysene
Ammonia	Dibenz(a,h)anthracene
Acetaldehyde	Indeno(1,2,3-cd)pyrene
Acrolein	
1,3-Butadiene	
Benzene	
Ethylbenzene	
Formaldehyde	
Naphthalene	
Propylene oxide	
Toluene	
Xylene	

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.

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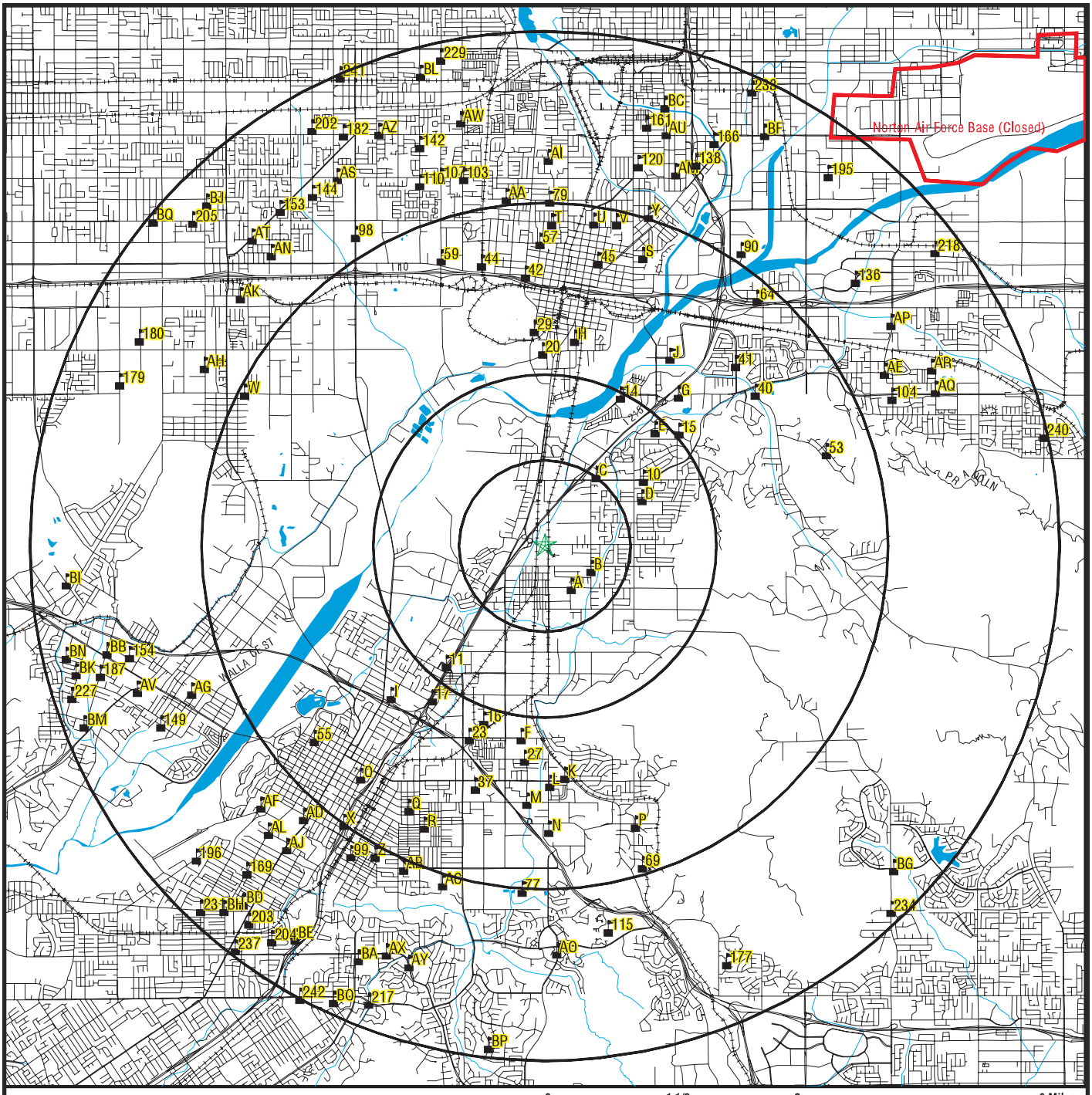
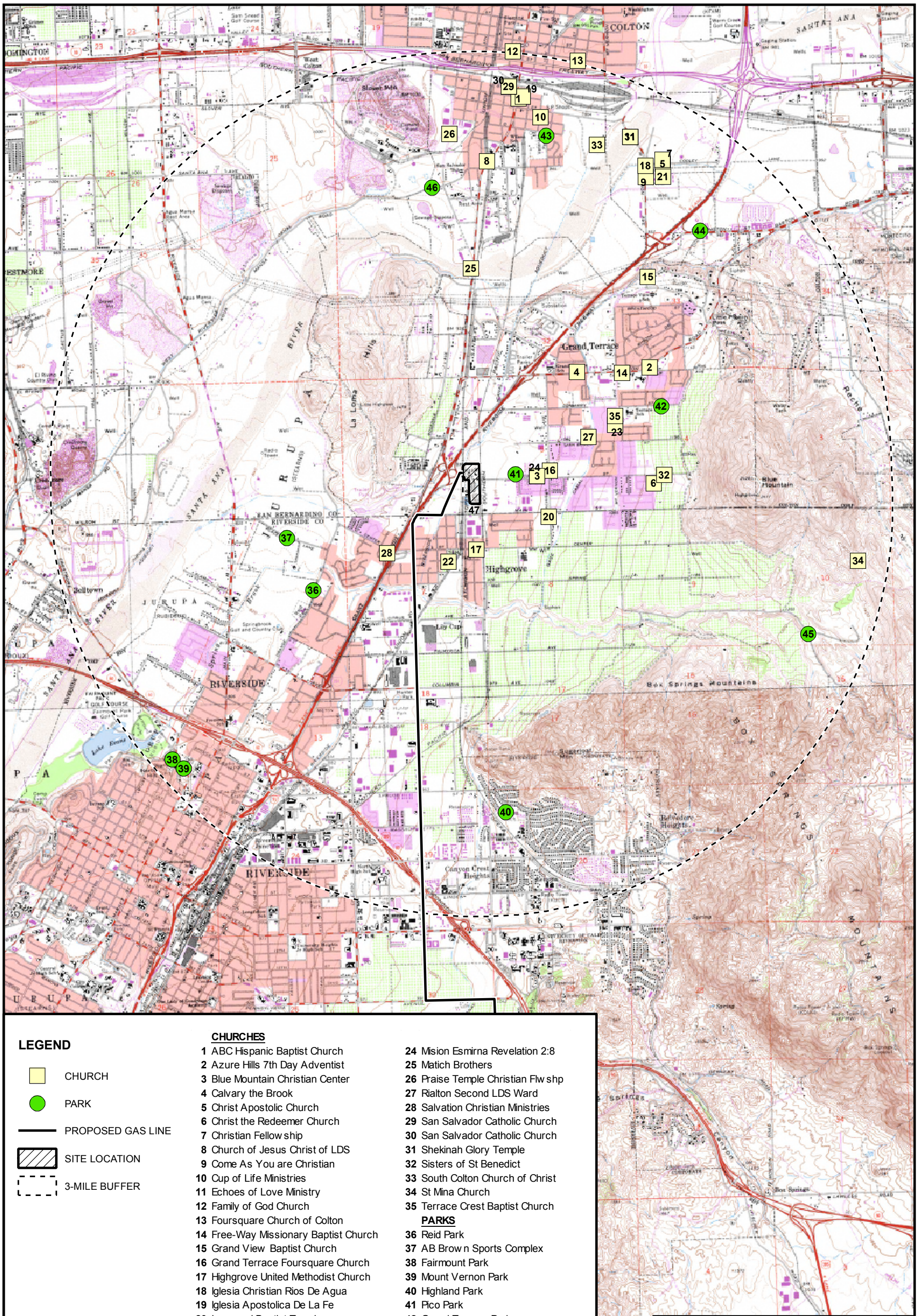


SOURCE: ENVIRONMENTAL DATA RESOURCES, 2006 (SEE APPENDIX 8.6A)

IS022006001RDD_22 (3/1/06)

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

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

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

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_6-1_CHURCHESANDPARKS.MXD 5/11/2006 09:41:08

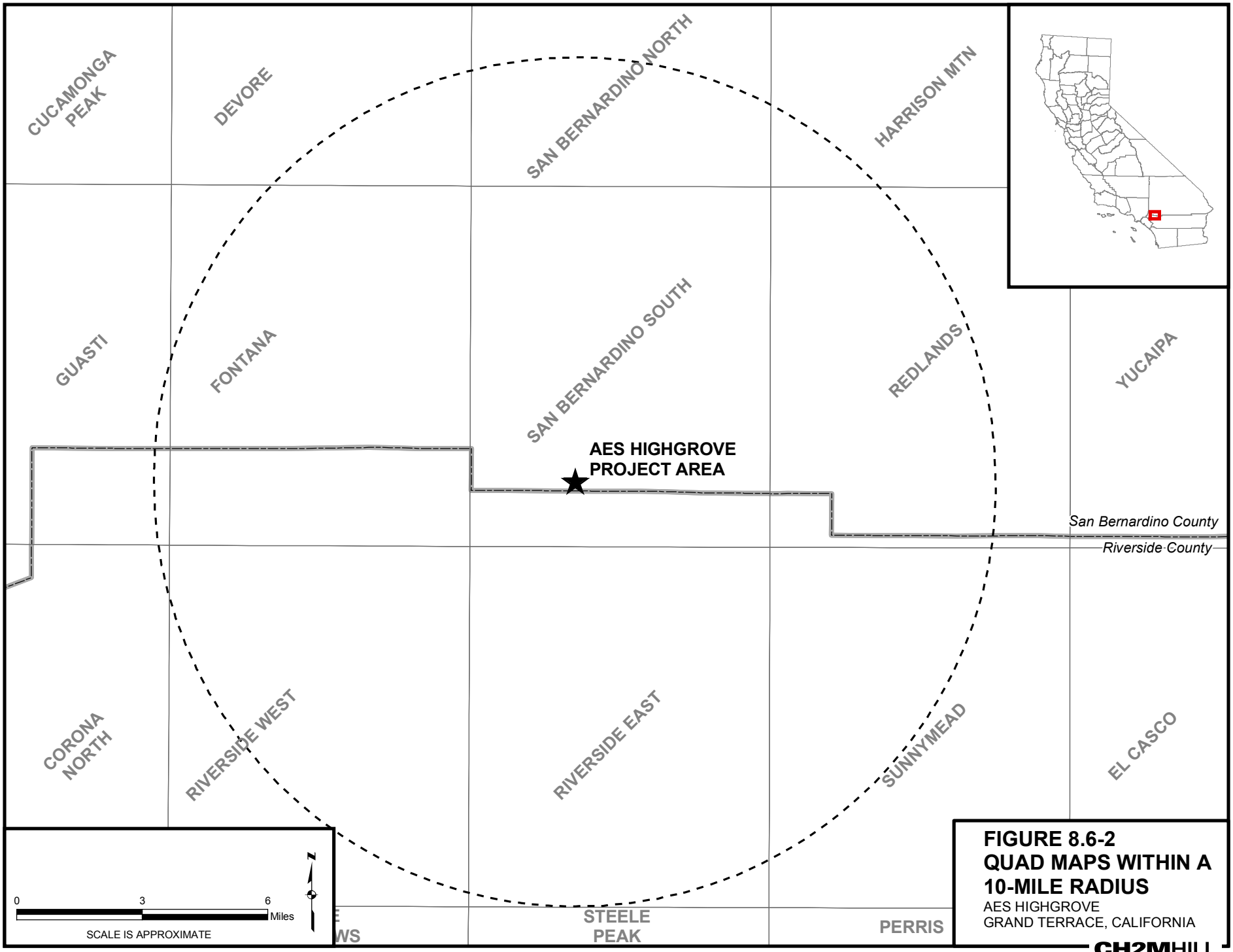


FIGURE 8.6-2
QUAD MAPS WITHIN A 10-MILE RADIUS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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