DOCKETED	
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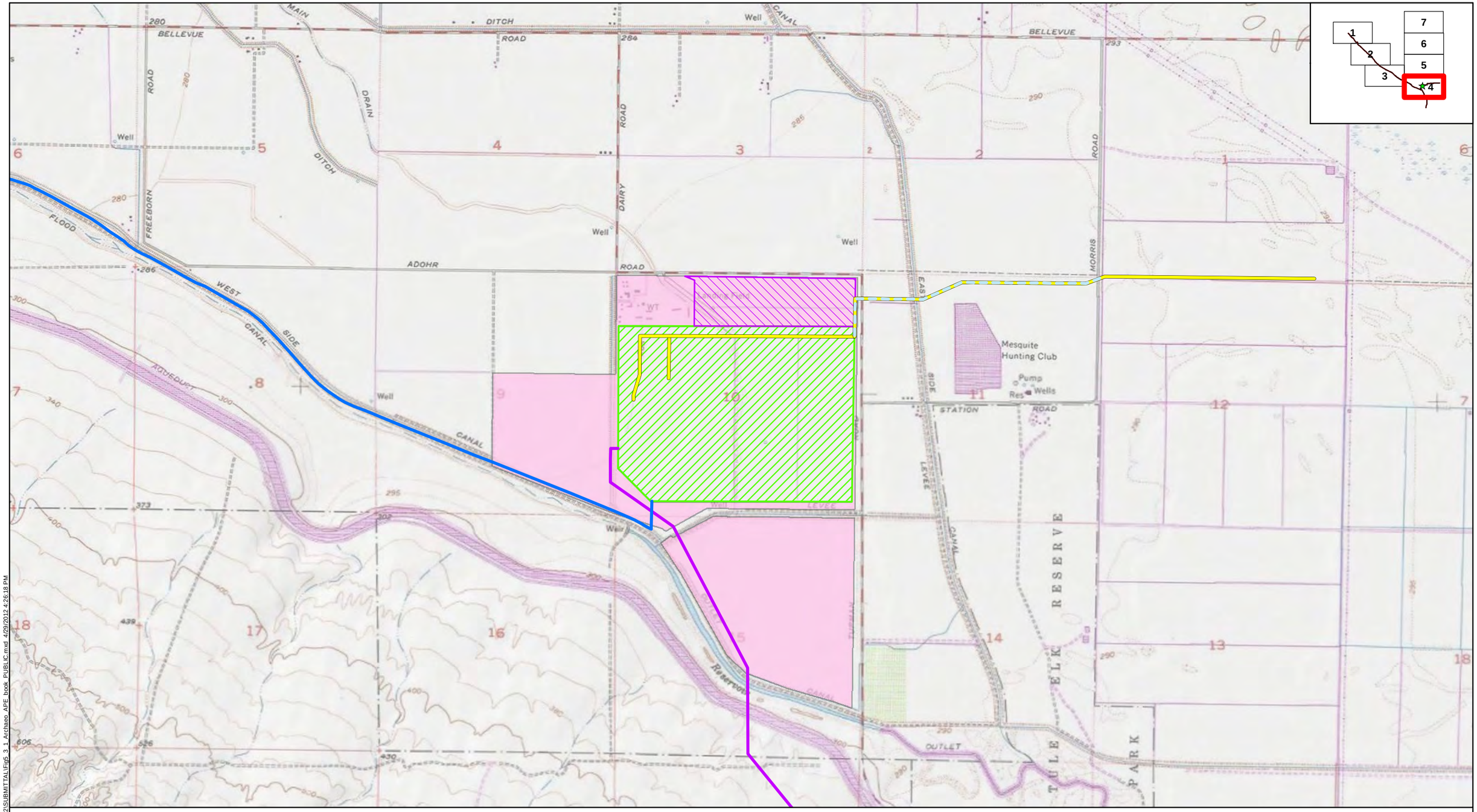
Project Title:	Hydrogen Energy Center Application for Certification Amendment
TN #:	233603-3
Document Title:	Continuation of Amended AFC - Volume I and II - HECA 3
Description:	*** These documents supersedes TN 65049 which was just the cover letter due to the fact the Amended AFC was too large to docket at the time. *** - Document was on proceeding webpage and is now moved over to the docket log.
Filer:	Raquel Rodriguez
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	6/22/2020 12:59:32 PM
Docketed Date:	6/22/2020



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Note:
1. Feature temporarily designated as confidential

N

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Source: Aerial Imagery, Bing Maps, 2009.

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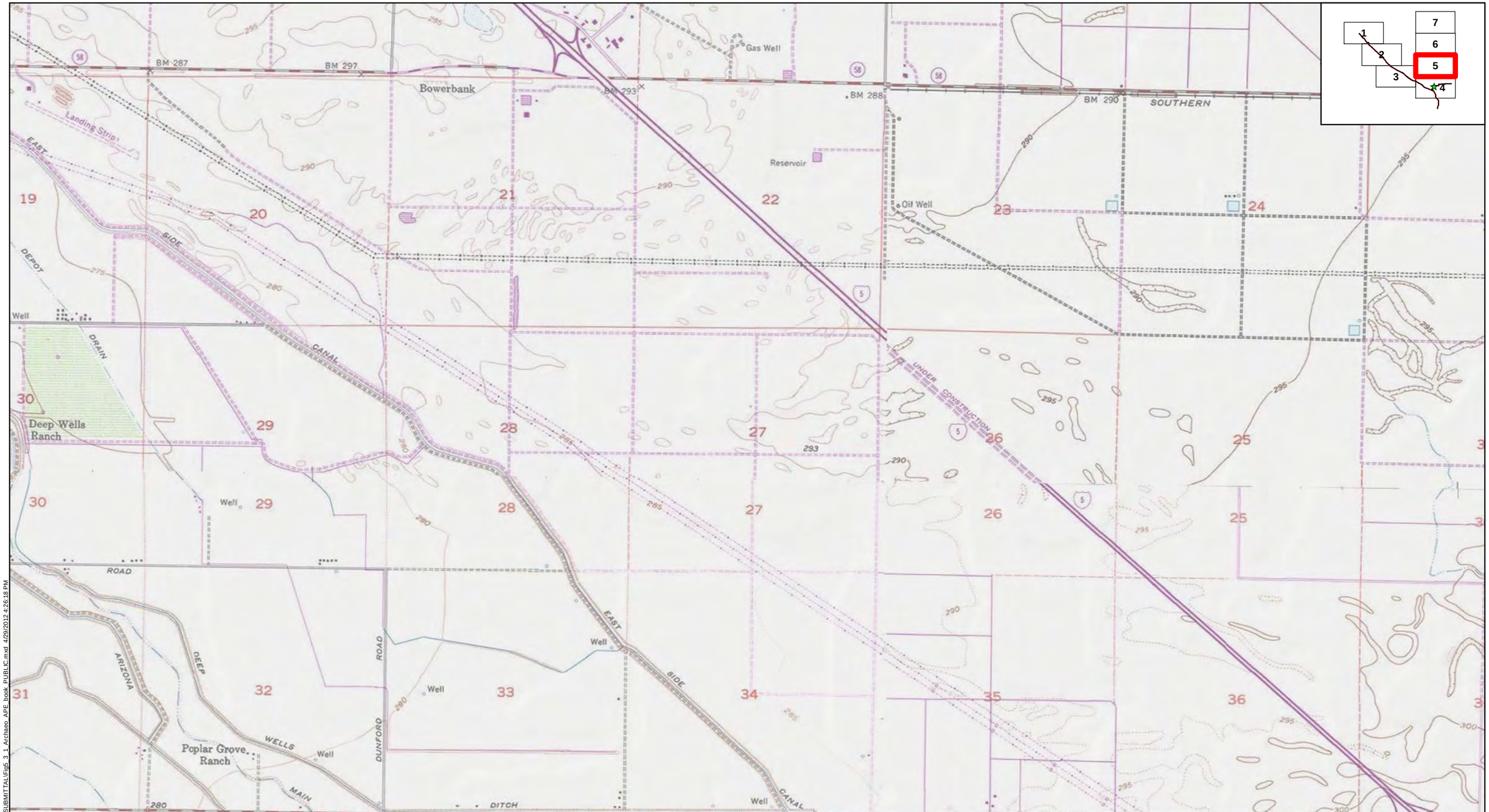
ARCHAEOLOGICAL RESOURCES STUDY AREA

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-1 - SHEET 4



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

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Potable Water
Process Water
Railroad[1]
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Source: Aerial Imagery, Bing Maps, 2009.

ARCHAEOLOGICAL RESOURCES STUDY AREA

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-1 - SHEET 5

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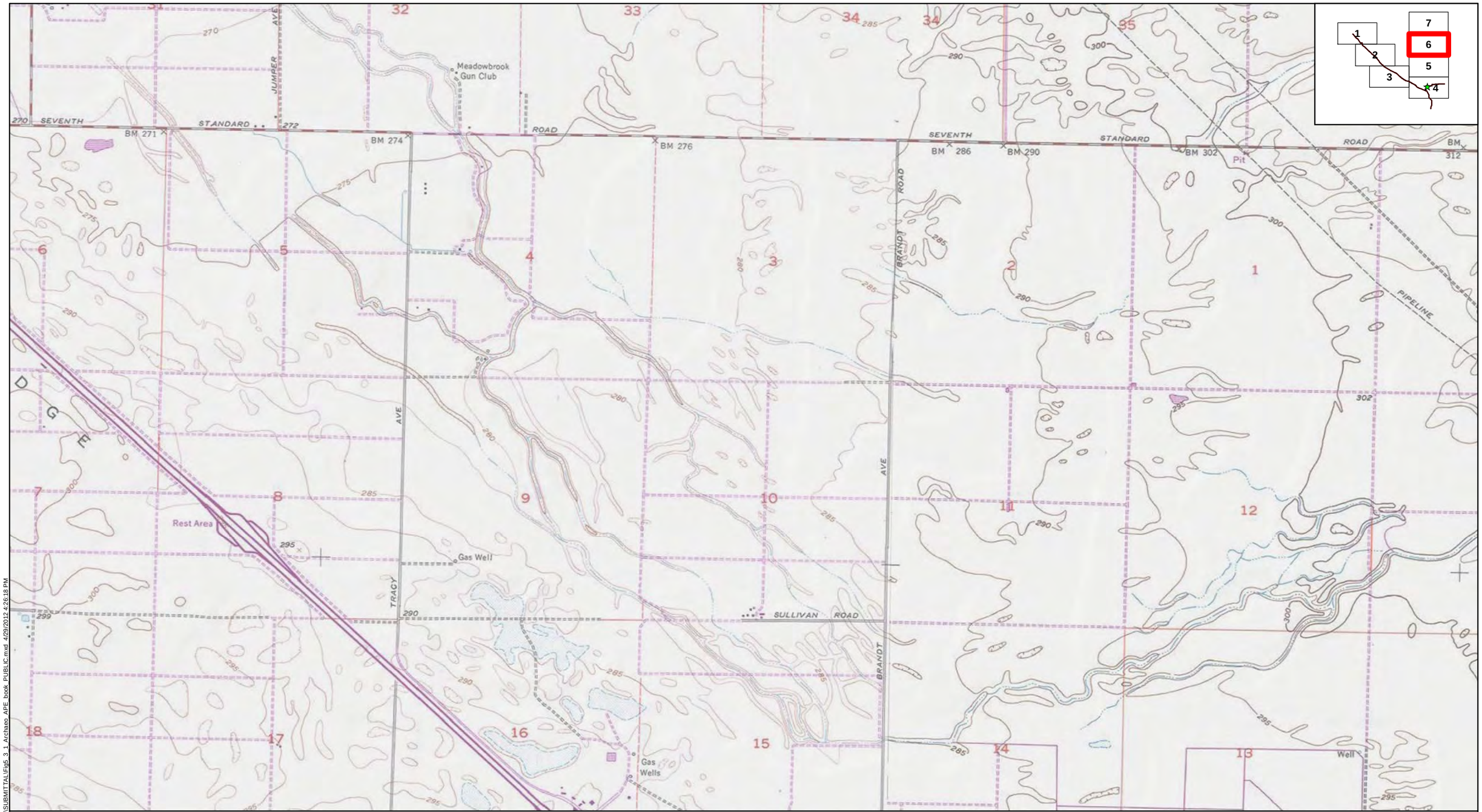

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

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Source: Aerial Imagery, Bing Maps, 2009.

ARCHAEOLOGICAL RESOURCES STUDY AREA

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-1 - SHEET 6

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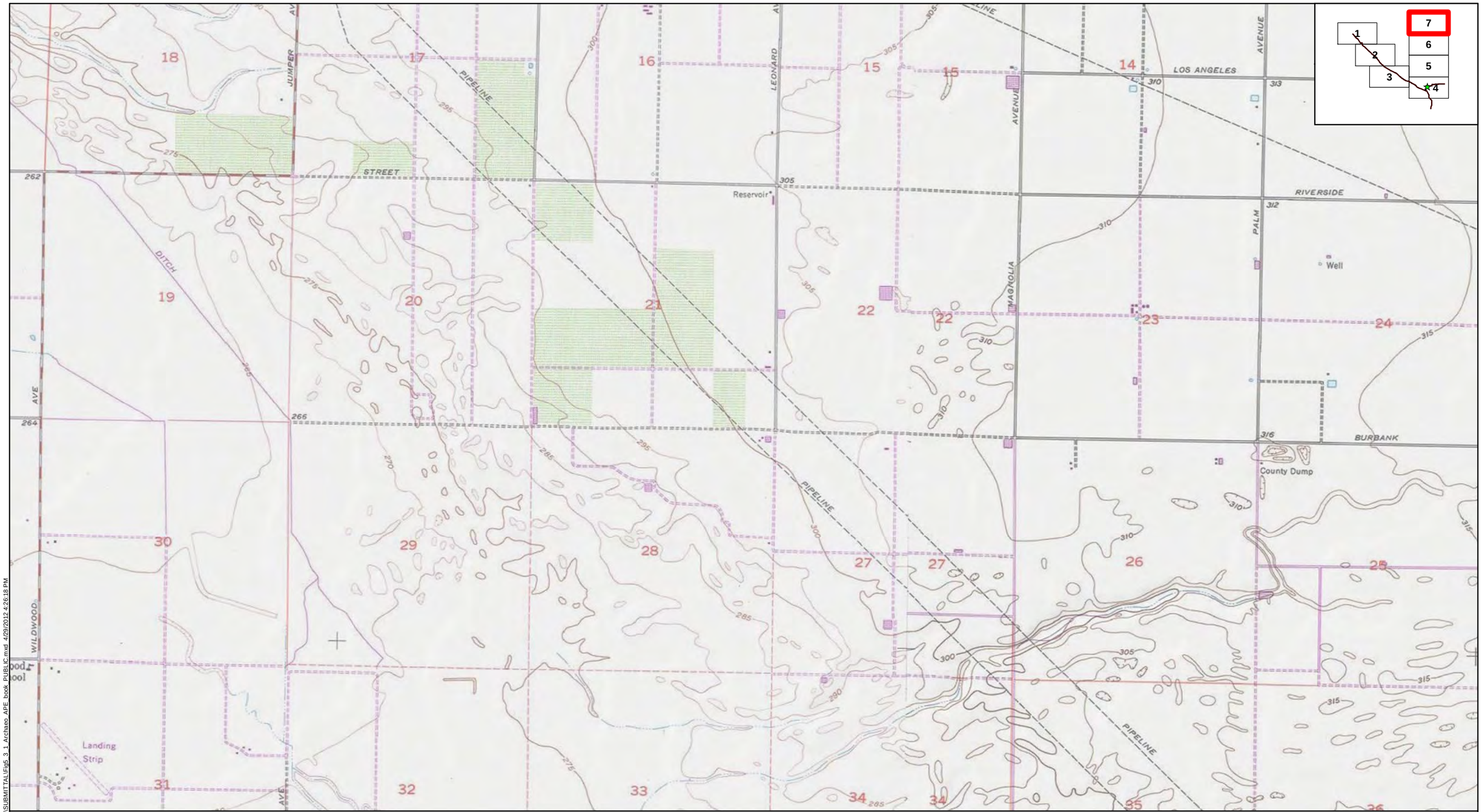

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Note:
1. Feature temporarily designated as confidential

N

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Source: Aerial Imagery, Bing Maps, 2009.

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ARCHAEOLOGICAL RESOURCES STUDY AREA

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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-1 - SHEET 7

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Historic Architecture Area of Potential Effects

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Note:
1. Feature temporarily designated as confidential

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Source: Aerial Imagery, Bing Maps, 2009.

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HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-2 - SHEET 1

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Historic Architecture Area of Potential Effects

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Note:
1. Feature temporarily designated as confidential

N

0 1,000 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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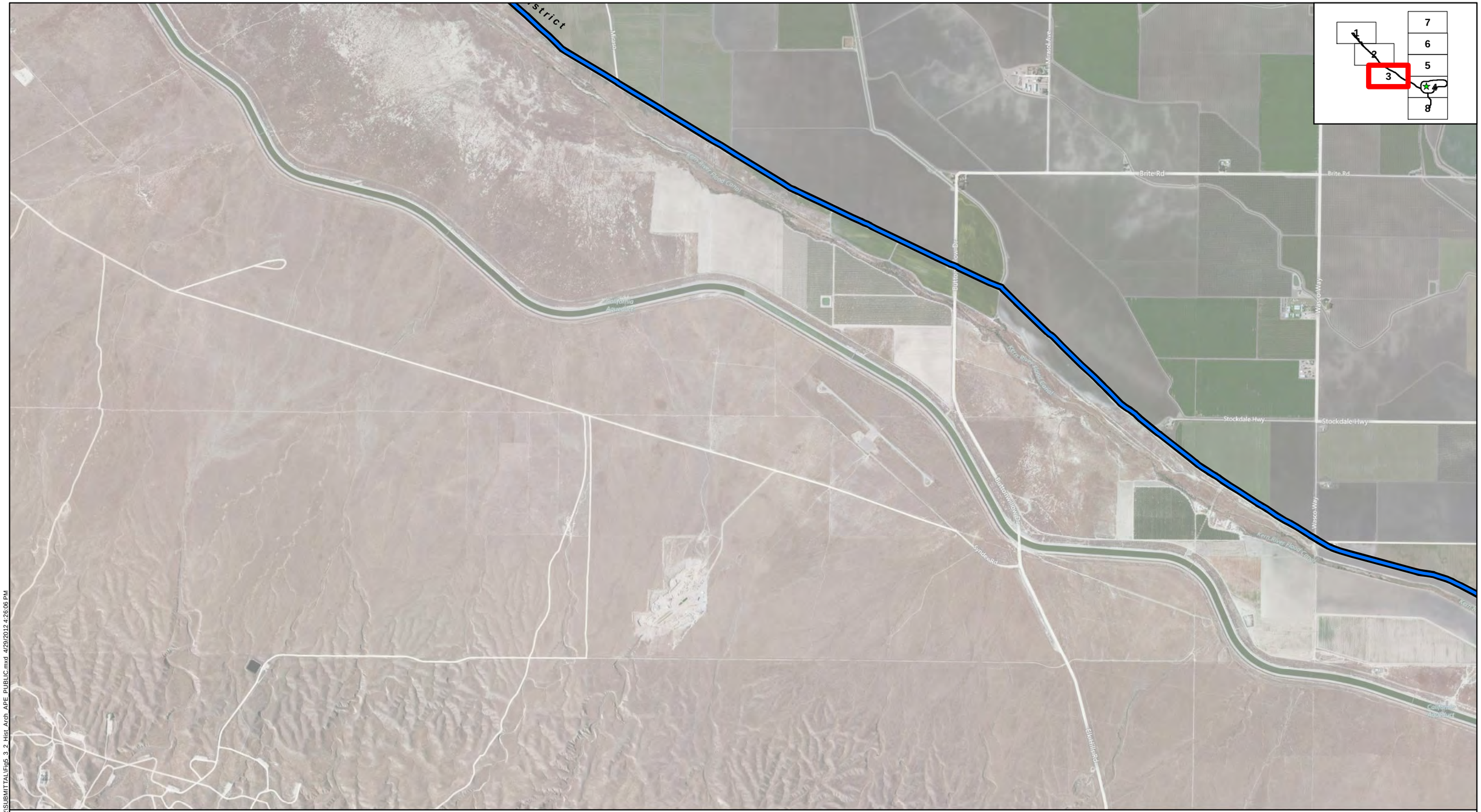
FIGURE 5.3-2 - SHEET 2



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Historic Architecture Area of Potential Effects

Carbon Dioxide
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Potable Water
Process Water
Railroad[1]
Transmission

Note:
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Source: Aerial Imagery, Bing Maps, 2009.

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HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

April 2012
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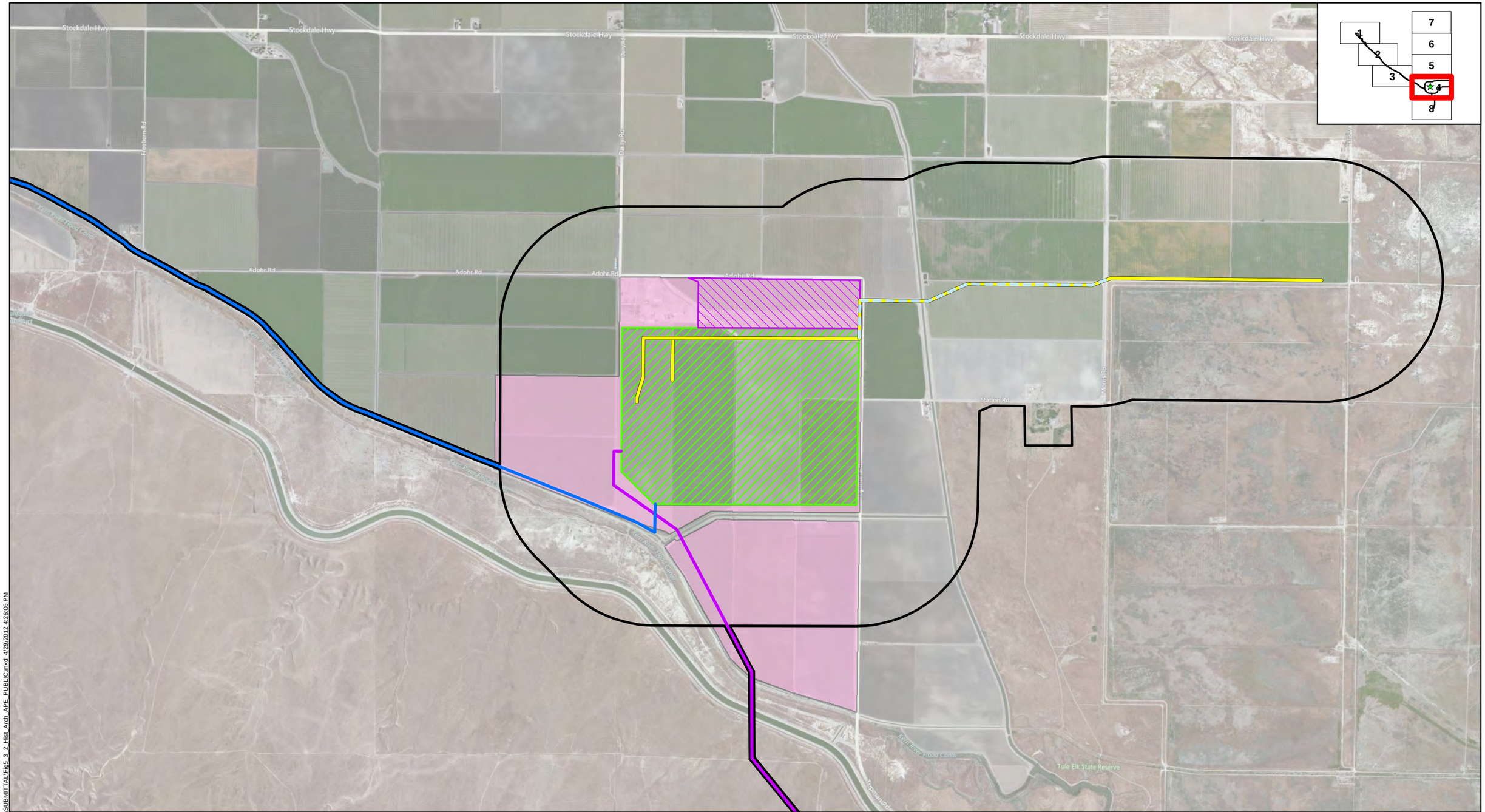
Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-2 - SHEET 3



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Historic Architecture Area of Potential Effects

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Note:
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Source: Aerial Imagery, Bing Maps, 2009.

HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.3-2 - SHEET 4

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Source: Aerial Imagery, Bing Maps, 2009.

HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-2 - SHEET 5

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Project Site
Construction Staging Area
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Carbon Dioxide
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Source: Aerial Imagery, Bing Maps, 2009.

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HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.3-2 - SHEET 6

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Historic Architecture Area of Potential Effects

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Note:
1. Feature temporarily designated as confidential

N

0 1,000 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.3-2 - SHEET 7

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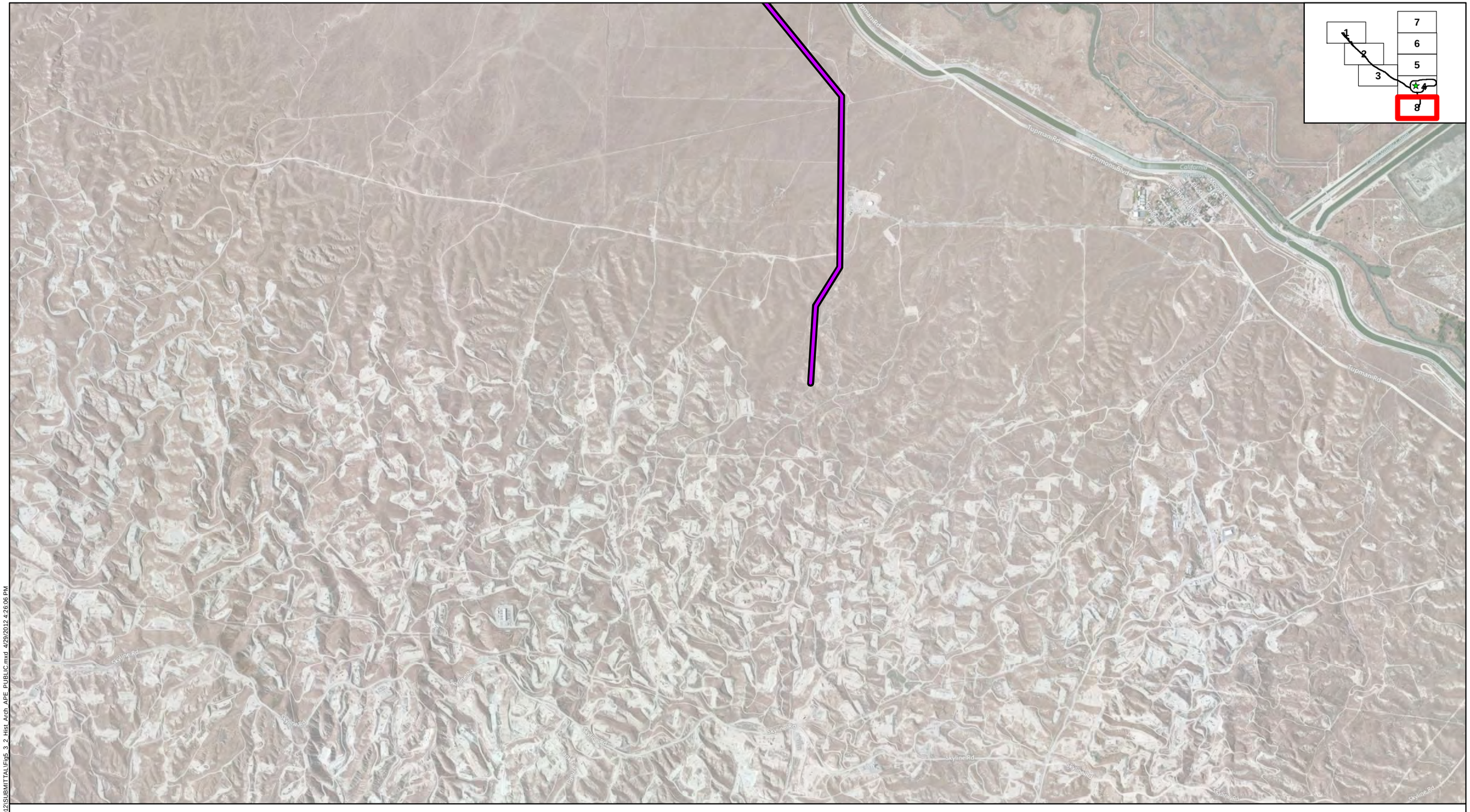

Source: Aerial Imagery, Bing Maps, 2009.

HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.3-2 - SHEET 8

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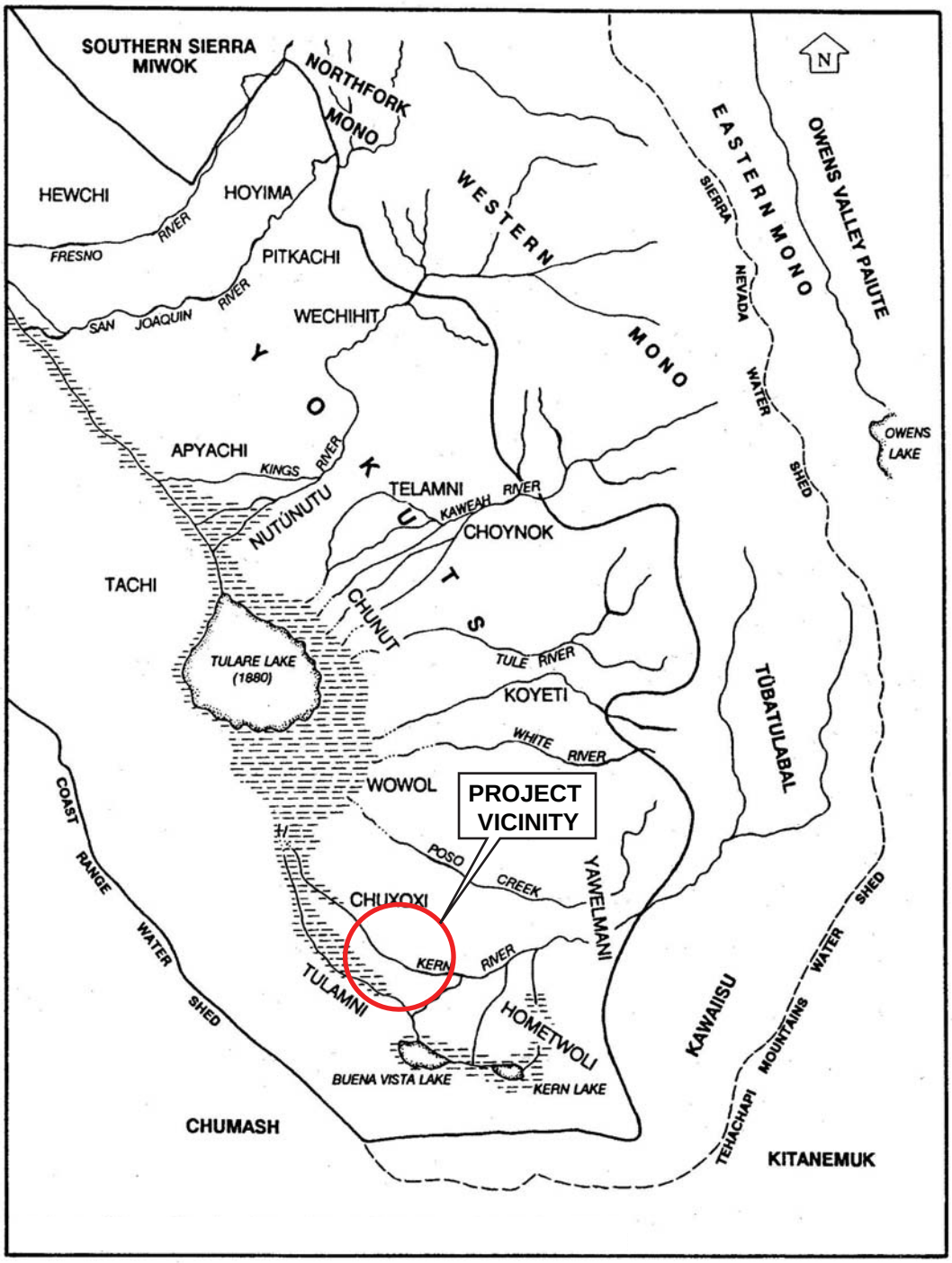

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ETHNOGRAPHIC TERRITORIES

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.3-3

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Source: Adopted from Kroeber 1925, Gayton 1948, and Wallace 1978.

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5.4 LAND USE AND AGRICULTURE

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  - **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  - **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

In accordance with the California Energy Commission (CEC) regulations, this section describes existing land uses and potentially sensitive land uses in a study area that extends 1 mile from the Project Site and 0.25 mile from Project linear facilities. The analysis included in this section focuses on the HECA Project as well as the CO_2 linear associated with the OEHI Project. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in Appendix A-1, Section 4.9, Land Use, and Appendix A-2, Section 2.4, Land Use, of this AFC Amendment. No agricultural or land use impacts related to coal transportation Alternative 2 are expected because the coal transloading facility is an existing use and trucks would use existing roads. Therefore, coal transportation Alternative 2 is not further evaluated in section.

Local, state, and federal jurisdictions potentially affected by the Project are identified, as are their respective plans, policies, laws, and regulations. Planned development and land use trends in the vicinity of the Project Site and associated linear facilities are identified based on currently available development plans. Reasonably foreseeable future development projects in the study area are discussed, and the potential land use impacts associated with the Project are assessed. The conformance with local plans and regulations and the compatibility of the Project with existing land uses in the area are evaluated.

Land use considerations for the Project have been identified and evaluated based on site reconnaissance surveys, current U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps, aerial photography, local land use ordinances, general plans and specific plans, and consultation with staff of the Kern County Planning Department.

Land uses in the study area are controlled and regulated through plans and ordinances adopted by the various agencies with jurisdiction over land use in the Project vicinity. The Kern County General Plan (Kern County, 2009) is the broadest in scope of the planning documents; it is a long-range planning instrument that includes land use goals and policies and designates preferred land uses for unincorporated Kern County. The Oglesby Specific Plan and Interstate 5 at Highway 58 Rural Community Specific Plan have also been developed for areas near Interstate 5 (I-5) and State Route 58 [SR 58] (Kern County, 1985 and 1986). The Kern County Zoning Ordinance (Kern County, 2011b) is the primary tool for achieving the objectives of the General Plan. The Zoning Ordinance identifies zoning districts and permitted uses, and includes development standards (e.g., density, minimum lot size, maximum height, and minimum setbacks). Other regulations governing development in the study area include grading and subdivision ordinances and building codes.

5.4.1 Affected Environment

5.4.1.1 Regional Setting

The Project Site is in western unincorporated Kern County, approximately 7 miles west of the outermost edge of the city of Bakersfield (see Figure 5.4-1). Kern County is in the southern Central Valley of California. The County extends east beyond the southern slope of the eastern Sierra Nevada range into the Mojave Desert, and includes parts of the Indian Wells Valley and the Antelope Valley. From the Sierra Nevada range, the county extends across the floor of the San Joaquin Valley to the eastern edge of the Temblor Range, which is part of the Coastal Ranges. The county also extends to the south over the ridge of the Tehachapi Mountains. Kern County is the third-largest California county in area, with a total of 8,171 square miles (5,229,440 acres).

The county includes numerous unincorporated communities and eleven incorporated cities, including Arvin, Bakersfield, California City, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco. Kern County is adjacent to nine other California counties, including Monterey County (northwest), Kings County (north), Tulare County (north), Inyo County (northeast), San Bernardino County (east), Los Angeles County (south), Ventura County (south), Santa Barbara County (southwest), San Luis Obispo County (west). None of these other jurisdictions (incorporated cities or other counties) is located in the Project vicinity (see Figure 5.4-1).

Predominant land uses in Kern County include agriculture, oil production, mineral exploration (including gold, borate, and kernite), residential, and military installations (including Edwards Air Force Base and China Lake Naval Air Weapons Station). Farm products are an important component of the county's economy, as well as petroleum, logistics/warehousing, and national defense and aerospace activities.

In 2010, the county's population was 839,631, and it is expected to grow 3.8 percent per year on average, to 1,352,627 in 2030 (CDOF, 2007; U.S. Census Bureau, 2010). This growth is primarily occurring in the incorporated cities rather than the unincorporated county areas. For example, Bakersfield's population grew by approximately 100,426 residents between 2000 and 2010, an increase of more than 28 percent (CDOF, 2007; Kern County, 2011).

5.4.1.2 Land Uses On Site and in the Project Vicinity

The Project Site is located 2 miles northwest of the unincorporated community of Tupman, and approximately 4 miles southeast of the unincorporated community of Buttonwillow. The Project Site is bounded by Tupman Road to the east, an irrigation canal to the south, and Dairy Road to the west; Adohr Road is located approximately 1,080 feet to the north. Primary access to the site is from Dairy Road. Stockdale Highway and I-5 are located approximately 1 mile to the north and 3 miles to the east, respectively. The Elk Hills-Buttonwillow Airport, which is a public airport primarily used for general aviation, is approximately 5 miles west-northwest of the Project Site and 3 miles south of Buttonwillow. EHOF is approximately 1 mile south of the Project Site. Distances to places, sensitive receptors, and unique land uses in the Project vicinity are listed in Table 5.4-1.

Existing land uses in the study area were identified through site reconnaissance surveys, current USGS 7.5-minute topographic quadrangle maps, aerial photography, and Kern County Assessor's land use codes. Existing land uses (including sensitive land uses) in the study area are presented on Figure 5.4-2 and listed in Table 5.4-2. Figure 5.4-3 presents 2011 crop types for agricultural lands in the study area, which are also listed in Table 5.4-3. A list of assessor's parcel numbers (APNs) and ownership information in the study area is provided in Appendix H.

The 453-acre Project Site is currently used for farming purposes, including the cultivation of cotton, alfalfa, and onions. HECA LLC also has the option of purchasing 653 acres adjacent to the Project Site, whereby HECA LLC will control public access and future land uses. Land in the Controlled Area to the north, west, and south of the Project Site is also currently used for the cultivation of these crops. A fertilizer manufacturing plant (Port Organics) was previously located adjacent to the northwest of the Project Site in the Controlled Area.

Land within 1 mile of the Project Site is primarily used for farming purposes (particularly the cultivation of cotton, alfalfa, and onions), undeveloped areas, and orchards for the cultivation of pistachios. The western border of the Tule Elk State Natural Reserve is approximately 3,868 feet to the east of the Project Site. The nearest single-family dwellings are approximately 370 feet to the north, 1,400 feet to the east, and 3,300 feet to the southeast. The two nearest residences to the north consist of one single-family residence and a mobile home on a 5 acre parcel adjacent to the Project Site. The option to purchase this parcel was acquired subsequent to the 2009 Revised

AFC and it became part of the Controlled Area. These residences will not be in use during Project construction and operation.

Existing land uses within 0.25 mile of the 3.4-mile CO_2 linear primarily include undeveloped areas, farming (mainly alfalfa, cotton and onion cultivation), and resource extraction (oil production). The CO_2 linear would also cross under the Outlet Canal, the Kern River Flood Control Channel, and the California Aqueduct with horizontal directional drilling.

Land uses within 0.25 mile of the 13-mile natural gas linear and the 5.3-mile railroad primarily include farmland (mainly alfalfa, cotton, wheat, and corn cultivation) and orchards for the cultivation of pistachios.

Land within 0.25 mile of the 15-mile process water linear is primarily used for farming (mainly cotton and alfalfa cultivation), and orchards (pistachio). The process water pipeline extends from Seventh Standard Road to the Project Site, along the existing BVWSD road on the northwest side of the West Side Canal. Much of the land between the West Side Canal and the Kern River Flood Control Channel is undeveloped.

Land within 0.25 mile of the 2.1-mile electrical transmission linear and 1.2-mile potable water linear is primarily used for farming (mainly alfalfa and cotton cultivation), and orchards (pistachio). The electrical transmission linear will cross Tupman Road and Morris Road and interconnect with a future PG&E switching station approximately 2 miles east of the Project Site. The potable water linear will extend along a portion of this alignment, and will cross the East Side Canal.

5.4.1.3 Agricultural Lands and Williamson Act Contracts

Agricultural Lands

The California Department of Conservation (CDOC) Farmland Mapping and Monitoring Program (FMMP) produces Important Farmland Maps to analyze impacts on California's agricultural resources. Land is rated according to soil quality, irrigation status, and current land use, and is included in one of the following classifications:

- **Prime Farmland.** Land that has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.

- **Farmland of Statewide Importance.** Similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.

- **Unique Farmland.** Includes lands with lesser-quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated

orchards or vineyards, as found in some climatic zones in California. Land must have been cropped at some time during the 4 years prior to the mapping date.

- **Farmland of Local Importance.** Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

- **Grazing Land.** Land on which the existing vegetation is suited to the grazing of livestock.

- **Urban and Built-Up Land.** Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

- **Other Land.** Land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas unsuitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines and borrow pits; and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land. In some counties Other Land is further classified as follows:

  — **Rural Residential Land.** Residential areas of 1 to 5 structures per 10 acres ("ranchettes").

  — **Semi-Agricultural and Rural Commercial Land.** Includes farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds.

  — **Vacant or Disturbed Land.** Open-field areas that do not qualify for an agricultural category; that are mineral and oil extraction areas or off road vehicle areas; or that have electrical substations, channelized canals, and rural freeway interchanges.

  — **Confined Animal Agriculture.** May be a component of Farmland of Local Importance in some counties. This category includes poultry facilities, feedlots, dairy facilities, and fish farms.

  — **Nonagricultural or Natural Vegetation.** Heavily wooded, rocky, or barren areas, riparian and wetland areas, and grassland areas that do not qualify for Grazing Land due to their size or land management restrictions. This category includes small water bodies, recreational water ski lakes, and constructed wetlands.

- **Water.** Perennial water bodies with an extent of at least 40 acres.

Figure 5.4-3 presents the important farmland classifications assigned to land in the study area. The acreage of land in the study area included in each of the FMMP categories is listed in Table 5.4-4. As shown on Figure 5.4-3 and in Table 5.4-4, the Project Site is categorized as Prime Farmland. The Prime Farmland and Semi-Agricultural and Rural Commercial Land classifications extend over the Controlled Area, which is to the north, south, and west of the

Project Site. Land within 1 mile of the Project Site is primarily included in the Prime Farmland classification. Grazing Land is located on the southern side of the West Side Canal and Outlet Canal. The Nonagricultural or Natural Vegetation classification applies to lands used for the Tule Elk State Natural Reserve to the east of the East Side Canal and south of Station Road.

As shown on Figure 5.4-3 and in Table 5.4-4, land within 0.25 mile of the Project linears is primarily included in the Prime Farmland or Grazing Land classifications. Prime Farmland is mostly found along the process water linear on the eastern side of the West Side Canal and along the railroad and natural gas linear. Grazing Land is mostly found along the process water linear on the western side of the West Side Canal, and the CO_2 linear south of the Outlet Canal.

Williamson Act Contracts

The Williamson Act of 1965, which is also known as the California Land Conservation Act, was passed to preserve agricultural and open space lands by discouraging premature and unnecessary conversion to urban uses. The Act creates a mechanism that allows private landowners to contract with cities and counties to voluntarily restrict land to agricultural and open-space uses under a rolling 10-year contract. Restricted parcels are assessed for property tax purposes at a rate consistent with their actual use rather than potential market value. Unless either party files a "notice of non-renewal," the contract is automatically renewed annually for an additional year.

Figure 5.4-3 depicts the lands under Williamson Act contracts in the study area, and the acreage of land in the study area under Williamson Act contracts is listed in Table 5.4-5. As shown on Figure 5.4-3 and in Table 5.4-5, the 453-acre Project Site is currently under Williamson Act contract. The Williamson Act contracts for the Project Site are included in Appendix H.

Williamson Act contracts also cover most of the land currently used for farmland within 1 mile of the Project Site, as well as properties adjacent to the process water linear (particularly on the eastern side of the West Side Canal), along the railroad and natural gas linear, and along portions of the CO_2 linear, electrical transmission linear, and potable water linear.

5.4.1.4 General and Specific Plan Designations

Kern County General Plan

The Kern County General Plan covers all of unincorporated Kern County, except for the metropolitan Bakersfield planning area, which is covered by the Metropolitan Bakersfield General Plan. The General Plan is a policy document that is intended to give long-range guidance for decisions relating to the growth and resources to unincorporated areas of the County. The plan was adopted in 2004 and was last amended in 2009. The General Plan is a long-term planning document and is anticipated to have a range of 15 to 25 years. The General Plan includes six of the seven mandatory general plan elements, including land use, circulation, housing, conservation, open space, noise, and safety, as well as an optional element addressing energy. The mandatory housing element is an interrelated document that has been kept separate for ease of future updating and use. A military readiness element is anticipated to be developed in the future as a separate program, and incorporated as a chapter of the General Plan. General Plan goals and policies relevant to the proposed Project are presented in Table 5.4-6.

The General Plan Land Use Element includes maps that present preferred land uses within unincorporated Kern County. The intent of these land use designations is also described in the Land Use Element. General Plan land use designations in the study area are shown on Figure 5.4-4. Table 5.4-7 presents a summary of the intent and the acreage of land for each of the land use designations identified in the study area.

As shown on Figure 5.4-4 and in Table 5.4-7, the entire Project Site is included in the Intensive Agriculture (Map Code 8.1) land use designation. Land designated as Intensive Agriculture is intended to be devoted to the production of irrigated crops or has a potential for such use. Permitted uses in the designation also include public utility uses. Most of the land within 1 mile of the Project Site is also included in the Intensive Agriculture designation, except for land to the south of the Outlet Canal, which is designated Extensive Agriculture (Map Code 8.3), and the Tule Elk State Natural Reserve, which is designated State or Federal Land (Map Code 1.1).

Land within 0.25 mile of the CO_2 linear is primarily included in the Mineral and Petroleum (Map Code 8.4) designation. The Intensive Agriculture designation applies to most of the land within 0.25 mile of the natural gas linear, railroad, process water linear, electrical transmission linear, and potable water linear. The Accepted County Plan Areas (Map Code 4.1) and Mineral and Petroleum (Map Code 8.4) designations apply to land within 0.25 mile of the natural gas linear near SR 58 and I-5 (see Figure 5.4-3 and Table 5.4-7). The Accepted County Plan Areas (Map Code 4.1) designation applies to lands included in the Oglesby Specific Plan and Interstate 5 at Highway 58 Rural Community Specific Plan.

Oglesby Specific Plan

The Oglesby Specific Plan was adopted by Kern County in 1985. The plan applies to 124 acres of land bounded to the west by the Interstate 5 at Highway 58 Rural Community Specific Plan, and to the south by SR 58. The purpose of the plan is to guide development of the plan area for three primary land use designations: public facilities; residential; and commercial facilities. The plan identifies constraints affecting development of the site, policies, programs and intended actions. Land within the Oglesby Specific Plan area and 0.25 mile of the natural gas linear is included in the Highway Commercial (Map Code 6.3), General Commercial (Map Code 6.2), and Maximum 10 Units/Net Acre (Map Code 5.3) land use designations.

Interstate 5 at Highway 58 Rural Community Specific Plan

The Interstate 5 at Highway 58 Rural Community Specific Plan was adopted by Kern County in 1986. The plan includes 640 acres of land bisected by I-5, SR 58, and an industrial rail spur paralleling SR 58. The purpose of the plan is to guide development of the plan area, particularly for transportation-related commercial and industrial uses. The plan identifies constraints affecting development of the site, policies, programs and intended actions. Land within the Specific Plan area and 0.25 mile of the natural gas pipeline is included in the Highway Commercial (Map Code 6.3) and Light Industrial (Map Code 7.1) land use designations.

5.4.1.5 Zoning Districts

The Kern County Zoning Ordinance is included in Title 19 of the Kern County Code. The Zoning Ordinance includes zoning maps that include land in unincorporated areas of the County into various zoning districts. The purpose of these zoning districts is described in the Zoning Ordinance, as well as permitted land uses and standards for development. Zoning districts in the study area are shown on Figure 5.4-5. Table 5.4-8 presents a summary of the purpose and the acreage of land for each of the zoning districts identified in the study area.

As shown on Figure 5.4-5 and in Table 5.4-8, the entire Project Site is included in the Exclusive Agriculture (A) zone. Electrical Power Generating Plants and Fertilizer Manufacture and Storage for Agricultural Use Only are permitted under Zoning Ordinance § 19.12.030.G with a Conditional Use Permit. Most of the land within 1 mile of the Project Site is also included in the Exclusive Agriculture (A) zone, except for land to the south of the Outlet Canal, which is zoned Limited Agriculture (A-1).

Land within 0.25 mile of the CO_2 linear is primarily included in the Limited Agriculture (A-1) and Exclusive Agriculture (A) zoning districts. Land within 0.25 mile of the natural gas linear and railroad is primarily included in the Exclusive Agriculture (A) zone (see Figure 5.4-5 and Table 5.4-8). Land within 0.25 mile of the process water linear is primarily included in the Exclusive Agriculture (A) zone, except for some areas on the western side of the West Side Canal (see Figure 5.4-5 and Table 5.4-8). The Airport Approach Height (H) Combining zoning district applies to land along the process water linear south of Brite Road. The purpose of this combining zoning district is to regulate the height of buildings, and minimize other aviation hazards near the Elk Hills-Buttonwillow Airport. The Exclusive Agriculture (A) zone applies to all of the land within 0.25 mile of the potable water pipeline and electrical transmission line.

Transmission lines, underground facilities for natural gas and water owned and operated by a public utility company or companies under the jurisdiction of the California Public Utilities Commission, are permitted uses in the Limited Agriculture (A-1) and Exclusive Agriculture (A) zoning districts. Oil or gas exploration and production, and related accessory equipment, which would include the CO_2 pipelines to the EHOF, are also permitted uses in these zoning districts. The federal Surface Transportation Board (STB) will have exclusive regulatory authority over the construction and operation of the railroad spur. The spur is expected to be exempt from STB certification because it would be exclusively used for industrial deliveries required for the HECA Project.

5.4.1.6 Legal Status of Project Site

HECA currently has an Option Agreement for the entire Project Site and Controlled Area. The Project Site includes Assessor's Parcel Numbers 159-040-02 (part), 159-040-16 (part) and 159-040-18 (part); and the Controlled Area includes Assessor's Parcel Numbers 159-040-16 (part), 159-040-17, 159-040-18 [part], and 159-190-09. HECA will own this property and have control over public access and future land use, including over the Controlled Area.

HECA proposes to be the owner and operator of the IGCC electrical generation, low-carbon nitrogen-based products manufacture, and associated equipment processes, including it linear

facilities. OEHI will own and operate the CO_2 pipeline. The transmission line ownership, up to the point of interconnect at the future PG&E switching station, will be determined in the future based on input from PG&E and the California Independent System Operator (CAISO). HECA will also be the owner of the proposed railroad spur and potable water line. HECA will need to obtain easement agreements conveying the necessary legal rights from the owners of properties crossed by the railroad spur, natural gas pipeline, electrical transmission line, and potable water line. The natural gas pipeline will be constructed by HECA or PG&E and PG&E will own the natural gas pipeline. The process water pipeline will be constructed and owned by BVWSD.

As discussed in Sections 5.4.1.3, 5.4.2.3, and 5.4.7, the Project Site is covered by Williamson Act contracts, which must be cancelled pursuant to GC § 51280 *et seq.* prior to construction and operation of the Project.

Following cancellation of the Williamson Act contracts, HECA will seek approval from Kern County to merge the Project Site into one legal parcel by obtaining a lot line adjustment from Kern County, pursuant to Chapter 18.35 of the Kern County Code. The lot line adjustment will require approval by the Planning Director, subject to certain findings, and is appealable to the Board of Supervisors. Approval of the lot line adjustment is anticipated within 90 days of submitting the lot line adjustment application (see Section 5.4.7).

5.4.1.7 Recent and Proposed General Plan Amendments, Zoning Changes, and Discretionary Reviews

As shown in Table 5.4-9, two applications within 1 mile of the Project Site and 0.25 mile of the Project linears are currently in the preliminary review stage for conditional use permit or zoning change.

5.4.2 Environmental Consequences

5.4.2.1 Significance Criteria

The following sections discuss the potential land use and agriculture impacts associated with construction and operation of the Project. Appendix G of the California Environmental Quality Act (CEQA) describes project-related effects that would normally be considered to have a significant effect on the environment. Based on this guidance, project-related land use and agriculture impacts are considered significant if the Project would do any of the following:

- Physically divide an established community
- Conflict with any applicable land use plan and policies
- Conflict with any applicable habitat conservation plan or natural community conservation plan
- Result in conversion of prime or unique farmland, or farmland of statewide importance, to non-agricultural use
- Conflict with existing zoning for agricultural use or with a Williamson Act contract
- Result in degradation or loss of available agricultural land, agricultural activities, or agricultural land productivity
- Result in alteration of agricultural land characteristics due to plant air emissions

Consistency with applicable habitat conservation and natural community plans is discussed in Section 5.2, Biological Resources. Other issues related to land use are addressed in Section 5.1, Air Quality; Section 5.10, Traffic and Transportation; Section 5.5, Noise; Section 5.8, Socioeconomics; and Section 5.11, Visual Resources.

5.4.2.2 Compatibility with Established Land Uses

The Project is not expected to conflict with existing land uses in the vicinity of the Project Site, which include farming, the Tule Elk State Natural Reserve, and a few scattered single-family dwellings. The Project would not result in physical division of an established community because the Project would involve the conversion of a portion of an existing farm, and surrounding land uses are primarily farming. Project linears would be buried, except for the electrical transmission line and the railroad spur, and would not conflict with the continuation of existing land uses. Poles supporting the electrical transmission line would be located to minimize interference with the continuation of existing land uses, which primarily include farming and orchards. The railroad spur bed would be minimized to 22 feet in width to minimize interference with existing land uses. Therefore, the Project would be compatible with existing land uses.

5.4.2.3 Compatibility with Agricultural Lands and Williamson Act Contracts

Agricultural Lands

The Project would result in conversion of the 453-acre Project Site from agricultural uses. The Controlled Area will provide a buffer area between the Project Site and adjacent parcels, and would continue to be used for agricultural purposes. The Project Site is categorized as Prime Farmland and represents approximately 0.07 percent of the 608,789 acres of Kern County Prime Farmland inventoried by the CDOC in 2010 (CDOC, 2011). No significant changes to agricultural land uses on properties adjacent to the Project Site are expected because Project construction and operations will be isolated to the Project Site, with the exception of the temporary construction laydown areas, the railroad spur, the electrical transmission line, the PG&E gas metering station, and underground off-site linears. The conversion of farmland at the Project Site is not expected to result in the conversion of adjacent or nearby lands from agricultural use. When fully operational, the Project will require approximately 200 employees. This number of people is insufficient to require additional public services, and the use would not involve customers or public visits. Consequently, surrounding agricultural uses will not be affected. Most of the land in the vicinity of the Project Site is under Williamson Act contracts that prohibit use for purposes other than agriculture, open space, and compatible uses. Based on the small percentage of Prime Farmland affected by the Project, it would not result in significant impacts to agricultural lands and activities.[1]

[1] The fact that the Project meets the criteria to be determined a project of statewide, regional, or areawide significance per CEQA Guidelines Section 15206 (b)(3) by virtue of the cancellation of a Williamson Act contract for a parcel of 100 or more acres does not necessarily mean that the Project causes a significant impact to agricultural resources. The determination of whether a project is of statewide, regional, or areawide significance is relevant to certain procedural requirements under CEQA, and is distinct from and independent of the determination of whether the project will significantly impact a specific resource.

Williamson Act Contracts

As discussed in Section 5.4.1.3, the Project Site is currently under Williamson Act contract. Because Kern County has determined that the Project is not a compatible use under the Williamson Act, the Williamson Act restrictions on the Project Site must be cancelled pursuant to California GC § 51280 *et seq.* prior to construction and operation of the Project. The Project Site represents approximately 0.03 percent of the 1,649,780 acres of Williamson Act contracted lands in Kern County (Kern County, 2007).

HECA will own the Controlled Area adjacent to the Project Site, and cancellation of the Williamson Act contracts covering these lands would not be required because they would continue to be used for agricultural purposes. Construction of the Project would require temporary use of approximately 80 acres of the Controlled Area in addition to the Project Site as a construction laydown area for construction equipment and materials (see Figure 5.4-1). The type of equipment and materials that will be staged in the construction laydown area is anticipated to include piping, vessels, steel for fabrication, electrical conduit and similar materials, pumps, compressors, valves, spools, insulation, instrumentation, scaffolding, tools, heavy equipment such as cranes, trucks, and earthmoving equipment, as well as construction worker vehicles. Kern County and the CDOC have confirmed that the proposed temporary use of this area for staging construction equipment and materials during Project construction would not require cancellation of the Williamson Act restrictions over this laydown area.

Williamson Act contracts covering lands along the CO_2 linear, natural gas linear, railroad, process water linear, electrical transmission linear, and potable water linear would not be cancelled because Kern County has determined that these Project components are compatible uses under the Williamson Act.

On June 29, 2010, the Kern County Board of Supervisors adopted Resolution 2010-168, approving the tentative cancellation of the Williamson Act contracts on approximately 491 acres, which included the 473 acres of the former Project Site boundaries, as described in HECA's Revised AFC that was filed in 2009, and 18 acres of the former fertilizer manufacturing plant (Port Organics) adjacent to the northwestern boundaries of the Project Site (see Figure 5.4-6). In approving the tentative cancellation, the Board of Supervisors found that the cancellation was in the public interest, pursuant to GC § 51282(a). A Certificate of Tentative Cancellation was recorded on July 14, 2010. The Certificate of Tentative Cancellation and Resolution 2010-168 are included in Appendix H. Additionally, a letter from the CDOC dated May 27, 2010, included in Appendix H, states that CDOC has no objection to the approval of the cancellation application by the Kern County Board of Supervisors. Also included in Appendix H is the Staff Report of the Kern County Board of Supervisors regarding the approval of the cancellation application. The Williamson Act restrictions over the tentatively cancelled acreage continue to remain in place until the conditions set forth in the Certificate of Tentative Cancellation are satisfied, including payment of the assessed cancellation fee, and recording of the final Certificate of Cancellation.

HECA plans to submit a new petition to Kern County to cancel the Williamson Act contract restrictions over the new Project Site boundaries (see Figure 5.4-6). Cancellation of the Williamson Act contract restrictions will require tentative approval of the Williamson Act

cancellation by the Kern County Board of Supervisors, following a public hearing and subject to certain findings discussed below. Final approval of the cancellation is subject to obtaining all discretionary permits necessary to implement the Project, payment of a cancellation fee, and satisfaction of any other conditions imposed by the Board of Supervisors in the tentative cancellation. Once these conditions are satisfied, a certificate of final cancellation will be issued and recorded by Kern County. The Kern County Planning Department has advised that the petition for cancellation would be statutorily exempt from CEQA pursuant to State Public Resources Code (PRC) § 21080(b)(6) and State CEQA Guidelines § 15271, which exempts early actions related to thermal power plants if an environmental document covering the actions will subsequently be prepared by a regulatory agency.

In order to grant tentative approval for cancellation of a Williamson Act contract, GC § 51282(a) requires the Kern County Board of Supervisors to make one of the following determinations:

- The cancellation is consistent with the purposes of the Williamson Act.
- The cancellation is in the public interest.

HECA will seek cancellation based on the public interest determination. The Board of Supervisors made this public interest determination in connection with its June 2010 approval of tentative cancellation of the Williamson Act contract affecting the former Project Site boundaries. HECA anticipates that the Board of Supervisors will determine—as it did in June 2010—that the cancellation would be in the public interest based on the following two findings:

1. Other public concerns, which include public concerns of energy supply, energy security, global climate change, water supply, hydrogen infrastructure, substantially outweigh the objectives of the Williamson Act Land Use Contract;

2. There is no available and suitable proximate noncontracted land for the use proposed on the contracted land and the site was selected based upon the proximity to a CO_2 storage reservoir, existing natural gas transportation, electric transmission, and brackish groundwater supply infrastructure that could support the proposed power generation.

The first finding is supported by the following facts:

- **Supplying Electricity.** The Project will provide approximately 300 MW of new, baseload low-carbon generating capacity, enough to power more than 159,000 homes.

- **Capturing Green House Gas Emissions.** The Project will prevent the release of approximately 3 million tons per year of greenhouse gases to the atmosphere by sequestering them underground. Existing conventional power plants release CO_2 into the atmosphere, rather than capturing and sequestering it. This will help the State to meet its important greenhouse gas reduction targets as established by Assembly Bill (AB) 32, AB 1925, and Senate Bill 1368. The Project is designed to support Executive Order S-3-05, which sets a State target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

- **Water Supply and Agricultural Production.** The Project will conserve fresh water sources by using brackish groundwater for its water needs. The brackish groundwater will be

supplied by BVWSD, a water district with impaired groundwater sources not suitable for agricultural or drinking use. Project consumption of the sources is expected to benefit local agriculture by removing salts from the groundwater sourcing the BVWSD, which will result in an improved groundwater quality. As a result, the Project will facilitate efforts by the Water District to improve local groundwater quality and agriculture in localized areas.

- **Protecting Energy Security and Domestic Energy Supplies.** The Project will conserve domestic energy supplies by using coal and petcoke, a local energy source that is currently exported overseas for fuel. Conservation of this domestic energy supply will enhance energy security. Petcoke is a by-product from the oil refining process. In addition, the Project will produce additional energy from existing California oil fields by injecting CO_2 for EOR, which will help California extract an otherwise unrecoverable 5 million barrels of oil each year or 150 million barrels over the first thirty years of the Project.

- **Promoting Hydrogen Infrastructure.** The Project will increase the supply of hydrogen available to support the State's goal of energy independence as expressed in California Executive Order S-7-04, which mandates the development of a hydrogen infrastructure and hydrogen transportation in California. The Project is poised to supplement the quantities of hydrogen necessary for these future energy and transportation technologies, and support California's roles as a world leader in clean energy.

- **Stimulating the Local and California Economy.** The Project will boost the local and California economy with an estimated 2,500 jobs associated with peak construction and approximately 200 fulltime positions associated with Project operations, plus ancillary jobs and businesses to support the Project.

Given that the Project addresses these public concerns, there is substantial evidence to support the finding set forth in GC § 51282(c)(1) that "other public concerns substantially outweigh the objects of the Williamson Act."

The following facts support the second finding:

The Project Site was selected based upon the available land, proximity to a suitable CO_2 EOR and sequestration site and the existing natural gas transportation, electric transmission and brackish groundwater supply infrastructure that could support the proposed 300 MW of baseload low-carbon power generation. The Project Site was also selected for its reasonable proximity to I-5, State Routes 58 and 119, and Stockdale Highway. There is no non-contracted land proximate to the Project Site that is both available and suitable for the Project. As such, the finding set forth in GC § 51282(c)(2) is satisfied. With regard to availability, virtually all land in the proximity of the Project Site is either under Williamson Act or in the Tule Elk State Natural Reserve. With regard to suitability, no alternative sites have been identified that meet the highly specific site selection requirements of the Project.

5.4.2.4 Consistency with Adopted General and Specific Plans

The Project is consistent with applicable Kern County General Plan goals and policies, which are presented in Table 5.4-6. The General Plan Energy Element recognizes the importance of

alternative energy development and the County's role as a major electricity producer, given its geographic position in California and location on the boundaries of the State's largest gas and electric utilities. The Project is also consistent with County goals and policies related to resource development, since the Project would enhance existing oil production in the EHOF.

The Project is also consistent with the allowed uses in the Intensive Agriculture land use designation, which include (but are not limited to) non-agricultural uses such as public utilities. For example, the Pastoria Energy Facility was found to be consistent with the intent of Kern County's Intensive Agriculture General Plan designation, and was permitted by the CEC. Agricultural industries are also permitted uses, and the production of nitrogen-based products as part of the Project would not conflict with the intent of the Intensive Agriculture land use designation. Land adjacent to the Project Site is also included in the Intensive Agriculture designation and is primarily used for farming purposes. The Project would not interfere with surrounding agricultural uses.

Project linears would be buried, except for the railroad and transmission line, and would not conflict with the intent of applicable General Plan and Specific Plan land use designations, which primarily include Intensive Agriculture and Mineral and Petroleum. Permitted uses in these land uses designation include (but are not limited to) pipelines, transmission facilities, and petroleum exploration and extraction. Poles supporting the electrical transmission line would be located to minimize interference with the continuation of existing land uses, which primarily include farming and orchards. In addition, the railroad spur bed would be minimized to 22 feet in width to minimize interference to existing land uses.

The Project will be constructed and operated to minimize impacts to all adjacent land uses as described in Section 5.1, Air Quality; Section 5.2, Biological Resources; Section 5.5, Noise; 5.10, Traffic and Transportation; and Section 5.11, Visual Resources. Therefore, the Project would not conflict with the Kern County General Plan and relevant specific plans.

5.4.2.5 Consistency with Kern County Zoning Ordinance

The Project Site is included in the Exclusive Agriculture (A) zone. The Project is consistent with the purpose of the Exclusive Agriculture (A) zoning district because Electrical Power Generating Plants are permitted under Zoning Ordinance § 19.12.030.G with a Conditional Use Permit (CUP). The CUP for the Project will be subsumed within the CEC's permitting process. In the last 10 years, a number of energy facilities were found to be consistent with the purpose of Kern County's Exclusive Agriculture (A) zoning district and were permitted by the CEC, including the La Paloma Generating Project, Pastoria Energy Facility, Sunrise Cogeneration and Power Project, and Western Midway Sunset Power Project.

The Project also includes a Manufacturing Complex, which will produce low-carbon nitrogen-based products including fertilizer. Fertilizer production and storage for agricultural purposes (whether on-site or off-site) is a conditionally permitted use in the Exclusive Agriculture (A) zoning district. Production and storage of low-carbon nitrogen-based products other than fertilizer for agricultural purposes are not listed as permitted uses in the zoning district. The Kern County Planning Department expects to issue a Similar Use Determination under Zoning Ordinance § 19.08.030 for the proposed production and storage of low-carbon nitrogen-based

products. A Determination of Similar Use is a ministerial approval made by the Planning Director within 45 days of application submittal. No discretionary approvals under the Kern County Zoning Ordinance would be required.

The Project is consistent with the development standards for the Exclusive Agriculture (A) zoning district. The Kern County Zoning Ordinance regulates a minimum setback of 55 feet from the legal centerline of any existing or proposed street or access easement. The Zoning Ordinance indicates that there are no height limits on nonresidential structures and no landscaping is required.

Most of the land in the vicinity of the Project Site and Project linears is included in the Exclusive Agriculture (A) zone or the Limited Agriculture (A-1) zone. The Project would not interfere with surrounding land uses, which are permitted uses in the Exclusive Agriculture (A) zone or the Limited Agriculture (A-1) zone. Transmission lines and underground facilities for natural gas and water owned and operated by a public utility company or companies under the jurisdiction of the California PUC are permitted uses in the Exclusive Agriculture (A) and Limited Agriculture (A-1) zoning districts. Oil or gas exploration and production, and related accessory equipment, which would include the CO_2 pipelines to the EHOF are also permitted uses in these zoning districts. Project linears would be buried, except for the railroad and electrical transmission line, and would not conflict with the purpose of these zoning districts. The height of poles supporting the electrical transmission line would not conflict with the Zoning Ordinance because there are no height limits for nonresidential structures in the Exclusive Agriculture (A) or Limited Agriculture (A-1) zoning districts. In addition, poles supporting the electrical transmission line would be located to minimize interference with the continuation of existing land uses, which primarily include farming and orchards. The federal Surface Transportation Board will have exclusive regulatory authority over the construction and operation of the industrial rail spur. The spur is expected to be exempt from STB certification because it would be exclusively used for industrial deliveries required for the HECA Project.

5.4.2.6 OEHI Project

According to the analysis contained in Appendix A-1, Section 4.9, Land Use, and Appendix A-2, Section 2.4, Land Use, construction and operation of the OEHI Project will not result in significant adverse impacts.

5.4.3 Cumulative Impacts Analyses

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts (CEQA Guidelines § 15130). A "cumulative impact" consists of an impact that is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines § 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines § 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines § 15065 [b][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines § 15130[a]). It is also possible that a project's contribution to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines § 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines § 15130[b]). The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines § 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects in a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines § 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines § 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects, which is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

Of the projects identified in Appendix I only two are located in the land use study area (i.e., 1 mile from the Project Site and 0.25 mile from the Project linears). One of these projects involves establishing a 121-acre dairy farm with 739-acres for liquid waste disposal and 201 acres for solid waste disposal on the southwestern corner of Adohr Road and Dairy Road, directly across the Dairy Road right-of-way from the Project Site. Although dairies are not common in the vicinity of the Project Site, the use is compatible with surrounding farming uses and the Project. The second project involves a general plan amendment from light industrial to service industrial to develop a 1.3-million-square-foot distribution facility. The facility will be located on Old Tracy Road and I-5, and will be compatible with the nearby land use designations. No other planned industrial or commercial projects were identified in the study area. For these reasons, the Project is not expected to result in significant cumulative land use impacts.

According to the analysis contained in Appendix A-1, Section 4.9, Land Use, and Appendix A-2, Section 2.4, Land Use, construction and operation of the OEHI Project would not result in significant cumulative adverse impacts to land use.

5.4.4 Mitigation Measures

The Project would not result in significant land use impacts; therefore, no mitigation measures are necessary.

5.4.5 Laws, Ordinances, Regulations, and Standards

The Project will be constructed and operated in compliance with all LORS applicable to land use and agricultural resources. Federal, state, and local LORS applicable to land use and agricultural resources are discussed below and summarized in Table 5.4-10.

5.4.5.1 Federal

49 U.S.C. § 10501(b)(2) preempts state regulatory authority over railroad operations.

49 U.S.C. § 10906 precludes all regulation of industrial or spur tracks.

No federal LORS are applicable to land in the vicinity of the Project.

5.4.5.2 State

CEQA PRC § 21000-21177 requires evaluation and appropriate mitigation measures for potential environmental impacts to land use and agricultural resources from a proposed project. A discussion and evaluation of applicable CEQA provisions is included in Section 5.4.2, above.

The Williamson Act of 1965 (GC § 51200-51207), which is also known as the California Land Conservation Act, enables local governments to enter into contracts with private landowners to voluntarily restrict specific parcels of land to agricultural and open space uses under a rolling 10-year contract. Restricted parcels are assessed for property tax purposes at a rate consistent with their actual use rather than potential market value. Unless either party files a "notice of non-renewal," the contract is automatically renewed annually for an additional year. The Act also includes findings for cancellation of Williamson Act contracts. A discussion and evaluation of applicable Williamson Act provisions is included in Section 5.4.2.3, above.

5.4.5.3 Local

The Project will be constructed and operated in accordance with all local land use LORS as discussed in Section 5.4.2.4 and 5.4.2.5, above.

5.4.6 Involved Agencies and Agency Contacts

Kern County will review the proposed development plans for consistency with their General Plan and Zoning Ordinance and consider a petition for cancellation of the Williamson Act contract restrictions on the Project Site, a lot line adjustment application, a Similar Use Determination application, and an application for vacating roads and easements within the Project Site. See Section 5.4.7 for required permits and schedule. Kern County has expressed support for the Project and a willingness to cooperate throughout the permitting process. Involved agencies are listed in Table 5.4-11.

5.4.7 Permits Required and Permit Schedule

Permits required for the Project are listed in Table 5.4-12. The CEC has exclusive authority to license power plants in California. According to PRC § 25500:

> The issuance of a certificate by the Commission shall be in lieu of any permit, certificate or similar document required by any state, local or regional agency. . . and shall supersede any applicable statute, ordinance or regulation of any state, local or regional agency . . .

Nonetheless, barring a finding that a project is required for the public convenience and necessity and that there are no more prudent and feasible means of achieving that convenience and necessity (20 California Code of Regulations 7752 [1]), the CEC might not issue a license for a project that is inconsistent with local land use designations.

As discussed above, the Project is consistent with the goals and policies of Kern County's General Plan and Zoning Ordinance. The Project is a permitted use in the Exclusive Agriculture (A) zoning district with a Conditional Use Permit.

Although the Kern County CUP requirement for the Project will be subsumed within the CEC permitting process, HECA will need to seek approval from the County for the following:

1. Cancellation of the Williamson Act contract restrictions on the Project Site (as discussed in Section 5.4.2.3);

2. Lot line adjustment to merge the Project Site into a single legal parcel (as discussed in Section 5.4.1.6);

3. Similar Use Determination (as discussed in Section 5.4.2.5); and

4. Vacation of various public roads and easements within the Project Site, which will require approval by the Board of Supervisors, following a noticed public hearing pursuant to California Streets & Highways Code § 8320–8334.5.

The timelines for the required Kern County approvals are set forth in Table 5.4-12.

5.4.8 References

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Table 5.4-1
Distances to Places, Sensitive Receptors, and Unique Land Uses in the Project Vicinity

Place/Sensitive Receptor	Location	Direction from Project Site	Distance from Project Site
Buttonwillow (unincorporated community)	N/A	Northwest	4.3 miles
Buttonwillow Elementary School	42600 SR 58 Buttonwillow, CA 93206	Northwest	6.3 miles
California Aqueduct	N/A	South	1,980 feet
City of Bakersfield	N/A	East	6.5 miles
East Side Canal	N/A	East	1,415 feet
Elk Hills Elementary School	501 Kern Street Tupman, CA 93276	South	2.4 miles
Elk Hills Oil Field	N/A	South	1 mile
Elk Hills–Buttonwillow Airport	Buttonwillow, CA 93206	West	5 miles
Kern River Flood Control Channel	N/A	South	805 feet
Kern Water Bank	N/A	East	1 mile
Oasis Church of God	405 Kern Street Tupman, CA 93276	Southeast	2.4 miles
Residence	6122 Tule Park Road Buttonwillow, CA 93206	East	1,466 feet
Residence	34365 Stockdale Highway Buttonwillow, CA 93206	North	5,308 feet
Residence	8229 Station Road Buttonwillow, CA 93206	East	1,442 feet
Residence	Tupman Road Buttonwillow, CA 93206	Southeast	3,024 feet
Tule Elk State Natural Reserve	8653 Station Road Buttonwillow, CA 93206	East	3,869 feet
Tupman (unincorporated community)	N/A	Southeast	2.0 miles
West Side Canal (called Outlet Canal further east)	N/A	South	580 feet

Notes:
N/A = not applicable

Table 5.4-2
Existing Land Uses in the Study Area

Existing Land Use	Area (acres)	Percent
Project Site	**446.4**	**100.0**
Farming	445.4	99.8
Industrial	1.0	0.2
Vicinity of Project Site (1 Mile Radius)	**4362.0**	**100.0**
Canal	36.4	0.8
Farming	2715.9	62.3
Industrial	31.6	0.7
Orchards	505.7	11.6
Parks/Open Space/Recreation	372.1	8.5
Public/Quasi-Public	29.7	0.7
Residential	0.6	0.0
Residential/Urban	5.6	0.1
Undeveloped	664.3	15.2
CO_2 Linear (0.25 Mile Radius)	**1120.8**	**100.0**
Canal	5.6	0.5
Farming	319.4	28.5
Public/Quasi-Public	6.6	0.6
Resource Extraction	286.2	25.5
Undeveloped	503.0	44.9
Natural Gas/Railroad Linears (0.25 Mile Radius)	**4144.2**	**100.0**
Canal	26.5	0.6
Commercial	27.0	0.7
Farming	2825.7	68.2
Industrial	106.1	2.6
Orchards	782.7	18.9
Public/Quasi-Public	32.0	0.8
Residential	5.1	0.1
Undeveloped	339.0	8.2
Transmission/Potable Water Linears (0.25 Mile Radius)	**771.0**	**100.0**
Canal	8.6	1.1
Farming	698.0	90.5
Orchards	50.7	6.6
Public/Quasi-Public	13.6	1.8
Process Water Linears (0.25 Mile Radius)	**4832.6**	**100.0**
Canal	65.8	1.4
Farming	2936.9	60.8
Orchards	571.3	11.8
Public/Quasi-Public	8.4	0.2
Residential	12.8	0.3
Undeveloped	1237.6	25.6

Source: Site reconnaissance surveys; U.S. Geological Survey (USGS) 7.5 minute topographic quadrangle maps; aerial photography; and Kern County Assessor's land use codes

Table 5.4-3
Crop Types in the Study Area

Crop Type	Area (acres)	Percent
Project Site	**430.7**	**100.0**
Alfalfa	118.0	27.4
Cotton	246.8	57.3
Onion	65.9	15.3
Vicinity of Project Site (1 Mile Radius)	**2906.2**	**100.0**
Alfalfa	615.1	21.2
Corn	200.8	6.9
Cotton	1449.8	49.9
Onion	177.3	6.1
Pistachio	376.2	12.9
Wheat	11.0	0.4
Other	76.2	2.6
CO_2 Linear (0.25 Mile Radius)	**301.5**	**100.0**
Alfalfa	102.7	34.1
Cotton	124.9	41.4
Onion	73.9	24.5
Natural Gas/Railroad Linears (0.25 Mile Radius)	**4054.7**	**100.0**
Alfalfa	1205.9	29.7
Almond	137.6	3.4
Carrot	60.2	1.5
Corn	421.9	10.4
Cotton	948.0	23.4
Pistachio	434.4	10.7
Uncultivated Ag	100.5	2.5
Wheat	618.2	15.2
Other	128.0	3.2
Potable Water/Transmission Linears (0.25 Mile Radius)	**343.9**	**100.0**
Alfalfa	225.5	65.6
Corn	17.3	5.0
Cotton	64.8	18.9
Pistachio	35.2	10.2
Wheat	1.2	0.3
Process Water Linear (0.25 Mile Radius)	**8530.57**	**100.0**
Alfalfa	1005.6	11.8
Almond	31.8	0.4
Carrot	72.6	0.9
Corn	72.6	0.9
Cotton	1233.1	14.5
Onion	212.8	2.5
Pistachio	456.3	5.4
Uncultivated Ag	78.5	0.9
Wheat	210.9	2.5
Other	2578.2	30.2

Source: Kern County, 2011.

Table 5.4-4
Important Farmland in the Study Area

Important Farmlands	Area (acres)	Percent
Project Site	**453.0**	**100.0**
Prime Farmland	453.0	100.0
Vicinity of Project Site (1 Mile Radius)	**4579.8**	**100.0**
Grazing Land	741.3	16.2
Nonagricultural or Natural Vegetation	397.7	8.7
Prime Farmland	3285.9	71.8
Semi-Agricultural and Rural Commercial Land	39.7	0.9
Unique Farmland	37.6	0.8
Vacant or Disturbed Land	77.6	1.7
CO_2 Linear (0.25 Mile Radius)	**1196.2**	**100.0**
Grazing Land	574.2	48.0
Nonagricultural or Natural Vegetation	199.8	16.7
Prime Farmland	343.6	28.7
Semi-Agricultural and Rural Commercial Land	9.9	0.8
Vacant or Disturbed Land	68.6	5.7
Natural Gas/Railroad Linears (0.25 Mile Radius)	**4271.5**	**100.0**
Confined Animal Agriculture	80.0	1.9
Farmland of Statewide Importance	896.9	21.0
Nonagricultural or Natural Vegetation	427.6	10.0
Prime Farmland	2632.4	61.6
Semi-Agricultural and Rural Commercial Land	31.9	0.7
Unique Farmland	0.6	0.0
Urban and Built-up Land	92.7	2.2
Vacant or Disturbed Land	109.4	2.6
Potable Water/ Transmission Linears (0.25 Mile Radius)	**781.9**	**100.0**
Grazing Land	182.0	23.3
Prime Farmland	585.0	74.8
Unique Farmland	14.9	1.9
Process Water Linear (0.25 Mile Radius)	**4915.3**	**100.0**
Farmland of Statewide Importance	132.8	2.7
Grazing Land	1599.5	32.5
Nonagricultural or Natural Vegetation	22.7	0.5
Prime Farmland	2962.3	60.3
Unique Farmland	198.0	4.0

Source: Kern County, 2007.

Table 5.4-5
Williamson Act Contracts in the Study Area

Important Farmlands	Area (acres)	Percent
Project Site	**453**	**100.0**
Williamson Act Contract	453	100.0
Vicinity of Project Site (1 mile Buffer)	**4579.9**	**100.0**
Williamson Act Contract	2821.0	61.6
CO_2 Linear (0.25 Mile Buffer)	**1196.2**	**100.0**
Williamson Act Contract	488.3	40.8
Natural Gas/Railroad Linears (0.25 Mile Buffer)	**4271.5**	**100.0**
Williamson Act Contract	2652.2	62.1
Potable Water/Transmission Linears (0.25 Mile Buffer)	**782.0**	**100.0**
Williamson Act Contract	341.3	43.6
Process Water Linear (0.25 Mile Buffer)	**4915.3**	**100.0**
Williamson Act Contract	2448.3	49.8

Source: Kern County, 2007.

Table 5.4-6
Kern County General Plan Goals and Policies

Goal/Policy No.	Goal/Policy
Land Use Policy 1.4.5	Ensure that adequate supplies of quality (appropriate for intended use) water are available to residential, industrial, and agricultural users in Kern County.
Land Use Goal 1.9.2	Protect areas of important mineral, petroleum, and agriculture resource potential for future use.
Land Use Goal 1.9.3	Ensure the development of resource areas and minimize effects on neighboring resource lands.
Land Use Goal 1.9.4	Encourage safe and orderly energy development in the County, including research and demonstration projects, and to become actively involved in the decision and actions of other agencies as they affect energy development in Kern County.
Land Use Goal 1.9.5	Conserve prime agriculture lands from premature conversion.
Land Use Goal 1.9.6	Encourage alternative sources of energy, such as solar and wind energy, while protecting the environment.
Land Use Policy 1.9.7	Areas designated for agriculture use, which include Class I and II and other enhanced agriculture soils with surface delivery water systems, should be protected from incompatible residential, commercial, and industrial subdivision and development activities.
Land Use Policy 1.9.11	Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.
Land Use Policy 1.9.16	The County will encourage development of alternative energy sources by tailoring its Zoning and Subdivision Ordinances and building standards to reflect Alternative Energy Guidelines published by the California State Energy Commission.
Land Use Policy 1.9.20	Areas along rivers and streams will be conserved where feasible to enhance drainage, flood control, recreation, and other beneficial uses, while acknowledging existing land use patterns.
Land Use Policy 1.10.8	The County shall ensure that new industrial uses and activities are sited to avoid or minimize significant hazards to human health and safety in a manner that avoids overconcentrating such uses in proximity to schools and residents.
Land Use Policy 1.10.19	In considering discretionary projects for which an Environmental Impact Report must be prepared pursuant to the California Environmental Quality Act, the appropriate decision making body, as part of its deliberations, will ensure that: (a) All feasible mitigation to reduce significant adverse air quality impacts have been adopted; and (b) The benefits of the proposed project outweigh any unavoidable significant adverse effects on air quality found to exist after inclusion of all feasible mitigation. This finding shall be made in a statement of overriding considerations and shall be supported by factual evidence to the extent that such a statement is required pursuant to the California Environmental Quality Act.
Land Use Policy 1.10.20	The County shall include fugitive dust control measures as a requirement for discretionary projects and as required by the adopted rules and regulations of the San Joaquin Valley Unified Air Pollution Control District and the Kern County Air Pollution Control District on ministerial permits.

Table 5.4-7
General and Specific Plan Land Use Designations in the Study Area

Designation (Map Code)	Intent	Area (Acres)	Percent
Project Site		**453**	**100.0**
Intensive Agriculture (8.1)	Areas devoted to the production of irrigated crops or having a potential for such use. Other agriculture uses, while not directly dependent on irrigation for production, may also be consistent with the intensive agriculture designation. Minimum parcel size is 20 acres gross. Uses shall include, but are not limited to, the following: Irrigated cropland; orchards; vineyards; horse ranches; raising of nursery stock, ornamental flowers, and Christmas trees; fish farms, bee keeping, ranch and farm facilities, and related uses; one single-family dwelling unit; cattle feed yards; dairies; dry land farming; livestock grazing; water storage; groundwater recharge acres; mineral, aggregate, and petroleum exploration and extraction; hunting clubs; wildlife preserves; farm labor housing; public utility uses; agricultural industries pursuant to provisions of the Kern County Zoning Ordinance; and land in development areas subject to significant physical constraints.	453	100.0
Vicinity of Project Site (1 Mile Radius)		**4579.8**	**100.0**
Extensive Agriculture (8.3)	Agricultural uses involving large amounts of land with relatively low value-per-acre yields, such as livestock grazing, dry land farming, and woodlands. Minimum parcel size is 20 acres gross, except lands subject to a Williamson Act Contract/ Farmland Security Zone Contract, in which case the minimum parcel size shall be 80 acres gross.	711.7	15.5
Intensive Agriculture (8.1)	See intent under Project Site, above.	3493.2	76.3
State or Federal Land (1.1)	Applied to all property under the ownership and control of the various state and federal agencies operating in Kern County (such as military, United States Forest Service, Bureau of Land Management, and Department of Energy)	375.0	8.2

Table 5.4-7
General and Specific Plan Land Use Designations in the Study Area (Continued)

Designation (Map Code)	Intent	Area (Acres)	Percent
CO_2 Linear (0.25 Mile Radius)		**1196.2**	**100.0**
Extensive Agriculture (8.3)	See intent under Vicinity of Project Site, above.	207.6	17.4
Intensive Agriculture (8.1)	See intent under Project Site, above.	334.8	28.0
Mineral and Petroleum (8.4)	Areas that contain producing or potentially productive petroleum fields, natural gas, and geothermal resources, and mineral deposits of regional and statewide significance. Uses are limited to activities directly associated with the resource extraction. Minimum parcel size is 5 acres gross.	653.8	54.7
Natural Gas/Railroad Linears (0.25 Mile Radius)		**4271.5**	**100.0**
Extensive Agriculture (8.3)	See intent under Vicinity of Project Site, above.	161.2	3.8
General Commercial (6.2) [1]	Retail and service facilities of less intensity than regional centers providing a broad range of goods and services which serve the day-to-day needs of nearby residents. Permitted uses shall include, but are not limited to, the following: neighborhood shopping centers, convenience markets, restaurants, offices, and wholesale business facilities.	11.5	0.3
Highway Commercial (6.3) [1]	Uses which provide services, amenities, and accommodations at key locations along major roadways to visitors and through traffic. Maximum building height not to exceed 50 feet. Permitted uses shall include, but are not limited to, the following: hotels, motels, restaurants, garages, service stations, and recreation vehicle facilities.	133.4	3.1
Intensive Agriculture (8.1)	See intent under Project Site, above.	3333.4	78.1
Light Industrial (7.1) [1]	Unobtrusive industrial activities that can locate in close proximity to commercial uses with a minimum of environmental conflicts. These industries are characterized as non-labor intensive and nonpolluting and do not produce fumes, odors, noise, or vibrations detrimental to nearby properties. Permitted uses shall include, but are not limited to, the following: wholesale businesses, storage buildings and yards, warehouses, manufacturing and assembling, truck parking and servicing, all commercial uses, public facilities, and resource land use.	88.8	2.1
Residential Maximum 10 Units/Net Acre (5.3) [1]	This category is designed to accommodate single-family development on mobile home lots in conformance with § 17.3 of the Kern County Zoning Ordinance and State of California Title 25 ordinance standards.	17.9	0.4

Table 5.4-7
General and Specific Plan Land Use Designations in the Study Area (Continued)

Designation (Map Code)	Intent	Area (Acres)	Percent
Mineral and Petroleum (8.4)	See intent under CO_2, above.	244.0	5.7
Resource Management (8.5)	Primarily open space lands containing important resource values, such as wildlife habitat, scenic values, or watershed recharge areas. These areas may be characterized by physical constraints, or may constitute an important watershed recharge area or wildlife habitat or may have value as a buffer between resource areas and urban areas. Other lands with this resource attribute are undeveloped, non-urban areas that do not warrant additional planning within the foreseeable future because of current population (or anticipated increase), marginal physical development, or no subdivision activity. Minimum parcel size is 20 acres gross, except lands subject to a Williamson Act Contract/Farmland Security Zone Contract, in which case the minimum parcel size shall be 80 acres gross. Uses shall include, but are not limited to, the following: Recreational activities; livestock grazing; dry land farming; ranching facilities; wildlife and botanical preserves; and timber harvesting; one single-family dwelling unit; irrigated croplands; water storage or groundwater recharge areas; mineral; aggregate; petroleum exploration and extraction; open space and recreational uses; one single-family dwelling on legal residentially zoned lots on effective date of this General Plan; land within development areas subject to significant physical constraints; State and federal lands which have been converted to private ownership.	275.6	6.5
State Land (1.1) [1]	Applied to property owned or controlled by the State of California.	4.5	0.1
Potable Water/Transmission Linears (0.25 Mile Radius)		**782.0**	**100.0**
Intensive Agriculture (8.1)	See intent under Project Site, above.	782.0	100.0
Process Water Linear (0.25 Mile Radius)		**4915.3**	**100.0**
Extensive Agriculture (8.3)	See intent under Vicinity of Project Site, above.	1055.8	21.5
Intensive Agriculture (8.1)	See intent under Project Site, above.	3859.5	78.5

Sources: Kern County, 1985, 1986, 2009.

Notes:
[1] Designations under the Oglesby Specific Plan (Kern County, 1985) or Interstate 5 at Highway 58 Rural Community Specific Plan (Kern County, 1986)

Table 5.4-8
Zoning Districts in the Study Area

Designation	Purpose/Development Standards	Area (Acres)	Percent
Project Site		**453**	**100.0**
Exclusive Agriculture (A)	The purpose of the Exclusive Agriculture (A) District is to designate areas suitable for agricultural uses and to prevent the encroachment of incompatible uses onto agricultural lands and the premature conversion of such lands to nonagricultural uses. Uses in the A District are limited primarily to agricultural uses and other activities compatible with agricultural uses. Minimum lot size is 20 gross acres. A minimum lot size of 80 gross acres applies to lots under Williamson Act Contract and designated 8.2, 8.3, or 8.5 by the County General Plan or equivalent designation of any other adopted General or Specific Plan. The minimum front yard setback is 55 feet from the legal centerline of any existing or proposed private local street or access easements. The minimum side yard setback is 5 feet, except a minimum of 10 feet is required on the street side or corner lots. The minimum rear yard setback is 5 feet. There are no height limits for non-residential structures.	453	100.0
Vicinity of Project Site (1 mile Buffer)		**4440.9**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	4050.6	91.2
Limited Agriculture (A-1)	The purpose of the Limited Agriculture (A-1) District is to designate areas suitable for a combination of estate-type residential development, agricultural uses, and other compatible uses. Final map residential subdivisions are not allowed in the A-1 District.	390.3	8.8
CO_2 Linear (0.25 Mile Buffer)		**1135.3**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	438.8	38.7
Limited Agriculture (A-1)	See intent under Vicinity of Project Site, above.	696.5	61.4

Table 5.4-8
Zoning Districts in the Study Area (Continued)

Designation	Purpose/Development Standards	Area (Acres)	Percent
Natural Gas/Railroad Linears (0.25 Mile Buffer)		**4180.8**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	3969.5	94.9
General Commercial (C-2), Precise Development Combining (PD)	The purpose of the General Commercial (C-2) District is to designate areas for the widest range of retail commercial activities, including regional shopping centers and heavy commercial uses. The C-2 District should be located on major highways. The purpose of the Precise Development (PD) Combining District is to designate areas with unique site characteristics or environmental conditions or areas surrounded by sensitive land uses to ensure that development in such areas is compatible with such constraints.	78.3	1.9
Limited Agriculture (A-1)	See intent under Vicinity of Project Site, above.	97.1	2.3
Medium Industrial (M-2), Precise Development Combining (PD)	The purpose of the Medium Industrial (M-2) District is to designate areas for general manufacturing, processing, and assembly activities. Uses may not produce fumes, odor, dust, smoke, gas, or vibrations extending beyond zoning district boundaries. See intent above.	16.6	0.4
Mobilehome Park (MH)	The purpose of the Mobilehome (MH) Combining District is to provide for the installation of mobile homes with or without foundations in agricultural, resource-related, and residential zoned areas.	19.3	0.5
Potable Water/Transmission Linears (0.25 Mile Buffer)		**782.0**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	782.0	100.0
Process Water Linear (0.25 Mile Buffer)		**4881.0**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	3843.7	78.8

Table 5.4-8
Zoning Districts in the Study Area (Continued)

Designation	Purpose/Development Standards	Area (Acres)	Percent
Exclusive Agriculture (A), Airport Approach Height Combining (H)	The purpose of the Airport Approach Height (H) Combining District is to minimize aviation hazards by regulating land uses, restricting the height of buildings and vegetation, and specifying design criteria necessary to promote aviation safety and to implement the requirements of the adopted Airport Land Use Compatibility Plan. The H District may be applied to areas within the vicinity of any public or general-use airport as provided for in the adopted Airport Land Use Compatibility Plan. The standards established by the H District are in addition to the regulations of the base district with which the H District is combined.	36.5	0.8
Limited Agriculture (A-1)	See intent under Vicinity of Project Site, above.	577.2	11.8
Limited Agriculture (A-1), Airport Approach Height Combining (H)	See intent above.	423.5	8.7

Source: Kern County, 2011a.

Note:
The identified zoning districts have been summarized and only those districts in the affected environment of the Project study area are discussed.

Table 5.4-9
Recent and Proposed Discretionary Reviews in the Study Area

APN	Request	Case Type/ Permit Number	Status
159-020-16 159-030-06 159-070-03 159-130-11	Establish a 1,061 acre dairy (121-acre dairy, 739 acres of liquid waste disposal/spreading, and 201 acres for solid waste disposal/spreading)	Conditional Use Permit #10212	Application submitted on July 24, 2004. Project is part of a Master Environmental Impact Report by Kern County for dairies
103-080-45	General Plan Amendment from Other Facilities (3.3) and Light Industrial (7.1) to Service Industrial (7.2) to develop a 1.3 million square foot distribution facility	General Plan Amendment #13479	Application submitted and on hold pending payment of fees. Expected to require Environmental Impact Report

Source: Mynk, 2012.

Notes:
APN = Assessor's Parcel Number

Table 5.4-10
Applicable Land Use Laws, Ordinances, Regulations, and Standards

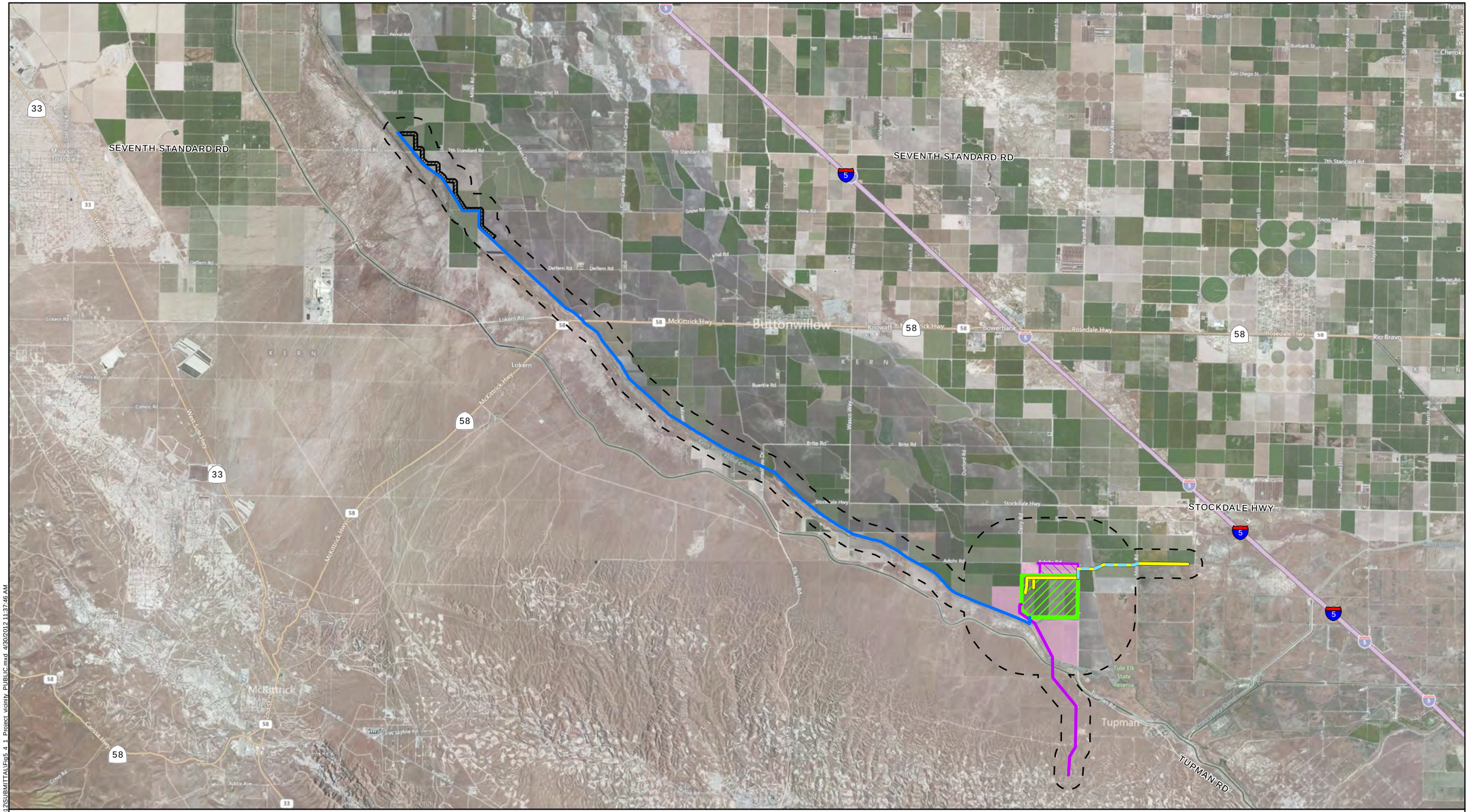
LORS	Applicability	Administering Agency	AFC Section
Federal			
None Applicable			
State			
California Environmental Quality Act (CEQA), Pub. Res. Code § 21000-21177	Requires evaluation of impacts to land use and mitigation measures for potential impacts.	CEC	5.4.2
Williamson Act, Government Code § 51200-51207	Enables local governments to enter into contracts with private landowners to restrict specific parcels of land to agriculture or related open space use. Restricted parcels are assessed for property tax purposes at a rate consistent with their actual use rather than potential market value. The Act includes findings for cancellation of Williamson Act contracts.	Kern County	5.4.2.3
Local Jurisdiction			
Kern County General Plan	Includes goals and policies, and preferred land use designations to guide development in unincorporated county areas	Kern County	5.4.2.4
Interstate 5 at Highway 58 Rural Community Specific Plan	The plan includes 640 acres of land bisected by I-5, Highway 58, and a rail spur paralleling Highway 58. The purpose of the plan is to guide development of the site, particularly for transportation-related commercial and industrial uses.	Kern County	5.4.2.4
Oglesby Specific Plan	The plan applies to 124 acres of land bounded to the west by the Interstate 5 at State Route 58 Rural Community Specific Plan and to the south by State Route 58. The purpose of the plan is to guide development of the site for three primary land use designations: public facilities; residential; and commercial facilities.	Kern County	5.4.2.4
Kern County Zoning Ordinance	Includes development standards for development in the Exclusive Agriculture (A) zoning district	Kern County	5.4.2.5

Table 5.4-11
Involved Agencies and Agency Contacts

Agency	Contact	Title	Telephone
Kern County Planning Department 2700 "M" Street, Suite 100 Bakersfield, CA 93301	Lorelei Oviatt	Planning and Community Development Director	(661) 862- 8866

Table 5.4-12
Permits Required and Permit Schedule

Responsible Agency	Permit/Approval	Timeline	Schedule
Kern County	Williamson Act Cancellation	120 days	Prior to certification
Kern County	Similar Use Determination	45 days	Prior to certification
Kern County	Lot Line Adjustment	90 days	Prior to commencing construction
Kern County	Various Public Road and Easement Vacations	120 days	Prior to commencing construction



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential

N

0 1 2 MILE

Source: Aerial Imagery, Bing Maps, 2010.

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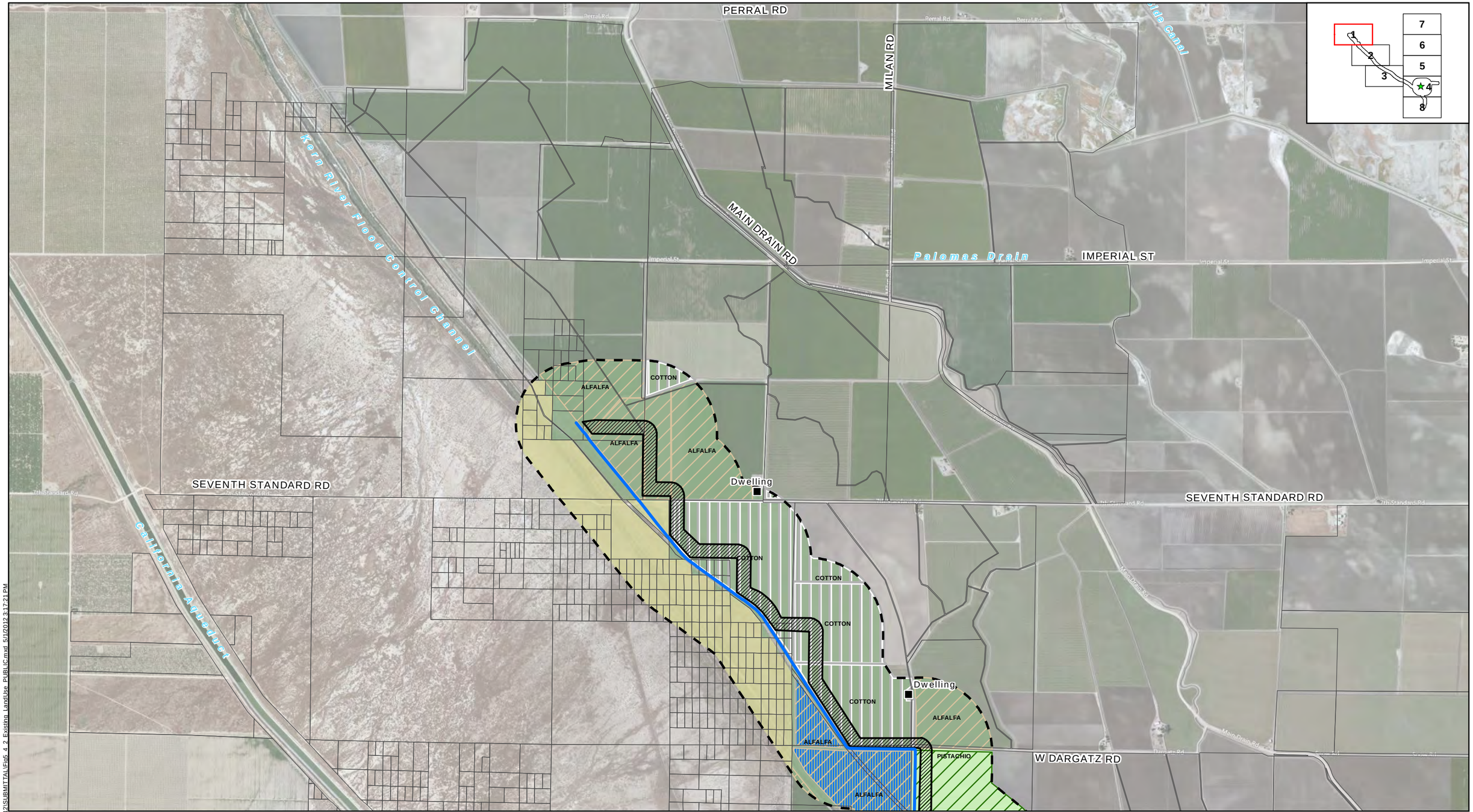
PROJECT VICINITY

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.4-1



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]
Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
Transmission

Land Uses
Commercial
Farming
Industrial
Orchards
Parks/Open Space/Recreation
Public/Quasi-Public
Residential
Resource Extraction
Undeveloped

Commodity
Alfalfa
Almond
Carrot
Corn
Cotton
Onion
Other Crops
Pistachio
Uncultivated Ag
Wheat[2]

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential
3. Includes wheat for/ not for food

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

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EXISTING LAND USE

May 2012
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Hydrogen Energy California (HECA)
Kern County, California

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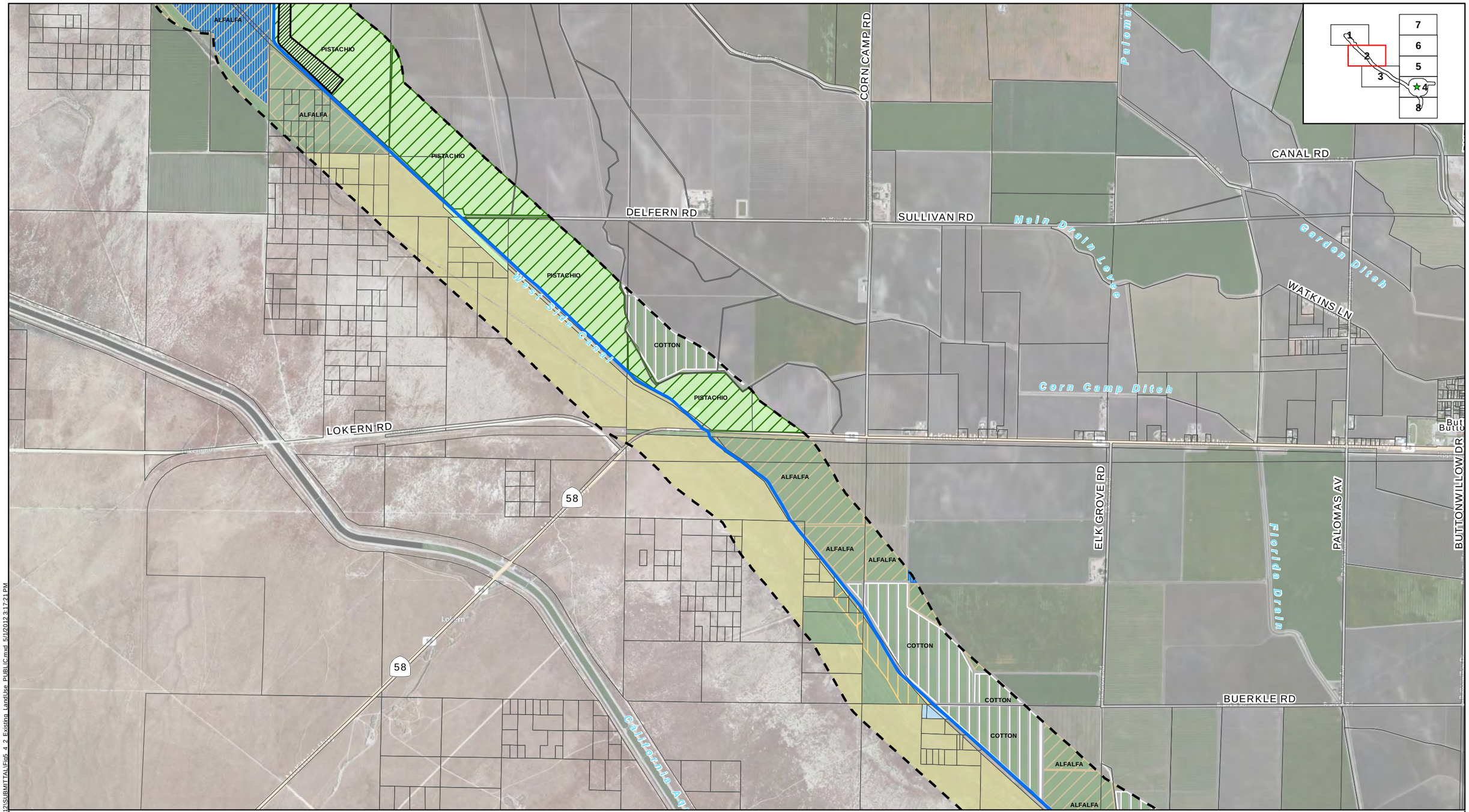
FIGURE 5.4-2 (1)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]

Carbon Dioxide
Natural Gas[2]
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Undeveloped

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Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

EXISTING LAND USE

May 2012
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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-2 (2)

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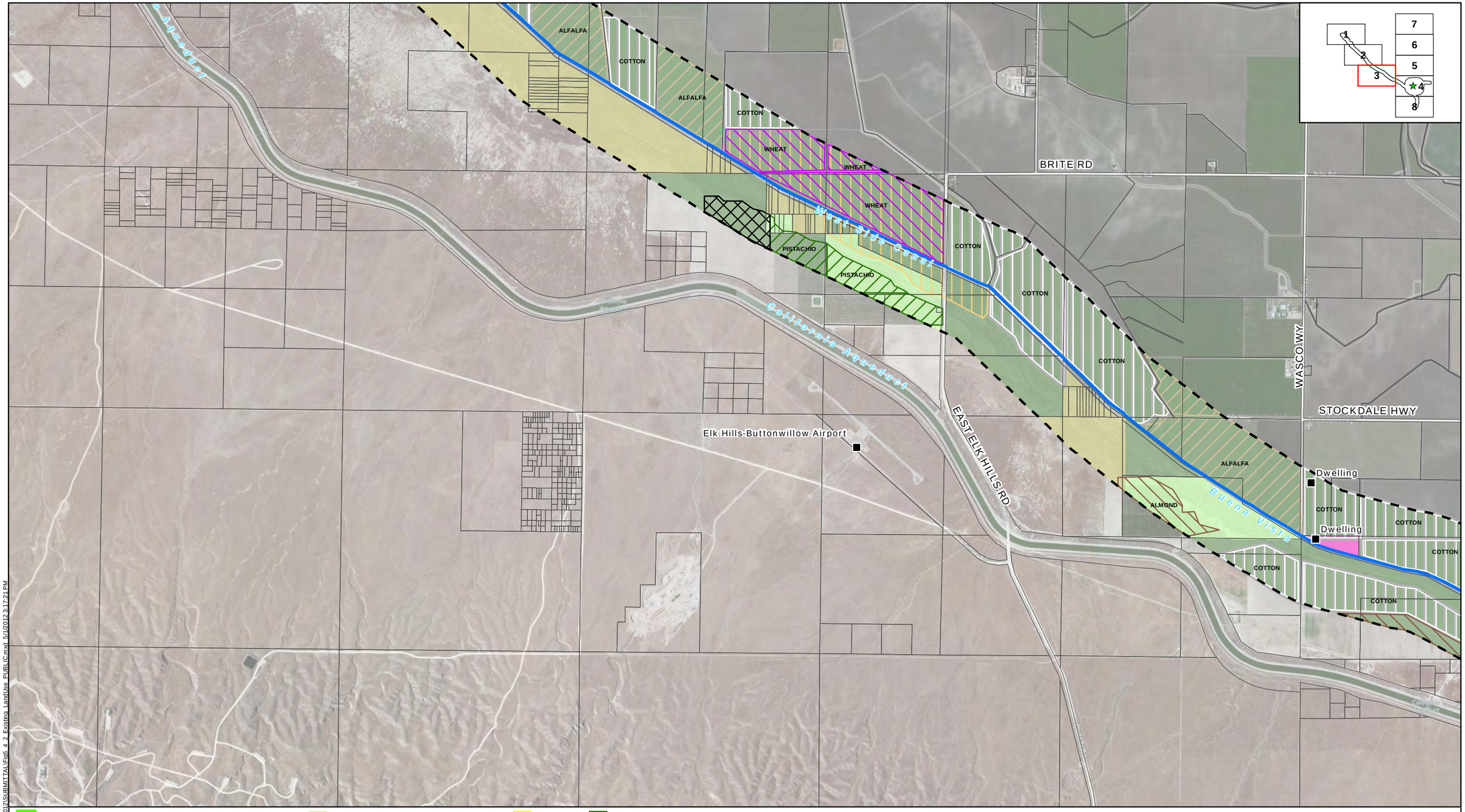

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]
Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
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Land Uses
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Industrial
Orchards
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Public/Quasi-Public
Residential
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Onion
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Pistachio
Uncultivated Ag
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EXISTING LAND USE

May 2012
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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-2 (3)

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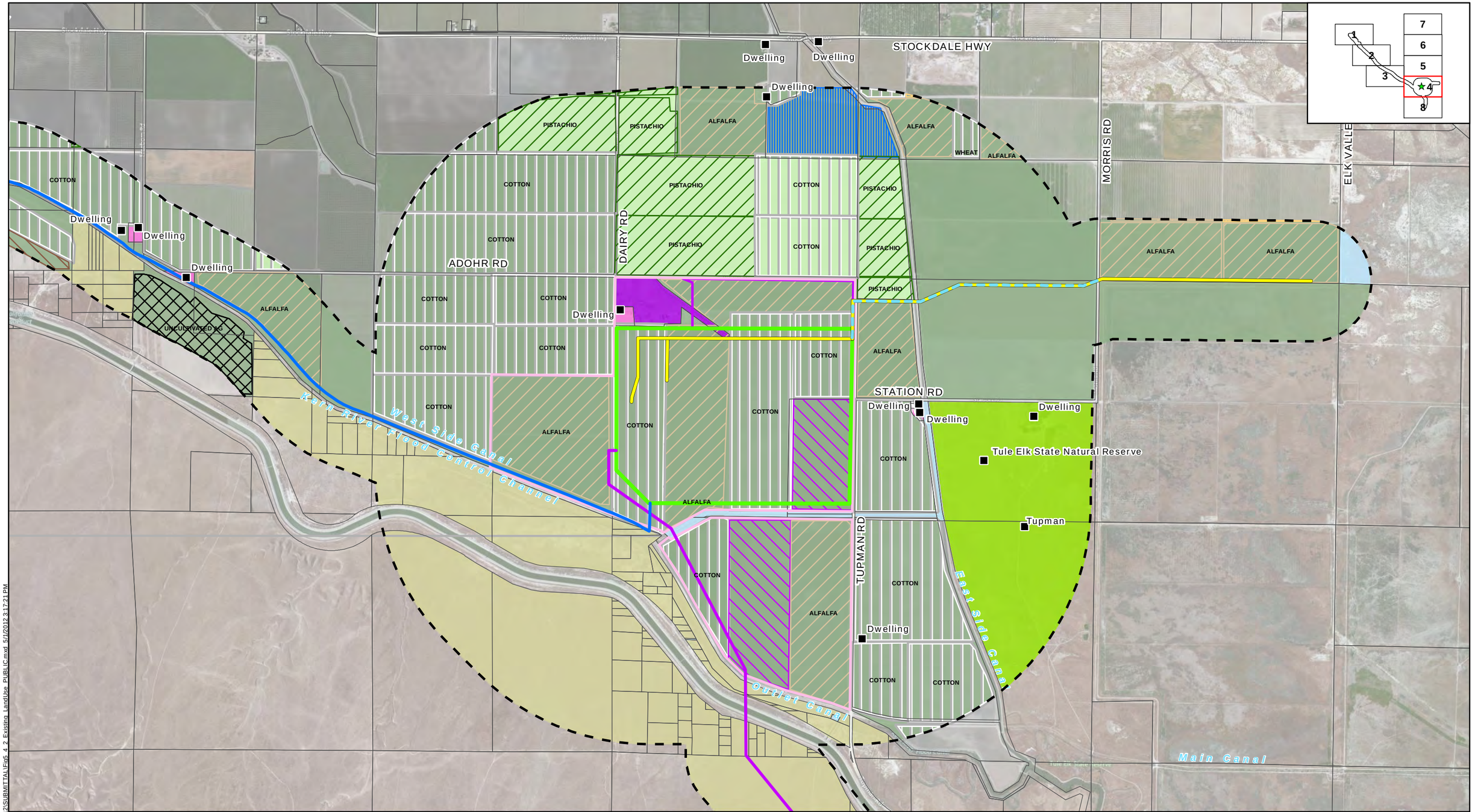

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
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Land Uses
Commercial
Farming
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Alfalfa
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Pistachio
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Wheat[2]

Notes:
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2. Feature temporarily designated as confidential
3. Includes wheat for/ not for food

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

EXISTING LAND USE

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-2 (4)

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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
Transmission

Land Uses
Commercial
Farming
Industrial
Orchards
Parks/Open Space/Recreation
Public/Quasi-Public
Residential
Resource Extraction
Undeveloped

Commodity
Alfalfa
Almond
Carrot
Corn
Cotton
Onion
Other Crops
Pistachio
Uncultivated Ag
Wheat[2]

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential
3. Includes wheat for/ not for food

N

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Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

EXISTING LAND USE

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28068052

Hydrogen Energy California (HECA)
Kern County, California

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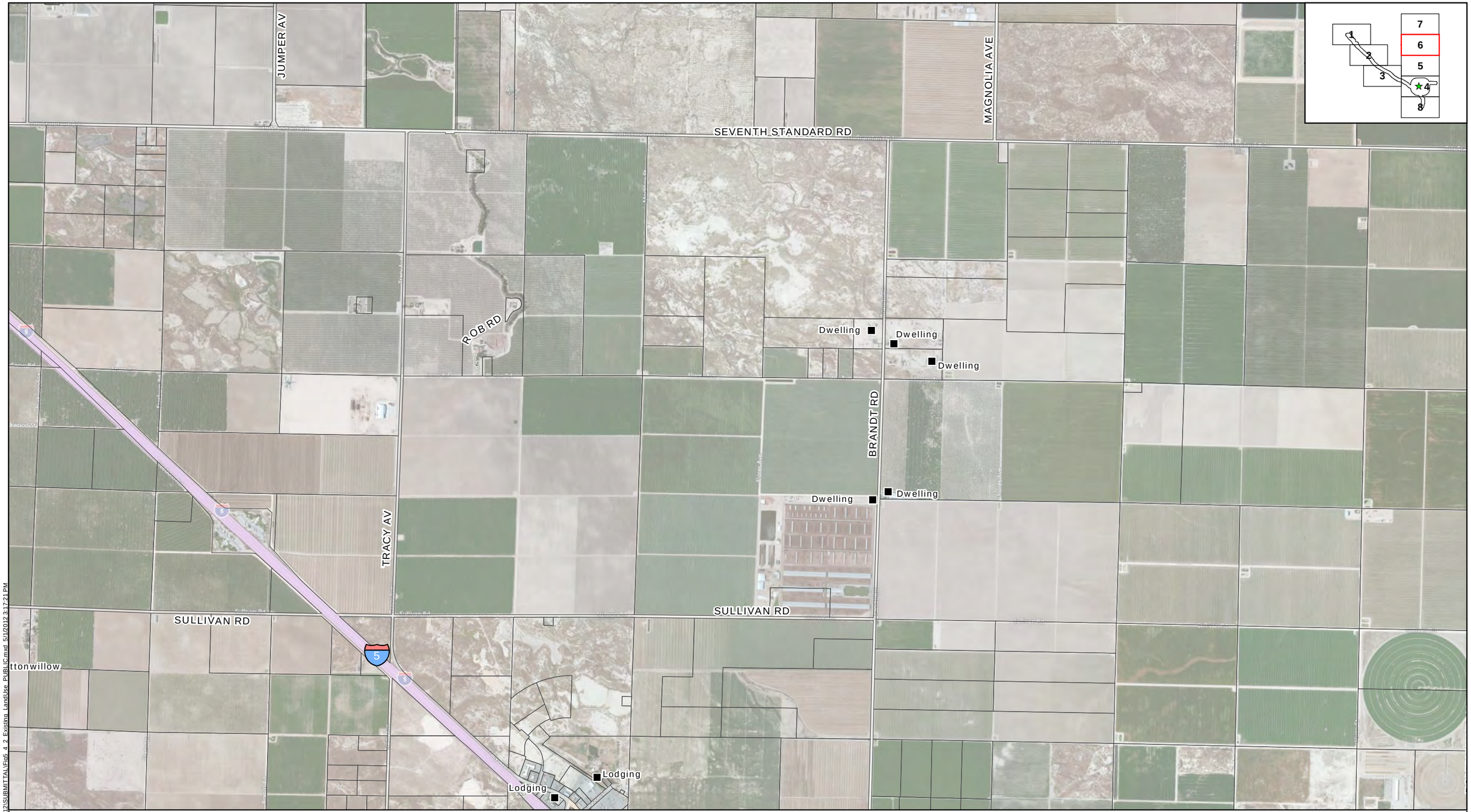
FIGURE 5.4-2 (5)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]
Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
Transmission

Land Uses
Commercial
Farming
Industrial
Orchards
Parks/Open Space/Recreation
Public/Quasi-Public
Residential
Resource Extraction
Undeveloped

Commodity
Alfalfa
Almond
Carrot
Corn
Cotton
Onion
Other Crops
Pistachio
Uncultivated Ag
Wheat[2]

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential
3. Includes wheat for/ not for food

N
0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

EXISTING LAND USE

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-2 (6)

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
Transmission

Land Uses
Commercial
Farming
Industrial
Orchards
Parks/Open Space/Recreation
Public/Quasi-Public
Residential
Resource Extraction
Undeveloped

Commodity
Alfalfa
Almond
Carrot
Corn
Cotton
Onion
Other Crops
Pistachio
Uncultivated Ag
Wheat[2]

Notes:
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N

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Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

EXISTING LAND USE

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Hydrogen Energy California (HECA)
Kern County, California

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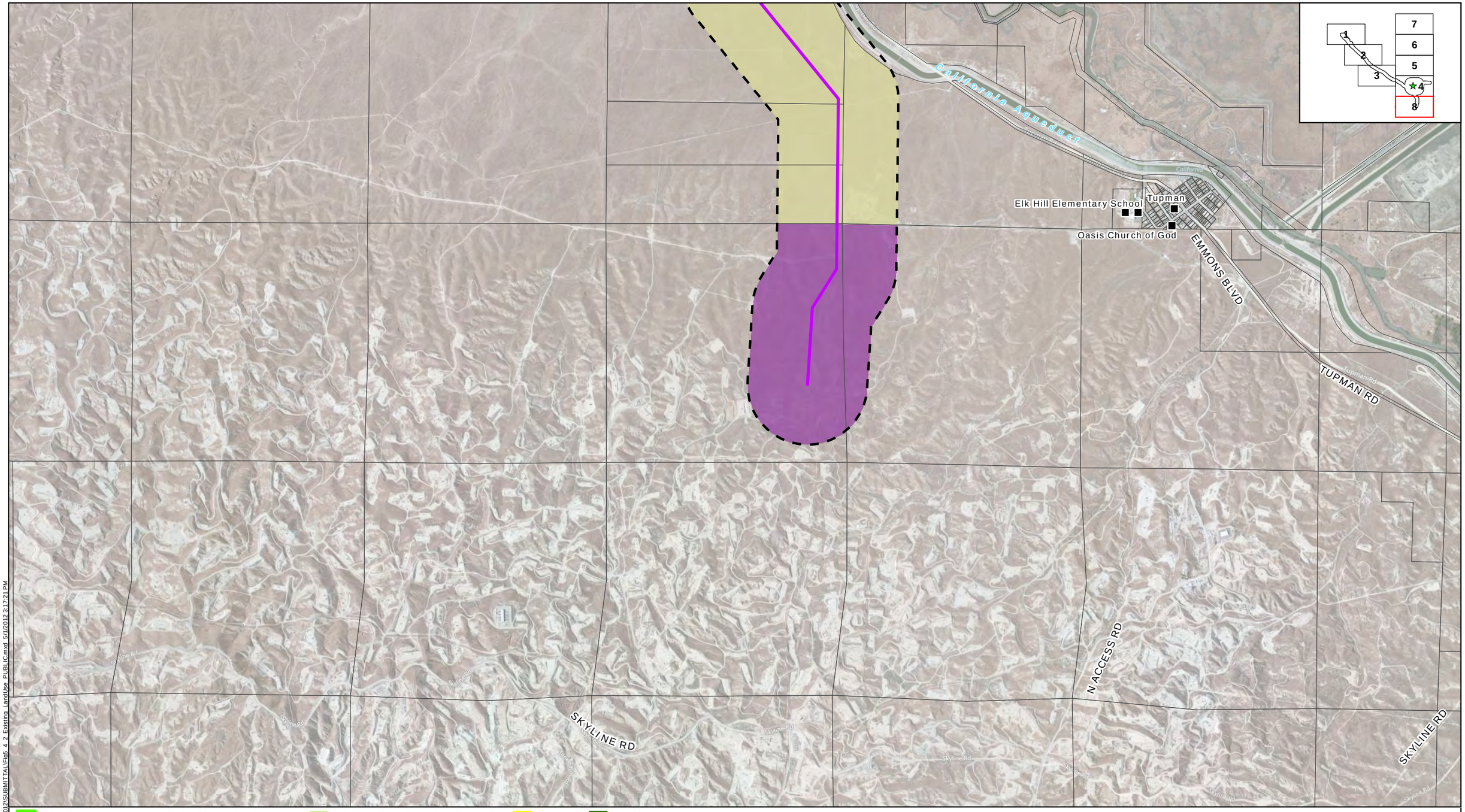
FIGURE 5.4-2 (7)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary
Rail Laydown Yard[2]
Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Railroad[2]
Transmission

Land Uses
Commercial
Farming
Industrial
Orchards
Parks/Open Space/Recreation
Public/Quasi-Public
Residential
Resource Extraction
Undeveloped

Commodity
Alfalfa
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2. Feature temporarily designated as confidential
3. Includes wheat for/ not for food

N

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Source: Aerial Imagery, Bing Maps, 2009; Existing Land Use: Kern County, 2011

EXISTING LAND USE

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-2 (8)

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PERRAL RD

MILAN RD

MAIN DRAIN RD

IMPERIAL ST

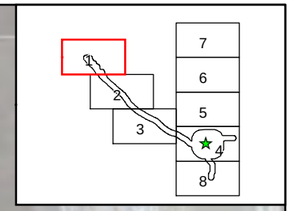
SEVENTH STANDARD RD

W DARGATZ RD

Kern River Flood Control Channel

California Aqueduct

Palomas Drain



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Important Farmland Areas
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
Grazing Land

Nonagriculture or Natural Vegetation
Semi-Agriculture and Rural Commercial Land
Vacant or Disturbed Land
Urban and Built-Up Land
Confined Animal Agriculture

Williamson Act Contracted Land

Note:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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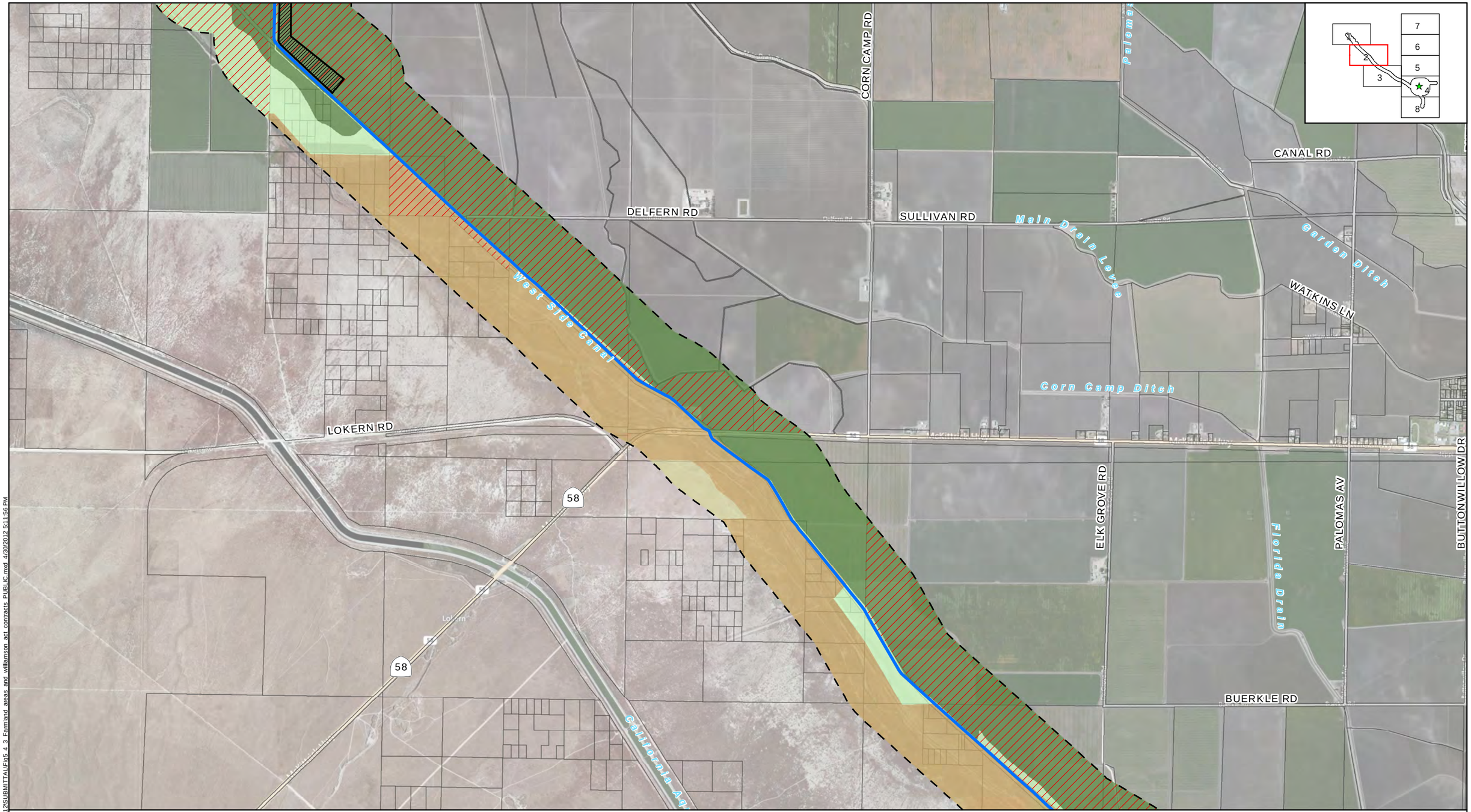
FIGURE 5.4-3(1)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Important Farmland Areas
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
Grazing Land

Nonagriculture or Natural Vegetation
Semi-Agriculture and Rural Commercial Land
Vacant or Disturbed Land
Urban and Built-Up Land
Confined Animal Agriculture

Williamson Act Contracted Land

Note:
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N
0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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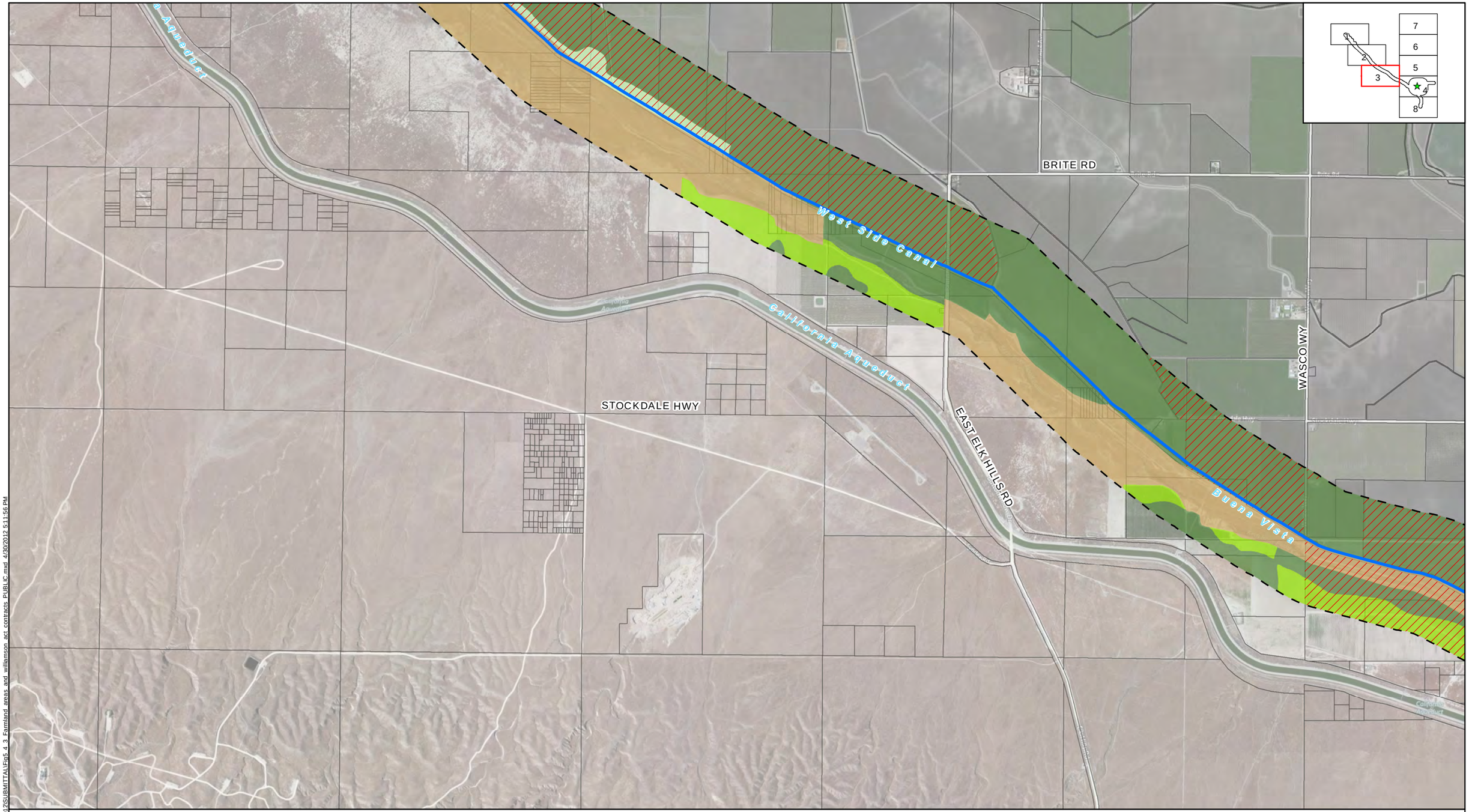
FIGURE 5.4-3(2)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Important Farmland Areas
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
Grazing Land

Nonagriculture or Natural Vegetation
Semi-Agriculture and Rural Commercial Land
Vacant or Disturbed Land
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Confined Animal Agriculture

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N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-3(3)

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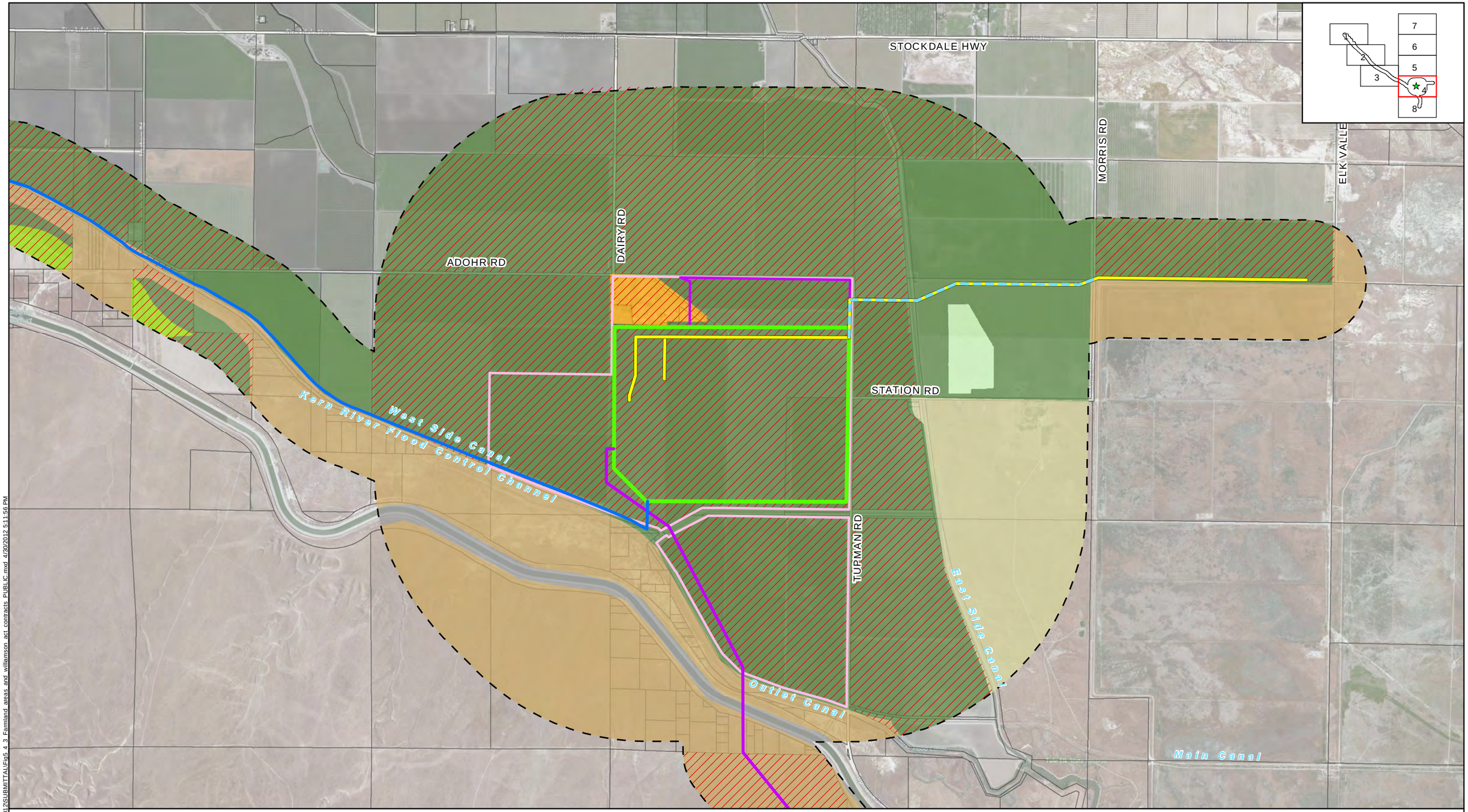

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Important Farmland Areas
Prime Farmland
Farmland of Statewide Importance
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Confined Animal Agriculture

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Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-3(4)

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Important Farmland Areas
Prime Farmland
Farmland of Statewide Importance
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Confined Animal Agriculture

Williamson Act Contracted Land

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0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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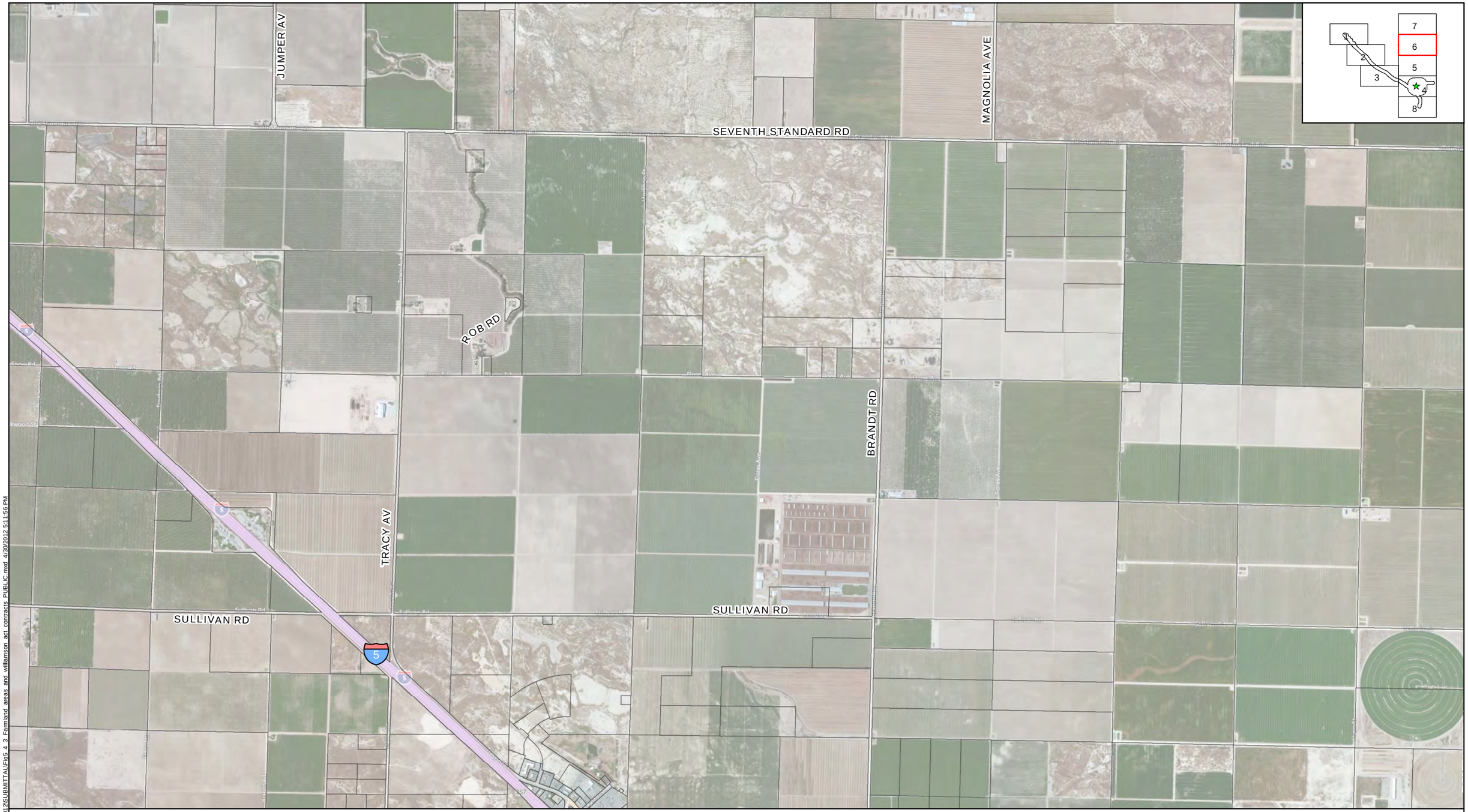
FIGURE 5.4-3(5)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
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Railroad[2]

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0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-3(6)

- Project Site
- Construction Staging Area
- Controlled Area
- BVWSD Well Field
- Project Study Area[1]
- Parcel Boundary
- Carbon Dioxide
- Natural Gas[2]
- Potable Water
- Process Water
- Transmission
- Railroad[2]

Important Farmland Areas

- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- Grazing Land
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Source: Aerial Imagery, Bing Maps, 2009.

FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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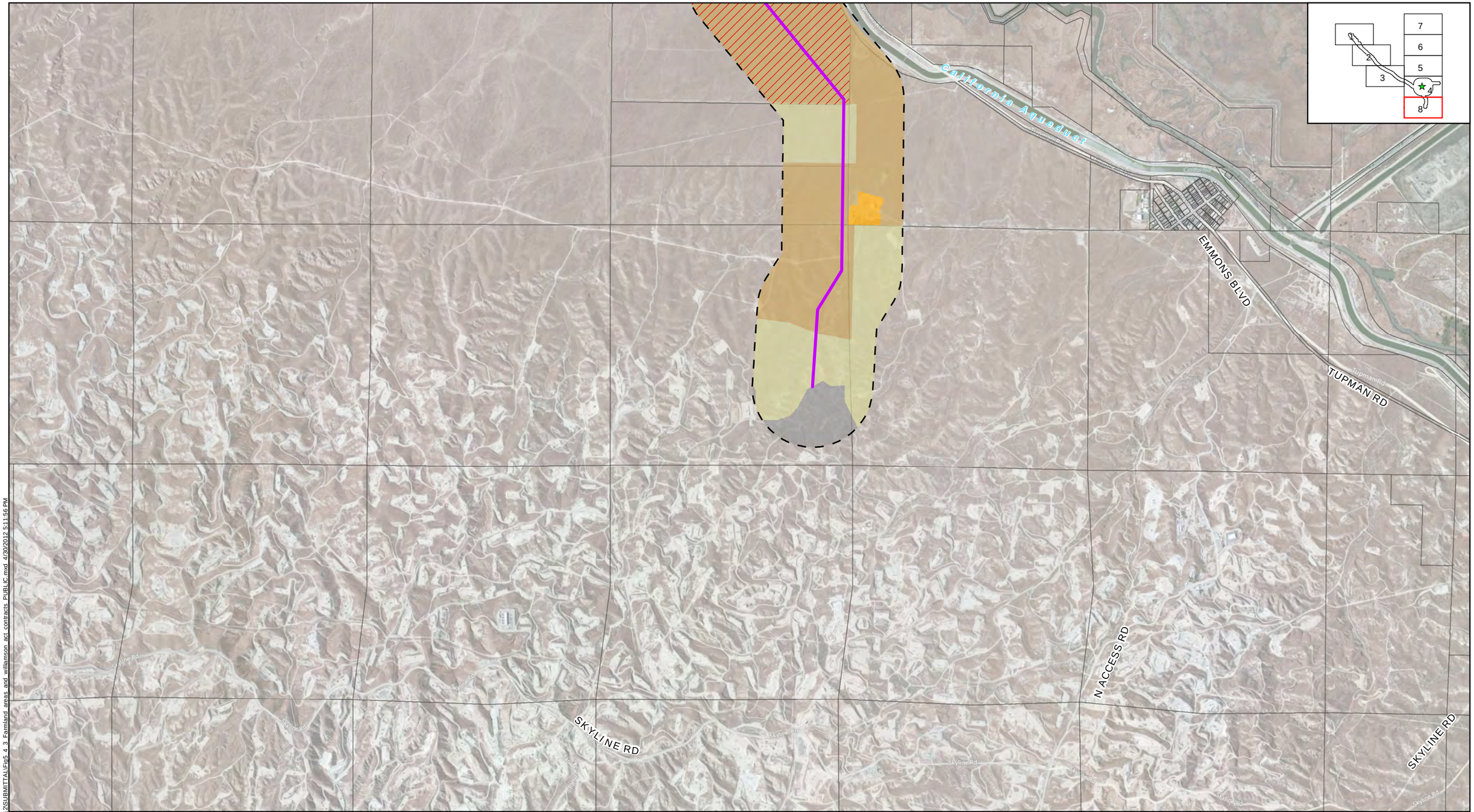
FIGURE 5.4-3(7)



- Project Site
- Construction Staging Area
- Controlled Area
- BVWSD Well Field
- Project Study Area[1]
- Parcel Boundary
- Carbon Dioxide
- Natural Gas[2]
- Potable Water
- Process Water
- Transmission
- Railroad[2]

Important Farmland Areas

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FARMLAND AREAS AND WILLIAMSON ACT CONTRACTS

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-3(8)

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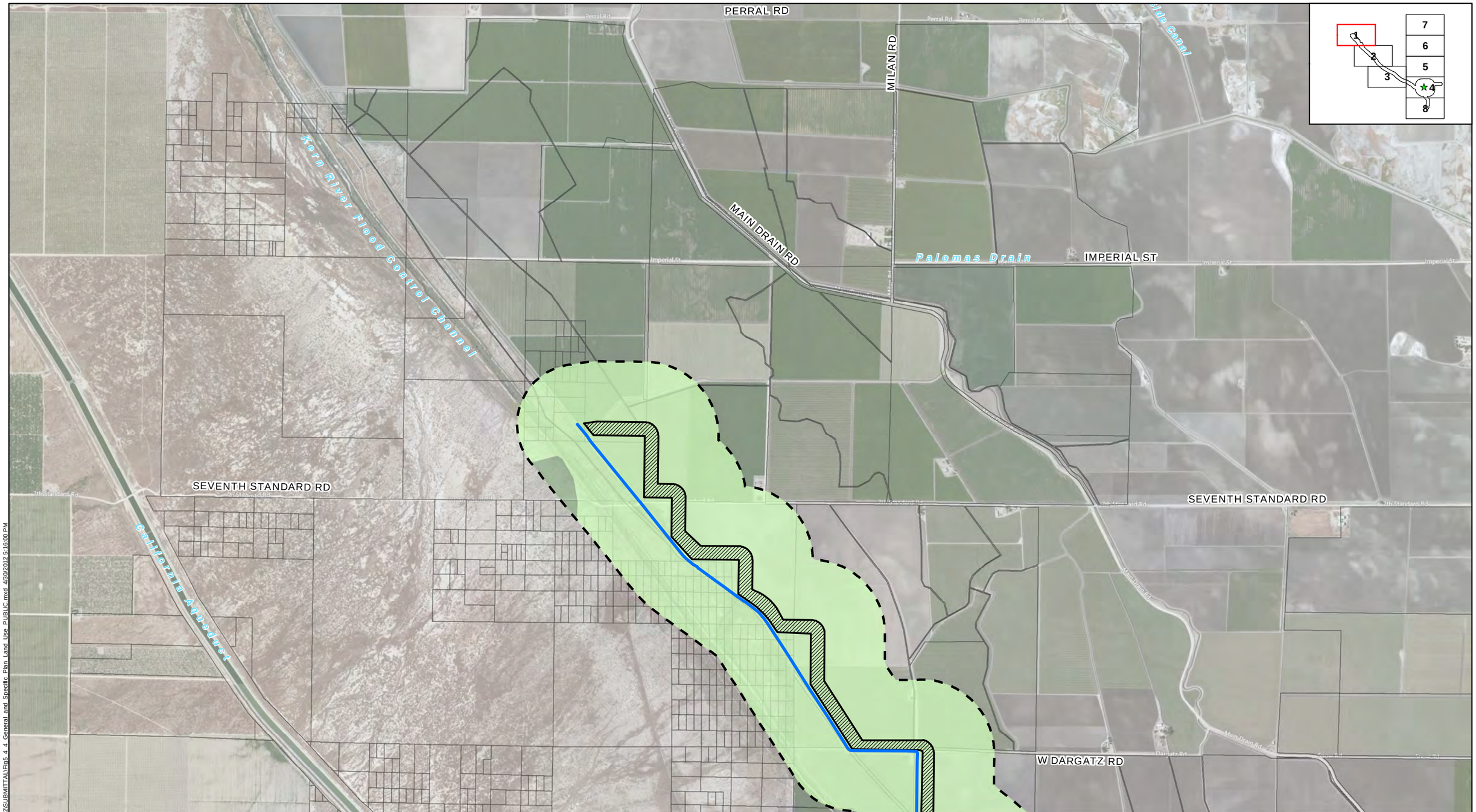

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
6. Commercial
   - 6.2 General Commercial
   - 6.3 Highway Commercial
7. Industrial
   - 7.1 Light Industrial
8. Resource
   - 8.1 Intensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.3 Extensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
   - 8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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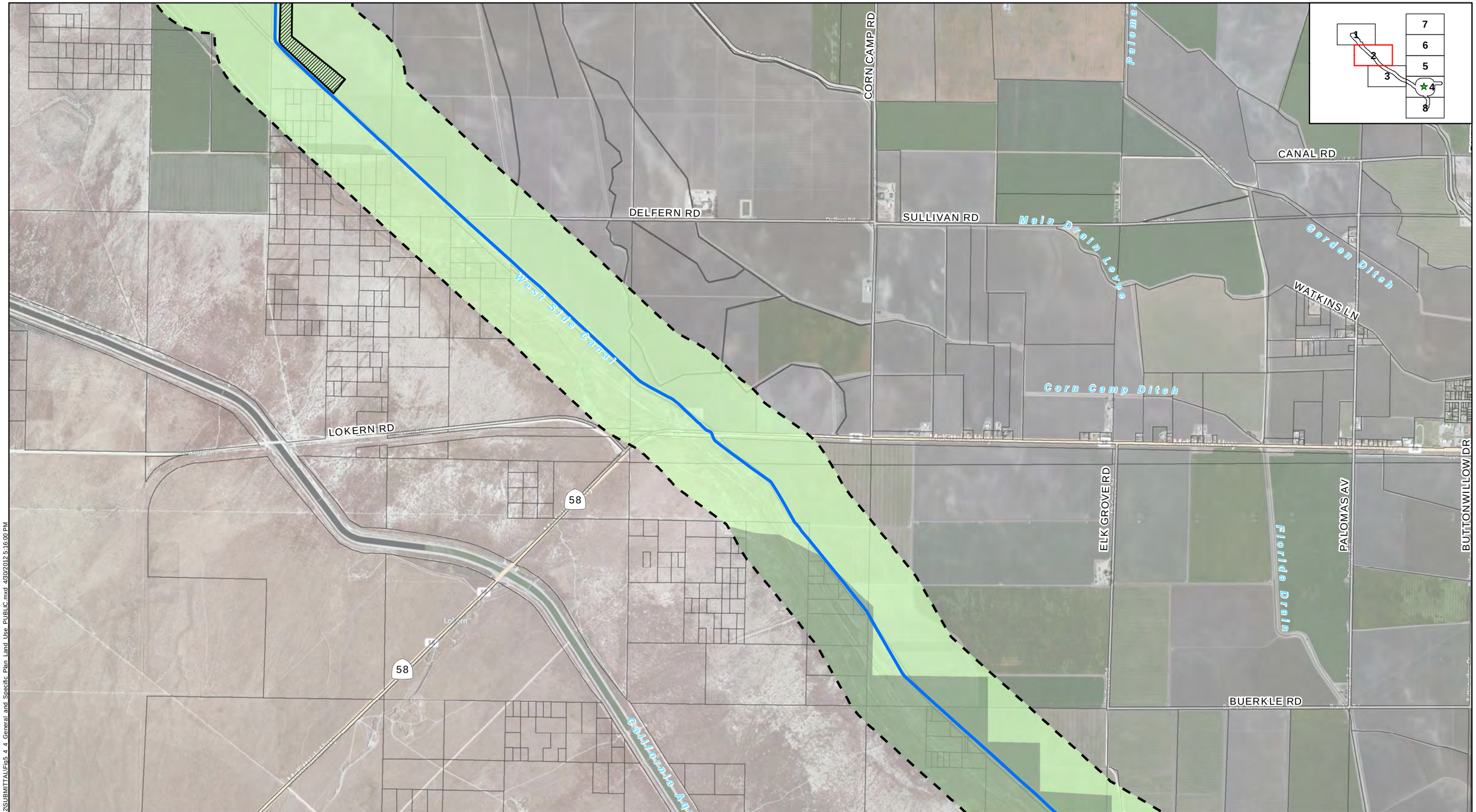
FIGURE 5.4-4 (1)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
6. Commercial
   - 6.2 General Commercial
   - 6.3 Highway Commercial
7. Industrial
   - 7.1 Light Industrial
8. Resource
   - 8.1 Intensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.3 Extensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
   - 8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-4 (2)

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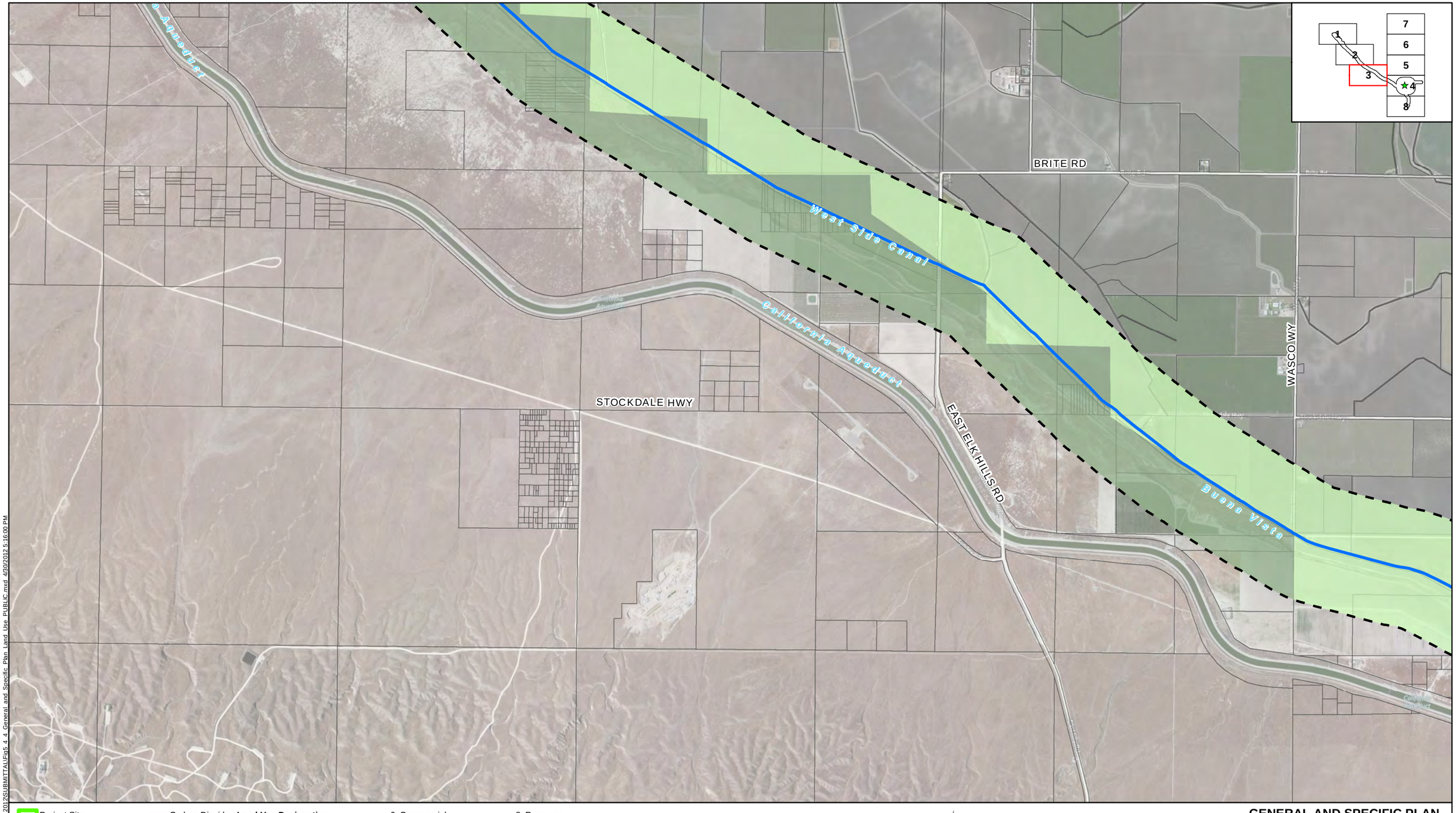

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

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   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
6. Commercial
   - 6.2 General Commercial
   - 6.3 Highway Commercial
7. Industrial
   - 7.1 Light Industrial
8. Resource
   - 8.1 Intensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.3 Extensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
   - 8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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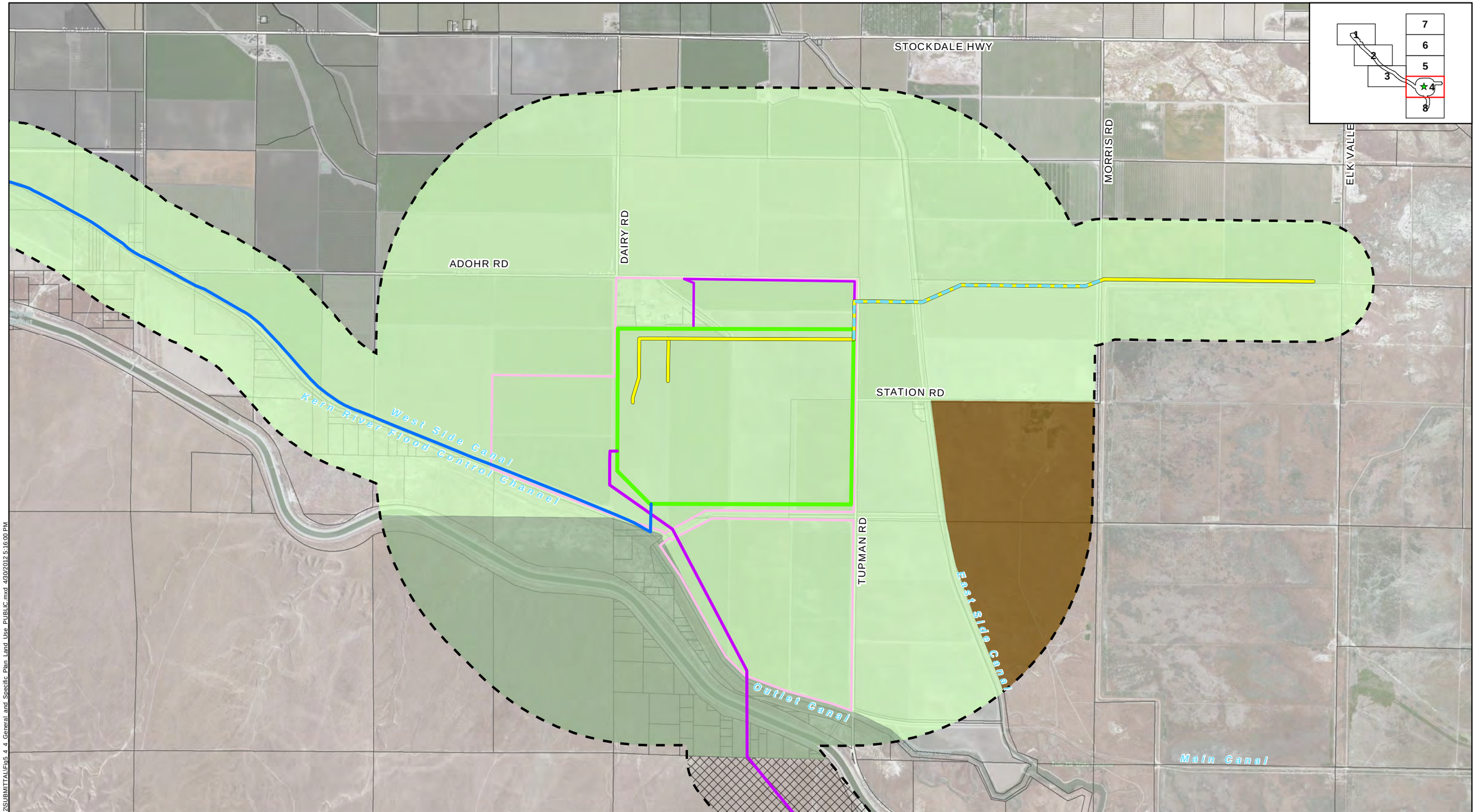
FIGURE 5.4-4 (3)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
6. Commercial
   - 6.2 General Commercial
   - 6.3 Highway Commercial
7. Industrial
   - 7.1 Light Industrial
8. Resource
   - 8.1 Intensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.3 Extensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
   - 8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporarily designated as confidential

N

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Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-4 (4)

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
6. Commercial
   - 6.2 General Commercial
   - 6.3 Highway Commercial
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   - 7.1 Light Industrial
8. Resource
   - 8.1 Intensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.3 Extensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
   - 8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
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2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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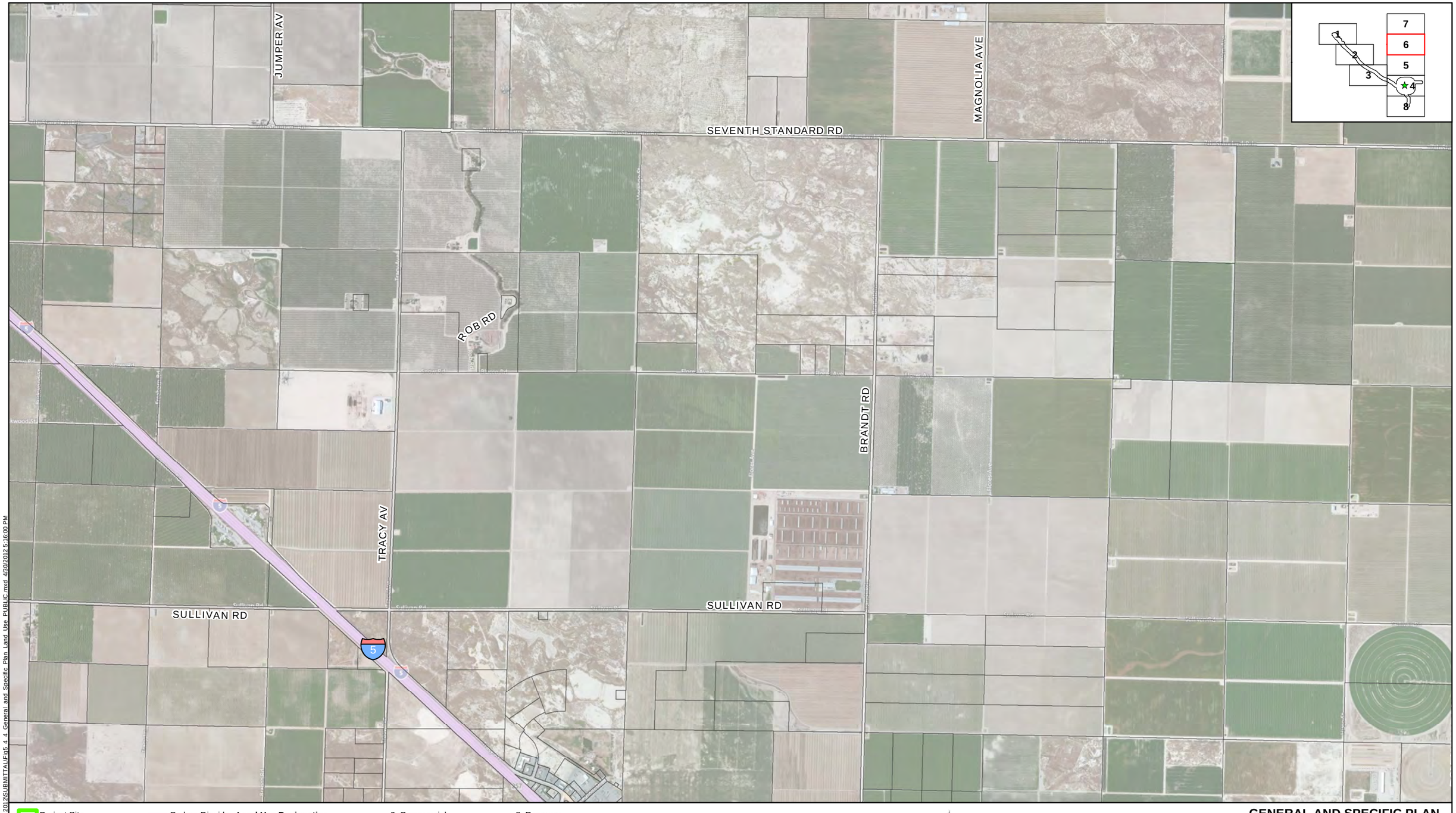
FIGURE 5.4-4 (5)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
6. Commercial
   - 6.2 General Commercial
   - 6.3 Highway Commercial
7. Industrial
   - 7.1 Light Industrial
8. Resource
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   - 8.3 Extensive Agriculture (Min. 20-Acre Parcel Size)
   - 8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
   - 8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
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2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-4 (6)

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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
1.1 State or Federal Land

5. Residential
5.3 Maximum 10 Units/ Net Acre

6. Commercial
6.2 General Commercial
6.3 Highway Commercial

7. Industrial
7.1 Light Industrial

8. Resource
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8.4 Mineral and Petroleum (Min. 5-Acre Parcel Size)
8.5 Resource Management (Min. 20-Acre Parcel Size)

Notes:
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2. Feature temporarily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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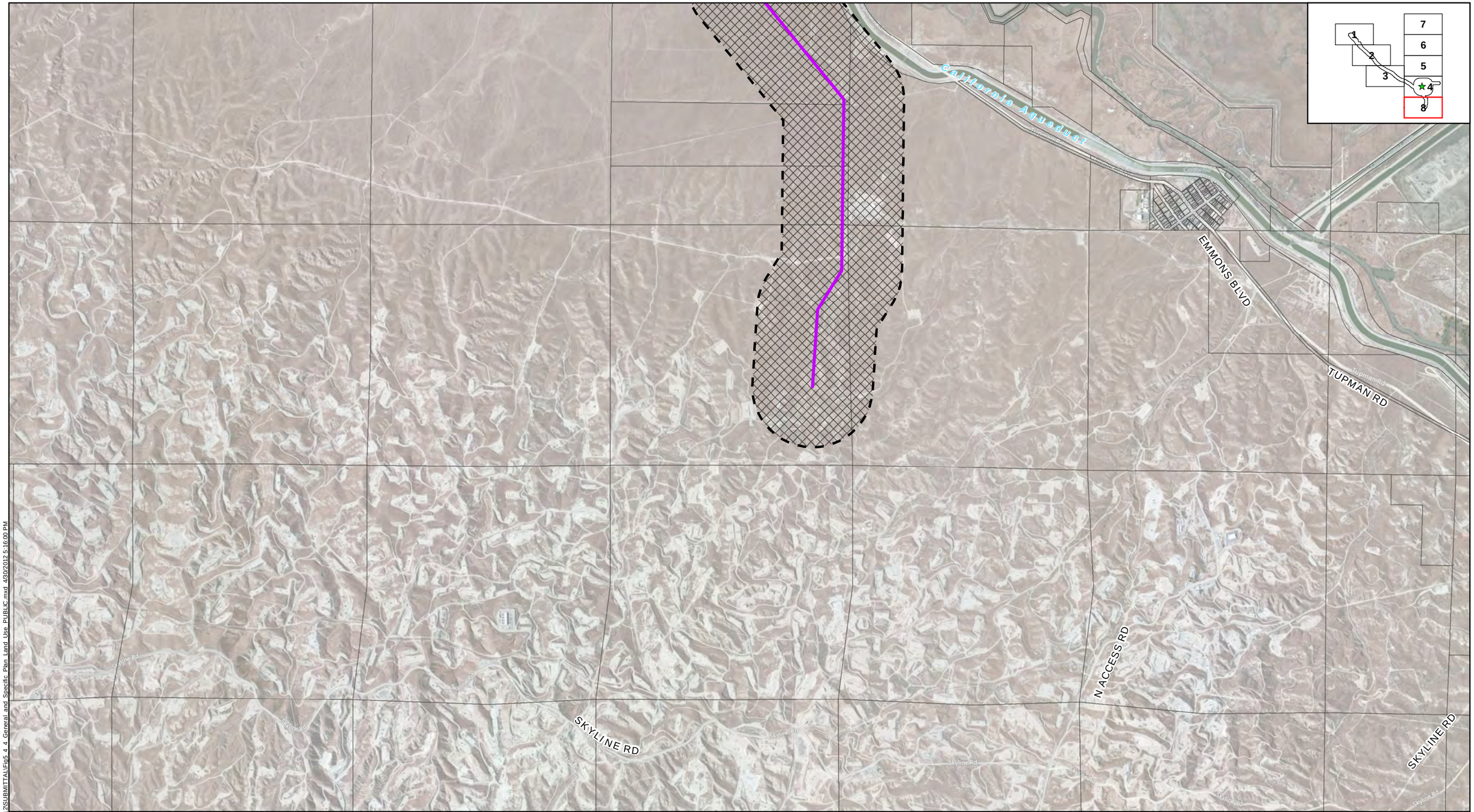
FIGURE 5.4-4 (7)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Specific Plan Boundary
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Land Use Designation

1. Non- Jurisdictional
   - 1.1 State or Federal Land
5. Residential
   - 5.3 Maximum 10 Units/ Net Acre
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   - 6.2 General Commercial
   - 6.3 Highway Commercial
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N

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Source: Aerial Imagery, Bing Maps, 2009; General/ Specific plans: Kern County, 2011

GENERAL AND SPECIFIC PLAN LAND USE DESIGNATIONS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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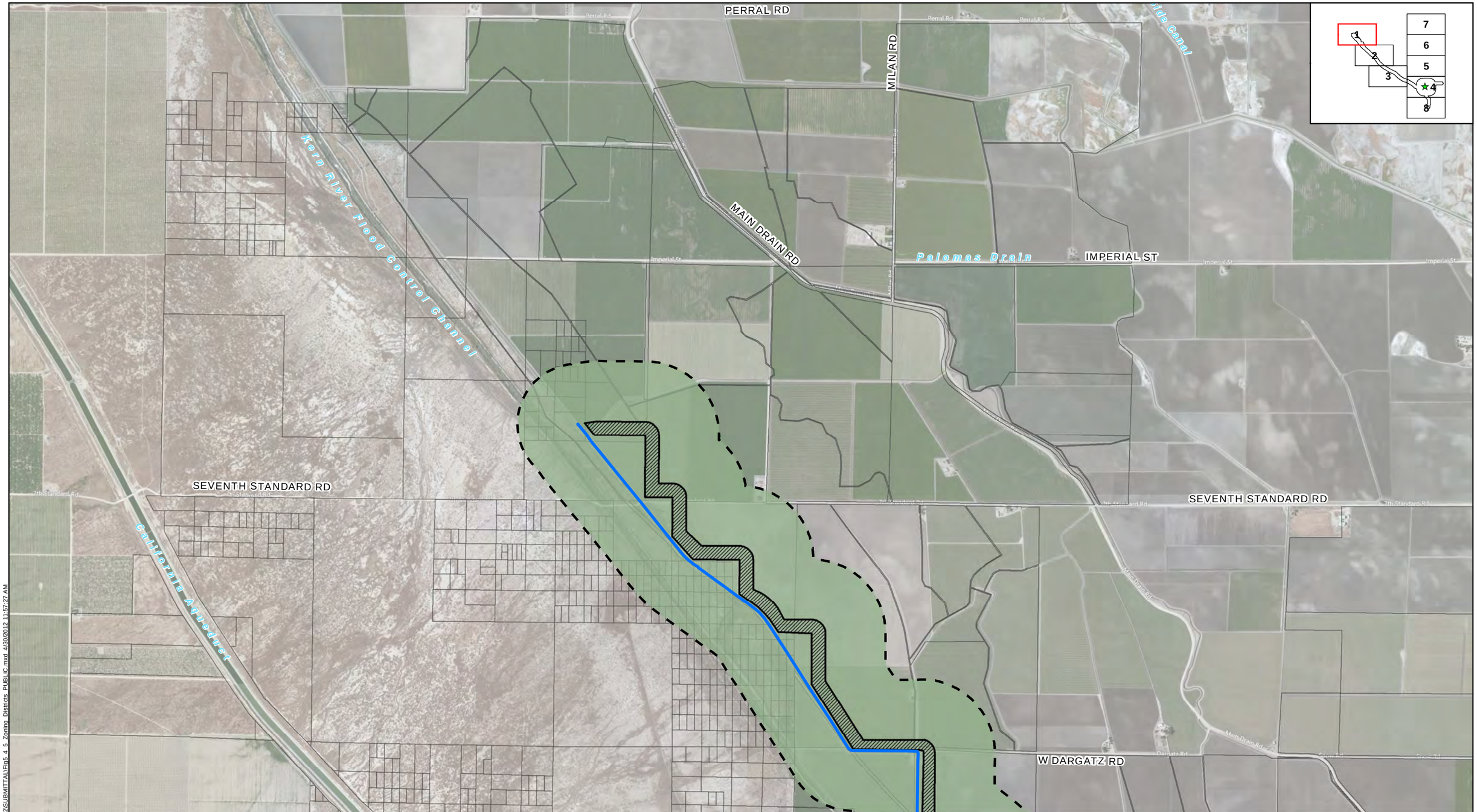
FIGURE 5.4-4 (8)



- Project Site
- Construction Staging Area
- Controlled Area
- BVWSD Well Field
- Project Study Area[1]
- Parcel Boundary
- Carbon Dioxide
- Natural Gas[2]
- Potable Water
- Process Water
- Transmission
- Railroad[2]

Zoning Districts

- Exclusive Agriculture (A)
- General Commercial (K-2)
- Limited Agriculture (A-1)
- Medium Industrial (M-2)

Zoning Combining Districts

- Airport Approach Height (H)
- Mobile Home (MH)
- Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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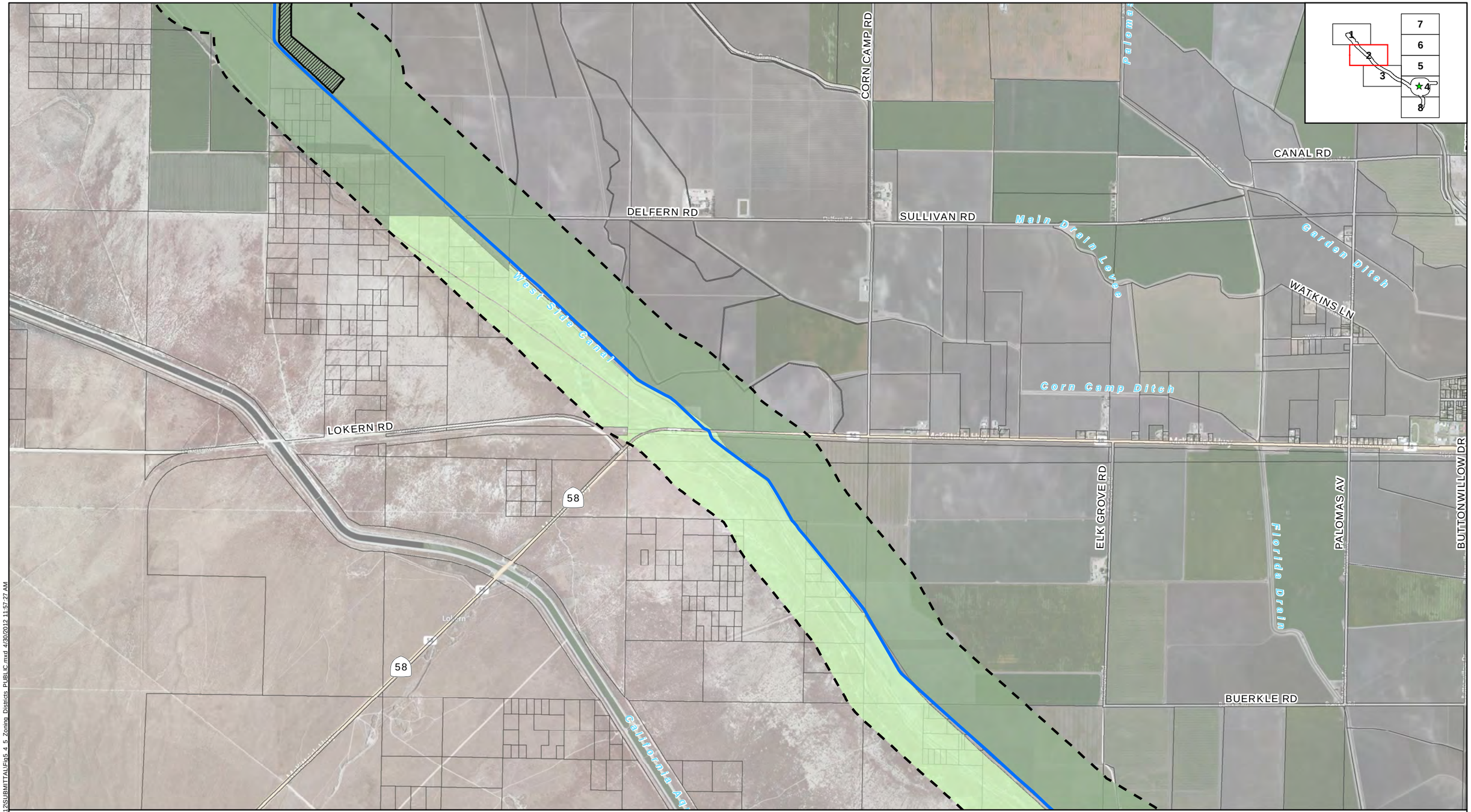
FIGURE 5.4-5(1)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N
0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.4-5(2)

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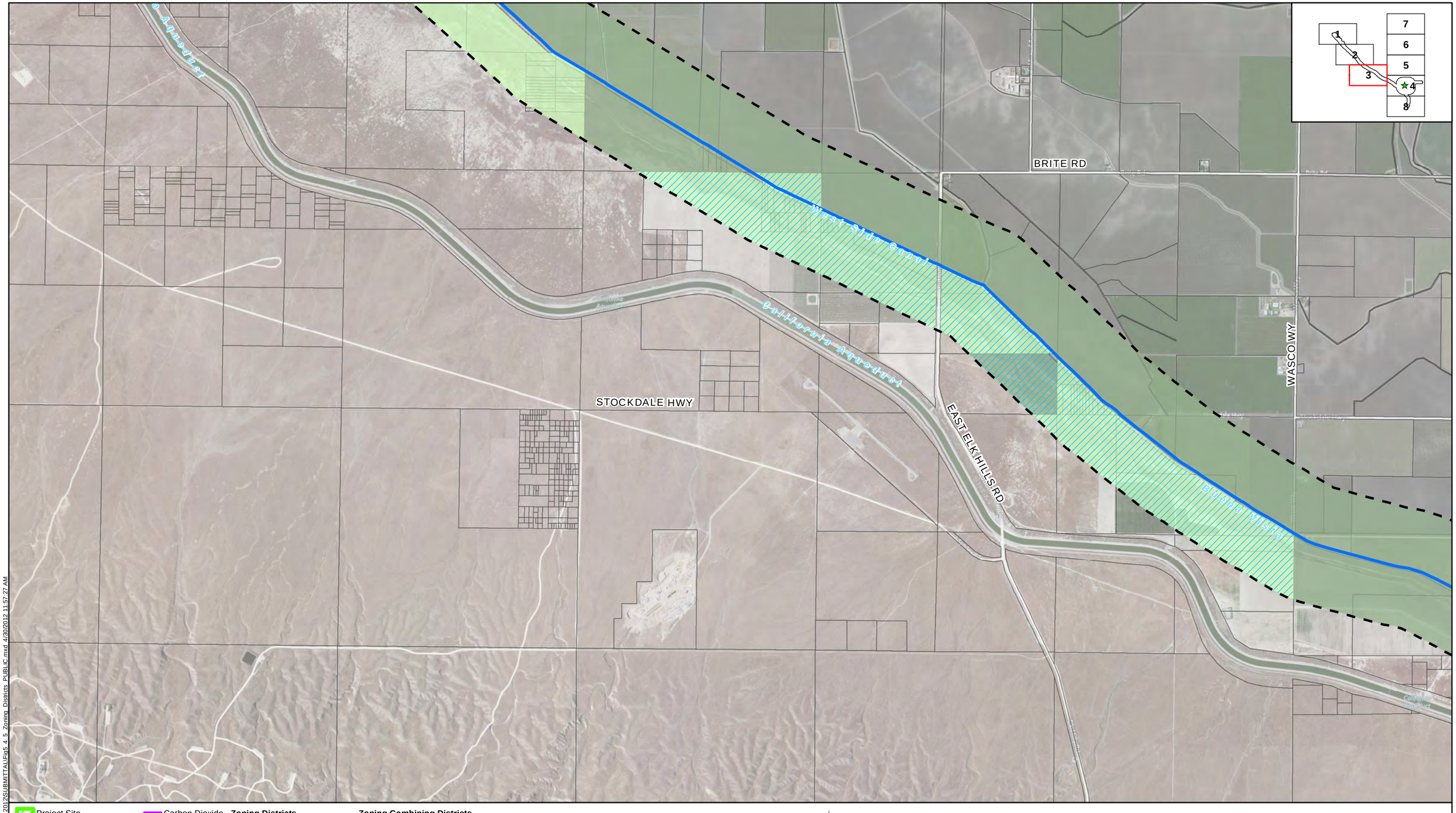

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N
0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.4-5(3)

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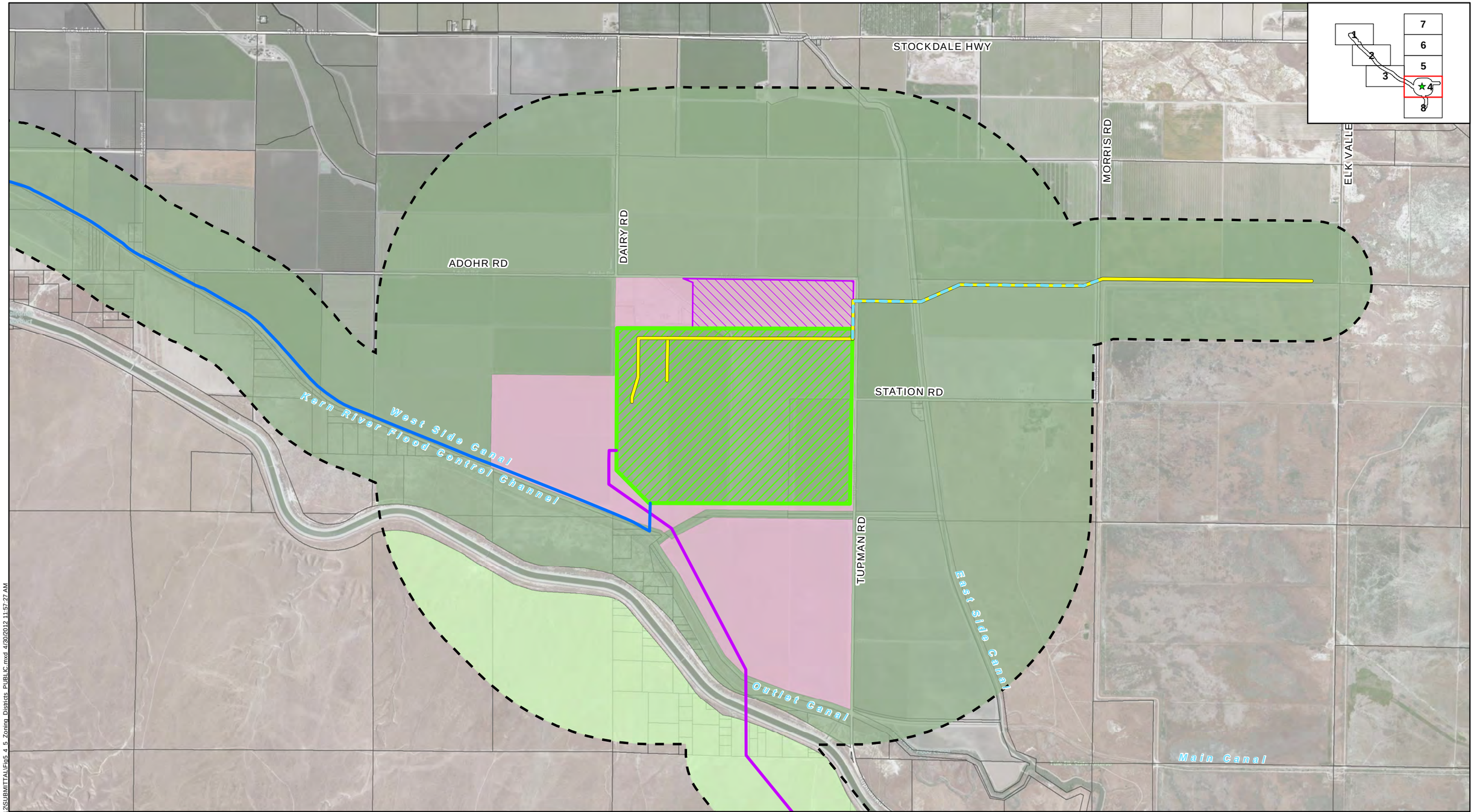

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N
0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.4-5(4)

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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N
0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.4-5(5)

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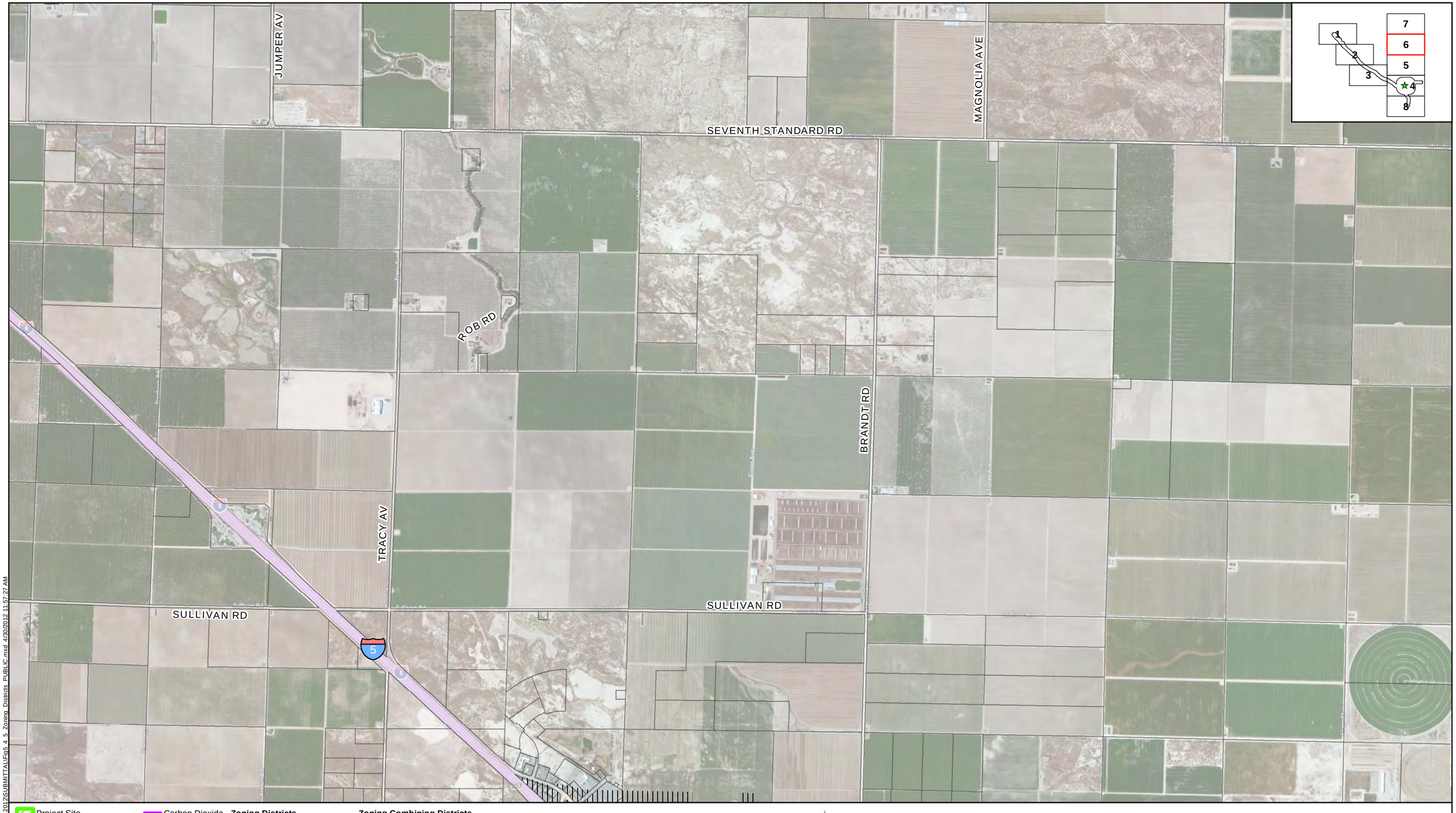

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

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ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-5(6)

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

Notes:
1. 1 mile from project site and 1/4 mile radius from linear facilities
2. Feature temporararily designated as confidential

N

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Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.4-5(7)

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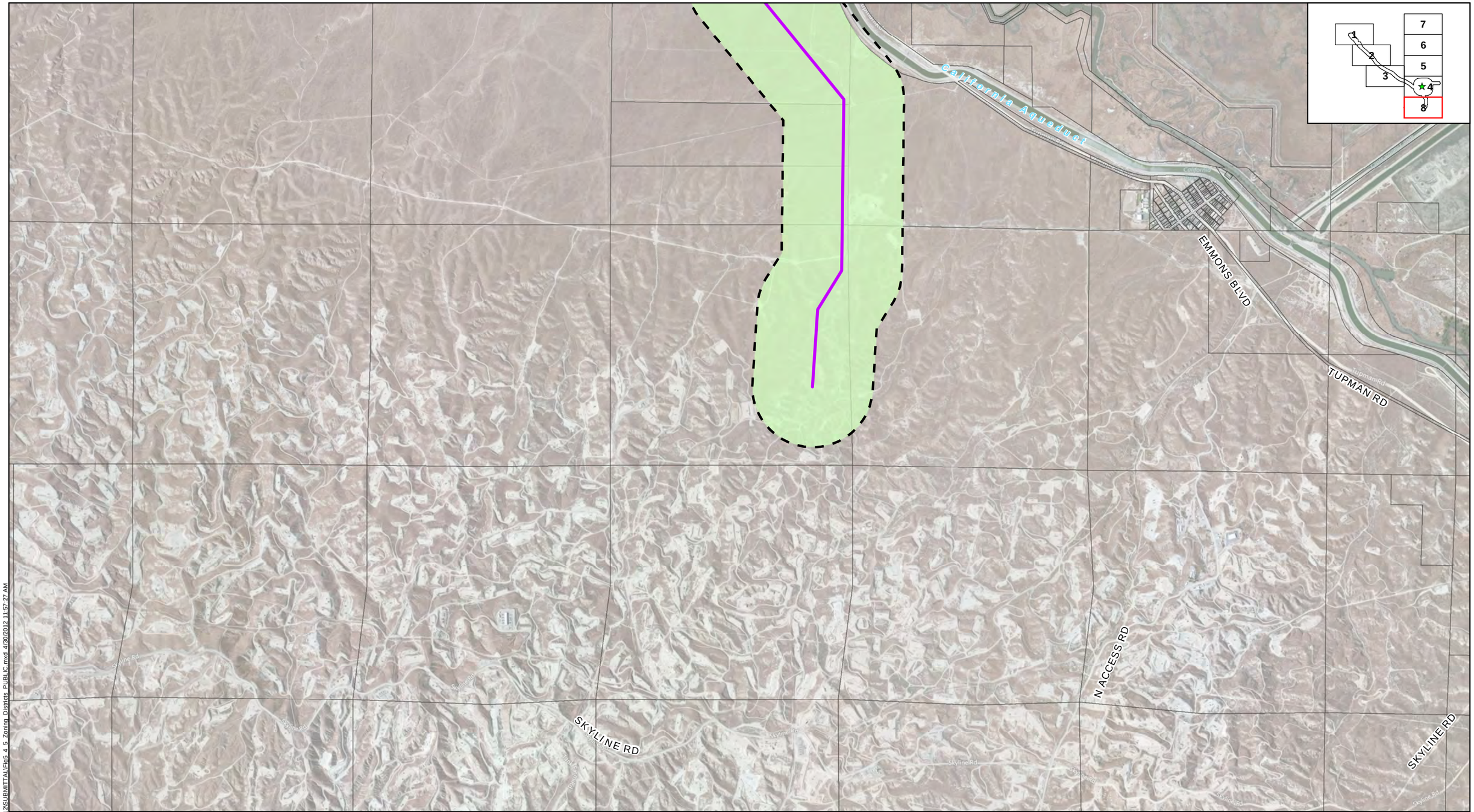

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Project Study Area[1]
Parcel Boundary

Carbon Dioxide
Natural Gas[2]
Potable Water
Process Water
Transmission
Railroad[2]

Zoning Districts
Exclusive Agriculture (A)
General Commercial (K-2)
Limited Agriculture (A-1)
Medium Industrial (M-2)

Zoning Combining Districts
Airport Approach Height (H)
Mobile Home (MH)
Precise Development (PD)

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N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009; Zoning: Kern County, 2012

ZONING DISTRICTS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.4-5(8)

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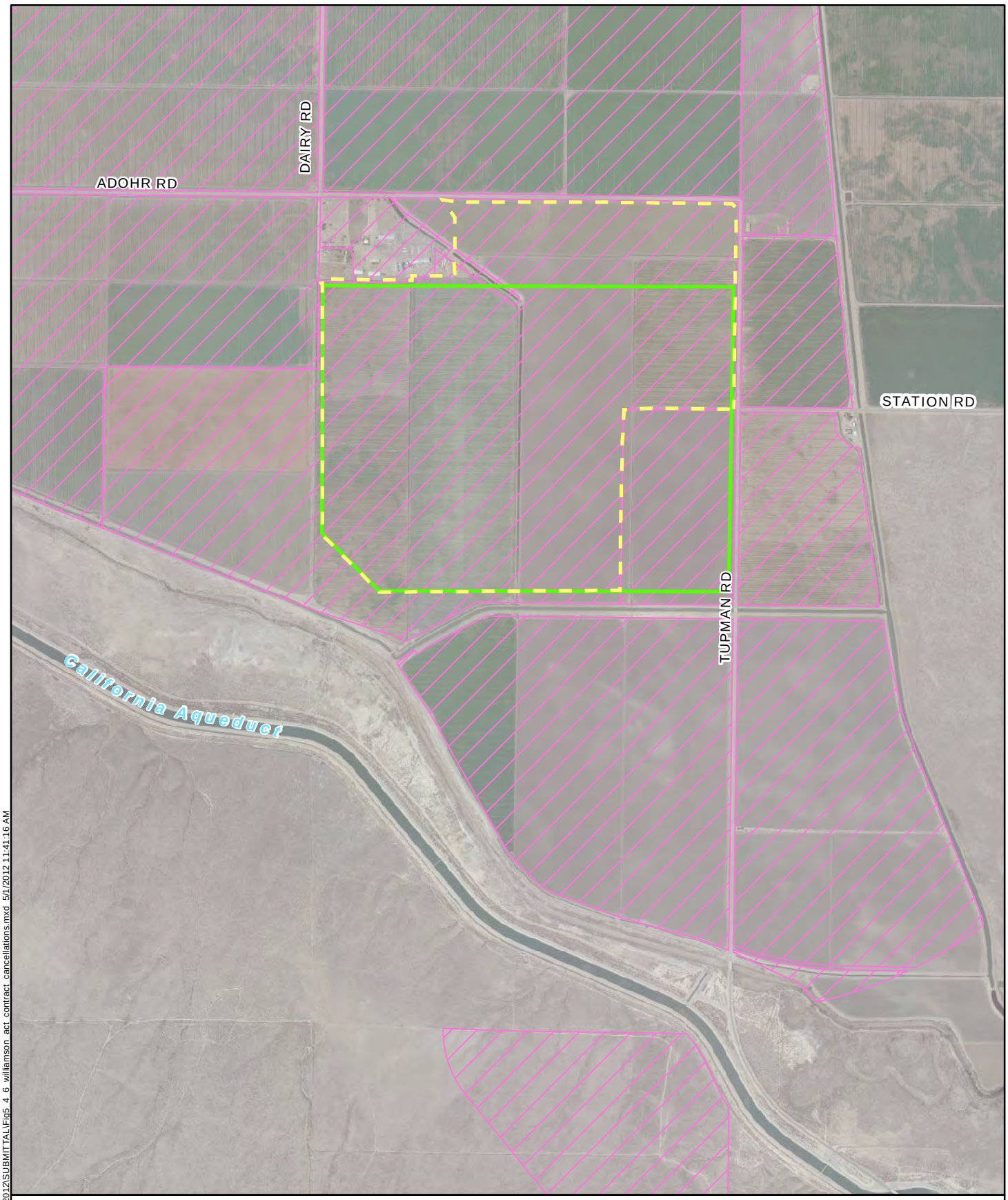

Project Site
Tentatively Cancelled Williamson Act Contracted Land[1]
Williamson Act Contracted Land

Note:
1. The Kern County Board of Supervisors adopted Resolution 2010-168 on June 29, 2010, approving the tentative cancellation of 491 acres of Williamson Act contracted lands.

N

0 750 1,500 FEET

HECA WILLIAMSON ACT CONTRACT CANCELLATIONS

April 2012 Hydrogen Energy California (HECA)
28068052 Kern County, California

URS

FIGURE 5.4-6

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Appendices

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5.5 NOISE

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

In accordance with California Energy Commission (CEC) regulations, this section describes the existing noise environment on the Project Site and in the vicinity of the Project Site, and assesses potential noise impacts associated with the Project. Noise-sensitive receptors that may be affected by noise are identified, as well as the laws, ordinances, regulations, and standards (LORS) that regulate noise levels at those receptors. The following discussion describes the results of a detailed site reconnaissance, sound level measurements, acoustical calculations, and assessment of potential noise impacts. The analysis included in this section focuses on the HECA Project as well as the CO_2 pipeline associated with the OEHI Project. Potential noise impacts related to both coal transportation alternatives are evaluated in this section. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in

Appendix A-1, Section 4.11, Noise and Appendix A-2, Section 2.5, Noise, of this AFC Amendment.

5.5.1 Affected Environment

5.5.1.1 Fundamentals of Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to typical environmental noise exposure levels is annoyance. The responses of individuals to similar noise events are diverse, and influenced by many factors, including the type of noise, the perceived importance of the noise, its appropriateness to the setting, the time of day, the type of activity during which the noise occurs, and the noise sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and amplitude. Frequency describes the sound's pitch (tone) and is measured in cycles per second (Hertz [Hz]), and amplitude describes the sound's pressure (loudness). Because the range of sound pressures that occur in the environment is extremely large, it is convenient to express these pressures on a logarithmic scale that compresses the wide range of pressures into a more useful range of numbers. The standard unit of sound pressure measurement is the decibel (dB).

Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second, it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the healthy human ear.

As mentioned above, sound levels are expressed by reference to a specified national/international standard. This report refers to two acoustical quantities: (1) sound power level is used to express the sound energy radiated from a source; and (2) sound pressure level is used to describe sound at a specified distance or specific receptor location. In expressing sound power as a dB level, the standard reference sound power is 1 picowatt. In expressing sound pressure level on a logarithmic scale, sound pressure is compared to a reference value of 20 micropascals. These terms are different and should not be confused. Sound power level is a measure of the inherent acoustic power radiated by a source, whereas sound pressure level depends not only on the power of the source, but also the distance from the source and the acoustical characteristics of the space surrounding the source (absorption, reflection, etc.).

Outdoor sound levels decrease logarithmically as the distance from the source increases. This decrease is due to wave divergence, atmospheric absorption, and ground attenuation. Sound radiating from a source in a homogeneous and undisturbed manner travels in spherical waves. As the sound waves travel away from the source, the sound energy is dispersed over a greater

area, decreasing the sound pressure of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of distance.

Atmospheric absorption also influences the sound levels received by a listener. The greater the distance the sound travels, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances greater than 1,000 feet. The degree of absorption varies depending on the frequency of the sound, as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest (i.e., sound carries farther) at high humidity and high temperatures; and lower frequencies are less readily absorbed (i.e., sound carries farther) than higher frequencies. Over long distances, lower frequencies become dominant as the higher frequencies are more rapidly attenuated. Turbulence, gradients of wind, and other atmospheric phenomena also play a significant role in determining the degree of attenuation. For example, certain conditions such as temperature inversions can channel or focus the sound waves and result in higher noise levels than would otherwise result from simple spherical spreading.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds that one hears in the environment do not consist of a single frequency but rather a broad band of many frequencies differing in sound level. Because of the broad range of audible frequencies, methods have been developed to quantify these values into a single number. The most common method used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that is reflective of human hearing. Human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This process of discriminating frequencies based on human sensitivity is termed A-weighting, and the resulting dB level is termed an A-weighted decibel (dBA).

A-weighting is widely used in local noise ordinances and state and federal guidelines. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve. Unless specifically noted, the use of A-weighting is always assumed with respect to environmental sound and community noise even if the notation does not show the "A."

In terms of human perception, a sound level of 0 dBA is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. This threshold is the reference level against which the amplitude of other sounds is compared. Normal speech has a sound level of approximately 60 dBA. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort, progressing to pain at still higher levels. Humans are much better at discerning relative sound levels than absolute sound levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dBA. A 3 to 5 dBA change is readily perceived. An increase (or decrease) in sound level of about 10 dBA is usually perceived by the average person as a doubling (or halving) of the sound's loudness.

Because of the logarithmic nature of the dB unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB =

63 dB, and 80 dB + 80 dB = 83 dB. However, about a 10-decibel increase is required to double the perceived intensity of a sound, and it is interesting to note that a doubling of the acoustical energy (a 3 dB increase) is at the lower limit of readily perceived change.

5.5.1.2 Noise Metrics

Although dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most ambient environmental noise includes a mixture of noise from nearby and distant sources that creates an ebb and flow of sound, including some identifiable sources, plus a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) is used to describe sound that is either constant or changing in level over a period of time. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given constant source to equal the acoustic energy contained in the fluctuating or time-varying sound level measured during the interval. The L_{eq} is the "base" metric used to establish other measures of environmental noise, such as the day-night sound level (L_{dn}) or the Community Noise Equivalent Level (CNEL).

In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This range is indicated through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}). These values represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{10}, L_{50}, and L_{90} may be used. These descriptors are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with L_{10} typically describe transient or short-term events, such as car and truck pass-bys. Sound levels are higher than this value only 10 percent of the measurement time.

L_{50} represents the median sound level during the measurement interval. Levels will be above and below this value exactly one-half of the measurement time. L_{90} is the sound level exceeded 90 percent of the time, and is therefore often used to describe ambient noise conditions because it typically represents generators of continuous sound and the aggregate of distant background environmental noise. For this reason, L_{90} is a key criterion metric used by the CEC to define noise during the quietest periods of the day and night.

The day-night sound level or L_{dn} represents the time-weighted average sound level for a 24-hour day, and is calculated from the L_{eq} by adding a 10 dB penalty to sounds that occur during the night period (10:00 p.m. to 7:00 a.m.). The L_{dn} is the descriptor of choice for nearly all federal, state, and local agencies throughout the United States to define acceptable land use compatibility with respect to noise.

Within the state of California, the CNEL is sometimes used. CNEL is similar to L_{dn}, except that an additional 5 dB penalty is applied to sounds that occur during the evening hours (7:00 p.m. to 10:00 p.m.). Because of the time-of-day penalties associated with the L_{dn} and CNEL descriptors, the L_{dn} or CNEL dBA value for a continuously operating sound source during a 24-hour period

will be numerically greater than the dBA value of the 24-hour L_{eq}. Thus, for a continuously operating noise source producing a constant noise level operating for periods of 24 hours or more, the L_{dn} will be 6 dB higher than the L_{eq} value. To provide a frame of reference, common sound levels are presented in Table 5.5-1, Sound Levels of Typical Noise Sources and Noise Environments (A-Weighted Sound Levels).

5.5.1.3 Existing Conditions

Project Site Description

The Project Site is located near the unincorporated community of Tupman in western Kern County, California within Section 10 of Township 30 South, Range 24 East. The site is approximately 7 miles west of Bakersfield, California.

Adjacent land uses are agricultural. The western border of the Tule Elk State Natural Reserve is located approximately 1,700 feet to the east of the Project Site. The Kern River Flood Control Channel and California Aqueduct are located south of the Project Site. A small number of noise-sensitive residential receptors are located approximately 0.5 to 4.5 miles from the Project Site, and are comprised of widely scattered farmhouses. The nearest single-family residences are located approximately 1,400 feet to the east of the Project Site. There are no hospitals, libraries, schools, places of worship, or other public facilities where quietness is an important attribute within the area.

Ambient Noise-Level Survey

Ambient noise-level surveys were conducted in 2009 and 2012. An ambient noise-level survey was conducted on March 2 through March 3, 2009 in the vicinity of the Project Site and additional data were collected on April 28, 2009. Another ambient noise-level survey was conducted on February 28 through February 29, 2012 at several single family residences.

The purpose of the surveys was to quantify noise exposure in the Project environs, with emphasis on locations of noise-sensitive receivers that may be impacted by Project construction, operation, or Project-related transportation. The 2009 ambient noise-level survey consisted of three long-term (greater than 25-hours continuous data) (denoted as "LT") and six short-term measurement locations (denoted as "ST"). Short-term measurements included two consecutive 10-minute measurements at each location during the day (7:00 a.m.–7:00 p.m.), evening (7:00 p.m.–10:00 p.m.) and night (10:00 p.m.–7:00 a.m.).

The selected measurement sites consisted of noise-sensitive receivers located near the Project Site, or along the primary transportation corridor, and two sites located along the transmission and potable water linear routes for the purpose of assessing potential construction-related impacts. The selected sites are considered to be representative of the ambient noise environment in the vicinity of the Project. Short-term measurements at each long-term measurement site were conducted in order to verify the accuracy of long-term measurement data, and to document ambient noise sources particular times of the day, evening, and night. The 2012 ambient noise-level survey included three additional LT measurement locations. Field measurement data sheets

can be found in Appendix J-1. Figure 5.5-1 illustrates the locations of all ambient noise measurement sites.

LT-1/ST-1: This location is approximately 370 feet northwest of the Project Site's nearest boundary, 3,000 feet northwest of the center of the Project Site, and is representative of the nearest noise-sensitive receptor. There are two residences located near the measurement site, consisting of one single-family residence and a mobile home. The option to purchase this 5-acre parcel adjacent to the Project Site was acquired subsequent to the 2009 Revised AFC. This parcel became part of the Controlled Area. Project Site boundaries have changed to include some areas previously within the Controlled Area, and to exclude other areas that were previously part of the Project Site. The current Project Site and Controlled Area are now 453 acres and 653 acres, respectively, rather than the previous sizes of 473 and 633 acres. These residences will not be in use during Project construction and operation. Long-term measurements were conducted near the east residence (mobile home). Noise levels at this location are representative of ambient noise levels at both residences. Long-term noise monitoring at LT-1 was conducted from 2:00 a.m. on March 3, 2009 until 3:00 a.m. on March 4, 2009.

The hourly L_{eq} values at LT-1 ranged from 35 dBA to 58 dBA. The average hourly L_{eq} was 53 dBA. The hourly L_{90} values ranged from 26 dBA to 52 dBA. The lowest average L_{90} over a consecutive 4-hour period for the entire 25-hour measurement was from 2:00 a.m. until 6:00 a.m. The average L_{90} during that period was 31 dBA. Table 5.5-2 displays the results of the measurements from LT-1.

Six short-term measurements were conducted at this location with two 10-minute measurements occurring consecutively during daytime hours, evening hours and nighttime hours. The daytime L_{eq} at ST-1 ranged from 42 to 44 dBA, and the daytime L_{90} ranged from 37 to 38 dBA. The evening L_{eq} at ST-1 ranged from 46 to 47 dBA, and the evening L_{90} ranged from 41 to 42 dBA.

The nighttime L_{eq} at ST-1 ranged from 30 to 35 dBA, and the nighttime L_{90} ranged from 27 to 29 dBA. Noise sources during the short-term surveys consisted of distant traffic noise, barking dogs, birds, aircraft, agricultural equipment, and farm animals. ST-1 sound-level measurement data are displayed in Table 5.5-3.

LT-2/ST-2: The LT-2/ST-2 location is approximately 1,400 feet east of the Project Site and 4,000 feet east of the center of the Project Site. There are two single-family residences located at this measurement site. Long-term measurements were conducted on the northwestern side of the residence (closest to the Project Site). Long-term noise monitoring at LT-2 was conducted from 6:00 p.m. on March 2, 2009 until 7:00 p.m. on March 3, 2009.

The hourly L_{eq} values at LT-2 ranged from 42 dBA to 61 dBA. The average hourly L_{eq} was 55 dBA. The hourly L_{90} values ranged from 25 dBA to 37 dBA. The lowest average L_{90} over a consecutive 4-hour period for the entire 25-hour measurement was from 1:00 a.m. until 5:00 a.m. The average L_{90} during that period was 30 dBA. Table 5.5-4 displays the measurement results at LT-2.

Six short-term measurements were conducted with two 10-minute measurements occurring consecutively during daytime, evening, and nighttime hours. The daytime L_{eq} at ST-2 ranged from 48 to 51 dBA, and the daytime L_{90} ranged from 26 to 27 dBA. The evening L_{eq} at ST-2 was 53 dBA, and the evening L_{90} ranged from 39 to 43 dBA. The nighttime L_{eq} at ST-2 ranged from 42 to 55 dBA, and the nighttime L_{90} was 34 dBA. Audible noise sources during the short-term noise measurements consisted of distant traffic, wildlife, and aircraft. ST-2 sound-level measurement data are displayed in Table 5.5-5.

LT-3/ST-3: This location is approximately 6,700 feet northeast of the Project Site's nearest boundary, and 9,900 feet northeast of the center of the Project Site. The primary purpose for this location is to determine existing noise levels along Stockdale Highway. The site is located 15 feet south of Stockdale Highway (23 feet south of the highway centerline), approximately 4,400 feet west of Morris Road. Short-term measurements were conducted at the same location as LT-3. Long-term noise monitoring at LT-3 was conducted from 7:00 p.m. on March 2, 2009 until 8:00 p.m. on March 3, 2009.

The hourly L_{eq} values at LT-3 ranged from 50 dBA to 69 dBA. The average hourly L_{eq} was 65 dBA. The hourly L_{90} values ranged from 28 dBA to 46 dBA. The lowest average L_{90} during a consecutive 4-hour period for the entire 25-hour measurement lasted from 7:00 p.m. until 11:00 p.m. The average L_{90} over that time-period was 30 dBA. Table 5.5-6 displays the long-term measurement results from LT-3.

Six short-term measurements were conducted with two consecutive 10-minute measurements occurring during daytime, evening, and nighttime hours. The daytime L_{eq} at ST-3 ranged from 64 to 66 dBA, and the daytime L_{90} was 35 dBA. The evening L_{eq} at ST-3 ranged from 53 to 59 dBA, and the evening L_{90} was 25 dBA. The nighttime L_{eq} at ST-3 ranged from 56 to 63 dBA, and the nighttime L_{90} was 30 dBA. Short-term sound-level measurement data from ST-3 are displayed in Table 5.5-7.

ST-4: ST-4 is located approximately 3,900 feet east of the Project Site's nearest boundary, and 6,600 feet east of the center of the Project Site, at the northern extent of the Tule Elk State Natural Reserve. Short-term ambient noise-level measurements were conducted along Station Road near the Tule Elk State Natural Reserve and were completed on March 2 and 3, 2009. Four short-term measurements were conducted with two 10-minute measurements occurring back-to-back during daytime and evening hours. Weather conditions, including gusty winds, had an adverse effect on the original nighttime ambient measurement results. An additional 1-hour-and-15-minute short-term ambient noise-level measurement was conducted during nighttime hours on April 28, 2009 during weather conditions acceptable for noise measurements.

Table 5.5-8 displays the results of all of the ambient noise-level measurements conducted at ST-4. The results from the April 28, 2009 noise measurement are the results that are used in the analysis of the Project. The L_{eq} was 41 dBA, and the L_{90} was 37 dBA.

ST-5: This location is approximately 3,300 feet southeast of the Project boundary and 5,900 feet south of the center of the Project Site, in the vicinity of a single-family residence. Short-term ambient noise-level measurements were completed along Tupman Road near the residence. Measurements were not conducted at the residence due to the presence of domestic animals.

Short-term ambient noise-level measurements were completed on March 3, 2009. Four short-term measurements were completed with two consecutive 10-minute measurements conducted during daytime and evening hours. Adverse weather conditions, including gusty winds, had an effect on the original nighttime ambient measurement results. An additional 1-hour-and-15-minute short-term ambient noise-level measurement was conducted during nighttime hours on April 28, 2009 in weather conditions acceptable for noise measurements.

Table 5.5-9 displays the results of all of the ambient noise-level measurements completed at ST-5. The results from the April 28, 2009 noise measurement are the results that are used in the analysis of the Project. The L_{eq} was 62 dBA and the L_{90} was 33 dBA.

ST-6: This location is approximately 10,750 feet northwest of the Project Site and 13,500 feet northwest of the center of the Project Site. Short-term ambient noise-level measurements were conducted during daytime hours along Freeborn Road near a single-family residence. Two consecutive short-term 10-minute ambient noise-level measurements were conducted on March 3, 2009. Sound-level measurements were conducted at ST-6 because of daytime construction of a pipeline taking place in the vicinity of residences located near the intersection of Freeborn Road and Adohr Road.

Table 5.5-10 displays the results of both of the short-term ambient noise-level measurements completed at ST-6. The average L_{eq} from the two measurements was 60 dBA, and the L_{90} was 24 dBA.

LT-7: This location is south of an existing railroad and south of McKittrick Highway. The primary purpose for this measurement location was to obtain ambient noise-level data near a single-family residence in close proximity to existing railroad. Long-term noise monitoring at LT-7 was conducted from 5:00 p.m. on February 28, 2012 until 6:00 p.m. on February 29, 2012.

The hourly L_{eq} values at LT-7 ranged from 54 dBA to 63 dBA. The average hourly L_{eq} was 58 dBA. The hourly L_{90} values ranged from 49 dBA to 56 dBA. The lowest average L_{90} during a consecutive 4-hour period for the entire 25-hour measurement lasted from 9:00 a.m. until 1:00 p.m. The average L_{90} over that time-period was 50 dBA. Table 5.5-11 displays the long-term measurement results from LT-7.

The primary sources of noise at this location were noise from traffic along McKittrick Highway and train noise.

LT-8: The primary purpose for this measurement location was to obtain ambient noise-level data near a single-home residence. Long-term noise monitoring at LT-8 was conducted from 6:00 p.m. on February 28, 2012 until 7:00 p.m. on February 29, 2012.

The hourly L_{eq} values at LT-8 ranged from 34 dBA to 57 dBA and the average hourly L_{eq} was 49 dBA. The hourly L_{90} values ranged from 28 dBA to 50 dBA. The lowest average L_{90} during a consecutive 4-hour period for the entire 25-hour measurement lasted from 1:00 a.m. until 5:00 a.m. Over that time-period, the average L_{90} was 30 dBA. Table 5.5-12 displays the long-term measurement results from LT-8.

The primary sources of noise at this location were local traffic during the day and distant traffic along State Route 58 and Interstate 5 during nighttime hours.

LT-9: The primary purpose for this measurement location was to obtain ambient noise-level data near a single-home residence. Long-term noise monitoring at LT-9 was conducted from 6:00 p.m. on February 28, 2012 until 7:00 p.m. on February 29, 2012.

The hourly L_{eq} values at LT-9 ranged from 44 dBA to 66 dBA. The average hourly L_{eq} was 60 dBA. The hourly L_{90} values ranged from 31 dBA to 55 dBA. The lowest average L_{90} during a consecutive 4-hour period for the entire 25-hour measurement lasted from 1:00 a.m. until 5:00 a.m. The average L_{90} over that time-period was 32 dBA. Table 5.5-13 displays the long-term measurement results from LT-9.

The primary sources of noise at this location were local traffic during the day and distant traffic along State Route 58 and Interstate 5 during nighttime hours.

Meteorological Conditions

Weather conditions appropriate for outdoor noise measurements existed on March 2, 2009. Evening temperatures averaged 70° Fahrenheit (°F). The average relative humidity was 56 percent. The average wind speed was 1 to 2 miles per hour. Nighttime temperatures averaged 65°F. The average wind speed was 1 to 2 miles per hour. The average relative humidity was 53 percent.

Weather conditions appropriate for outdoor noise measurements existed during the daytime and evening on March 3, 2009. During the daytime, the temperature averaged 66°F. The average relative humidity was 40 percent. Winds were calm. During evening hours on March 3, 2009, the average temperature was 72°F. The average relative humidity was 40 percent. The average wind speed was 2.5 miles per hour.

Weather conditions not suitable for outdoor noise measurements were encountered during nighttime measurements on March 3, 2009. Wind speeds averaged 11 miles per hour with gusts up to 18 miles per hour. These conditions exceeded the wind conditions necessary for accurate noise measurements. Nighttime temperatures averaged 70°F. The average relative humidity was 40 percent.

Additional nighttime measurements were made at noise-sensitive receptor sites ST-4 and ST-5 on April 28, 2009 under weather conditions acceptable for noise measurements. The daytime and evening measurements conducted on March 2 and 3, 2009 were conducted under weather conditions acceptable for noise measurements. The average temperature was 50°F. The average relative humidity was 50 percent. Wind speed averaged 2 miles per hour.

Weather conditions appropriate for outdoor noise measurements existed on February 28 and 29, 2012. Temperatures ranged from 43ºF to 63ºF throughout the measurement period. Relative humidity ranged from 38 percent to 70 percent throughout the measurement period. Wind speeds ranged from calm to 8 miles per hour. The sky was clear on February 28, 2012, and partly cloudy on February 29, 2012.

Instrumentation

The 25-hour continuous ambient noise-level measurements at all LT measurement locations were conducted using Larson Davis Model 820 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meters (SLM). The SLMs were calibrated before and after the measurements. The SLMs at LT-1, LT-2, LT-7 and LT-8 were mounted to fences approximately 5 feet above ground in order to simulate the average height of the human ear. The SLM at LT-3 was mounted to a telephone pole roughly 5 feet above ground and the SLM at LT-9 was mounted to a tree, also about 5 feet above ground. All short-term measurements were completed using a Brüel and Kjær Model 2250 ANSI Type 1 Integrating SLM. The sound level meter was mounted on a tripod approximately 5 feet above ground. The sound level meter was calibrated before and after the measurements. Certification of calibration for all meters and the Larson Davis CAL200 that was used to calibrate all sound level meters is provided in Appendix J-1. All SLMs were equipped with windscreens during the measurement periods.

5.5.1.4 Local Land Use and Noise Sources

The area surrounding the Project Site is comprised primarily of agricultural uses. The Project Site is bounded by Tupman Road to the east, an irrigation canal to the south, and Dairy Road to the west; agricultural land and Adohr Road are to the north.

Adjacent land uses are agricultural. The western border of the Tule Elk State Natural Reserve is located approximately 1,700 feet to the east of the Project Site while the Kern River and California Aqueduct are located to the Project Site's south. A small number of noise-sensitive residential receptors comprised of widely scattered farmhouses are located approximately 0.5 to 4.5 miles from the Project Site. The nearest single-family residences are located approximately 1,400 feet to the east of the Project Site.

The primary noise source at LT-2 was traffic along Station Road. The primary noise source at LT-3 was traffic along Stockdale Highway. The primary noise sources at LT-7 were traffic along Interstate 5 and McKittrick Highway and nearby trains to the north. The primary noise source at LT-8 was traffic along Brite Road and, during nighttime hours, distant traffic along Interstate 5 and McKittrick Highway. The primary noise source at LT-9 was traffic along Stockdale Highway and distant traffic along Interstate 5 and McKittrick Highway during nighttime hours. No operations of agricultural equipment were noted during the measurement period, and wildlife activity, other than birds, was minimal. Due to the limited activity, the documented noise levels are considered to be representative of the quietest annual periods.

5.5.1.5 Noise Level Design Goals

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (California Code Regulations, Title 14, Appendix G) sets forth characteristics that may signal a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. Exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.

2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

3. Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

4. Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

California Energy Commission

The CEC guidelines, in applying item 3 above, state that the area of impact to be studied should include areas where the noise of the project plus the background exceeds the existing background levels by 5 dBA or more at the nearest Noise Sensitive Area (NSA), including those receptors that are considered a minority population. In previous findings, CEC has considered it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is considered insignificant; an increase of more than 10 dBA in a residential setting is considered significant. For projects where the increase is between 5 and 10 dBA, the level of an impact depends on the particular circumstances of a case. Factors to be considered in determining the significance of an impact for this +5 to +10 dB situation include:

- Resulting noise level
- Duration and frequency of the noise
- Number of people affected
- Land use designation of the affected receptor sites
- Public concern or controversy as demonstrated at workshops or hearings, or by correspondence

Noise from construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- Construction activity is temporary
- Use of heavy equipment and noisy activities is limited to daytime hours
- All industry-standard noise abatement measures are implemented for noise-producing equipment

CEC uses the above method and threshold to protect the most sensitive populations, including any minority population.

Federal Transit Administration

The Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (FTA-VA-90-1003-06) outlines key environmental impact assessment processes and procedures for mass transit projects. The methodology outlined in this document is widely used

to assess potential noise impacts from railway operations and was adopted to assess potential impacts associated with the rail spur. The noise calculations and impact criteria used by the FTA are based on the change in outdoor noise exposure using a sliding scale with three receiver categories and three degrees of impact. They were developed to respond to heightened community annoyance caused by late-night or early-morning service and they respond to varying sensitivity of communities to noise from projects during different ambient noise conditions.

For operational rail noise, FTA's three receiver land use categories are:

- **Noise Category 1**. Tracts of land where quiet is an essential element in their intended purpose, such as outdoor amphitheaters, concert pavilions and National Historic Landmarks with significant outdoor use.

- **Noise Category 2**. Residences and buildings where people normally sleep, including homes, hospitals and hotels.

- **Noise Category 3.** Institutional land use (schools, places of worship, libraries) with use typically during the daytime and evening. Other uses in this category can include medical offices, conference rooms, recording studios, concert halls, cemeteries, monuments, museums, historical sites, parks, and recreational facilities.

The categories are determined from general land use information about each receiver. No Category 1 receivers are located within 1 mile of the proposed railroad spur. Outdoor hourly L_{eq} applies to Categories 1 and 3, whereas outdoor L_{dn} applies to Category 2.

Figure 5.5-2 presents the criteria for FTA's three degrees of impact: No Impact, Moderate Impact, and Severe Impact. As shown in Figure 5.5-2, the criterion for each degree of impact is on a sliding scale dependent on the existing noise exposure and the increase in noise exposure that could result from the Project.

As an example of impact evaluation, consider the FTA's sliding impact criterion for Category 2 receivers. An existing environment of 45 dBA L_{dn} would be affected if the rail project created an increase of 8 dBA to 14 dBA L_{dn} in the total noise level. An existing environment of 60 dBA L_{dn} would be impacted if the rail project created an increase of 2 dBA to 5 dBA L_{dn} in the total noise level. Those same "existing" environments (45 or 60 dBA L_{dn}) would be severely impacted (or "significantly impacted" according to NEPA) if the rail project created an increase greater than 14 dBA and 5 dBA L_{dn}, respectively.

The FTA has developed criteria for assessing potential vibration impacts related to rail projects. The criteria contained in the FTA Manual are based on community reaction to rail-related vibration and the potential for adverse effects on vibration-sensitive activities and processes. The criteria identify intensities of ground-borne vibration that may be considered significant and thus require consideration of mitigation and abatement measures.

The FTA assigns vibration-sensitive receptors to the following relevant categories:

- **Vibration Category 1**, **High Sensitivity.** Buildings where low ambient vibration is essential for operations within the building. This category includes buildings with extremely

vibration-sensitive equipment, such as finely calibrated research, manufacturing, optical, and imaging systems. Actual vibration levels may be below the level of human perception.

- **Vibration Category 2**, **Residential.** Residences and buildings where people normally sleep. This category includes private dwellings, hospitals and hotels where nighttime sensitivity is assumed to be of utmost importance.

- **Vibration Category 3**, **Institutional.** Land uses with primarily daytime use including schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment.

Table 5.5-14 illustrates FTA's vibration impact criteria used in mass transit projects. Where vibration is intermittent (e.g., train pass-bys), human annoyance from ground vibration is dependent on the number and magnitude of vibration events that occur during a typical 24-hour period. Based on frequency of occurrence, the FTA Manual defines three groups of events: Frequent, Occasional, and Infrequent. "Frequent" is defined as 70 or more vibration events per day; "Occasional" is defined as 30 to 70 events per day; and "Infrequent" is defined at fewer than 30 events per day. The FTA impact criterion for infrequent ground-borne vibration events is 80 vibration decibels (VdB) for land use Category 2. The criterion will be applied to the residential dwelling on the south side of SR 58 between Tracy Lane and Brandt Road. The address of this site is 5069 SR 58. This site is known as Modeled Receptor 1 (MR-1).

If the criteria in Table 5.5-14 were to be exceeded as a result of the Project, then feasible/ effective vibration mitigation measures would need to be considered. If feasible/effective mitigation actions are not available, then significant and unavoidable impacts would occur.

The generalized Ground Surface Vibration Curves presented in Figure 5.5-3 are used to estimate ground-borne vibrations. The curves take into account typical ground-surface vibration levels assuming equipment is in good condition and speeds are 50 miles per hour for the rail systems and 30 miles per hour for buses. The levels must be adjusted to account for factors such as different speeds and different geological conditions.

Vehicular Traffic

The implementation of the HECA Project will result in increased traffic volumes in the areas around the Project Site. There are 12 intersections that are analyzed in the vicinity of the Project area where traffic volumes increase due to Project construction and operations. The noise levels generated by the estimated average daily traffic (ADT) volumes during the construction period without Project construction will be compared to estimated ADT traffic volumes with Project construction. For the operation period, noise levels generated by estimated ADT traffic volumes in 2017 without Project operations will be compared to estimated ADT traffic volumes with Project operations.

In accordance with Section 5.10 of this AFC Amendment, the 2016 construction traffic volumes were used as a worst-case scenario for evaluating traffic noise impacts resulting from construction. The change in traffic noise will be analyzed using estimated traffic mixes and the speeds along the roads. The noise metric that will be used to determine noise impacts due to

traffic is the L_{dn}/CNEL metric. All of the noise-sensitive receptors are subject to the 65 dBA L_{dn} noise exposure threshold established by the respective Noise Elements of Kern County and the cities of Wasco and Shafter. An increase of 3 dBA is considered perceptible by the human ear, and therefore it would be considered a significant increase in noise level resulting from the increase in traffic during construction and operation of the HECA Project.

If the modeled "with construction" or "with Project" noise levels are: (1) greater than 65 dBA L_{dn}/CNEL at a noise-sensitive receptor due to the introduction of construction or Project-related traffic, and (2) the construction or Project-related traffic also causes an increase in L_{dn}/CNEL of 3 dBA over anticipated existing noise levels, then the noise impact would be considered significant. However, if the modeled "with construction" or "with Project" L_{dn}/CNEL is less than 65 dBA due to the introduction of construction or Project-related traffic, then there would be no noise impact at the noise-sensitive receptor.

Local

Kern County

The Noise Element of the Kern County General Plan, Section 3.2, states:

> Implementation Measures. . . F) [r]equire proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB L_{dn} and interior noise levels in excess of 45 dB L_{dn}.

As discussed in the General Plan, an exterior noise level up to 65 dBA L_{dn} is compatible with residential land uses. Because of the weighting and averaging nature of the L_{dn}, a constant noise source produces an L_{dn} approximately 6 dBA higher than its hourly L_{eq}. Therefore, constant noise sources producing exterior noise levels up to 58 dBA L_{eq} are compatible with residential land uses based on the Noise Element of the Kern County General Plan.

The Ordinance Code of Kern County has been reviewed, including Chapter 8.36, Noise Control, and there are specific noise limits for construction noise sources that are applicable to the Project. The Noise Control Ordinance (Kern County, 2009) in Chapter 8.36 of the Kern County Code states that noise from construction should be limited to the following hours when construction takes place within 1,000 feet of a sensitive receptor:

- Weekdays: 6:00 a.m. to 9:00 p.m.
- Weekends: 8:00 a.m. to 9:00 p.m.

City of Wasco

The Noise Element for the City of Wasco General Plan (2010), Chapter 8, states:

> Policies, Standards. . . . 2.) Noise sensitive land uses should be discouraged in noise impacted areas unless effective mitigation measures are incorporated into the specific design of such projects to reduce exterior noise levels to 65 dB L_{dn} (or CNEL) or less and 45 dB L_{dn} (or CNEL) or less within interior living spaces. Noise sensitive land uses

includes hospitals, residences, schools, churches, and other uses of a similar nature as determined by the Planning Director.

Industrial, commercial or other noise-generating land uses (including roadways, railroads, and airports) are also strongly discouraged by the City of Wasco from exceeding the 65 dB L_{dn} (or CNEL) at the boundary areas of planned or zoned noise-sensitive land uses. The City of Wasco enforces the State Noise Insulation Standards (California Administrative Code, Title 24) and Uniform Building Code noise requirements.

City of Shafter

The Noise Element for the City of Shafter General Plan (2005), Chapter 7, states that the objective of the Noise Element is to "achieve and maintain exterior noise levels appropriate to planned land uses throughout Shafter, as described below":

- **Residential**
  Single-Family: 60-65 dBA CNEL in rear yards
  Multifamily: 60-65 dBA CNEL in interior open space areas
- **Schools**
  Classrooms: 60 dBA CNEL
  Play and sports areas: 70 dBA CNEL
- **Hospitals, Libraries:**
  60 dBA CNEL
- **Commercial/Industrial:**
  65-70 dBA CNEL at the front setback

Summary of Design Goals

Operations of Project Site

Generally, the design basis for noise control is the minimum, or most stringent, noise level required by any of the applicable LORS. Therefore, facility operational noise from this Project is evaluated against the CEC limit, where the Project noise level is considered insignificant if it does not exceed the ambient background noise level (L_{90}) by 5 dB or more at the nearest sensitive receptor, as detailed below.

The ambient background noise levels and the associated Project design noise levels necessary to comply with CEC guidelines are shown in Table 5.5-15.

Operations of Railroad Spur (Alternative 1)

The FTA Noise Impact Criteria, shown in Figure 5.5-2, were used to determine the thresholds for moderate and severe noise impacts from the proposed railroad spur at nearby noise-sensitive receptors. These results are shown in Table 5.5-16, which lists the existing measured noise levels at each long-term site and the noise level thresholds for moderate and severe impacts at each respective noise-sensitive receptor.

The noise-sensitive receptor located at MR-1 is to the west of the proposed railroad spur. The existing noise level of 65 dBA L_{dn} that was measured at LT-7 was used as the ambient noise level at this receptor. The thresholds for moderate and severe impacts for LT-7 are 67 and 69 dBA L_{dn}, respectively. The noise-sensitive receptor located at MR-2 is west of the proposed railroad spur. The existing noise level of 53 dBA L_{dn} that was measured at LT-8 was used as the ambient noise level at this receptor. The thresholds for moderate and severe impacts for MR-2 are 54 and 60 dBA L_{dn}, respectively. LT-8 is west of the proposed railroad spur and has a measured, existing noise level of 53 dBA L_{dn}. The thresholds for moderate and severe impacts for LT-8 are 56 and 61 dBA L_{dn}, respectively. LT-9 is west of the proposed railroad spur and has a measured, existing noise level of 67 dBA L_{dn}. The thresholds for moderate and severe impacts for LT-9 are 69 and 71 dBA L_{dn}, respectively.

There will be a horn blowing when the train encounters at-grade rail crossings, which will increase operational noise levels due to an operational railroad spur. The train will blow its horn for 20 seconds before each at-grade rail crossing, which equates to a length of approximately 733 feet. The approximate rail horn noise is calculated to be 77 dBA L_{dn} at a distance of 50 feet from the railroad spur line.

Horn noise will be added to the train noise that results from the train engines and cars passing each noise-sensitive receptor in order to produce an overall Project noise level exposure in terms of the L_{dn} metric. These modeled L_{dn} results will be compared to the moderate and severe noise impact thresholds found in Table 5.5-16.

The FTA Criteria of Impact for Human Annoyance and Interference due to Ground-Borne Vibration, found in Table 5.5-14, was used to determine the threshold for vibration impacts due to the proposed railroad spur centerline. MR-1 and MR-2 are noise-sensitive receptors located west of the proposed railroad spur centerline. MR-2 was not analyzed due to the presence of the canal between the source and the receiver.

Assuming a worst-case scenario for train operations, the train will arrive and leave the Project Site via the proposed railroad spur once a day for a total of two train events. According to FTA vibration criteria, this is considered to be "infrequent." The receptor at MR-1 is a Category 2 receptor, and therefore the vibration impact threshold is 80 VdB. It is important to note that the threshold for human perception of vibration is 65 VdB. At this threshold, the vibration effects can be slightly felt, and below this threshold, the events will not be perceived by the receptors.

Construction

Kern County does not have specific noise limits for construction noise sources that are applicable to the Project. Construction noise is exempt from 6:00 a.m. to 9:00 p.m. on weekdays and from 8:00 a.m. to 9:00 p.m. on weekends. If construction is conducted outside of these hours, the noise level limits found in the California Model Municipal Noise Ordinance (Anonymous, 1977) will be used. The California Model Municipal Noise Ordinance recommends that a 45 dBA L_{eq} noise level limit be used for nighttime hours in rural areas. If the lowest measured hourly L_{eq} during non-exempt hours is higher than 45 dBA L_{eq}, then the lowest measured hourly L_{eq} measured during non-exempt hours will be used as the noise limit for construction during non-exempt hours at all noise-sensitive receptors.

Table 5.5-17 lists each noise-sensitive receptor, the lowest measured hourly L_{eq} at long-term measurement sites or 10 minute L_{eq} for short-term measurement sites during non-exempt times, and each respective construction noise level limit at each noise-sensitive receptor. Construction noise level limits during non-exempt hours are listed because of the potential for some construction activities to be conducted 24 hours per day.

Traffic

Construction and Project traffic noise levels will be evaluated based on the increases in ADT traffic volumes along each roadway segment that branches off of the 12 intersections analyzed in the traffic study. If the modeled "with construction" or "with Project" noise levels are (1) greater than 65 dBA L_{dn}/CNEL at a noise-sensitive receptor due to the introduction of construction or Project-related traffic, and (2) the construction or Project-related traffic also causes an increase in L_{dn}/CNEL of 3 dBA over anticipated existing noise levels, then the noise impact would be considered significant. However, if the modeled "with construction" or "with Project" L_{dn}/CNEL is less than 65 dBA due to the introduction of construction or Project-related traffic, then there would be no noise impact at the noise-sensitive receptor.

5.5.2 Environmental Consequences

Noise will be produced during construction and operation of the Project. Potential noise impacts from both on-site and off-site activities are assessed in this section.

5.5.2.1 Construction Noise

Project Site Construction

The construction schedule has been estimated on a single-shift, 5-day basis, beginning at 6 a.m. Monday through Friday. Additional hours and/or a second shift may be necessary to make up schedule deficiencies or to complete critical construction activities. During Project start up and testing, some activities may continue up to 24 hours per day, 7 days per week. The construction process for the Project will be expected to generate noise during the following phases:

- Site Preparation
- Excavation
- Foundation Placement
- Project and Building Construction
- Exterior Finish and Cleanup

Equipment used during the construction process will differ from phase to phase. In general, heavy equipment (bulldozers, dump trucks, and concrete mixers) will be used during excavation and concrete-pouring activities. Most other phases involve the delivery and erection of the equipment and building components. The method of pile installation (driven, augured, or vibrated), if required for some foundations, will be determined in the final design. Noise levels of construction equipment typically used for this type of Project are presented in Table 5.5-18, Individual Equipment Noise Levels Generated by Project Construction. The equipment

presented herein is not used in every phase of construction. Further, equipment used is not generally operated continuously, nor is the equipment necessarily operated simultaneously.

Project Site average sound levels for each phase of construction (from USEPA, 1971; FTA, 2006; and URS, 2012) are presented in Table 5.5-19, Aggregate Estimated Noise Levels Generated by Phase for the Project Construction Activities. This analysis takes into account the expected number of construction equipment items, their nominal usage factors, and the average sound emissions factor for each. The highest site-average sound levels (89 to 91 dBA) are associated with Foundation and Site Clearing phases of the construction schedule.[1]

The noise levels presented in Tables 5.5-18 and 5.5-19 use the equipment-specific and phase-aggregate sound levels, respectively, at 50 feet from the construction activity to predict the noise levels at the nearest noise-sensitive receptor locations that surround the Project Site. Noise associated with the construction of the Project will be attenuated by a variety of mechanisms. The most significant of these is the diversion of the sound waves with distance (attenuation by divergence). This attenuation mechanism results in a 6 dB decrease in the sound level with every doubling of distance from the source. For example, the 83 dBA average sound level associated with excavation (Table 5.5-19) will be attenuated to 77 dBA at 100 feet, 71 dBA at 200 feet, and 65 dBA at 400 feet. Attenuation for atmospheric absorption, earthen berms, or ground effects was not included in the construction noise analysis to allow for a conservative worst-case analysis. The small number of noise-sensitive receptors in the vicinity of the Project are located approximately 4,130 feet to 4.7 miles from the center of the Project process area, where the predominant amount of future construction activity will be located.

Because of the nature of construction noise, and with common fluctuations in the background noise level, construction activity occasionally would be discernible at the nearest receptors. Given some occasional atmospheric conditions, construction noise could also be discernible at the receptors located farther from the Project Site because of inversion effects. Under certain circumstances, the construction noise could be a source of annoyance to noise-sensitive individuals. Nighttime construction activities may be conducted in order to meet the construction schedule. However, if nighttime construction is needed, the Project will limit noisy construction activities (particularly pile-driving work) to daytime hours in order to minimize nighttime noise levels to the extent practical.

If construction activities at the Project Site are conducted outside of construction noise exempt times, the construction noise level limits for each noise-sensitive receptor found in Table 5.5-17 will not be exceeded.

Given the intermittent and temporary nature of construction activities, potential noise impacts are considered to be less than significant.

Linear Facility Construction

For construction of the linear facilities, the loudest construction activities are associated with pile driving. As shown on Table 5.5-18, pile driving activities generate noise levels of 101 dBA L_{eq}

[1] Excluding consideration for pile installation which is a short-term subset of the Foundation Phase.

at a distance of 50 feet. Construction noise levels associated with all other construction activities related to linear facility construction could be as high as 89 dBA L_{eq} at 50 feet. This is a conservative construction activity noise level based on information found in the Roadway Construction Noise Model's (RCNM) User Guide (FHWA RCNM, Version 1.0 User's Guide).

Electrical Transmission Line

Approximately 26 steel poles, fifteen of which will be located outside the HECA Project Site, are expected to be required for the electrical transmission line. Construction of the transmission line will consist of installing footings, poles, insulators and hardware, and pulling conductors and shield wires. Table 5.5-20 summarizes construction of the electrical transmission line without pile-driving activities. This table lists each noise-sensitive receptor location, distance to construction activities, noise levels at the receptor due to construction activities, and construction noise level limits for each noise-sensitive receptor.

If construction activities (not including pile-driving activities) associated with construction of the electrical transmission line are conducted outside of construction noise exempt hours, the construction noise level limits will be exceeded at LT-2, ST-4 and ST-5.

Although it is expected that any piles required for transmission line construction would be augered, if pile driving was required, it would be the loudest activity during transmission line construction. As shown on Table 5.5-18, pile driving activities generate noise levels of 101 dBA L_{eq} at a distance of 50 feet. Table 5.5-21 summarizes construction of the electrical transmission line with pile driving activities being conducted.

If pile driving activities associated with construction of the electrical transmission line are conducted outside of construction noise exempt hours, the construction noise level limits will be exceeded at all of the noise-sensitive receptors listed in Table 5.5-21, except at LT-7.

In summary, if construction activities associated with the installation of the electrical transmission line occur during hours when construction noise is exempt, potential noise impacts are considered to be less than significant. However, if construction activities associated with the installation of the electrical transmission line occur outside of construction noise exempt times, the construction noise level limits for seven of the eight noise-sensitive receptors listed in Table 5.5-21 will be exceeded. Therefore, if construction activities, especially those associated with pile driving, are performed during non-exempt hours, then the Project will implement mitigation measure NOISE-1 to reduce this impact to less-than-significant levels.

Potable Water Supply Pipeline

The potable water supply pipeline follows the same route as the proposed electrical transmission line. The potable water supply pipeline will cross the East Side Canal. Table 5.5-22 summarizes the noise-sensitive receptor location, distance to construction activities, noise levels at the receptor due to construction activities, and construction noise level limits associated with the construction of the potable water supply line.

If construction activities associated with the installation of the potable water supply pipeline occur during construction noise exempt times, potential noise impacts are considered to be less than significant.

Although not expected, if construction activities associated with the installation of the potable water supply pipeline occur outside of construction noise exempt times, the construction noise level limits for three of the eight noise-sensitive receptors listed in Table 5.5-22 will be exceeded. Therefore, if construction activities are performed during non-exempt hours, then the Project will implement mitigation measure NOISE-1 to reduce this impact to less-than-significant levels.

Process Water Supply Pipeline

The process water pipeline route runs from Seventh Standard Road to the Project Site, along the existing BVWSD road on the northwest side of the West Side Canal. There are several noise-sensitive receptors located within a few hundred feet of the existing BVWSD road. The nearest noise-sensitive receptor is located less than 100 feet away from process water pipeline construction activities. This single-family residence is located at Wasco Way near the West Side Canal. Noise levels associated with construction and installation of the process water pipeline have the potential to be as loud as 83 dBA L_{eq} at this location. There is a single-family residence located at the western end of Stockdale Highway. This home and the single family residence at ST-6 are located approximately 350 feet away from proposed construction activities, and these activities have the potential to generate noise levels reaching 72 dBA L_{eq} at both locations.

If construction activities related to the installation of the process water supply pipeline occur during construction noise exempt times, potential noise impacts are considered to be less than significant. However, if construction activities related to the installation of the process water supply pipeline occur outside of construction noise exempt times, the construction noise level limits for the residences described above, which are within 350 feet of the construction area, will be exceeded. The Project will implement mitigation measure NOISE-1 to reduce this impact to less than significant. For all other noise-sensitive receptors listed in Table 5.5-17, the construction noise level limits outside of the construction noise exempt times will not be exceeded and there will be no impact.

Natural Gas Supply Pipeline

There are several noise-sensitive receptors located near the proposed natural gas supply pipeline route. Construction activities associated with the natural gas supply pipeline could potentially be as loud as 70 dBA L_{eq} at one of the sensitive receptors. Since no noise measurements were conducted at this home, the 45 dBA L_{eq} construction noise level limit during non-exempt hours was used for this analysis. The 45 dBA L_{eq} construction noise level limit during non-exempt hours would be exceeded at this home.

Construction activities associated with the natural gas supply pipeline near another sensitive receptor could potentially be as loud as 83 dBA L_{eq}. Noise levels at all other noise-sensitive receptors due to construction of the natural gas supply pipeline are summarized in Table 5.5-23.

If construction activities associated with construction of the natural gas supply pipeline are conducted outside of construction noise exempt hours, the construction noise level limits would be exceeded at all noise-sensitive receptors except LT-3 and ST-6. Therefore, if construction activities are performed during non-exempt hours, the Project will implement mitigation measure NOISE-1 to reduce this impact to less-than-significant levels. If construction activities associated with the installation of the natural gas supply pipeline are conducted during construction noise exempt times, potential noise impacts would be less than significant.

CO_2 Pipeline

An approximately 3-mile CO_2 pipeline will transfer the CO_2 captured from the Project Site southeast to the OEHI CO_2 Processing Facility. HDD will be used to install the CO_2 pipeline under the Outlet Canal, the Kern River Flood Control Channel, and the California Aqueduct. If necessary, HDD activities will be conducted 24 hours per day. HDD construction activities generate noise levels of 80 dBA at a distance of 50 feet (Burge and Kitek, 2009). Additional information on noise impacts associated with the construction of the CO_2 pipeline is provided in Appendix A.

The only residence located near proposed HDD locations is the single-family residence located at ST-5, approximately 2,600 feet northeast of proposed HDD activities. Noise levels associated with HDD construction activities have the potential to be as loud as 46 dBA L_{eq} at this location. This would exceed the established 45 dBA L_{eq} nighttime exterior noise level limit by 1 dBA. Other construction activities associated with the construction of the CO_2 pipeline would generate noise levels of 89 dBA at a distance of 50 feet. Table 5.5-24 summarizes construction of the CO_2 pipeline without the HDD construction activities. Each noise-sensitive receptor location, distance to construction activities, noise levels at the receptor due to construction activities, and construction noise level limits are listed for each noise-sensitive receptor.

If construction activities associated with construction of the CO_2 pipeline are conducted outside of construction noise exempt hours, the construction noise level limits would be exceeded at LT-2 and ST-5. Therefore, if construction activities are performed during non-exempt hours, the Project will implement mitigation measure NOISE-1 to reduce this impact to less-than-significant levels. If construction activities relating to the construction of the CO_2 pipeline are conducted during construction noise exempt times, potential noise impacts are considered to be less than significant.

Railroad Spur (Alternative 1)

Construction of the railroad spur will use earthwork and track construction equipment typically used on similar rail projects throughout California and the United States. Table 5.5-25 summarizes the noise-sensitive receptor location, noise levels at the receptor due to construction activities, and construction noise level limits associated with construction of the railroad spur.

If construction activities associated with construction of the railroad spur are conducted outside of construction noise exempt hours, the construction noise level limits would be exceeded at every noise-sensitive receptor except at LT-3, ST-6, and LT-7. Therefore, if construction

activities are performed during non-exempt hours, the Project will implement mitigation measure NOISE-1 to reduce this impact to less-than-significant levels.

If construction activities associated with the railroad spur occur during construction noise exempt times, potential noise impacts are considered to be less than significant.

Special Construction Activities

During final construction, a method used to clean piping and testing called "steam blows" creates substantial noise. A steam blow results when high-pressure steam is discharged through the steam piping to clean the piping. The intent of the steam blows is to heat and sweep the piping systems to remove any debris or fine particles that could damage the steam turbine generator or other equipment. Each steam blow is followed by a cool-down period. The heating and cooling cycles are expected to last 2 or 3 hours each, and will be performed several times daily over a period of 2 or 3 weeks.

Unattenuated steam blows can produce very loud noise levels at the steam discharge/clean-out point. However, for this Project, temporary silencing systems will be employed to minimize these short-term, temporary noise impacts. Typical steam blow silencing should be able to reduce noise levels by 20 dBA to 30 dBA at each receptor location. Table 5.5-26, Estimated, Silenced Steam Blow Noise Levels, summarizes the potential noise levels at each receptor location for this temporary construction activity, including the use of silencers.

In general, steam blow events will be short-term, intermittent, and temporary, and will not result in significant impacts.

OEHI Project

According to the analysis contained in Appendix A-1, Section 4.11, Noise; and Appendix A-2, Section 2.5, Noise, construction of the OEHI Project will not result in significant adverse impacts as a result of noise.

5.5.2.2 Post-Commissioning Maturation-Phase Noise

As described in Section 2.6.4 of the Project Description of this AFC Amendment, the major process units will be commissioned sequentially. For this Project, the Power Block will be commissioned ahead of the Gasification Block. The commissioning for the Project will require four distinct phases: (1) Power Block commissioning on natural gas; (2) Gasification Block and Balance of Plant (BOP) Commissioning; (3) Power Block Commissioning on hydrogen-rich fuel; and (4) Manufacturing Complex Commissioning. The steps involved in the commissioning of these four phases are given in Sections 2.6.4.1 to 2.6.4.4 of the Project Description of this AFC Amendment.

As described in Section 2.1.7 of the Project Description of this AFC Amendment, the start-up and commissioning period of the Project is expected to be completed within approximately 13 months after completion of construction. Commercial operation will start when the

commissioning and startup activities are completed and the licensor/contractor guarantees and milestones have been achieved.

Commissioning periods for conventional combined-cycle systems operating on natural gas typically last only a few months. In contrast, commissioning duration for combined-cycle systems using hydrogen-rich fuel from solid feedstock such as petcoke or coal require a longer ramping duration due to the shakedown period.

After the initial Startup and basic Commissioning Phase, it is anticipated that there will be two planned gasifier starts per year. These will occur over the lifespan of the Project and can be considered as part of the operations of the Project, from a noise standpoint. Consequently, these gasifier (and related systems) start-up noise sources require noise control treatments such that their contribution to the overall Project noise profile is no greater than the contributions from the Project equipment and systems that are operating between gasifier starts. That is, steam or gas discharges, by-pass valves, eductor systems, atmospheric vents, increased flaring rates, and the like that will be used beyond the initial start-up efforts will have noise reduction features (such as casing treatments, lagging, and discharge silencers) to keep the Project's aggregate sound energy at or below the level needed to comply with the Project's noise goals.

With these general noise control measures for the Project equipment and systems (as detailed in Table 5.5-15), the aggregate noise emissions into the adjacent community will be comparable between the post-Commissioning Maturation Phase and the Operations Phase, discussed below.

5.5.2.3 Operational Noise

To evaluate the expected noise emissions from the Project and identify the need for noise control measures, a noise modeling study of the Project has been performed.[2] A computerized noise prediction program, Cadna/A, was used to simulate and model the future equipment noise emissions throughout the area. The modeling program uses industry-accepted propagation algorithms based on International Organization for Standardization (ISO) standards.[3] The calculations account for classical sound wave divergence (spherical spreading loss with adjustments for source directivity from point sources) plus attenuation factors due to air absorption, ground effects, and barrier/shielding.

Calculations were performed using octave band sound power levels (L_w) as inputs from each noise source. The computer outputs are in terms of octave band and overall A-weighted noise levels (sound pressure levels, abbreviated SPL or L_p) at discrete receptor positions or at grid map nodes (in preparation for computing a contour map). The output listing can be ranked by relative noise contribution from each noise source.

Figure 2-5, Preliminary Plot Plan (in Section 2.1 of this AFC Amendment) was used to establish the position of the noise sources and other relevant physical characteristics of the site. The noise

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[2] For background information, the reader is encouraged to refer to Appendix K-2, Noise Technical Report, from the May 2009 AFC filing.

[3] ISO is the International Organization for Standardization. Algorithms and methods for this program are included in the ISO 9613, ISO 1913 (Part 1), and/or ISO 3891 standards.

source locations and noise-sensitive receptor locations were translated into input x, y, z coordinates for the noise modeling program.

Modeling Procedures, Inputs, and Assumptions

For conservatism, and as is standard practice in the description of environmental noise, the modeling assumed stable atmospheric conditions suitable for reproducible measurements (under "standard-day" conditions of 59°F and 70 percent relative humidity) that are favorable for propagation. These inherent conservative factors and assumptions result in a noise model that will tend to be biased to higher predicted values than will be expected in the actual environment around the Project.

All currently planned, continuous-operation equipment items that were deemed to be significant noise sources at the Project were included in the noise model. The major process areas of the Project include:

- Material Handling (feedstock in-flow and solids out-flow)
- Gasification (Area 010)
- Gas Treating (Area 020)
- Acid Gas Removal and Refrigeration (Area 030)
- CO_2 Compression/Purification (Area 040)
- Sulfur Recovery and Degassing (Area 050)
- Pressure Swing Adsorption (PSA) and Off-gas Compression (Area 060)
- Power Block (Area 070)
- Manufacturing Complex (Area 080)
- Water Treatment (Area 090)
- Fire Protection and Utilities (Area 100)
- Air Separation Unit (ASU) (Area 150)

Within these overall units, the set of modeled sources included:

- Power Block Cooling Towers and ASU Cooling Tower;
- Main Power Block –combined-cycle, outdoor installation;
  (Gas Turbine + Steam Turbine + Heat Generator Recovery Steam Generator [HRSG]);
- Single-shaft Generator;
- Main Transformer, plus several facility auxiliary transformers;
- Power Block Cooling Tower Main Water Pumps and Motors;
- Process Cooling Tower Main Water Pumps and Motors;
- Boiler Feed Water Pumps and Motors;
- ASU systems, primarily large compressors, and related pumps, valves, and other systems;
- Material Handling Systems, including crushers, conveyors, and transfer towers;
- Flares, thermal oxidizers, SRU furnaces, and process vents;
- Syngas, CO_2, Air, Ammonia, Tail Gas, Refrigeration, and Recycle Compressors;
- Various sources in the Gasification Area and in the Manufacturing Complex;
- Various significant Pump Systems (over 25 hp each).

The Project is assumed to operate 24 hours per day at its design capacity, which means its noise output will nominally be constant, regardless of time of day (and, thus, the statistical sound levels should nominally be the same—that is, $L_{100} = L_{90} = L_{50} = L_{10} = L_0$). Given the early stages of the Project design, only limited vendor data are available for use as noise model inputs. Consequently, conservative data and assumptions were used from similar-sized IGCC power plant configurations and from information gathered during the previous HECA AFC development efforts. As a secondary information source, model inputs derived from generic industry reference information were used.

The noise control options developed for the May 2009 Revised AFC documentation served as the starting point for this current assessment. These levels, which often included prudent and feasible noise reduction features, were converted into sound power levels (in decibels re 1 picoWatt) to serve as the initial inputs for the noise modeling program. Major buildings and structures were included as barriers to account for propagation losses due to shielding between a given noise source and a receptor location. Most tanks, as well as the perimeter earthen berms along the northern and eastern edges of the Project Site, as described in Figure 2-5, Preliminary Plot Plan, were also included as barriers in the model. The tanks and berms were included in the noise analysis as they would break the direct, line-of-sight propagation pathway from many Project noise sources to the off-site receptors.

Noise Modeling

To ensure compliance with applicable LORS during ongoing Project operations, extensive noise reduction features were incorporated into the Project design. These features, leveraged from the 2009 Revised AFC effort, were included in the noise modeling configuration for the Project Site. From an analysis viewpoint, these noise reduction features were incorporated into the model by applying reasonable adjustments to the input noise levels to account for such treatments as enclosing noisy equipment items, incorporating appropriate transmission loss characteristics on selected building walls, installing silencers on inlets/exhausts, or specifying low-noise equipment. This process resulted in an efficient and reasonably achievable[4] mix of noise course characteristics that will result in predicted compliance at all receptor locations.[5] This mix of noise reduction measures focused on the following generalized treatments:

- Putting open-top enclosures on selected non-enclosed compressors/expanders;
- Noise abatement for various noise sources associated with the gasifiers;
- Low-noise procurement or shrouded or blanketed pump trains;
- Low-noise procurement or shrouded or blanketed blowers and dust handlers;
- Reduced-noise cooling tower cells;
- Use of a stack silencer on HRSG exhaust;
- Use silencers on selected gas and steam vents to atmosphere;
- Specify low-noise package for the CT train;
- Specify low-noise package for the ST train;

[4] Assessment of achievability was based on mitigation experience efforts on similar industrial projects.

[5] Per historical CEC acceptability guidelines and per the discussion in Section 5.5.1.5.

- Specify reduced-noise components on the HRSG system;
- Additional acoustical paneling of feed, transfer, and crusher enclosures/buildings;
- Refined noise emissions information for sulfur recovery unit (SRU) burners (using vendor information); and
- Refined noise emissions information for Thermal Oxidizer (using vendor information).

Noise Control Design Features

The effective noise control treatments that were used in the Project design modeling are a combination of vendor specification limits, acoustical designs in specific systems, and/or external treatments on selected equipment items or systems. These noise control design features are summarized in Table 5.5-27, Summary of Project Noise Control Design Features.

Noise source sound levels modeled for the Project Operations Phase may be found in Appendix J-2 of this document.

Noise Analysis Compared to Kern County Standards

The Project is predicted to comply with the Kern County standards, as shown in Table 5.5-28 and Table 5.5-29 for exterior and interior results, respectively.

Noise Analysis Compared to CEC Significance Thresholds

With receptor Location LT-2/ST-2 as the closest residential receptor, this location was the focus for noise control to achieve compliance with CEC noise thresholds. While this nearest location does not benefit from the current configuration of earthen berms breaking line-of-sight propagation, it is approximately 4,500 feet from the center of the Project process areas and would experience on the order of 39 dB of divergence attenuation, plus a notable amount of ground attenuation over soft or vegetated ground. The other noise-sensitive receptor locations are located between 5,000 and over 13,000 feet away from the Project process areas and would receive less noise than the nearest location due to sizable distance attenuation factors.

The results of the modeling which incorporated noise reduction features are shown in Table 5.5-30, Summary of Project Contributions with Noise Control Features Relative to CEC Noise Impact Criteria.

The results show that with the design features for controlling Project noise emissions, receptor locations LT-3/ST-3, ST-4, ST-5, ST-6, LT-7, LT-8, and LT-9 are predicted to be at or below the design goal needed to achieve compliance with the CEC thresholds. The closest off-site receptor location, LT-2/ST-2, is predicted to be 2 dB above the L_{90}+5 dB guideline (that is, it is predicted to be +7 dB with respect to the existing, late-night ambient conditions).

As indicated previously in Section 5.5.1.5, the CEC has determined that the level of potential impact for noise increases between +5 and +10 dBA depends on the particular circumstances of a project. In considering the factors for this situation, the Project would result in less-than-significant impacts at the closest receptor location (LT-2/ST-2) based on the low resulting noise levels (37 dBA) and the small number of people potentially affected.

After the results for the discrete receptor locations were predicted, the same modeling process (again using the noise control features in Table 5.5-27, Summary of Project Noise Control Design Features) was used to calculate plant noise levels at regularly-spaced grid points. From these grid results, a noise level contour map was generated. This contour map is a plot of constant, A-weighted sound levels in 5 dB increments for just the Project noise sources, and is shown in Figure 5.5-4, Noise Contours at Project Site. The figure is the graphical illustration of the predicted Project noise contributions, in terms of L_{eq}, at each noise-sensitive receiver summarized in Tables 5.5-28 and 5.5-30 above.

These extensive and comprehensive design features for controlling Project noise emissions are considered to be technically feasible, as well as reasonable and cost-effective for overall Project noise reduction. These noise reduction measures and features will be refined during detailed design phases to ensure that noise emissions resulting from the Project are as low as reasonably achievable.

OEHI Project

According to the analysis contained in Appendix A-1, Section 4.11, Noise and in Appendix A-2, Section 2.5, Noise, operation of the OEHI Project will not result in significant adverse impacts as a result of noise.

5.5.2.4 Ground-Borne Vibration

Experience at similar facilities demonstrates a very low probability for either ground-borne or airborne-induced vibration impacts to surrounding land uses. The equipment that will be used in the Project is well-balanced and 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 installed in the equipment are designed to ensure that the equipment remains balanced. Should an imbalance occur, the event will be detected and the equipment will automatically shut down. Also, given the distances from the actual equipment to the nearest receptor locations (on the order of at least 3,000 feet), coupled with the inherently low vibration levels from the Project's well-balance machinery, ground-borne vibrations would not even be expected to be detectable above the residual background vibration environment at any of the pertinent receptor locations. As a result, impacts related to ground-borne vibrations would be less than significant.

5.5.2.5 Worker Exposure to Noise

As part of the detailed design phase, the Project will specify that nearly all components will not exceed a near-field maximum noise level of 80 dBA at 1 meter (3 feet) as the standard for equipment selection and procurement. Because there are no permanent or semi-permanent workstations located near any piece of noisy Project equipment, and because a high degree of automation will be employed for operating the Project, workers' average exposure to noise should remain within allowable levels per OSHA regulations. 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 noise levels throughout the Project will

typically range from 90 dBA near certain systems or sets of equipment to roughly 65 dBA in areas more distant from any major noise source.

After the Project has been constructed and employee jobs and routines determined, HECA will conduct an occupational noise survey to identify the noise-hazardous areas in the facility. The survey will be conducted, after the Project is in full operation, by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, § 5095–5100 (Article 105) and Title 29, Code of Federal Regulations, Part 1910.

5.5.2.6 Railroad Spur Operational Noise

Noise from the proposed railroad spur was assessed using the FTA Noise Impact Assessment Spreadsheet model. These results are shown in Table 5.5-31. This table lists the existing measured noise levels in terms of L_{dn} at each long-term measurement site. The table also summarizes the moderate and severe noise impact thresholds at each noise-sensitive receptor, the modeled project noise contribution due to horn noise and train engines and cars, and the resulting total noise exposure level. The total noise exposure is the sum of the measured existing noise level plus the modeled Project noise contributions due to horn noise and trains' engines and cars. The farthest column on the right states whether there is an impact and the type of impact at the noise-sensitive receptor. The analysis considered the following assumptions in regard to operations on the railroad spur:

- Number of trains per day: 1 train
- Speed of trains: 25 miles per hour
- Number of cars per train: 111 cars
- Number of engines per train: 5 engines per train
- Number of daytime train events: 0 events
- Number of nighttime train events: 2 events
- Horns will blow at the Stockdale Highway and Dairy Road crossing
- Horns will blow at the Adohr Road and Dairy Road crossing

Although trains may be received at the Project Site at any hour of the day, a worst-case scenario for train events assumes that the train will come into the Project Site during nighttime hours and leave during nighttime hours. This results in a total of two train events occurring during nighttime hours. Trains will blow their horns for 20 seconds before each at-grade rail crossing, which equates to a length of approximately 733 feet. The approximate rail horn noise is calculated to be 77 dBA L_{dn} at a distance of 50 feet from the railroad spur line.

As shown on Table 5.5-31, the modeled Project noise levels that result from the combination of horn noise and engine and rail noise would result in moderate noise impacts at MR-1 and MR-2, but a moderate impact is considered to be less than significant. No significant impacts were identified for Locations LT-8 or LT-9. Therefore, noise impacts that would result from operations of the railroad spur would be less than significant.

5.5.2.7 Railroad Spur Ground-Borne Vibration

The potential vibration effects from the proposed railroad spur operations were assessed using the methodology contained in the FTA manual (FTA, 2006), which are also discussed in Section 5.5.1.5 – Noise Level Design Goals. The table illustrating FTA's Criteria of Impact for Human Annoyance and Interference due to Ground-Borne Vibration can be found in Section 5.5.1.5 as Table 5.5-14. The projected vibration levels at MR-1 would be approximately 67 VdB. This vibration level is below the threshold of perceptibility of 80 VdB when there are fewer than 30 events per day. The results of the vibration impact analysis are present in Table 5.5-32. The vibration level thresholds will not be exceeded at any receptors due to operations on the railroad spur line. Since the vibration level at MR-1 is above the 65 VdB threshold for human perception of vibration, vibration will be slightly perceived.

If the railroad spur is constructed and used during operations of the Project, potential vibration impacts are considered to be less than significant.

5.5.2.8 Traffic Noise for Construction and Operations

Project construction and operation would result in an increase in vehicular traffic along site access roadways. Primary access roadways include Stockdale Highway, State Route 119, Morris Road, Station Road, Dairy Road, Tupman Road, and Adohr Road.

As discussed above, the CEC assesses noise exposure in terms of local General Plans, noise ordinances, and changes to the ambient noise environment. While analysis of the change in the background noise level (L_{90}) has proven to be effective for assessing noise impacts from stationary, steady-state noise sources, this metric is not reliable for assessing changes in noise levels from intermittent mobile noise sources such as highway traffic. Highway noise is most often assessed in terms of a cumulative 24-hour metric such as L_{dn}, or, in the State of California, CNEL.

There are 12 intersections that are analyzed in the vicinity of the Project area where traffic volumes would increase due to Project-related construction and operations. Each leg of the respective intersection is analyzed by the increases in CNEL due to construction and Project-related operational traffic going to and from the Project Site. The change in traffic noise is analyzed using estimated traffic mixes and the speeds along the roads. Per the Kern County Noise Element, described in Section 5.5.1.5, an impact is defined as both being above 65 L_{dn}/CNEL and having an increase of 3 dBA L_{dn}/CNEL or more above the existing noise level. An increase in L_{dn}/CNEL of 3 dBA or more is considered perceptible by the human ear.

The FHWA-RD-77-108 traffic noise model was used to model noise impacts at all 12 intersection legs for construction and operations. This model takes into account the speed limit, ADT volume, and traffic mix. Calculations were made at a distance of 50 feet from the centerline of each intersection leg.

Construction Traffic

Acoustic calculations were performed for vehicular traffic during the construction period of the HECA Project. Year 2010 ADT volumes were provided. A 2-percent increase in traffic volumes was assumed to occur each year. The construction traffic ADT volumes were added to the estimated traffic volumes for 2016 to determine the "future with Project" scenario. Adjustments to the traffic mix for the future with Project scenario were made based on the added auto, medium truck and heavy truck ADT volumes due to construction. Table 5.5-33 illustrates the change in L_{dn}/CNEL and the noise levels in L_{dn}/CNEL at a distance of 50 feet from the centerline of each intersection leg for both "no Project construction" and "with Project construction" scenarios.

The noise levels along the Project intersection legs are expected to increase up to 18 dBA above the existing traffic noise levels during construction. Only three of the 48 intersection legs would be expected to have increases of 3 dBA L_{dn}/CNEL or more and also have "with Project construction" traffic volumes that result in noise levels of 65 dBA L_{dn}/CNEL or greater.

The west leg of the intersection of Dairy Road and Stockdale Highway will have an increase in L_{dn}/CNEL of 3 dBA with a resulting noise level of 67 dBA L_{dn}/CNEL at 50 feet due to construction traffic related to the Project. There are two residences located along the north side of Stockdale Highway that will be temporarily impacted during construction. The east leg of the intersection of Stockdale Highway and Morris Road will be impacted and will see an increase in L_{dn}/CNEL of 3 dBA with resulting noise level of 67 dBA L_{dn}/CNEL at a distance of 50 feet due to construction traffic related to the Project. There are no residences close enough to this leg to be considered impacted. The west leg of the intersection of Interstate-5 SB Ramp and Stockdale Highway will be impacted and will see an increase in L_{dn}/CNEL of 3 dBA with a resulting noise level of 67 dBA L_{dn}/CNEL at 50 feet due to construction traffic related to the Project. There are no residences close enough to this leg to be considered impacted.

As long as construction traffic is limited to construction noise exempt hours, noise impacts are considered to be less than significant because construction activities will be intermittent and temporary.

Project Operational Traffic with Railroad Spur (Alternative 1, Rail Transportation)

Acoustic calculations were performed for vehicular traffic during the operational period of the HECA Project. This traffic analysis takes into account that the proposed railroad spur line will be built and operational in the year 2017. Year 2010 ADT volumes were provided. A 2 percent increase in traffic volumes were assumed to occur each year. Traffic volumes resulting from an operational HECA Project were added to the estimated year 2017 ADT volumes to determine the "future with Project" traffic scenario in order to analyze the changes in L_{dn}/CNEL along each roadway segment. Adjustments to the traffic mix for the future with Project scenario were made based on the added auto, medium trucks and heavy truck ADT volumes due to operations. Table 5.5-34 illustrates the change in L_{dn}/CNEL and the noise levels in L_{dn}/CNEL at a distance of 50 feet from the centerline of each intersection leg for both "no Project" and "with Project" scenarios for operations starting in 2017.

There will be noticeable increases in traffic noise (10 dBA or more) at the intersections of Dairy Road/Adohr Road, Dairy Road/Stockdale Highway, Tupman Road/Station Road and Stockdale Highway/Morris Road. None of the 48 intersection legs have both (1) an increase of 3 dBA or more in L_{dn}/CNEL due to the introduction of Project-related traffic and (2) a resulting noise level of 65 dBA L_{dn}/CNEL or greater due to the introduction of Project-related traffic.

Potential noise impacts during operations due to traffic are considered to be less than significant.

Project Operation Traffic without Railroad Spur (Alternative 2, Truck Transportation)

Acoustic calculations also were performed for vehicular traffic during the operational period of the Project assuming that the railroad spur is not constructed as part of the Project. The traffic noise analysis includes 100 intersection legs. Year 2010 ADT volumes were established as part of the traffic analysis presented in Section 5.10 of the AFC Amendment. To estimate traffic volumes in 2017 (i.e., the first year of operations), a 2 percent increase in existing traffic volumes was assumed to occur each year. The construction traffic ADT volumes were added to the estimated 2017 traffic volumes to determine the "with Project" scenario. Adjustments to the traffic mix for the future "with Project" scenario were made based on the added auto, medium truck, and heavy truck ADT volumes due to operation. Table 5.5-35 illustrates the changes in L_{dn}/CNEL and the noise levels in L_{dn}/CNEL at a distance of 50 feet from the centerline of each intersection leg for both "no Project" and "with Project" scenarios for operation.

Six of the 100 intersection legs will have noticeable increases in traffic noise (10 dBA or more). The west leg of the intersection of the I-5 northbound ramp and Stockdale Highway will be impacted and will have both an increase in L_{dn}/CNEL of 3 dBA and have a "with Project" L_{dn}/CNEL of greater than 65 dBA at a distance of 50 feet from the centerline. Noise-sensitive residential homes are located as close as 60 feet to the centerline along this leg. The east and west legs of the intersection of the I-5 southbound ramp and Stockdale Highway will be impacted and will see increases in L_{dn}/CNEL of 3 and 5 dBA, respectively, as well as having "with Project" L_{dn}/CNELs of greater than 65 dBA. Noise-sensitive residential homes are located as close as 60 feet to the centerline along the west leg and as close as 100 feet along the east leg of the intersection. The south and east legs of the intersection of Stockdale Highway and Morris Road will be impacted and will see increases in L_{dn}/CNEL of 19 and 5 dBA, respectively, as well as having "with Project" L_{dn}/CNELs of greater than 65 dBA.

Noise-sensitive residential homes are located as close as 60 feet to the centerline along the west leg, but there are no homes located on the south leg. There will be no noise impacts on the south leg of the intersection of Stockdale Highway and Morris Road. The east leg of the intersection of Tupman Road and Station Road will be impacted and will see an increase in L_{dn}/CNEL of 18 dBA and have a "with Project" L_{dn}/CNEL of 65 dBA or greater at a distance of 50 feet from the centerline. Noise-sensitive residential homes are located as close as 40 feet to the centerline along this leg.

If the railroad spur is not constructed, the Project's traffic noise impacts during Project operations at certain locations are potentially significant without mitigation. The Project will implement mitigation measure NOISE-2 in order to reduce noise levels to less than significant if this alternative is chosen for the HECA Project.

5.5.3 Cumulative Impacts

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts (CEQA Guidelines § 15130). A "cumulative impact" consists of an impact which is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines § 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines § 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines § 15065 [a][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines § 15130[a]). It is also possible that a project's contribution to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines § 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines § 15130[b]). The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines § 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects within a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines § 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines § 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects, which is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

Only one project has been identified that could potentially influence ambient levels at noise-sensitive receptors in the vicinity of the Project Site. This is the proposed dairy farm, a 1,057-acre milk production facility that may occupy plots to the west, north, and east of the Project Site. Of the total dairy project, approximately 121 acres are slated for cattle yards and milking facilities. Although no details are currently available for this development, noise from dairy operations is estimated to be in the range of 75 to 85 dB (unweighted decibels); this is approximately equivalent to 57 to 67 dBA. For these levels of on-site dairy noise, and in consideration of the distances to the nearest sensitive receptors, the dairy facility is expected to contribute negligible, if any, additional noise levels to the environment around the Project Site. Therefore, there are no known noise sources in the area that will contribute to Project noise levels in a manner that would result in an additional cumulative impact.

For potential Project operations noise impacts to the proposed dairy facility, the 121 acres of cow yards and milking facilities were assumed, as a worst case, to be near the southeastern corner of Section 9, immediately to the west of the Project Site across Dairy Road. Project modeling for this

location indicated an expected daytime contribution of 51 dBA (which is approximately equivalent to 68 dB unweighted). Because the majority of Project noise sources would be over 0.5 mile away, and based on predicted Project contributions, the estimated dairy facility self-generated noise is seen to eclipse the Project equipment noise levels by a difference of about 6 or more dB. Thus, no noise impacts from the Project are expected at the closest potential dairy facilities.

According to the analysis contained in Appendix A-1, Section 4.11, Noise and Appendix A-2, Section 2.5, Noise, construction and operation of the OEHI Project would not result in significant cumulative adverse impacts as a result of noise.

5.5.4 Mitigation Measures

The implementation of Project design features during the detailed design process will result in the operation of the Project meeting the Kern County Noise Element limits, as well as the CEC's significance impact threshold. To ensure compliance, the Project will implement the following mitigation measures.

NOISE-1

As noted in the above analysis, potentially significant impacts may occur if certain construction activities are conducted outside of construction noise exempt times. Construction noise is exempt from 6:00 a.m. to 9:00 p.m. on weekdays and from 8:00 a.m. to 9:00 p.m. on weekends. Therefore, the Project has incorporated mitigation measure NOISE-1 to reduce the construction impacts to less-than-significant levels.

During construction, the Project will implement the following measures:

- Conduct construction activities during construction noise exempt hours, when possible.
- For construction activities being conducted outside of construction noise exempt hours, the Contractor will obtain a permit from Kern County, if necessary.
- Contractor will be responsible for maintaining equipment in best possible working condition.
- Each piece of construction equipment should be fitted with efficient, well-maintained mufflers that reduce equipment noise emissions.
- Schedule truck loading, unloading, and hauling operations so as to reduce noise levels due to construction during non-exempt construction hours.
- Locate construction equipment as far as possible from nearby noise-sensitive receptors.
- Situate construction equipment so that natural berms or aggregate stockpiles are located in between the equipment and noise-sensitive receptors.
- Acoustically attenuating shielding (barriers) and shrouds should be used when possible.

NOISE-2

If the Project decides to implement Alternative 2 (truck transportation), there will be operational traffic noise impacts on the identified intersection legs where the "with Project" L_{dn}/CNEL is greater than 65 dBA and the increase in noise levels from "without Project" volumes is 3 dBA or greater. Therefore, the Project has incorporated mitigation measure NOISE-2 to reduce the noise impacts due to traffic to less-than-significant levels.

During design, the Project will evaluate the following measures to reduce noise levels during operations:

- Reduced speeds of trucks
- Soundwalls at the impacted noise-sensitive receptors
- Roadway improvements along impacted intersection legs

5.5.5 Laws, Ordinances, Regulations, and Standards

This section describes LORS for the control of noise, as summarized in Table 5.5-36, Summary of LORS—Noise.

5.5.5.1 Federal

There are no noise-related federal LORS that affect this Project. However, there are guidelines at the federal level that direct the consideration of a broad range of noise issues as listed below:

- National Environmental Policy Act, 42 United States Code (U.S.C.), § 4321 *et seq*.; Public Law PL-91-190)
- Noise Control Act of 1972 (42 U.S.C. § 4910)

The USEPA has not promulgated standards or regulations for environmental noise generated by power plants. However, USEPA has published a guideline containing recommendations for noise levels affecting residential land use. The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues, and therefore should not be construed as standards or regulations.

Occupational Safety and Health Administration. In the U.S., worker noise exposure limits are regulated by OSHA under the Occupational Safety and Health Act of 1970.[6]

The noise exposure level for workers is limited to 90 dBA over a time-weighted average (TWA) 8-hour work shift to protect hearing.[7] If there are workers exposed to a $TWA_{8\text{-}hr}$ above 85 dBA (i.e., the OSHA Action Level), then the regulations call for a worker hearing protection program that includes baseline and periodic hearing testing, availability of hearing protection devices, and training in hearing damage prevention.

Federal Transit Administration. The Transit Noise and Vibration Impact Assessment manual (FTA, 2006) outlines key environmental impact assessment processes and procedures for mass

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[6] OSHA noise regulations are established in Code of Federal Regulation (CFR) Title 29, Part 1910-G, §191095, "Occupational Noise Exposure."

[7] In practice, workers are routinely exposed to varying noise levels for their 8-hour shift. So, to compute the entire shift's time-weighted average (higher level means shorter duration and vice versa), the other key component of worker noise exposure—the exchange rate—comes into play. The exchange rate is simply the decibel trade-off factor for exposure duration. Under OSHA regulations, the exchange rate is 5 dB. Thus, for every 5 dB increase in sound level, the allowable exposure duration is halved (i.e., 90 dB(A) for 8 hours, 95 dB(A) for 4 hours, 100 dB(A) for 2 hours, etc.).

transit projects. The noise calculations and impact criteria used by the FTA are based on the change in outdoor noise exposure using a sliding scale with three receiver categories and three degrees of impact. They were developed to respond to heightened community annoyance caused by late-night or early morning service and they respond to varying sensitivity of communities to noise from projects during different ambient noise conditions.

The FTA has developed criteria for assessing potential vibration impacts related to rail projects. The criteria contained in the FTA Manual are based on community reaction to rail-related vibration and the potential for adverse effects on vibration-sensitive activities and processes. The criteria identify intensities of ground-borne vibration that may be considered significant and thus require consideration of mitigation and abatement measures.

5.5.5.2 State of California

California Energy Commission

Under CEC siting requirements, new-source noise impacts at residential receptors are evaluated with respect to the pre-existing background noise level or specific local performance standards. The CEC typically defines an area as negligibly impacted by a project where operation potentially increases existing ambient noise levels by 5 dBA or less. CEC defines the ambient background noise level as the lowest 4-consecutive-hour logarithmic-average L_{90} at a 25-hour measurement site, and the lowest L_{90} at a short-term measurement site.

CEC also considers construction noise as typically insignificant if all of the following are true:

- The construction activity is temporary.
- Use of heavy equipment and noisy activities is limited to daytime hours.
- All feasible noise abatement measures are implemented for noise-producing equipment.

California Occupational Safety and Health Administration

Occupational exposure to noise is regulated by Cal/OSHA in Title 8, Group 15, Article 105, §§ 5095–5100. This standard stipulates that protection against the effects of noise exposure will be provided when sound levels exceed 90 dBA over an 8-hour exposure period. Protection will consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment will be provided and used to reduce exposure to the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the Action Level of an 8-hour TWA sound level of 85 dBA. The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

California Vehicle Code

Noise limits for highway vehicles are regulated under the California Vehicle Code, § 27151. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office.

5.5.5.3 Local

Noise Element to the Kern County General Plan and Cities of Wasco and Shafter

The Noise Element of the Kern County General Plan, as well as the Noise Elements for the Cities of Wasco and Shafter, require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise-sensitive land uses to exterior noise levels in excess of 65 dBA L_{dn}, and interior noise levels in excess of 45 dBA L_{dn} (Schafter, 2006 and 2009; City of Wasco, 2010).

5.5.6 Involved Agencies and Agency Contacts

5.5.6.1 Federal

No agencies were contacted.

5.5.6.2 State

No agencies were contacted.

5.5.6.3 County

No agencies were contacted.

5.5.7 Permits Required and Permit Schedule

No permits are required for noise.

5.5.8 References

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Table 5.5-1
Sound Levels of Typical Noise Sources and Noise Environments
(A-Weighted Sound Levels)

Noise Source (at Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels)
Military jet take-off with after-burner (50 feet)	140	Carrier flight deck	—
Civil Defense siren (100 feet)	130	—	—
Commercial jet take-off (200 feet)	120	—	**Threshold of pain** 32 times as loud
Pile driver (50 feet)	110	Rock music concert	16 times as loud
Ambulance siren (100 feet) Newspaper press (5 feet) Power lawn mower (3 feet)	100	—	**Very loud** 8 times as loud
Propeller plane flyover (1,000 feet) Diesel truck, 40 mph (50 feet) Motorcycle (25 feet)	90	Boiler room Printing press plant	4 times as loud
Garbage disposal (3 feet)	80	High urban ambient sound	2 times as loud
Passenger car, 65 mph (25 feet) Living room stereo (15 feet) Vacuum cleaner (3 feet)	70	—	**Moderately loud** 70 dBs (reference loudness)
Air conditioning unit (100 feet) Normal conversation (5 feet)	60	Data processing center Department Store	1/2 as loud
Light traffic (100 feet)	50	Private business office	1/4 as loud
Bird calls (distant)	40	Lower limit of urban ambient sound	**Quiet** 1/8 as loud
Soft whisper (5 feet)	30	Quiet bedroom	Very quiet
	20	Recording studio	Extremely quiet
	10	—	Extremely quiet
	0	—	Threshold of hearing

Source: Compiled by URS from various published sources and widely used references such as Harris, 1991; Berger, 2004; and Beranek, 1988.

Notes:

— = no specific noise environment identified
mph = miles per hour
dB = decibel

Table 5.5-2
25-Hour Sound Level Measurement at LT-1
(dBA)

Date	Time (Hour-Starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/3/2009	2:00:00	34.6	53.4	33.4	30.5	28.8	27.3
3/3/2009	3:00:00	37.2	51.9	38.7	31.4	29.3	27.1
3/3/2009	4:00:00	40.0	54.3	44.2	33.5	30.2	28.1
3/3/2009	5:00:00	43.2	59.7	47.2	38.1	35.2	32.4
3/3/2009	6:00:00	56.2	76.7	58.8	51.7	43.5	36.1
3/3/2009	7:00:00	56.7	77.3	58.8	54.3	49.8	45.8
3/3/2009	8:00:00	53.3	66.5	55.5	51.5	48.7	45.6
3/3/2009	9:00:00	57.1	76.6	57.9	54.3	51.3	47.6
3/3/2009	10:00:00	54.1	76.3	55.5	50.2	45.3	38.9
3/3/2009	11:00:00	54.0	72.7	57.1	50.9	45.7	40.1
3/3/2009	12:00:00	46.8	60.9	49.6	44.9	40.8	34.3
3/3/2009	13:00:00	53.6	66.0	56.6	52.4	47.1	38.1
3/3/2009	14:00:00	54.6	66.9	57.3	53.2	48.0	39.8
3/3/2009	15:00:00	56.5	64.8	60.1	54.8	48.5	35.5
3/3/2009	16:00:00	58.3	66.3	62.0	57.0	50.2	42.1
3/3/2009	17:00:00	56.7	81.8	60.2	53.8	42.9	36.2
3/3/2009	18:00:00	45.3	61.2	49.7	35.5	27.8	25.7
3/3/2009	19:00:00	37.0	55.5	41.7	29.6	26.4	24.3
3/3/2009	20:00:00	50.1	59.4	53.5	48.6	39.8	35.2
3/3/2009	21:00:00	49.9	61.3	53.4	47.9	42.6	36.9
3/3/2009	22:00:00	54.8	73.8	58.8	50.5	45.0	40.1
3/3/2009	23:00:00	54.1	65.3	57.2	52.8	46.2	42.4
3/4/2009	0:00:00	44.8	53.5	47.6	43.6	40.5	38.0
3/4/2009	1:00:00	38.3	53.5	41.2	35.2	29.8	28.0
3/4/2009	2:00:00	40.6	55.9	44.1	37.3	30.6	28.4

Source: URS, 2009.
Notes:
Measurements conducted on March 3 and 4, 2009.
Measurement Location: N 35°20'18.8", W 119°23'32.4"
Community Noise Equivalent Level = 58 dBA.
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise levels
LT = Long Term (greater than 25-hours continuous data) N = north
W = west

Table 5.5-3
Short-Term Sound Level Measurements at ST-1
(dBA)

Date	Date and Measurement Ending Time (10-minute Measurements)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/2/2009	23:11:00	29.8	48.8	31.3	28.5	27.1	25.4
3/2/2009	23:22:00	34.5	52.2	36.3	32.1	29.2	26.4
3/3/2009	12:14:00	43.8	57.3	46.2	41.3	38.2	34.3
3/3/2009	12:25:00	42.4	52.7	45.4	41.3	36.6	31.0
3/3/2009	21:20:00	45.8	61.4	49.0	44.2	40.5	37.2
3/3/2009	21:31:00	46.5	57.4	49.2	44.9	42.0	38.4

Source: URS, 2009.
Notes:
Measurements conducted on March 2 and 3, 2009.
Measurement Location: N 35°20'18.8", W 119°23'32.4"
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise levels
N = north
ST = Short Term
W = west

Table 5.5-4
25-Hour Sound Level Measurements at LT-2
(dBA)

Date	Time (Hour-Starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/2/2009	18:00:00	50.8	74.9	42.0	32.6	28.8	26.8
3/2/2009	19:00:00	49.7	73.2	41.9	31.7	27.9	26.1
3/2/2009	20:00:00	48.6	71.8	34.6	27.9	25.5	23.6
3/2/2009	21:00:00	47.7	72.0	39.0	29.3	25.8	23.8
3/2/2009	22:00:00	46.4	71.8	48.6	37.5	26.2	24.5
3/2/2009	23:00:00	45.8	72.4	47.1	35.0	30.3	28.3
3/3/2009	0:00:00	45.5	72.8	38.4	35.6	33.7	32.5
3/3/2009	1:00:00	41.9	69.2	35.4	33.3	32.0	30.3
3/3/2009	2:00:00	46.7	72.8	35.3	30.5	27.8	25.5
3/3/2009	3:00:00	51.3	79.0	35.0	31.6	30.0	28.3
3/3/2009	4:00:00	51.5	75.2	49.9	43.3	31.6	28.6
3/3/2009	5:00:00	58.2	80.4	56.8	43.3	34.4	30.6
3/3/2009	6:00:00	60.6	78.4	62.0	45.8	35.6	31.4
3/3/2009	7:00:00	53.8	76.0	51.7	43.1	37.2	32.5
3/3/2009	8:00:00	55.4	84.0	45.4	38.5	33.6	29.4
3/3/2009	9:00:00	53.8	76.9	45.7	34.9	30.3	27.4
3/3/2009	10:00:00	51.7	74.5	48.5	32.4	28.0	26.0
3/3/2009	11:00:00	54.0	79.0	43.8	31.7	28.5	26.9
3/3/2009	12:00:00	54.3	76.9	48.9	31.5	27.8	26.2
3/3/2009	13:00:00	52.5	72.7	46.7	32.1	28.2	26.1
3/3/2009	14:00:00	56.2	86.2	41.0	32.8	29.0	27.7
3/3/2009	15:00:00	59.6	77.9	57.8	33.8	27.5	24.7
3/3/2009	16:00:00	57.8	78.3	55.6	33.3	25.8	24.1
3/3/2009	17:00:00	57.8	80.3	57.0	36.0	25.3	23.3
3/3/2009	18:00:00	57.2	85.7	46.0	32.1	25.2	23.0

Source: URS, 2009.
Notes:
Measurements conducted on March 2 and 3, 2009.
Measurement Location: N 35°19'58.7", W 119°22'21.0"
Community Noise Equivalent Level = 61 dBA
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise levels
LT = Long Term (greater than 25-hours continuous data)
N = north
W = west

Table 5.5-5
Short-Term Sound Level Measurements at ST-2
(dBA)

Date	Date and Measurement Ending Time (10-minute measurements)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/2/2009	0:10:00	42.4	61.5	37.1	35.3	34.0	32.2
3/2/2009	0:21:00	52.5	79.4	39.4	35.7	33.9	31.9
3/3/2009	13:24:00	51.4	72.4	44.0	29.2	26.6	24.8
3/3/2009	13:41:00	48.0	75.2	36.6	28.7	25.9	24.2
3/3/2009	20:22:00	53.4	75.1	55.8	48.3	43.0	38.5
3/3/2009	20:33:00	52.5	73.5	52.8	44.4	38.9	33.7

Source: URS, 2009.
Notes:
Measurements conducted on March 3, 2009.
Measurement Location: N 35°19'58.7", W 119°22'21.0"
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise levels
N = north
ST = Short Term
W = west

Table 5.5-6
25-Hour Sound Level Measurements at LT-3
(dBA)

Date	Time (hour-starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/2/2009	19:00:00	59.4	86.0	52.9	38.8	32.4	28.9
3/2/2009	20:00:00	55.4	81.9	38.7	34.9	31.4	27.1
3/2/2009	21:00:00	58.8	85.0	45.6	32.7	27.5	24.0
3/2/2009	22:00:00	60.5	85.9	51.2	37.4	29.9	27.0
3/2/2009	23:00:00	56.7	86.1	45.9	41.6	35.1	31.4
3/3/2009	0:00:00	50.2	77.6	48.1	44.0	40.0	37.5
3/3/2009	1:00:00	53.6	79.9	47.4	44.2	41.8	38.7
3/3/2009	2:00:00	51.7	79.8	43.6	39.1	34.7	31.2
3/3/2009	3:00:00	55.9	85.4	41.3	38.9	37.0	31.6
3/3/2009	4:00:00	60.6	83.0	54.4	42.4	38.7	36.6
3/3/2009	5:00:00	68.7	85.1	72.9	53.3	45.7	38.4
3/3/2009	6:00:00	68.7	84.3	73.5	50.7	39.4	35.0
3/3/2009	7:00:00	65.5	85.5	63.0	45.1	39.3	36.3
3/3/2009	8:00:00	64.4	86.3	61.0	42.4	34.5	31.9
3/3/2009	9:00:00	66.6	88.1	63.0	41.0	35.0	31.4
3/3/2009	10:00:00	65.2	88.9	60.3	38.2	33.9	32.2
3/3/2009	11:00:00	66.5	87.2	62.8	38.5	34.4	32.4
3/3/2009	12:00:00	64.8	86.6	59.1	37.0	32.7	31.4
3/3/2009	13:00:00	65.6	86.9	60.9	38.6	35.2	32.9
3/3/2009	14:00:00	64.8	86.8	62.0	38.3	35.3	30.7
3/3/2009	15:00:00	68.6	85.3	71.4	42.9	33.5	30.9
3/3/2009	16:00:00	69.1	86.9	72.7	46.3	33.9	30.6
3/3/2009	17:00:00	68.0	87.4	70.2	46.1	33.2	26.7
3/3/2009	18:00:00	65.0	87.6	58.9	36.9	29.2	26.0
3/3/2009	19:00:00	60.5	82.9	50.9	37.5	28.3	25.0

Source: URS, 2009.
Notes:
Measurements conducted on March 2 and 3, 2009.
Measurement Location: N 35°21'17.2", W 119°22'24.5"
Community Noise Equivalent Level = 70 dBA.
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
N = north
W = west

Table 5.5-7
Short-Term Sound Level Measurements at ST-3
(dBA)

Date	Date and Measurement Ending Time (10-minute Measurements)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/2/2009	22:33:00	55.5	80.7	47.8	31.4	29.8	27.6
3/2/2009	22:49:00	63.3	88.7	54.2	34.8	30.4	27.5
3/3/2009	14:45:00	65.9	85.9	65.1	40.0	34.7	32.8
3/3/2009	14:58:00	64.4	82.8	61.6	38.6	34.7	32.3
3/3/2009	19:12:00	52.5	76.2	45.5	28.6	25.3	24.0
3/3/2009	19:25:00	58.5	79.8	54.9	29.2	24.9	23.2

Source: URS, 2009.
Notes:
Measurements conducted on March 2 and 3, 2009.
Measurement Location: N 35°21'17.2", W 119°22'24.5"
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
LT = Long Term (greater than 25-hours continuous data)
N = north
W = west

Table 5.5-8
Short-Term Sound Level Measurements at ST-4
(dBA)

Date	Date and Measurement Ending Time (10-minute measurements)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/3/2009	13:59:00	51.4	73.8	38.7	31.4	29.2	27.3
3/3/2009	14:11:00	51.3	75.9	34.1	29.8	28.4	26.5
3/3/2009	19:49:00	33.4	55.4	35.7	31.3	27.4	23.4
3/3/2009	20:03:00	48.0	71.2	44.1	36.0	32.7	29.6
4/28/2009	2:00:00*	41.1	56.2	43.4	39.9	36.9	33.6

Source: URS, 2009.
Notes:
Measurements conducted on March 2 and 3, 2009 and April 28, 2009.
Measurements conducted on March 2 and 3, 2009 are 10 minutes in length
*Measurement conducted on April 28, 2009 is 1 hour and 15 minutes in length
Measurement Location: N 35°20'00.3", W 119°21'55.0"
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
N = north
ST = Short Term
W = west

Table 5.5-9
Short-Term Sound Level Measurements at ST-5
(dBA)

Date	Date and Measurement Ending Time (10-minute measurements)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/3/2009	15:24:00	57.3	82.4	47.9	27.7	23.5	21.2
3/3/2009	15:35:00	62.8	83.1	59.0	38.9	24.5	21.0
3/3/2009	20:49:00	55.0	79.8	49.0	38.9	34.2	29.5
3/3/2009	21:00:00	38.5	52.0	41.9	36.2	31.9	27.2
4/28/2009	2:00:00*	61.7	93.1	43.3	36.6	33.0	29.5

Source: URS, 2009.
Notes:
Measurements conducted on March 3, 2009 and April 28, 2009.
Measurements conducted on March 3, 2009 are 10 minutes in length
*Measurement conducted on April 28, 2009 is 1 hour and 15 minutes in length
Measurement Location: N 35°19'09.8", W 119°22'36.6"
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
N = north
ST = Short Term
W = west

Table 5.5-10
Short-Term Sound Level Measurements at ST-6
(dBA)

Date	Date and Measurement Ending Time (10-minute measurements)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
3/3/2009	16:00:00	35.2	51.2	39.1	30.9	28.0	24.7
4/28/2009	16:12:00	30.1	46.7	33.3	28.3	24.9	22.5

Source: URS, 2009.
Notes:
Measurements conducted on March 3, 2009, are 10 minutes in length
Measurement Location: N 35°20'36.3", W 119°25'44.8"
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
N = north
ST = Short Term
W = west

Table 5.5-11
25-Hour Sound Level Measurement at LT-7
(dBA)

Date	Time (hour-starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
2/28/2012	17:00:00	57.3	68.2	58.9	56.9	54.8	51.7
2/28/2012	18:00:00	55.7	68.3	57.6	55.4	53.2	49.9
2/28/2012	19:00:00	57.8	67.0	60.8	56.5	53.2	48.2
2/28/2012	20:00:00	59.2	70.2	61.6	58.4	54.6	48.6
2/28/2012	21:00:00	58.4	67.6	61.1	57.5	53.7	49.4
2/28/2012	22:00:00	58.9	67.6	61.7	58.1	53.8	47.3
2/28/2012	23:00:00	58.4	66.0	61.1	57.7	53.1	47.6
2/29/2012	0:00:00	57.2	65.1	59.8	56.5	52.7	45.0
2/29/2012	1:00:00	54.9	65.0	57.1	54.3	50.8	46.7
2/29/2012	2:00:00	56.5	64.1	59.2	55.8	52.1	47.2
2/29/2012	3:00:00	57.9	66.2	60.6	57.0	52.3	47.3
2/29/2012	4:00:00	57.8	69.5	60.3	57.2	53.2	47.6
2/29/2012	5:00:00	59.2	64.5	61.1	58.9	56.2	51.6
2/29/2012	6:00:00	59.2	68.6	61.2	58.9	56.2	52.1
2/29/2012	7:00:00	57.6	66.4	60.2	57.0	53.2	47.1
2/29/2012	8:00:00	55.7	61.8	57.9	55.3	52.0	47.8
2/29/2012	9:00:00	53.9	61.6	56.7	53.0	48.8	42.0
2/29/2012	10:00:00	54.0	71.7	56.2	52.3	48.6	43.6
2/29/2012	11:00:00	63.0	89.8	57.8	53.6	50.1	46.2
2/29/2012	12:00:00	58.7	77.4	61.9	55.5	51.8	46.9
2/29/2012	13:00:00	54.3	60.0	56.6	53.8	50.8	45.4
2/29/2012	14:00:00	55.5	65.1	57.7	54.9	51.6	46.6
2/29/2012	15:00:00	56.9	66.4	59.6	56.1	52.6	47.0
2/29/2012	16:00:00	58.3	67.8	60.0	57.9	55.9	53.0
2/29/2012	17:00:00	58.9	79.7	60.2	58.3	55.9	51.6

Source: URS, 2012.
Notes:
Measurements conducted on February 28 and 29, 2012.
Community Noise Equivalent Level = 65 dBA.
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
LT = Long Term (greater than 25-hours continuous data)
N = north
W = west

Table 5.5-12
25-Hour Sound Level Measurements at LT-8
(dBA)

Date	Time (hour-starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
2/28/2012	17:00:00	43.7	72.6	37.6	31.3	27.6	25.0
2/28/2012	18:00:00	43.5	71.4	35.2	31.1	29.1	26.7
2/28/2012	19:00:00	36.6	54.6	38.4	35.6	33.9	32.8
2/28/2012	20:00:00	38.1	54.9	39.0	37.1	34.9	33.1
2/28/2012	21:00:00	37.8	60.3	38.8	36.2	33.8	32.0
2/28/2012	22:00:00	40.8	65.3	38.5	36.4	34.9	33.7
2/28/2012	23:00:00	51.1	76.2	39.5	37.0	34.0	31.6
2/29/2012	0:00:00	40.4	68.4	34.8	32.2	29.9	27.8
2/29/2012	1:00:00	33.6	52.3	34.1	30.4	27.6	26.2
2/29/2012	2:00:00	42.9	68.0	39.7	32.7	27.8	25.1
2/29/2012	3:00:00	40.4	64.8	39.8	36.1	32.5	30.2
2/29/2012	4:00:00	45.9	72.1	44.6	41.3	38.9	36.5
2/29/2012	5:00:00	49.6	68.7	52.7	46.8	41.4	39.3
2/29/2012	6:00:00	57.2	72.7	59.3	54.4	49.5	43.8
2/29/2012	7:00:00	53.9	72.9	55.8	49.8	45.5	39.8
2/29/2012	8:00:00	49.0	65.2	51.0	47.0	43.1	39.6
2/29/2012	9:00:00	49.3	66.2	51.5	44.5	38.2	30.8
2/29/2012	10:00:00	44.9	66.4	46.4	39.2	33.2	28.8
2/29/2012	11:00:00	44.2	66.7	46.1	39.0	31.4	27.5
2/29/2012	12:00:00	43.2	62.7	45.0	37.0	31.5	26.8
2/29/2012	13:00:00	44.4	63.8	47.3	38.0	29.5	25.8
2/29/2012	14:00:00	48.0	69.5	48.5	41.2	34.0	29.0
2/29/2012	15:00:00	49.6	74.6	49.5	43.6	39.1	33.0
2/29/2012	16:00:00	48.2	69.4	50.4	42.5	34.5	31.0
2/29/2012	17:00:00	55.6	76.8	43.0	37.5	32.3	29.0

Source: URS, 2012.
Notes:
Measurements conducted on February 28 and 29, 2012.
Community Noise Equivalent Level = 53 dBA.
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
LT = Long Term (greater than 25-hours continuous data)
N = north
W = west

Table 5.5-13
25-Hour Sound Level Measurements at LT-9
(dBA)

Date	Time (hour-starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
2/28/2012	18:00:00	59.6	79.0	64.0	42.3	34.0	30.7
2/28/2012	19:00:00	57.3	78.3	59.3	38.7	35.5	32.8
2/28/2012	20:00:00	45.4	66.8	43.6	40.8	38.4	36.2
2/28/2012	21:00:00	50.6	72.6	45.5	41.6	39.5	37.9
2/28/2012	22:00:00	51.6	73.8	47.5	40.7	36.5	34.6
2/28/2012	23:00:00	44.1	65.8	42.9	40.6	39.2	37.9
2/29/2012	0:00:00	46.9	70.6	45.6	41.6	38.5	35.3
2/29/2012	1:00:00	50.5	73.6	42.4	35.5	32.6	30.7
2/29/2012	2:00:00	45.9	72.9	34.9	32.9	31.3	29.0
2/29/2012	3:00:00	52.0	77.1	37.8	34.2	31.6	29.1
2/29/2012	4:00:00	61.5	76.9	66.8	42.8	33.8	31.8
2/29/2012	5:00:00	66.2	78.3	70.9	60.9	48.5	41.4
2/29/2012	6:00:00	66.1	79.9	70.1	62.6	55.7	47.0
2/29/2012	7:00:00	63.6	83.1	66.2	58.5	53.1	46.6
2/29/2012	8:00:00	61.8	74.9	65.4	57.4	52.8	47.4
2/29/2012	9:00:00	63.5	75.9	68.0	58.5	50.8	46.6
2/29/2012	10:00:00	59.0	75.9	62.9	50.7	44.1	37.9
2/29/2012	11:00:00	57.7	74.7	61.3	47.9	41.3	36.5
2/29/2012	12:00:00	59.4	78.6	60.6	53.8	44.0	36.7
2/29/2012	13:00:00	60.6	84.2	61.1	46.1	39.8	36.5
2/29/2012	14:00:00	56.7	77.1	60.0	46.6	39.6	34.4
2/29/2012	15:00:00	60.1	73.3	64.3	56.0	45.4	38.9
2/29/2012	16:00:00	63.7	77.0	67.1	60.2	54.8	47.4
2/29/2012	17:00:00	62.2	74.2	66.4	58.6	50.3	38.9
2/29/2012	18:00:00	56.7	72.7	60.7	49.5	41.0	34.9

Source: URS, 2012.
Notes:
Measurements conducted on February 28 and 29, 2012.
Community Noise Equivalent Level = 67 dBA.
º = degrees
' = minutes
" = seconds
dBA = A-weighted sound pressure level
L_{10} = noise levels equaled or exceeded 10 percent of a stated time
L_{50} = noise levels equaled or exceeded 50 percent of a stated time
L_{90} = noise levels equaled or exceeded 90 percent of a stated time
L_{eq} = Equivalent Sound Level
L_{max} = root-mean-square maximum noise level
L_{min} = root-mean-square minimum noise level
LT = Long Term (greater than 25-hours continuous data)
N = north
W = west

Table 5.5-14
Criteria of Impact for Human Annoyance and Interference due to Ground-Borne Vibration

Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Assessment						
	GBV Impact Levels (VdB re: 1 micro-inch/sec)			GBN Impact Levels (dB re: 20 micro-Pascals)		
Land Use Category	**Frequent Events[1]**	**Occasional Events[2]**	**Infrequent Events[3]**	**Frequent Events[1]**	**Occasional Events[2]**	**Infrequent Events[3]**
Category 1: Buildings where vibrations could interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[4]	N/A[4]	N/A[4]
Category 2: Residences and buildings where people usually sleep	72 VdB	75 VdB	80 VdB	35 VdB	38 VdB	43 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB	40 VdB	43 VdB	48 VdB

Source: FTA 2006, Table 8.1.

Notes:

[1] "Frequent Events" is defined as more than 70 events of the same source per day. Most rapid transit projects fall into this category.

[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

[5] Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

dB = decibel

N/A = not applicable

VdB = vibration decibels

Table 5.5-15
Receptor Ambient Sound Levels and CEC-Related Design Goals

Noise Sensitive Receptor	Label	Measured, Late-night L_{90} ambient conditions (dBA)	CEC's Late-Night L_{90} +5 dB Standard (dBA)
LT-2/ST-2	Adams	30	35
LT-3/ST-3	Along Stockdale Highway	30	35
ST-4	Tule Elk Reserve	37	42
ST-5	Along Tupman Road	33	38
ST-6[1]	Freeborn Road	N/A	N/A
LT-7	-	50	55
LT-8	-	30	35
LT-9	-	32	37

Source: URS, 2009 and 2012.
Notes:
[1] This location is representative of the linear facility construction activities; thus, no nighttime ambient data were obtained here. Given this location's distance from the Project Site (over 2 miles), if noise compliance is achieved at the other, closer locations, then compliance would be expected at ST-6 also, and the late-night criterion is deemed not applicable here.
CEC = California Energy Commission
dBA = A-weighted sound pressure level
LT = Long Term (greater than 25-hours continuous data)
N/A = not applicable
ST = Short Term

Table 5.5-16
Operational Railroad Spur Noise Analysis Results

Noise Sensitive Receptor	Measured, Existing Noise Level (dBA Ldn)	Moderate Noise Impact (dBA L_{dn})	Severe Noise Impact (dBA L_{dn})
MR-1	65	67	69
MR-2	53	54	61
LT-8	53	57	61
LT-9	67	69	71

Notes:
dBA = A-weighted sound pressure level
L_{dn} = day-night sound level
LT = Long Term (greater than 25-hours continuous data)

Table 5.5-17
Lowest Measured L_{eq} Levels and Construction Noise Level Limit Design Goals

Site ID	Lowest Measured L_{eq}[1] (dBA)	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})
LT-2/ST-2	42	45
LT-3/ST-3	50	50
ST-4	41	45
ST-5	39[2]	45
ST-6	30	45
LT-7	55	55
LT-8	34	45
LT-9	44	45

Notes:

[1] Lowest Hourly L_{eq} for LT measurement sites and 10-minute L_{eq} at ST measurement sites

[2] Lowest measured L_{eq} occurred during evening hours, but still within construction noise exempt times

dBA = A-weighted sound pressure level

L_{eq} = Equivalent Sound Level

LT = Long Term (greater than 25-hours continuous data)

ST = Short Term

Table 5.5-18
Individual Equipment Noise Levels Generated by Project Construction

Equipment Type	Equipment Noise Level at 50 feet, dBA	Estimated Equipment Noise Level at Each Receptor Location,[1] dBA							
		LT-2/ST-2 (1,400 feet [0.27 mi] E of Project)	LT-3/ST-3 (6,700 feet [1.3 mi] NNE of Project)	ST-4 (3,900 feet [0.75 mi] E of Project)	ST-5 (3,300 feet [0.55 mi] SE of Project)	ST-6 (10,750 feet [2.0 mi] WNW of Project)	LT-7 (22,300 feet [4.2 mi] NNW of Project)	LT-8 (13,400 feet [2.5 mi] NW of Project)	LT-9 (7,200 feet [1.4 mi] NW of Project)
		Atten[2] = 29 dB	*Atten[2] = 42 dB*	*Atten[2] = 38 dB*	*Atten[2] = 36 dB*	*Atten[2] = 46 dB*	*Atten[2] = 53 dB*	*Atten[2] = 48 dB*	*Atten[2] = 43 dB*
Trucks	88	59	46	50	52	42	35	40	45
Crane	83	54	41	45	47	37	30	35	40
Roller	74	45	32	36	38	28	21	26	31
Bulldozers	85	56	43	47	49	39	32	37	42
Pickup trucks	60	31	18	22	24	14	7	12	17
Backhoes	80	51	38	42	44	34	27	32	37
Jack hammers	88	59	46	50	52	42	35	40	45
Pile drivers	101	72	59	63	65	55	48	53	58
Rock drills	98	69	56	60	62	52	45	50	55
Pneumatic tools	85	56	43	47	49	39	32	37	42
Air compressor	81	52	39	43	45	35	28	33	38
Compactor	82	53	40	44	46	36	29	34	39
Grader	85	56	43	47	49	39	32	37	42
Loader	85	56	43	47	49	39	32	37	42

Sources: USEPA, 1971; FTA, 2006; and URS, 2012.

Notes:

[1] Distances shown are from the nearest site boundary line to each receptor structure (not necessarily the same as the representative monitoring location). This analysis assumes that an example piece of any given type of construction equipment could be, as a worst case, at or near any site boundary line during the various Project construction phases.

[2] This is the attenuation due to distance for sound propagating from 50 feet from each equipment type to the nearest indicated receptor location.

Table 5.5-19
Aggregate Estimated Noise Levels Generated by Phase for the Project Construction Activities

Construction Phase	Aggregate Activity Level at 50 feet, dBA	Estimated Construction Activity Noise Level at Each Receptor Location,[1] L_{eq}/L_{dn} [2 dB] A							
		LT-2/ST-2 (4,130 feet [0.78 mi] E of Project)	**LT-3/ST-3 (10,150 feet [approx. 2 mi] NNE of Project)**	**ST-4 (6,650 feet [1.3 mi] E of Project)**	**ST-5 (5,400 feet [1.0 mi] SE of Project)**	**ST-6 (13,750 feet [2.6 mi] WNW of Project)**	**LT-7 (24,680 feet [4.7 mi] NNW of Project)**	**LT-8 (16,700 feet [3.2 mi] NW of Project)**	**LT-9 (10,460 feet [2.0 mi] NW of Project)**
		Atten[3] = *38 dB*	*Atten*[3] = *46 dB*	*Atten*[3] = *42 dB*	*Atten*[3] = *41 dB*	*Atten*[3] = *49 dB*	*Atten*[3] = *54 dB*	*Atten*[3] = *50 dB*	*Atten*[3] = *46 dB*
Site Clearing	91	52/58	45/51	49/55	51/57	42/48	37/43	41/47	45/51
Excavation	83	44/50	37/43	41/47	43/49	34/40	29/35	33/39	37/43
Foundation	89	50/56	43/49	47/53	49/55	40/46	35/41	39/45	43/49
Pile Installation[4]	101	62/68	55/61	59/65	61/67	52/58	47/53	51/57	55/61
Building Construction	80	41/47	34/40	38/44	40/46	31/37	26/32	30/36	34/40
Finishing	60	21/27	14/20	18/24	20/26	11/17	6/12	10/16	14/20

Sources: USEPA, 1971; FTA, 2006; and URS, 2012.

Notes:

[1] Distances shown are from the Project construction activity centroid to each receptor location. This analysis, which differs from the equipment analysis, assumes that the aggregation of construction equipment for each phase will predominantly be at the centroid of the Project Site during the overall construction schedule. Note that the size of the Project Site provides additional distance attenuation benefits to each receptor location.

[2] An L_{dn} calculation was made by adding 6 dB to the receptor L_{eq} value under the very unlikely worst-case premise of 24-hour construction at a constant level of activity. See also Section 2.10 for further information on Project Construction.

[3] This is the attenuation due to distance for sound propagating from 50 feet from each phase's equipment aggregation to the nearest indicated receptor location. Note that this analysis only considers spherical spreading loss, and no other attenuation effects.

[4] Pile installation is a subset of the Foundation Phase and would only be expected to last 4 to 6 months within the overall Foundation Construction Phase. For conservative analysis, the worst-case, impact-type pile driving was assumed.

Table 5.5-20
Electrical Transmission Line Construction without Pile Driving

Site ID	Distance to Electrical Transmission Line Construction (feet)	Noise Level due to Electrical Transmission Line Construction (dBA L_{eq})	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})	Construction Noise Level Limit Exceeded During Non-Exempt Hours? (Yes/No)
LT-2/ST-2	1,400	60	45	Yes
LT-3/ST-3	7,850	45	50	No
ST-4	2,550	55	45	Yes
ST-5	2,700	54	45	Yes
ST-6	12,870	41	45	No
LT-7	22,400	36	55	No
LT-8	15,950	39	45	No
LT-9	10,000	43	45	No

Notes:
dBA = A-weighted sound pressure level
L_{eq} = Equivalent Sound Level
LT = Long Term (greater than 25-hours continuous data)
ST = Short Term

Table 5.5-21
Electrical Transmission Line Construction with Pile Driving

Site ID	Distance to Electrical Transmission Line Construction (feet)	Noise Level due to Electrical Transmission Line Construction (dBA L_{eq})	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})	Construction Noise Level Limit Exceeded During Non-Exempt Hours? (Yes/No)
LT-2/ST-2	1,400	72	45	Yes
LT-3/ST-3	7,850	57	50	Yes
ST-4	2,550	67	45	Yes
ST-5	2,700	66	45	Yes
ST-6	12,870	53	45	Yes
LT-7	22,400	48	55	No
LT-8	15,950	51	45	Yes
LT-9	10,000	55	45	Yes

Notes:
dBA = A-weighted sound pressure level
L_{eq} = Equivalent Sound Level
LT = Long Term (greater than 25-hours continuous data)
ST = Short Term

Table 5.5-22
Potable Water Supply Pipeline Construction

Site ID	Distance to Potable Water Supply Pipeline Construction (feet)	Noise Level due to Potable Water Supply Pipeline Construction (dBA L_{eq})	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})	Construction Noise Level Limit Exceeded During Non-Exempt Hours? (Yes/No)
LT-2/ST-2	1,400	60	45	Yes
LT-3/ST-3	7,850	45	50	No
ST-4	2,550	55	45	Yes
ST-5	7,400	46	45	Yes
ST-6	12,870	41	45	No
LT-7	22,400	36	55	No
LT-8	15,950	39	45	No
LT-9	10,000	43	45	No

Notes:
dBA = A-weighted sound pressure level
L_{eq} = Equivalent Sound Level
LT = Long Term (greater than 25-hours continuous data)
ST = Short Term

Table 5.5-23
Natural Gas Supply Pipeline Construction

Site ID	Noise Level due to Natural Gas Supply Pipeline Construction (dBA L_{eq})	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})	Construction Noise Level Limit Exceeded During Non-Exempt Hours? (Yes/No)
LT-2/ST-2	60	45	Yes
LT-3/ST-3	46	50	No
ST-4	51	45	Yes
ST-5	54	45	Yes
ST-6	43	45	No
LT-7	81	55	Yes
LT-8	50	45	Yes
LT-9	53	45	Yes
MR-1	82	55	Yes
MR-2	78	45	Yes

Notes:
dBA = A-weighted sound pressure level
L_{eq} = Equivalent Sound Level
LT = Long Term (greater than 25-hours continuous data)
ST = Short Term

Table 5.5-24
CO_2 Pipeline Construction

Site ID	Distance to CO_2 Pipeline Construction (feet)	Noise Level due to CO_2 Pipeline Construction (dBA L_{eq})	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})	Construction Noise Level Limit Exceeded During Non-Exempt Hours? (Yes/No)
LT-2/ST-2	6,100	47	45	Yes
LT-3/ST-3	12,583	41	50	No
ST-4	8,350	44	45	No
ST-5	2,600	55	45	Yes
ST-6	13,300	41	45	No
LT-7	11,850	42	55	No
LT-8	18,100	38	45	No
LT-9	26,750	34	45	No

Notes:
CO_2 = carbon dioxide
dBA = A-weighted sound pressure level
L_{eq} = Equivalent Sound Level
LT = Long Term (greater than 25-hours continuous data)
ST = Short Term

Table 5.5-25
Railroad Spur Construction

Site ID	Noise Level due to Railroad Spur Construction (dBA L_{eq})	Construction Noise Level Limit During Non-Exempt Hours (dBA L_{eq})	Construction Noise Level Limit Exceeded During Non-Exempt Hours? (Yes/No)
LT-2/ST-2	60	45	Yes
LT-3/ST-3	46	50	No
ST-4	51	45	Yes
ST-5	54	45	Yes
ST-6	43	45	No
LT-7	48	55	No
LT-8	50	45	Yes
LT-9	53	45	Yes
MR-1	82	55	Yes
MR-2	78	45	Yes

Notes:
dBA = A-weighted sound pressure level
L_{eq} = Equivalent Sound Level
LT = Long Term (greater than 25-hours continuous data)
ST = Short Term

Table 5.5-26
Estimated, Silenced Steam Blow Noise Levels

Receptor	Estimated Distance to Future Project Steam Blow[1]	Expected, Silenced Steam Blow Noise Level (dBA)[2]
LT-2/ST-2	4,100 feet (0.78 mi)	62–72
LT-3/ST-3	9,750 feet (1.85 mi)	54–64
ST-4	6,580 feet (1.25 mi)	58–68
ST-5	5,680 feet (1.08 mi)	59–69
ST-6	13,350 feet (2.57 mi)	5 –61
LT-7	—	46–56
LT-8	—	50–60
LT-9	—	54–64

Sources: URS, 2012.

Notes:

[1] Distances shown are from the Project centroid to each receptor location.

[2] This is the attenuation due to distance for sound propagating from 100 feet from a given steam blow to the nearest indicated receptor location. For conservatism, no other attenuation factors are considered.

dBA = A-weighted sound pressure level

L_{eq} = Equivalent Sound Level

LT = Long Term (greater than 25-hours continuous data)

ST = Short Term

Table 5.5-27
Summary of Project Noise Control Design Features

Noise Source	Conceptual Noise Control Feature(s)
Power Block Cooling Tower (12-cell) Process Cooling Tower (13-cell) (64 dBA at 400 feet from tower edge)	This is a low-noise design, and tower vendors can use a combination of slower-speed fans with special blade design, low-noise drive systems, splash control features, and/or tower baffling materials to achieve the specification.
ASU Area Cooling Tower	Same as above on a per-cell basis.
Gas Turbine Train	Vendor specification to meet an overall train limit of 59 dBA at 400 feet (this is a low-noise design relative to nominally standard offerings).
Steam Turbine Train	Vendor specification to meet an overall train limit of 58 dBA at 400 feet (this is a low-noise design relative to nominally standard offerings).
HRSG System	Vendor specification to meet an overall train limit of 58 dBA at 400 feet (this is a low-noise design relative to nominally standard offerings).
HRSG Stack Exit (alone)	Inclusion of a stack silencer to meet a stack exit-only limit of 50 dBA at 400 feet from stack base.
Main Power Block Transformers	Vendor specification to meet limits of 46 dBA at 400 feet or 59 dBA at 100 feet.
Selected Pump Trains (pump+motor) [for trains <100 hp, PWLA should be <83; for 150 to 750 hp trains, PWLA should be <91; and for trains >750 hp, PWLA should be <96]	Specify reduced noise emissions, relative to nominal offerings, for each size train (motor plus driven equipment item). Can be accomplished via noise limit specification to equipment vendor (for a quiet design). Alternatives include the installation of an acoustical enclosure around the pump and drive mechanics or blanketing around the main rotating equipment.
Miscellaneous Rotating Equipment Trains (e.g., blowers, dust collectors, agitators, etc.) [investigate all such sources for noise control, having PWLA > 83]	Specify reduced noise emissions, relative to nominal offerings, for each size train (motor plus driven equipment item). Can be accomplished via noise limit specification to equipment vendor (for a quiet design). Alternatives include the installation of an acoustical enclosure around the item and drive mechanics or blanketing around the main rotating equipment.
Material Handling Structures (including Truck Dumping Area, Train Dumping Area, Transfer Towers, and Feedstock Barn,)	Specify reduced noise emissions, relative to nominal offerings, for sheet metal building with several openings such that they are ≤60 dBA at 50 feet from any building façade (to be verified during detailed design phase). Assumes acoustical panel specifications for building walls in the detailed design such that interior space noise levels are adequately absorbed and encased within the building shell to meet the assumed emissions levels.
Conveyors (to be enclosed for noise and dust control)	Specify reduced noise emissions, relative to nominal offerings, such that they are ≤61 dBA at 50 feet).
Open Compressors and Expanders	Employ 4-sided, open-topped or closed-top enclosures on selected large trains. Remaining Compressor and Expander Trains above 500 hp or above 86 PWLA should be investigated for noise control such that they achieve noise reduction features for a nominal 15 dB reduction (relative to nominal designs).
Sulfur Recovery Unit Furnaces	Specify low-noise burners to equipment vendors or use noise control enclosures/plenums around burner systems.

Table 5.5-27
Summary of Project Noise Control Design Features

Noise Source	Conceptual Noise Control Feature(s)
Gasifiers	Specify low-noise fuel delivery systems or use noise control enclosures/plenums such that noise emissions are reduced to below 90 PWLA.
Elevated Flare Systems	None indicated at this time (provided vendors can supply equipment meeting Petrochem industry standards). (Assumes operations will be pilot flame only with design flows during occasional start-ups.)
Thermal Oxidizer (mainly used for miscellaneous tank vent discharges in Tail Gas Area)	None indicated at this time (provided vendors can supply equipment meeting Petrochem industry standards). (Assumes operations will be "low" flow; negligibly different than pilot flame only.)
Various Atmospheric Vents	Used of exhaust silencers, as applicable, such that noise emissions are below 83 PWLA.
Other Pump Sets (various)	Noise limit specification to equipment vendor; no more than 85 dBA at 3 feet.
Other Mechanical Equipment not specified above (various)	Noise limit specification to equipment vendor; no more than 85 dBA at 3 feet.
Other Electrical Equipment not specified above (various)	Noise limit specification to equipment vendor; no more than 85 dBA at 3 feet.
Building HVAC units and fans (various)	Noise limit specification to equipment vendor; no more than 85 dBA at 3 feet.

Source: HECA, 2012.

Notes:
ASU = Air Separation Unit
dBA = A-weighted sound pressure level
HRSG = Heat Generator Recovery Steam Generator
HVAC = Heating, Ventilation, and Air Conditioning
PWLA = Sound Power Level – A-weighted

Table 5.5-28
Summary of Project Contributions with Noise Control Features Relative to Kern County Noise Element Standards (Exterior)

Location [column 1]	Kern County Noise Element Exterior Standards, L_{dn} [column 2]	Existing Exterior L_{dn} Environment [column 3]	Predicted Project L_{eq} Contributions, dBA [column 4]	Predicted Project L_{dn} Contributions, [column 5][a]	Total, Future Calculated L_{dn} (existing plus Project)[f] [column 6][b]	Project Contribution/ Project Compliance[c,f] [column 7]
LT-2/ST-2	65	61	37	43	61	0/Yes
LT-3/ST-3	65	70	27	33	70	0/Yes
ST-4	65	51 [e]	31	37	51	0/Yes
ST-5	65	68 [e]	36	42	68	0/Yes
ST-6	65	N/A[g]	26	32	N/A[g]	0/Yes
LT-7	65	65	16	22	65	0/Yes
LT-8	65	53	21	27	53	0/Yes
LT-9	65	67	27	33	67	0/Yes

Source: URS and The Planning Center DC&E.

Notes:

[a] Using 24 hourly L_{eq} values to calculate the equivalent L_{dn} metric, assuming continuous operations at steady-state, design conditions. Thus, $L_{dn} = L_{eq} + 6$ dB.

[b] Summing sound levels from column 3 plus column 5.

[c] Is column 6 less than or equal to columns 3 and 2?

[d] Footnote not used.

[e] Estimated L_{dn} from short-term data in Tables 5.5-8 and 5.5-9.

[f] Result is completely controlled by the existing noise environment.

[g] No nighttime noise measurements were conducted at this location.

L_{dn} = day-night sound level

L_{eq} = Equivalent Sound Level

LT = Long Term (greater than 25-hours continuous data)

N/A = not applicable

ST = Short Term

Table 5.5-29
Summary of Project Contributions with Noise Control Features Relative to Kern County Noise Element Standards (Interior)

Location [column 1]	Kern County Noise Element Interior Standards, L_{dn} [column 2]	Existing Interior L_{dn} Environment[1] [column 3]	Predicted Project Exterior L_{dn} Contributions, [column 4][2]	Predicted Project Interior L_{dn} Contributions, [column 5][3]	Total, Future Calculated L_{dn} (Existing plus Project)[7] [column 6][4]	Project Contribution/ Project Compliance[5, 6] [column 7]
LT-2/ST-2	45	44	43	26	44	0/Yes
LT-3/ST-3	45	53	33	16	53	0/Yes
ST-4	45	34	37	20	34	0/Yes
ST-5	45	51	42	25	51	0/Yes
ST-6	45	N/A[g]	32	N/A[g]	N/A[g]	0/Yes
LT-7	45	48	22	5	48	0/Yes
LT-8	45	36	27	10	36	0/Yes
LT-9	45	50	33	16	50	0/Yes

Source: URS and The Planning Center|DC&E.
Notes:
[1] Applying -17 dB to results from Table 5.5-28.
[2] Using results of column 5 from Table 5.5-28.
[3] Applying -17 dB to column 4.
[4] Summing sound levels from column 3 plus column 5.
[5] Is column 6 less than or equal to columns 3 and 2?
[6] Result is completely controlled by the existing noise environment.
[7] No nighttime noise measurements were conducted at this location
L_{dn} = day-night sound level
LT = Long Term (greater than 25-hours continuous data)
N/A = not applicable
ST = Short Term

Table 5.5-30
Summary of Project Contributions with Noise Control Features
Relative to CEC Noise Impact Criteria

Location	Distance from Project Site (feet)		Measured, Late-Night L_{90} ambient conditions, (dBA)	CEC's +5 dB Late-Night L_{90} Standard[1] (dBA)	Predicted, Project Contributions (dBA)	Predicted Project Contributions plus Existing Ambient (dBA)	Comparison to Design Goal
	From Approx. Nearest Boundary	From Process Area Centroid					
Off-Site Receptors							
LT-2/ST-2	1,400	4,130	30	35	37	37	2 dB over
LT-3/ST-3	6,700	10,150	30	35	27	32	3 dB under
ST-4	3,900	6,650	37	42	31	38	4 dB under
ST-5	3,300	5,400	33	38	36	38	At standard
ST-6	10,750	13,750	N/A	N/A	26	N/A	N/A
LT-7	—	—	50	55	16	50	5 dB under
LT-8	—	—	30	35	21	31	4 dB under
LT-9	—	—	32	37	27	33	4 dB under
Project Site Boundary							
North	—	3,686		—	40	41[2]	N/A
East	—	3,235	—	—	42	42[2]	N/A
South	—	1,293	—	—	51	51[2]	N/A
West	—	2,339	—	—	53	53[2]	N/A

Source: URS and The Planning Center|DC&E.
Notes:
dB = decibels
dBA = A-weighted sound pressure level
N/A = not applicable
— = not available
[1] Also see Table 5.5-11.
[2] Assumes that the Power Plant contributions dominate the rural noise environment along the Project Site Boundary.

Table 5.5-31
Operational Noise Impacts due to Railroad Spur

Site ID	Measured, Existing Noise Level (dBA L_{dn})	Moderate Noise Impact Threshold (dBA L_{dn})	Severe Noise Impact Threshold (dBA L_{dn})	Modeled Project Noise Contribution due to Horn Noise (dBA L_{dn})	Modeled Project Noise Contribution due to Train Engines and Cars (dBA L_{dn})	Total Noise Exposure Level (dBA L_{dn})	Type of Noise Impact?
MR-1	65	67	69	N/A	61	67	Moderate
MR-2	53	54	61	N/A	58	59	Moderate
LT-8	53	57	61	N/A	37	53	None
LT-9	67	69	71	41	40	67	None

Notes:

dBA = A-weighted sound pressure level
L_{dn} = day-night sound level
LT = Long Term (greater than 25-hours continuous data)
N/A = not applicable

Table 5.5-32
Operational Vibration Analysis Results

Vibration Sensitive Receptor	Modeled Vibration Level (VdB)	Land Use Category	Impact Vibration Level Threshold (VdB)	FTA Vibration Impact[1]
MR-1	67	2	80	No impact

Notes:

[1] Criteria for human annoyance due to ground-borne vibration is 80 VdB.
LT = Long Term (greater than 25-hours continuous data)
VdB = vibration decibels

Table 5.5-33
2016 Construction Traffic Noise Results

Intersection	Leg	Speed Limit (mph)	2016 Construction ADT Volumes		2016 Construction L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
I-5 NB Ramp/ Stockdale Highway	North	55	770	985	58	60	2	No impact
	South	55	374	399	55	57	2	No impact
	East	55	6,809	8,353	68	69	1	No impact
	West	55	5,797	7,581	67	69	1	No impact
I-5 SB Ramp/ Stockdale Highway	North	55	2,904	3,119	64	65	1	No impact
	South	55	330	355	55	57	2	No impact
	East	55	5,764	7,548	67	68	1	No impact
	West	55	2,772	4,796	64	67	3	Impact
I-5 NB Ramp/ SR 119	North	55	121	124	50	51	1	No impact
	South	55	231	423	53	55	2	No impact
	East	55	11,110	12,270	71	72	0	No impact
	West	55	11,088	12,437	71	72	0	No impact
I-5 SB Ramp/ SR 119	North	55	638	641	57	58	0	No impact
	South	55	473	665	56	57	1	No impact
	East	55	11,055	12,404	72	72	0	No impact
	West	55	11,154	12,692	72	72	0	No impact

Table 5.5-33
2016 Construction Traffic Noise Results

Intersection	Leg	Speed Limit (mph)	2016 Construction ADT Volumes		2016 Construction L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
SR 119/SR 43	North	55	8,470	8,470	70	70	0	No impact
	South	55	3,091	3,091	66	66	0	No impact
	East	55	10,670	12,208	73	73	0	No impact
	West	55	17,171	18,709	75	75	0	No impact
SR 43/Stockdale Highway	North	55	6,589	6,781	71	71	0	No impact
	South	55	7,029	7,029	71	71	0	No impact
	East	55	8,470	9,822	69	70	0	No impact
	West	55	5,896	7,440	67	68	1	No impact
Stockdale Highway/Morris Road	North	25	22	22	35	35	0	No impact
	South	25	231	623	46	48	2	No impact
	East	55	2,783	4,805	64	67	3	Impact
	West	55	2,552	4,182	64	66	2	No impact
SR 119/Tupman Road	North	25	583	2,313	50	53	4	No impact
	South	25	429	429	48	48	0	No impact
	East	55	18,018	19,556	72	73	0	No impact
	West	55	17,468	17,660	72	72	0	No impact
Tupman Road/ Grace Avenue	North	25	484	2,408	50	54	4	No impact
	South	25	539	2,463	50	54	4	No impact
	East	25	154	154	44	44	0	No impact
	West	25	231	231	46	46	0	No impact

Table 5.5-33
2016 Construction Traffic Noise Results

Intersection	Leg	Speed Limit (mph)	2016 Construction ADT Volumes		2016 Construction L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
Tupman Road/ Station Road	North	25	121	2,437	43	52	10	No impact
	South	25	418	2,342	48	53	5	No impact
	East	25	319	711	47	49	2	No impact
	West	25	0	0	N/A	N/A	N/A	No impact
Dairy Road/ Stockdale Highway	North	25	22	22	35	35	0	No impact
	South	25	176	2,126	44	63	18	No impact
	East	55	2,541	4,171	64	66	2	No impact
	West	55	2,629	2,949	64	67	3	Impact
Dairy Road/ Adohr Road	North	25	55	2,005	47	63	16	No impact
	South	25	176	2,468	44	62	18	No impact
	East	25	165	1,875	44	55	11	No impact
	West	25	0	0	N/A	N/A	N/A	No impact

Notes:

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted sound pressure level
I-5 = Interstate 5
L_{dn} = day-night sound level
N/A = not applicable
NB = Northbound
SB = Southbound
SR = State Route

Table 5.5-34
2017 Operational Traffic Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 1 ADT Volumes		2017 Alternative 1 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
I-5 NB Ramp/ Stockdale Highway	North	55	784	853	58	61	2	No impact
	South	55	381	449	55	60	4	No impact
	East	55	6,933	7,117	68	68	0	No impact
	West	55	5,902	6,223	67	68	1	No impact
I-5 SB Ramp/ Stockdale Highway	North	55	2,957	3,026	64	65	1	No impact
	South	55	336	404	55	59	5	No impact
	East	55	5,869	6,189	67	68	1	No impact
	West	55	2,822	3,279	64	67	3	No impact
I-5 NB Ramp/ SR 119	North	55	123	130	50	52	2	No impact
	South	55	235	243	53	53	0	No impact
	East	55	11,312	11,404	72	72	0	No impact
	West	55	11,290	11,383	72	72	0	No impact
I-5 SB Ramp/ SR 119	North	55	650	657	58	58	0	No impact
	South	55	482	490	56	56	0	No impact
	East	55	11,256	11,348	72	72	0	No impact
	West	55	11,357	11,450	72	72	0	No impact
SR 119/SR 43	North	55	8,624	8,624	70	70	0	No impact
	South	55	3,147	3,147	66	66	0	No impact
	East	55	10,864	10,956	73	73	0	No impact
	West	55	17,483	17,575	75	75	0	No impact

Table 5.5-34
2017 Operational Traffic Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 1 ADT Volumes		2017 Alternative 1 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
SR 43/Stockdale Highway	North	55	6,709	6,725	71	71	0	No impact
	South	55	7,157	7,157	71	71	0	No impact
	East	55	8,624	8,792	69	69	0	No impact
	West	55	6,003	6,187	68	68	0	No impact
Stockdale Highway/ Morris Road	North	25	22	22	35	35	0	No impact
	South	25	235	539	46	60	14	No impact
	East	55	2,834	3,290	64	67	3	No impact
	West	55	2,598	2,750	64	65	1	No impact
SR 119/Tupman Road	North	25	594	702	50	50	0	No impact
	South	25	437	437	48	48	0	No impact
	East	55	18,346	18,438	72	72	0	No impact
	West	55	17,786	17,802	72	72	0	No impact
Tupman Road/Grace Avenue	North	25	493	617	50	50	0	No impact
	South	25	549	673	50	51	0	No impact
	East	25	157	157	44	44	0	No impact
	West	25	235	235	46	46	0	No impact
Tupman Road/ Station Road	North	25	123	339	43	45	2	No impact
	South	25	426	550	48	49	1	No impact
	East	25	325	629	47	60	13	No impact
	West	25	0	212	N/A	45	N/A	No impact

Table 5.5-34
2017 Operational Traffic Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 1 ADT Volumes		2017 Alternative 1 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
Dairy Road/ Stockdale Highway	North	25	22	22	35	35	0	No impact
	South	25	179	331	44	54	10	No impact
	East	55	2,587	2,739	64	65	1	No impact
	West	55	2,677	2,677	64	64	0	No impact
Dairy Road/Adohr Road	North	25	56	208	39	54	15	No impact
	South	25	179	547	44	55	10	No impact
	East	25	168	384	44	46	2	No impact
	West	25	0	0	NA	N/A	N/A	No impact

Notes:

ADT = average daily traffic
CNEL = Community Noise Level Equivalent
dBA = A-weighted sound pressure level
I-5 = Interstate 5
L_{dn} = day-night sound level
N/A = not applicable
NB = Northbound
SB = Southbound
SR = State Route

Table 5.5-35
2017 Industrial Operation Traffic No Rail Scenario Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 2 ADT Volumes		2017 Alternative 2 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
I-5 NB Ramp/ Stockdale Highway	North	55	784	853	58	61	2	No impact
	South	55	381	449	55	60	4	No impact
	East	55	6,933	7,607	68	70	2	No impact
	West	55	5,902	6,713	67	70	3	Impact
I-5 SB Ramp/ Stockdale Highway	North	55	2,957	3,026	64	65	1	No impact
	South	55	336	404	55	59	5	No impact
	East	55	5,869	6,679	67	70	3	Impact
	West	55	2,822	3,769	64	70	5	Impact
I-5 NB Ramp/ SR 119	North	55	123	130	50	52	2	No impact
	South	55	235	243	53	53	0	No impact
	East	55	11,312	11,404	72	72	0	No impact
	West	55	11,290	11,383	72	72	0	No impact
I-5 SB Ramp/ SR 119	North	55	650	657	58	58	0	No impact
	South	55	482	490	56	56	0	No impact
	East	55	11,256	11,348	72	72	0	No impact
	West	55	11,357	11,450	72	72	0	No impact
SR 119/SR 43	North	55	8,624	8,624	70	70	0	No impact
	South	55	3,147	3,147	66	66	0	No impact
	East	55	10,864	10,956	73	73	0	No impact
	West	55	17,483	17,575	75	75	0	No impact
SR 43/Stockdale Highway	North	55	6,709	7,215	71	72	1	No impact
	South	55	7,157	7,157	71	71	0	No impact
	East	55	8,624	8,792	69	69	0	No impact
	West	55	6,003	6,677	68	70	2	No impact

Table 5.5-35
2017 Industrial Operation Traffic No Rail Scenario Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 2 ADT Volumes		2017 Alternative 2 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
Stockdale Highway/ Morris Road	North	25	22	22	35	35	0	No impact
	South	25	235	1,029	46	65	19	Impact
	East	55	2,834	3,780	64	70	5	Impact
	West	55	2,598	2,750	64	65	1	No impact
SR 119/Tupman Road	North	25	594	702	50	50	0	No impact
	South	25	437	437	48	48	0	No impact
	East	55	18,346	18,438	72	72	0	No impact
	West	55	17,786	17,802	72	72	0	No impact
Tupman Road/Grace Avenue	North	25	493	617	50	50	0	No impact
	South	25	549	673	50	51	0	No impact
	East	25	157	157	44	44	0	No impact
	West	25	235	235	46	46	0	No impact
Tupman Road/ Station Road	North	25	123	339	43	45	2	No impact
	South	25	426	550	48	49	1	No impact
	East	25	325	1,119	47	65	18	Impact
	West	25	0	702	N/A	65	N/A	No impact
Dairy Road/ Stockdale Highway	North	25	22	22	35	35	0	No impact
	South	25	179	331	44	54	10	No impact
	East	55	2,587	2,739	64	65	1	No impact
	West	55	2,677	2,677	64	64	0	No impact
Dairy Road/Adohr Road	North	25	56	208	39	54	15	No impact
	South	25	179	547	44	55	10	No impact
	East	25	168	384	44	46	2	No impact
	West	25	0	0	N/A	N/A	N/A	No impact

Table 5.5-35
2017 Industrial Operation Traffic No Rail Scenario Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 2 ADT Volumes		2017 Alternative 2 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
SR 43/Poso Avenue	North	55	10,819	10,835	72	72	0	No impact
	South	55	11,088	11,349	72	73	1	No impact
	East	25	0	245	N/A	60	N/A	No impact
	West	25	358	358	48	48	0	No impact
SR 43/Kimberlina Road	North	55	9,666	9,927	71	72	1	No impact
	South	55	10,875	11,381	72	73	1	No impact
	East	25	3,909	4,154	59	62	4	No impact
	West	25	4,021	4,021	59	59	0	No impact
SR 43/Shafter Avenue	North	55	13,933	14,439	73	74	1	No impact
	South	55	10,696	11,202	72	73	1	No impact
	East	40	4,547	4,547	63	63	0	No impact
	West	40	5,230	5,230	64	64	0	No impact
SR 43/Central Avenue	North	55	11,648	12,154	72	73	1	No impact
	South	55	11,670	12,176	72	73	1	No impact
	East	40	3,763	3,763	63	63	0	No impact
	West	40	3,181	3,181	62	62	0	No impact
SR 43/Lerdo Highway	North	55	10,472	10,978	72	73	1	No impact
	South	55	9,442	9,948	71	73	1	No impact
	East	50	11,312	11,312	69	69	0	No impact
	West	50	8,266	8,266	68	68	0	No impact
SR 43/7th Standard Road	North	55	4,861	5,367	68	71	2	No impact
	South	55	5,734	6,240	69	71	2	No impact
	East	50	7,706	7,706	67	67	0	No impact
	West	50	6,003	6,003	66	66	0	No impact

Table 5.5-35
2017 Industrial Operation Traffic No Rail Scenario Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 2 ADT Volumes		2017 Alternative 2 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
SR 43/SR 58 (Rosedale Highway – West)	North	55	7,459	7,965	71	72	1	No impact
	South	55	10,640	11,146	73	74	1	No impact
	East	55	0	0	N/A	N/A	N/A	No impact
	West	55	8,154	8,154	69	69	0	No impact
SR 43/SR 58 (Rosedale Highway – East)	North	55	10,382	10,888	73	74	1	No impact
	South	55	7,146	7,652	71	72	1	No impact
	East	55	7,762	7,762	69	69	0	No impact
	West	55	963	963	60	60	0	No impact
H Street/9th Street	North	25	1,232	1,232	53	53	0	No impact
	South	25	1,165	1,410	52	61	8	No impact
	East	25	358	603	47	60	13	No impact
	West	25	0	0	N/A	N/A	N/A	No impact
H Street/Wasco Avenue	North	25	907	1,397	51	63	12	No impact
	South	25	0	0	N/A	N/A	N/A	No impact
	East	25	1,882	1,882	54	54	0	No impact
	West	25	2,744	3,234	56	64	8	No impact
Wasco Avenue/Poso Avenue	North	25	2,912	3,402	56	64	8	No impact
	South	25	1,254	1,499	53	61	8	No impact
	East	25	112	112	43	43	0	No impact
	West	25	2,531	2,776	57	62	5	No impact
Wasco Avenue/ Kimberlina Road	North	25	1,288	1,533	53	61	8	No impact
	South	25	0	0	N/A	N/A	N/A	No impact
	East	25	3,909	3,909	59	59	0	No impact
	West	25	3,920	4,165	59	62	4	No impact

Table 5.5-35
2017 Industrial Operation Traffic No Rail Scenario Noise Results

Intersection	Leg	Speed Limit (mph)	2017 Alternative 2 ADT Volumes		2017 Alternative 2 L_{dn}/CNEL (dBA)		Difference in L_{dn}/CNEL (dBA)	Impact
			Without Project	With Project	Without Project	With Project		
J Street/9th Street	North	25	1,837	1,837	54	54	0	No impact
	South	25	1,758	2,003	54	61	7	No impact
	East	25	0	0	N/A	N/A	N/A	No impact
	West	25	101	346	42	60	18	No impact

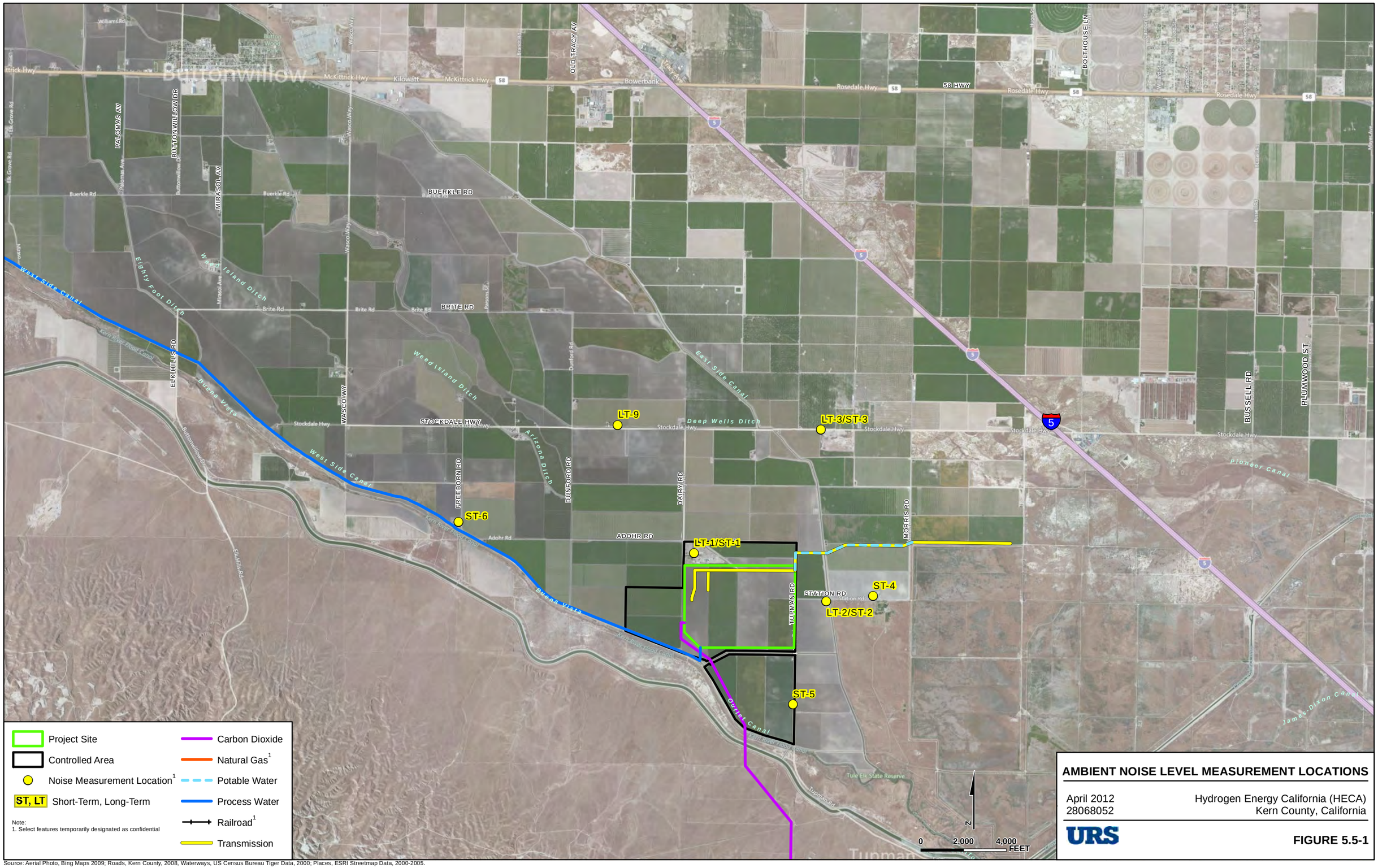
Notes:

ADT = average daily traffic
CNEL = Community Noise Level Equivalent
dBA = A-weighted sound pressure level
I-5 = Interstate 5
L_{dn} = day-night sound level
N/A = not applicable
NB = Northbound
SB = Southbound
SR = State Route

Table 5.5-36
Summary of LORS—Noise

LORS	Applicability	Section
Federal Jurisdiction		
Noise Guidelines, USEPA, 1974	Guidelines for state and local governments.	Section 5.5.1.5
Noise Control Act (1972) as amended by the Quiet Communities Act (1978); 42 U.S.C. §§ 4901–4918	Separate noise-sensitive areas are encouraged.	Section 5.5.1.5
FTA	Guidelines and standards for noise-sensitive receptors that are subjected to potential noise and vibration impacts due to a rail project.	Section 5.5.1.5
State Jurisdiction		
CEC	This agency has established guidelines for noise generated during operation and construction of the project. It identifies criteria for the determination of significant impact on residential areas.	Section 5.5.1.5
Cal/OSHA Occupational Noise Exposure Regulations (8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, §§ 5095 *et seq.*)	Sets employee noise exposure limits. Equivalent to Federal OSHA standards.	Section 5.5.1.5
California Vehicle Code	Regulates vehicle noise limits on California highways.	Section 5.5.1.5
Local Jurisdiction		
Kern County General Plan (Chapter 3 – Noise Element)	This requirement is applicable to stationary, transportation, and temporary construction noise sources relating to the project. It requires that proposed commercial and industrial uses or operations be designed so they will not significantly impact noise-sensitive areas.	Section 5.5.1.5
City of Wasco General Plan (Chapter 8 – Noise Element)	This requirement is applicable to stationary, transportation, and temporary construction noise sources relating to the project. It requires proposed commercial and industrial uses or operations be designed so they will not significantly impact noise sensitive areas.	Section 5.5.1.5
City of Shafter General Plan (Chapter 7 – Noise Element)	This requirement is applicable to stationary, transportation, and temporary construction noise sources relating to the project. It requires proposed commercial and industrial uses or operations be designed so they will not significantly impact noise sensitive areas.	Section 5.5.1.5

Source: URS, 2012.
Notes:
Cal/OSHA = California Occupational Safety and Health Administration
CCR = California Code of Regulations
CEC = California Energy Commission
FTA = Federal Transit Administration
LORS = laws, ordinances, regulations, and standards
OSHA = Occupational Safety and Health Administration
USC = United States Code
USEPA = U.S. Environmental Protection Agency



AMBIENT NOISE LEVEL MEASUREMENT LOCATIONS

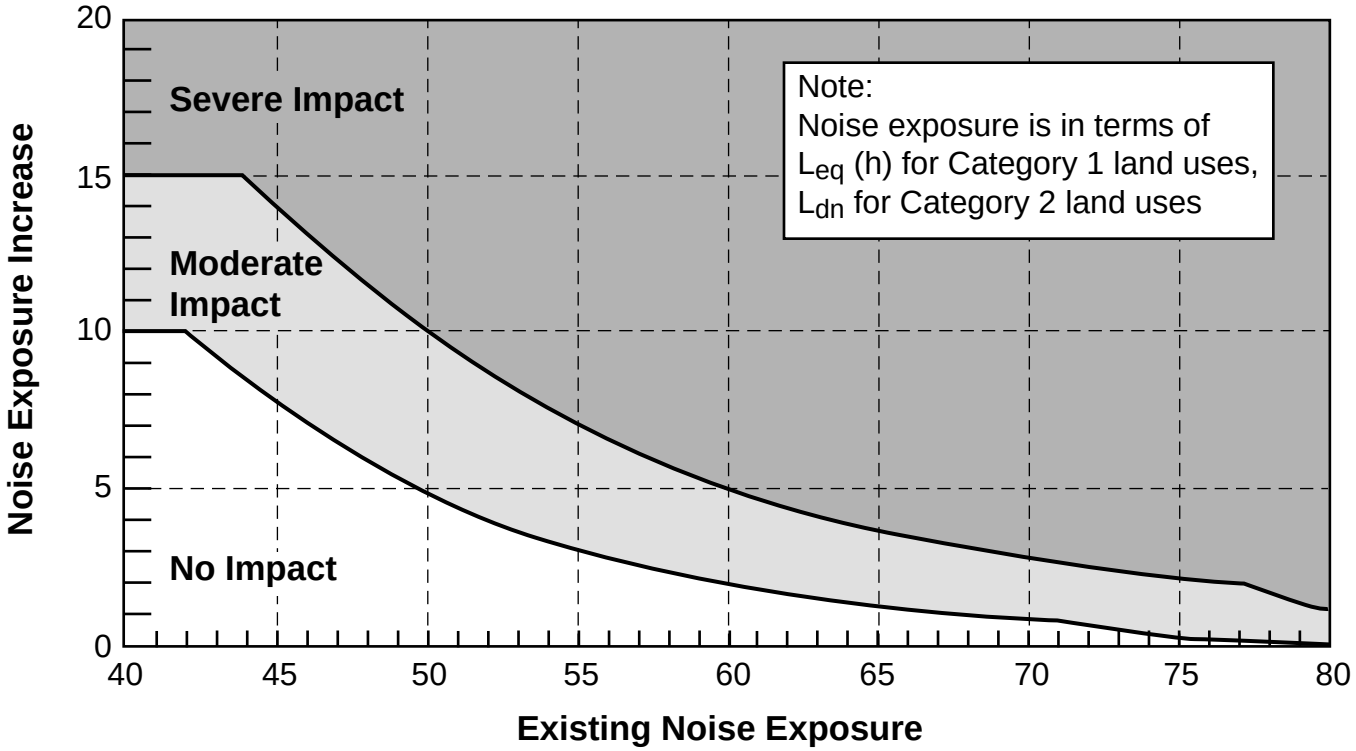
April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.5-1

Source: Aerial Photo, Bing Maps 2009; Roads, Kern County, 2008, Waterways, US Census Bureau Tiger Data, 2000; Places, ESRI Streetmap Data, 2000-2005.



Source:
FTA Manual; Figure 3.2 "Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2)."

FTA NOISE IMPACT CRITERIA

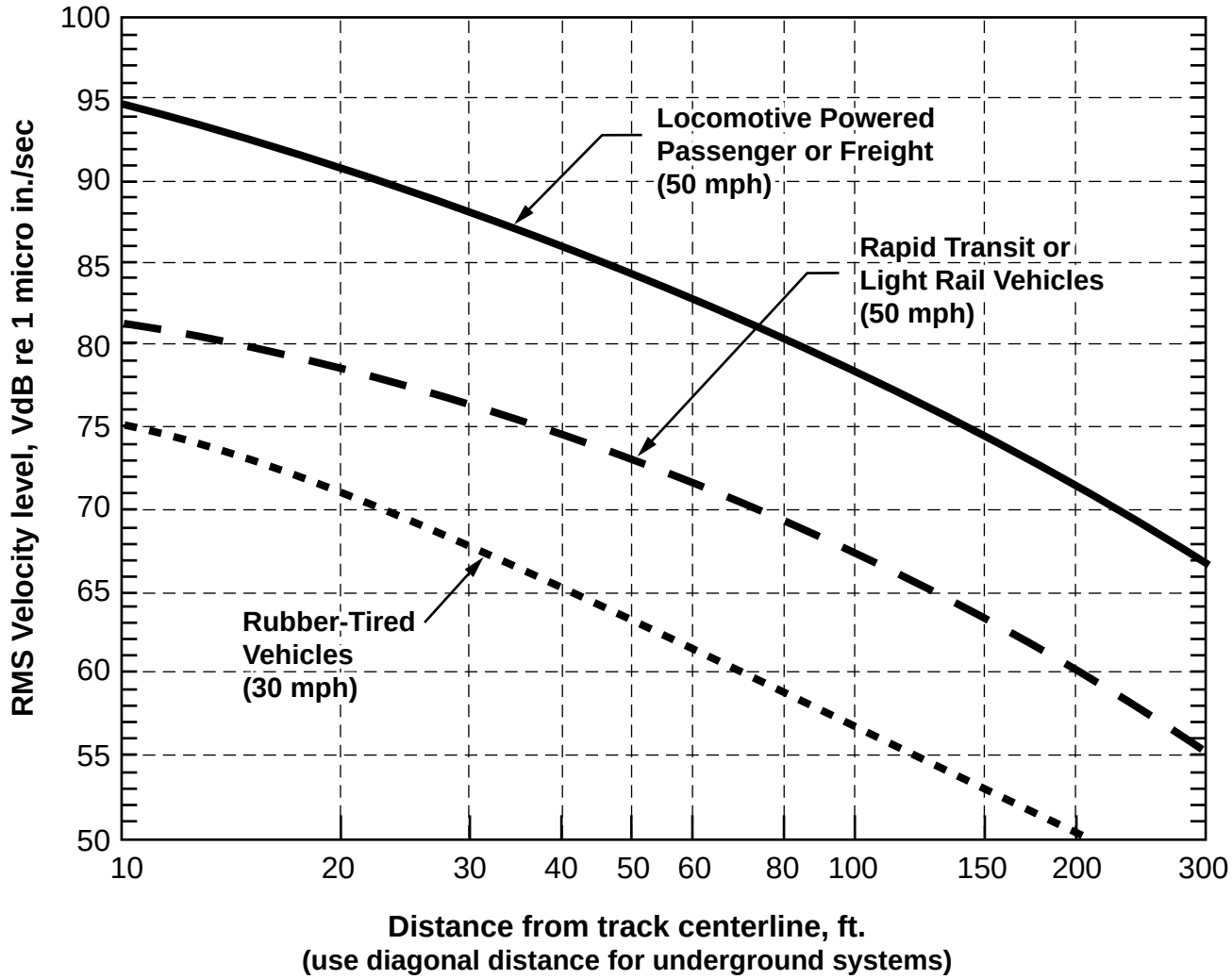
April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.5-2

4/30/12 vsa..T:\HECA-SCS 2012\GRAPHICS 2012\5.2_Noise\Fig5_5_5_imapcts.ai



Source:
FTA 2006, Figure 10.1

CRITERIA OF IMPACT FOR HUMAN ANNOYANCE AND INTERFERENCE DUE TO GROUND-BORNE VIBRATION

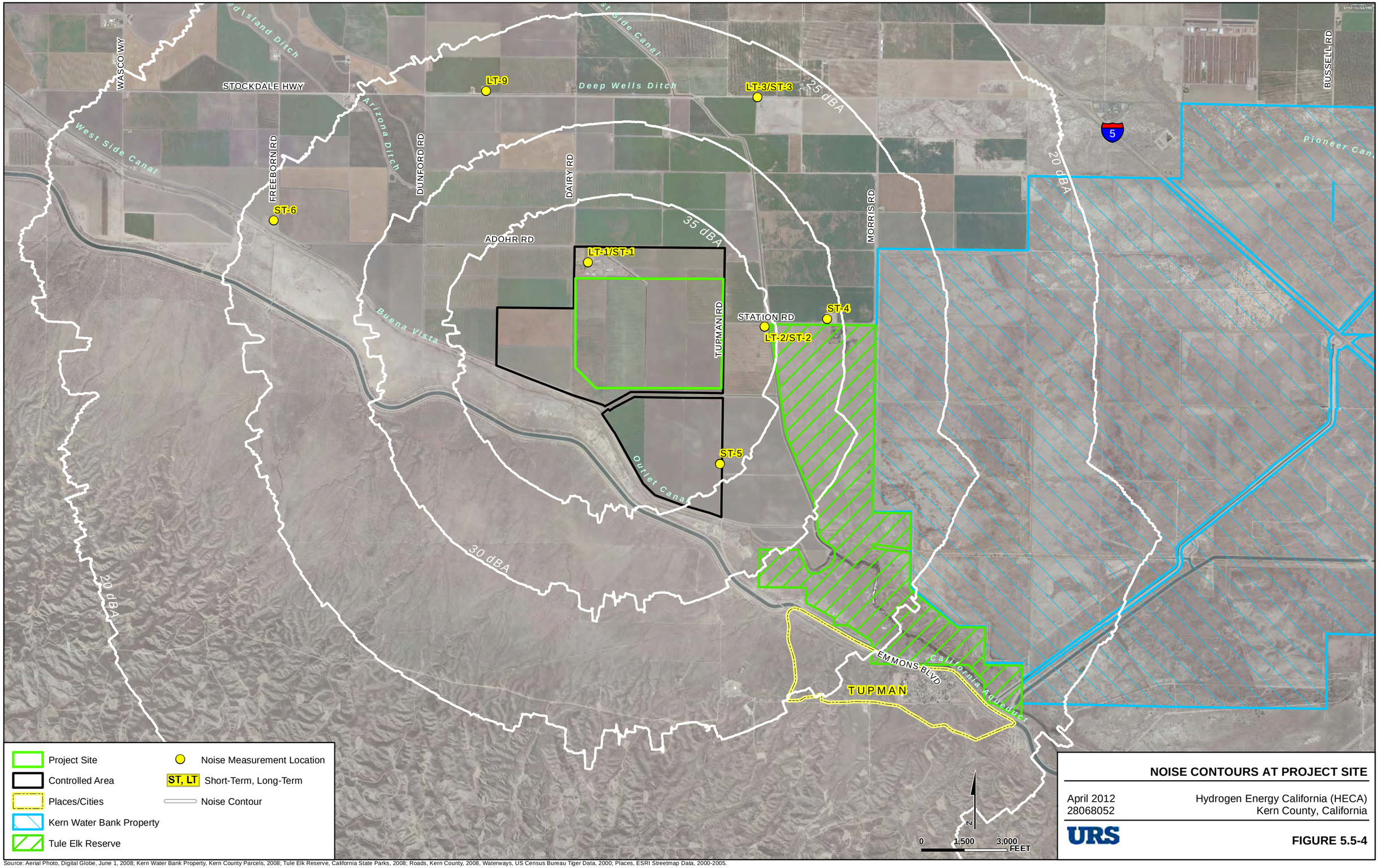
April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.5-3

4/30/12 vsa..T:\HECA-SCS 2012\GRAPHICS 2012\5.2_Noise\Fig5_5_3_criteria.ai



NOISE CONTOURS AT PROJECT SITE

April 2012
28068052

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Kern County, California

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FIGURE 5.5-4

Source: Aerial Photo, Digital Globe, June 1, 2008; Kern Water Bank Property, Kern County Parcels, 2008; Tule Elk Reserve, California State Parks, 2008; Roads, Kern County, 2008, Waterways, US Census Bureau Tiger Data, 2000; Places, ESRI Streetmap Data, 2000-2005.

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5.6 PUBLIC HEALTH

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

CO_2 pipeline. An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

The analysis included in this section focuses on the HECA Project as well as the CO_2 pipeline associated with the OEHI Project. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in Appendix A, Section 4.3, Air Quality and Section 4.7, Hazards and Hazardous Materials, of this AFC Amendment.

For the purposes of the health risk assessment (HRA), impacts were determined outside of both the Project Site and the Controlled Area. HECA will own both the Project Site and the Controlled Area, and will have control over public access and future land use. All temporary construction equipment laydown and parking, including construction parking, offices, and construction laydown areas, will be located on the Project Site and the Controlled Area.

To assess the potential impact of the Project on public health, a human health risk assessment (HRA) was performed, based on the Project's emissions of hazardous air pollutants (HAPs) and toxic air contaminants (TACs). The federal Clean Air Act (CAA) regulates HAPs, airborne pollutants that are known to have adverse human health effects. Unlike criteria pollutants, HAPs do not have adopted ambient air quality standards. HAPs have been regulated at the federal level since the CAA of 1977 under Title 40 of the Code of Federal Regulations (40 CFR), Part 61. Similar to the federal program, the California Clean Air Act regulates TACs, a class of airborne pollutants similar to the federal HAPs. Pollutants addressed under this section are generally referred to as TACs, except where federal designation is required.

To assess the potential impact of the proposed HECA Project on public health, an HRA was performed based on the Project's emissions of TACs. This section describes the methodology and results of the HRA for the Project. The purpose of the HRA is to evaluate potential public exposure and adverse health effects due to TAC emissions associated with Project operations. Impacts associated with the Project's emissions of criteria pollutants (i.e., pollutants for which federal or California ambient air quality standards [AAQS] have been promulgated) are described in Section 5.1, Air Quality. Potential public exposure to accidental releases of hazardous materials on the Project Site during operation is addressed in Section 5.12, Hazardous Materials Handling. To ensure worker safety during operations and construction, safe work practices will be followed (see Section 5.7, Worker Safety). An analysis of the impacts to worker safety from CO_2 venting is provided in Section 5.7, Worker Safety.

5.6.1 Affected Environment

The Project is near an oil-producing area in Kern County, California, as shown in Figure 2-1, Project Vicinity. The Project Site is in western unincorporated Kern County, approximately 7 miles west of the city of Bakersfield, approximately 2 miles northwest of the unincorporated community of Tupman, and approximately 6 miles southeast of the unincorporated community of Buttonwillow. The Project Site is bounded by Adohr Road on the north, Tupman Road to the east, an irrigation canal to the south, and Dairy Road to the west. Primary access to the site is from Adohr Road. Stockdale Highway and Interstate 5 are about 1 mile to the north and 3 miles to the east, respectively.

The western border of the Tule Elk State Natural Reserve is approximately 1,700 feet to the east of the Project Site and Controlled Area.

The California Energy Commission (CEC) defines sensitive receptors as infants and children, the elderly, the chronically ill, and any other members of the general population who are more susceptible to the effects of exposure to environmental contaminants than the population at large. For the purposes of this analysis, sensitive receptors are defined as the locations occupied by groups of individuals that may be more susceptible than the general population to health risks from a chemical exposure. These individuals include infants and children, the elderly, and the chronically ill. Sensitive receptor locations therefore include schools (public and private), day-care facilities, convalescent homes, parks, and hospitals.

Two sensitive receptors exist within 6 miles of the Project (6 miles is the extent of the modeling receptor grid): Elk Hills elementary school, 1.3 miles to the southeast; and the Tule Elk State

Natural Reserve, as described above. Figure 5.6-1, Sensitive and Residential Receptors Located Near the Project Site, shows the location of these sensitive receptors, plus the locations of the nearest residences. A total of 118 residences near the Project Site was included in the modeling. The closest residential neighborhood is in the unincorporated community of Tupman, approximately 2 miles southeast of the Project boundary. There are also additional single-family residences in the immediate Project vicinity, including residences approximately 1,400 feet to the east and 3,300 feet to the southeast of the Project Site. The HRA approach treats all human receptors as sensitive receptors.

After communicating with the local public health department at Kern County, health studies could not be identified concerning the potentially affected population(s) within a 6-mile radius of the Project Site related to respiratory illnesses, cancers, or related diseases (Chung, 2008).

The *Kern County Department of Public Health: Health Status Report – 2003* calculated average cancer mortality rates from 1993 to 2002 in Kern County as 183.0 per 100,000 people, compared to California's average of 185.0/100,000 people (Jinadu, 2003). The leading causes of death have remained consistent, with diseases of the heart and cancer as first and second leading causes of death, accounting for more than 60 percent of all deaths. The report compares the county's performance to the national objectives outlined in the U.S. Department of Health and Human Services' report, "Healthy People 2010: Understanding and Improving Health" (U.S. Department of Health and Human Services, 2000). "Kern County has made appreciable progress towards the 2010 goals in many areas of health. Yet, in other areas, substantial work still needs to be done to improve the health of our residents." In 2001, the Kern County death rate from heart disease was nearly 20 percent higher than the statewide average rate for California.

Coccidioides immites, a fungus that lives in the soils in southwestern United States and northwestern Mexico, is endemic to Kern County. The tiny spores become wind-borne and inhaled into the lungs, where they can cause *Coccidioidomycosis* or "Valley Fever." About 60 percent of the people who breathe in the spores do not get sick at all. For some it may feel like the cold or flu, and for some, pneumonia-like symptoms may occur, requiring medication and bed rest. Approximately 1 out of 200 who do get sick develop the disseminated form (the disease spreads past the lungs to the blood system), which can be fatal. The Health Officer recommends taking the following precautions for construction projects in Kern County:

1. When the top soil of undeveloped land is to be disturbed for construction, the standard precautionary measure of wetting the soil should be aggressively carried out.

2. It is advisable to perform work on non-windy days.

3. Workers doing soil excavation should wear simple dust masks for protection against exposure.

Further information on Valley Fever can be found in the "Valley Fever Task Force Report on the Control of *Coccidioides immites"* produced by the Kern County Department of Public Health (Jinadu, 1995).

The nearest California Air Resources Board (CARB) TAC monitor is in the Bakersfield-5558 California Avenue Monitoring Station, approximately 20 miles east of the Project Site. Although this station is in a suburban neighborhood, the proximity to the Project Site makes it representative of the local air quality. The most recent monitoring data are from year 2007, which are presented in Table 5.6-1, Annual Average Concentrations and Cancer Risks for Year 2007 from the Bakersfield-5558 California Avenue Monitoring Station, along with the estimated excess cancer risk. Summing the risk from all monitored TACs predicts an incremental background cancer risk of 81 in a million. By comparison, the risk of getting cancer for an individual in the United States from all causes is about 1 in 3, or 333,000 in one million.

5.6.2 Environmental Consequences

This section describes the evaluation of potential public health risks due to construction and operation of the Project, as well as the methodology and results of the HRA. A significant impact is defined as a maximum incremental cancer risk greater than 10 in 1 million, a chronic total hazard index (THI) greater than 1.0, or an acute THI greater than 1.0. Also, uncertainties in the HRA are discussed, and other potential health impacts of the Project are described.

5.6.2.1 Public Health Impact Assessment Approach

The potential human health risks posed by the Project's emissions were assessed by following the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines (Cal/EPA/OEHHA, 2003). The OEHHA guidelines were developed to provide risk assessment procedures, as required under the Air Toxics Hot Spots Information and Assessment Act of 1987, Assembly Bill 2588 (Health and Safety Code §§ 44360 *et seq*.). The Hot Spots law established a statewide program to inventory air toxics emissions from individual facilities, as well as guidance for execution of risk assessments and requirements for public notification of potential health risks.

As recommended by the OEHHA guidelines, the CARB Hotspots Analysis and Reporting Program (HARP) was used to perform an OEHHA Tier 1 HRA for the Project. HARP includes two modules: a dispersion module, and a risk module. The HARP dispersion module incorporates the U.S. Environmental Protection Agency (USEPA) ISCST3 air dispersion model. The HARP risk module implements the latest Risk Assessment Guidelines developed by OEHHA. For consistency with the criteria pollutant modeling, the dispersion modeling was conducted with AERMOD software. CARB has created a software package called HARP On-Ramp to convert AERMOD dispersion results into a format that can be read into the HARP risk module. Thus, HARP with AERMOD was used for this HRA.

The HRA was conducted in four steps using the HARP:

1. Hazard identification and emission quantification
2. Exposure assessment
3. Dose-response assessment
4. Risk characterization

First, hazard identification was performed to determine the potential health effects that could be associated with Project emissions. The purpose was to identify whether pollutants emitted during Project operation could be characterized as potential human carcinogens, or associated with other types of adverse health effects. Based on OEHHA guidelines, a list of pollutants with potential cancer and non-cancer health effects associated with the emissions from the Project has been provided in Table 5.6-2, Summary of Operational TACs and Toxicity Values Used to Characterize Health Risks.

Second, an exposure assessment was conducted to estimate the extent of public exposure to Project emissions. Public exposure is quantified based on the predicted maximum short- and long-term ground-level concentrations resulting from Project emissions, the exposure pathway(s), and the duration of exposure to those emissions. Dispersion modeling was performed using the AERMOD model to estimate the highest ground level 1-hour, 8-hour, and annual concentrations near the Project Site and Controlled Area boundary. The AERMOD model was run with unit emission rate (1 gram per second) for each source to calculate the concentration of TACs per unit emission rate from each source, known as "X/Q", for 1-hour and annual averaging times per receptor. AERMOD was run again to obtain the 8-hour concentrations per receptor for substances with 8-hour acute reference exposure levels (RELs). The 1-hour and annual X/Q values were processed in the HARP On-Ramp program for input into the HARP program. The methods used in the dispersion modeling were consistent with the approach described in Section 5.1, Air Quality, and the modeling protocols submitted for the Project to CEC, USEPA, and San Joaquin Valley Air Pollution Control District (SJVAPCD).

Third, a dose-response assessment was performed in HARP that incorporated the maximum 1-hour and annual ground-level concentrations predicted by AERMOD to characterize the relationship between pollutant exposure and the potential incidence of an adverse health effect in the exposed populations. The dose-response relationship is expressed in terms of potency factors for cancer risk and RELs for acute and chronic non-cancer risks. The OEHHA guidelines provide potency factors and RELs for an extensive list of TACs, including those listed in Table 5.6-2. All exposure pathways were included in this analysis, except the beef/dairy and fish ingestion and drinking water consumption pathways, no unenclosed water storage reservoirs or cattle exist near the site. For the calculation of cancer risk, the duration of exposure to Project emissions was assumed to be 24 hours per day for 70 years, at all receptors. The cancer risk was calculated in HARP using the Derived (Adjusted) Method, and the chronic THI was calculated in HARP using the Derived (OEHHA) Method. For the calculation of acute risk, it was assumed that exposure occurs over a 1-hour period. Calculation of chronic risk assumes an exposure over a 1-year period. The risk calculation for the maximally exposed individual worker (MEIW) assumed that the worker would be present at that location for 8 hours per day, 5 days per week, 49 weeks per year, for 40 years (default HARP worker adjustment).

Fourth, risk characterization was performed to integrate the health effects and public exposure information, and provide quantitative estimates of health risks resulting from Project emissions. Risk modeling was performed using HARP to estimate cancer and non-cancer health risks due to Project operational emissions. The HARP model uses OEHHA equations and algorithms to calculate health risks based on input parameters such as emissions, "unit" ground level concentrations, and toxicological data.

AERMOD modeling was conducted to determine the ground-level 8-hour concentrations of acetaldehyde, arsenic, formaldehyde, manganese, and mercury. These concentrations were then divided by the appropriate REL and summed by target organ to determine the total acute health index for TACs with 8-hour RELs.

Health risks were calculated for the areas that have public access; thus, all areas outside the Project Site and Controlled Area were included in the HRA.

Detailed descriptions of the model input parameters and results of the HRA are given in Section 5.6.2.4, Model Input Parameters. All HARP and AERMOD model files are provided electronically with this AFC Amendment.

The HRA was based on the Project with Alternative 1 (rail transportation). The differences that would result from Alternative 2 (truck transportation) are presented in Section 5.6.3, Alternatives.

5.6.2.2 Construction-Phase Emissions and HRA Approach

Of the air pollutants emitted during the construction period, diesel particulate matter (DPM) has the largest potential for human health risk. DPM has been classified by CARB and OEHHA as a TAC and a carcinogen. Section 5.1, Air Quality, presents a detailed analysis of the potential environmental impacts due to criteria pollutant emissions during construction, and a discussion of measures that will be implemented to control or reduce these emissions.

To analyze the potential cancer and chronic health impacts from DPM due to on-site DPM construction emissions, the exposure assessment was evaluated by modeling annual concentrations of particulate matter less than 10 microns in diameter (PM_{10}) from diesel exhaust sources. Because only one pollutant, DPM, was examined, AERMOD was run to estimate the ground-level PM_{10} concentration rather than Chi/Q. The AERMOD analysis conducted for the criteria pollutants was used to determine the ground-level PM_{10} concentration for the grid receptors from diesel exhaust sources. An additional run was conducted for the sensitive, residential, and off-site worker receptors; all other model parameters remained the same. Emissions from the construction activities are described in Section 5.1, Air Quality, and Appendix E-2, Construction Criteria Pollutant and Greenhouse Gas Emissions.

Emissions from the year consisting of construction months 20 through 31 were included in the HRA, because this was the 1-year period with the highest on-site DPM emissions. The cancer risk and chronic health index were estimated based on OEHHA and SJVAPCD guidance. With the exception of the off-site worker, all cancer risk was estimated based on residential cancer risk assumptions. The cancer risk was estimated by determining the inhalation dose from the annual PM_{10} concentration, then multiplying that by the cancer potency factor for an exposure duration factor of 4.1 years, as opposed to a typical lifetime exposure of 70 years, because the exposure to the DPM from construction equipment ends after 4.1 years (49 months). The maximally exposed individual worker (MEIW) cancer risk was analyzed in a manner similar to the residential cancer risk, with the exception that the off-site worker breathing rate of 149 liters per kilogram per day (L/kg-day) was used. The chronic hazard index was calculated by dividing the annual PM_{10} concentration by the chronic reference exposure level of 5.0 micrograms per cubic meter

($\mu g/m^3$). Detailed emission calculations for the PM_{10} from the diesel equipment and vehicles associated with construction are presented in Section 5.1, Air Quality, and Appendix E-2, Construction Criteria Pollutant and Greenhouse Gas Emissions.

To ensure worker safety during construction, safe work practices will be followed (see Section 5.7, Worker Safety and Health). Section 5.1, Air Quality, presents a detailed analysis of the potential environmental impacts due to criteria pollutant emissions during construction, and a discussion of measures that will be implemented to control or reduce these emissions.

Construction Emissions associated with OEHI EOR

The primary emission sources of TACs during construction of the OEHI Project facilities will be DPM from the heavy construction equipment. Different areas within the OEHI Project Site will be disturbed at different times during the 20-year construction phase of the proposed OEHI Project. An analysis of the public health impacts associated with the OEHI Project is included in Appendix A, Section 4.3, Air Quality and Section 4.7, Hazards and Hazardous Materials, of this AFC Amendment. That analysis concludes that the OEHI Project will not result in significant adverse impacts to public health.

5.6.2.3 Operational-Phase Emissions

Stationary Sources

The following operational sources associated with the Project will generate emissions of TACs. These emissions will be generated from the combustion of syngas, natural gas, diesel fuel, and process vent gasses. In addition, emissions will be generated from the operation of the cooling towers, the Manufacturing Complex, and fugitives associated with leaks in the piping and components from each process area.

Power Block

- Combustion Turbine (MHI 501GAC®)
- Power Block Cooling Tower

Gasification Block

- Coal Dryer
- Auxiliary Boiler
- Gasification Flare
- Sulfur Recovery Unit (SRU) Flare
- Rectisol® Flare
- Tail Gas Thermal Oxidizer
- ASU and Process Cooling Towers
- Carbon Dioxide Vent

Ancillary Equipment

- 2 Emergency Diesel Generators
- Emergency Diesel Firewater Pump

Manufacturing Complex

- Nitric Acid Unit
- Urea Absorbers
- Urea Pastillation
- Ammonium Nitrate Unit
- Ammonia Synthesis Unit Startup Heater

A summary of the TACs that are expected to be emitted as a result of operations and the corresponding toxicity values used for evaluation are shown in Table 5.6-2.

Table 5.6-3, HECA Total Toxic Air Contaminant Annual Emission Rates, outlines the estimated TAC annual emission rates for each source listed above. These rates were determined based on

the size, capacity, and expected annual operating hours of each piece of equipment. TAC emission estimates were made using the following emission factors and assumptions for each source.

The most significant emission source of the Project will be the combustion turbine generator (CTG) / heat recovery steam generator (HRSG) train. The MHI 501GAC® combustion turbine and steam turbine generator will provide a 405 MW gross output to produce a maximum of 300 MW of reliable, low-carbon baseload electricity. Exhaust gas from the turbine section is ducted through the HRSG to generate high-energy steam, which produces additional electricity in the steam turbine. Some of the exhaust gas is also ducted from the HRSG to the gasification block to dry the feed, and will be discharged at the coal-dryer stack in that process block. Remaining exhaust gas at the HRSG is discharged through the HRSG stack. The combustion system is designed for operation on hydrogen-rich fuel. Natural gas is used during startup and shutdown of the combustion turbine and during periods of unplanned equipment outages (up to 2 weeks per year).

Emission factors for the CTG/HRSG and coal dryer were obtained from the Wabash River Generating Station test data and the National Energy Technology Laboratory, U.S. Department of Energy, *Major Environmental Aspects of Gasification-based Power Generation Technologies, Final Report*, December 2002. These are considered the most representative because of the use of similar technology in operation. Ammonia slip from the SCR is limited to 5 parts per million volume (ppmv) dry at 15 percent O_2. Mercury emissions are based on the mercury content in the feedstock, mercury removal efficiency in the syngas cleanup, and mercury removal efficiency in the coal dryer exhaust. Mercury will be removed downstream of the Sour Shift and Low Temperature Gas Cooling Units, and at the coal dryer using activated carbon.

CTG/HRSG and coal dryer TAC emissions were estimated based on operating conditions firing syngas. Hourly emission rates were calculated based on the maximum hourly heat input required for operation at 100 percent load, which occurred under an ambient temperature of 97°F with duct firing. Annual emissions rates were calculated based on 100 percent load at annual average temperature of 65°F with duct firing. Annual operating hours include operations on syngas with duct firing, startup, shutdown, and backup operation on natural gas. Emissions were conservatively based on all hours of operation applying the syngas emission factors.

Emission factors for TACs from the natural gas external combustion sources, the auxiliary boiler, tail gas thermal oxidizer, gasifier flare, Sulfur Recovery Unit (SRU) flare, Rectisol® flare, and Ammonia Synthesis Startup Heater are from USEPA AP-42 Section 1.4.

Auxiliary boiler hourly emission rates were calculated based on the required standard cubic feet of natural gas required per hour based on boiler design. Ammonia emissions were calculated based on a limit of 5 ppm due to slip from the SCR. Annual emission rates were calculated based on a 25 percent capacity factor.

Tail gas thermal oxidizer hourly emission rates were calculated based on the standard cubic feet of natural gas required per hour based on oxidizer design for a combination of pilot and startup operations. Annual emission rates were calculated based on 8,760 hours per year of operations plus 48 hours per year of startup.

Gasification flare hourly emissions were calculated based on the hourly heat input rate required for pilot flame operation and the heat content of the fuel flared during the peak hour of startup or shutdown activities; contributions of both were accounted for in the hourly rates. Annual emission rates were calculated assuming 8,760 hours per year of pilot operation, and approximately 28 hours per year of flaring events associated with plant startup and shutdown.

SRU flare hourly emissions were calculated based on the hourly heat input rate required for pilot flame operation and the heat content required for assist gas during a startup; contributions of both were accounted for in the hourly rates. Annual emission rates were calculated assuming 8,760 hours per year of pilot operation and approximately 40 hours per year of startup flaring.

Rectisol® flare hourly emissions were calculated based on the hourly heat input rate required for pilot flame operation and the heat content required for assist gas during a startup or shutdown; contributions of both were accounted for in the hourly rates. Annual emission rates were calculated assuming 8,760 hours per year of pilot operation, and approximately 40 hours per year of startup and shutdown flaring.

Ammonia Synthesis Startup Heater hourly emission rates were calculated based on the required standard cubic feet of natural gas required per hour based on heater design. Annual emission rates were calculated based on the usage of 140 hours for startup operation per year.

Cooling tower (Power Block, Air Separation Unit [ASU], and Process Area) TAC emissions were based on engineering calculations using the contaminant concentrations in the raw water, the number of cycles of concentration in the cooling towers, and the assumed drift rate. Arsenic, fluoride, manganese, and selenium concentrations in the raw water were based on analytical test results. Copper concentrations in the raw water were based on one-half of the stated detection limit.

Carbon dioxide (CO_2) vent hourly emissions were calculated based on maximum hourly flow (by mass) of the vent, and the concentration of TACs in the vent stream. The H_2S content in the vent stream is 10 ppm and the carbonyl sulfide (COS) content is 10 ppm. This CO_2 vent is used during startup and emergency upset conditions, which are, by definition, unplanned and difficult to predict. Although the CO_2 centrifugal compressor and other injection equipment have historically been very reliable, as a worst-case scenario, annual emission rates were calculated based on 504 hours of full-rate venting per year.

The only emissions associated with the HP and LP Urea Absorbers are ammonia, which are reduced by the wet scrubber. The ammonia emission rate for each absorber was provided by the Project engineers. The Urea absorbers will operate 8,052 hours per year.

The only TAC emissions associated with the Urea Pastillation Unit are ammonia. The ammonia emission rate was provided by the Project engineers. The Urea Pastillation Unit will operate 8,052 hours per year.

The HECA nitric acid plant will have an ammonia emission limit of 5 ppm due to slip from the SCR. Annual emissions are based on 8,052 hours of operation per year.

The two diesel generator hourly emission rates were calculated based on the horsepower rating of each generator and the USEPA interim Tier 4 emission standard particulate emission rate. Annual emissions were calculated based on 50 hours per year of operation for each of two generators.

Fire-pump engine hourly emission rates were calculated based on the horsepower rating of the engine and the USEPA interim Tier 4 emission standard particulate emission rate. Annual emissions were calculated based on 100 operating hours per year.

Fugitive Emissions

Fugitive emissions of TACs may occur in some areas of the facility due to leaks in the piping and components. Fugitive emissions are associated primarily with the gasification block and the Manufacturing Complex. A leak detection and repair (LDAR) program will be implemented in select process areas to maximize emission reductions. LDAR is the primary established method for controlling fugitive emissions from various pieces of equipment, such as valves and seals.

The Applicant proposes to apply the LDAR program to the following areas in the Gasification Block, Area # 1(methanol), Area # 5 (propylene), Area # 7 (hydrogen sulfide [H_2S]-laden methanol), Area #8 (CO_2-laden methanol), Area # 9 (acid gas), and Area # 10 (ammonia-laden gas), and all portions of the Manufacturing Complex. These areas were selected because they had the largest uncontrolled emissions for methanol, propylene, H_2S and ammonia.

The SJVAPCD released a memo "*Procedures for Quantifying Fugitive VOC Emissions at Petroleum and Synthetic Organic Chemicals Manufacturing Industry (SOCMI) Facilities*" (2005). The memo recommends using emission factors from the California Air Pollution Control Officers Association (CAPCOA) document "*California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities*" (1999), or the emission factors from the U.S. Environmental Protection Agency (USEPA) document "*Protocol for Equipment Leak Emission Estimates*" (1995) for new or modified emission units. In cases where the CAPCOA and USEPA emission factors are different, the SJVAPCD memo says that CAPCOA emissions factors will take precedence over the USEPA emission factors.

According to the USEPA document (USEPA, 1995), the criteria for determining the appropriateness of emission factors are based on the following: (1) process design; (2) process operation parameters; (3) types of equipment used; and (4) types of material handled. Based on these criteria, the Project processes are most similar to a SOCMI plant. Therefore, the SOCMI fugitive emission factors from USEPA are used in the fugitive emission calculations.

Although the fugitive emission factors are typically used for VOC emission, the USEPA document (USEPA, 1995) states that the average emission factors can be used for inorganic compounds (like H_2S and ammonia), in the event that there is no other approach available to estimate the concentration of the inorganic compounds at the equipment leak source. Because this is a new facility, it is not possible to estimate the fugitive concentrations of the inorganic compounds at the equipment leaks; therefore, the average emission factor approach will be used. The SOCMI fugitive emission factors are multiplied by the equipment component count split by service types and the weight percentage of the compounds in the stream.

There were no gasification facilities similar to the HECA Project that have prepared site-specific fugitive emissions factors. Therefore, the average emission factor approach (from USEPA) was used as the best estimate for fugitive emissions. Detailed emission calculations for the fugitives are presented in Appendix M, Public Health and Safety.

Mobile Sources

Trucks and trains delivering feedstock and removing products would travel to the Project Site on a regular basis. On-site truck and train trip emissions were incorporated in the dispersion modeling and HRA.

Emissions associated with the truck movement were calculated using heavy-heavy-duty diesel truck emission factors for all trucks except the Operations and Maintenance trucks, which were calculated with the light-heavy-duty gasoline and diesel factors, from the CARB on-road emissions model EMFAC2007. The anticipated Project start date is 2017. HECA will invest in a fleet of delivery trucks that are model year 2010 or newer; thus, EMFAC2007 emissions factors for vehicles for calendar year 2010 were used in the emission calculations.

The emissions factors for criteria pollutants for line-haul and switch locomotives were obtained from the USEPA document "Technical Highlights: Emission Factors for Locomotives" for Tier 3 engines. On-site feedstock and product train emissions were calculated assuming the majority of the time the line-haul engines will operate in Notch 1 or idling; therefore, emissions were conservatively estimated for Notch 1 horsepower. The percentage of total engine horsepower used at Notch 1 was obtained from the "Port Of Long Beach Air Emissions Inventory for 2007," which was based on data derived from the USEPA. Emissions from the switching engine were based on the EPA Tier 3 emission factors and maximum switching engine horsepower of 260 hp.

Table 5.6-3 presents a summary of the total annual TAC emissions from all sources. Detailed hourly and annual emission calculations for each source are presented in Appendix M, Public Health and Safety.

SJVAPCD Rule 2520 requires adherence to federally mandated operating permits. As such, it is important to designate whether the project is a major source of HAPs or not. Under the federal CAA, §112, a major source is defined as one that emits 10 tons per year or more of any HAP, or 25 tons per year or more of any combination of HAPs. The Project is not a major source of HAPs, as determined by the list of federal HAPs and the Project's total annual HAP emissions presented in Table 5.6-3.

Operations Emissions associated with OEHI EOR

TAC emissions associated with the OEHI Project include emissions from new equipment installed for the purpose of CO_2 EOR, and will include process heaters, tanks, fugitive emissions from equipment at the CO_2 EOR Processing Facility, and DPM emissions from maintenance activities conducted on emergency use only equipment (i.e., diesel engines used for fire pumps). Diesel emergency engine testing is expected to occur 12 hours per year per engine. The emergency use only flares do not include maintenance allowance, because the flares have to be removed from service in order to conduct such maintenance. Mobile source emissions are

limited to on-road vehicle emissions from operational-phase employees transiting between area residences and the OEHI Project Site.

OEHI will implement mitigation in the form of BACT and LDAR, plus ERCs will be provided, as required, to offset criteria pollutant emission increases from permitted sources, ensuring that impacts from emissions are less than significant. An analysis of the public health impacts associated with the OEHI Project is included in Appendix A, Section 4.3, Air Quality and Section 4.7, Hazards and Hazardous Materials, of this AFC Amendment. That analysis concludes that the OEHI Project will not result in significant adverse impacts to public health.

5.6.2.4 Model Input Parameters

The HRA was conducted using the hourly and annual emissions listed for each source identified in Table 5.6-3. Cancer and chronic non-cancer health effects were evaluated using the HARP model with estimated annual average emission rates, and acute non-cancer health effects were analyzed based on maximum hourly emission rates.

Dispersion modeling was performed using the AERMOD model and methods consistent with the approach described in Section 5.1, Air Quality (e.g., building downwash and meteorological input data), and the modeling protocols submitted for review to USEPA, CEC, and SJVAPCD.

The AERMOD model is run with unit emission rates (1 gram per second emissions) for each source described above to calculate the concentration of TACs per unit emission rate from each source. HARP then uses this information—along with the estimated source emission rates for specific TAC compounds (as described above and in Appendix M, Public Health and Safety)—to calculate ground-level concentrations for each chemical species. All sources described in Section 5.6.2.3 are included in the modeling analysis and HRA.

Meteorological data for the years 2006 through 2010 (the same years used in the air quality modeling analysis described in Section 5.1) were used in the HRA. Risk values were modeled for the sensitive and residential receptors identified in Section 5.6.1, and at all grid receptors within 6 miles (10 km) of the site. The same grid receptors used in the air quality modeling were used in the HRA. To be certain that the maximum potential risks resulting from Project emissions would be addressed, all receptors were treated as sensitive receptors.

The stack parameters used for the full-load operations of the CTG/HRSG with duct burning at the average ambient temperature of 65°F were used in the modeling. HECA anticipates that 1 to 2 plant startups/shutdowns will be necessary for maintenance annually. Due to the limited operation in startup mode, only stack parameters for the CTG/HRSG for the on-peak average ambient temperature case were included in the modeling assessment.

Toxicological data, cancer potency factors, and RELs for specific chemicals are built into the CARB's HARP model. The pollutant-specific cancer potency factors and RELs used in the HRA are listed in Table 5.6-2. The HARP model uses the toxicological data in conjunction with the other input data described above to perform health risk estimates based on OEHHA equations and algorithms.

5.6.2.5 Calculation of Health Effects

Adverse health effects are expressed in terms of cancer or non-cancer health risks. Cancer risk is typically reported as "lifetime cancer risk," which is the estimated maximum increase in the risk of developing cancer caused by long-term exposure to a pollutant suspected of being a carcinogen. The calculation of cancer risk conservatively assumes an individual is exposed continuously to the maximum pollutant concentrations 24 hours per day for 70 years. Although such continuous lifetime exposure to maximum TAC levels is highly unlikely, the goal of the approach is to produce a conservative worst-case estimate of potential cancer risk.

Non-cancer risk is typically reported as a THI. The THI is calculated for each target organ as a fraction of the maximum acceptable exposure level or REL for an individual pollutant. The REL is generally the level at (or below) which no adverse health effects are expected. The THIs are calculated for both short-term (acute) and long-term (chronic) exposures to non-carcinogenic substances by adding the ratios of predicted concentrations to RELs for all pollutants.

Both cancer and non-cancer risk estimates produced by the HRA represent incremental risks (i.e., risks due to the modeled sources only) and do not include potential health risks posed by existing background concentrations. The HARP model performs all of the necessary calculations to estimate the potential lifetime cancer risk, and the acute and chronic non-cancer THIs due to the Project's TAC emissions. The acute 8-hour THI is calculated directly from the predicted concentrations of acetaldehyde, arsenic, formaldehyde, manganese, and mercury.

5.6.2.6 Health Effects Significance Criteria

Various state and local agencies provide different significance criteria for cancer and non-cancer health effects. For the Project, the SJVAPCD *Guidelines for Assessing and Mitigating Air Quality Impacts* (January 2002) provide the significance criteria for potential cancer and non-cancer health effects due to Project-related emissions. For carcinogenic health effects, an exposure is considered significant when the predicted increase in lifetime cancer risk exceeds 10 in 1 million ($10 \times 10\text{-}^{6}$). For non-carcinogenic acute and chronic health effects, an exposure that affects each target organ is considered significant when the corresponding THI exceeds a value of 1.0.

5.6.2.7 Health Risk Assessment Results

Construction HRA

Table 5.6-4, Estimated PM_{10} Concentration, Cancer Risk, and Chronic Non-Cancer THI Due to On-Site Construction Equipment DPM Exhaust, presents the peak PM_{10} annual concentration predicted with AERMOD, cancer risk, and chronic hazard index at the point of maximum impact (PMI), the maximally exposed individual resident (MEIR), the MEIW, and the nearest sensitive receptor during construction. The maximum modeled risk at a residence is reported in Table 5.6-4 as the MEIR. As shown in this table, the cancer risk and chronic hazard index from construction-related DPM at all receptor types were predicted to be below the significance thresholds.

The modeling files from this analysis, along with the spreadsheet to estimate the cancer risk and chronic hazard index, are provided electronically with this AFC Amendment.

Operational HRA

Table 5.6-5, Estimated Cancer Risk, Acute and Chronic Non-Cancer THI Due to HECA Operations, presents the results of the HRA at the PMI, MEIR, MEIW, and nearest sensitive receptor.

MEIR for the cancer and chronic and acute non-cancer health risks are presented in Table 5.6-5. As shown in this table, all health risks were predicted to be below the significance thresholds.

The AERMOD modeling files and risk calculation reports from HARP are included in the electronic files with this AFC Amendment. The files include the Chi/Q in micrograms per cubic meter ($\mu g/m^3$) per gram per second from each source at each receptor.

The maximum acute 8-hour THI resulting from worst-case hourly emissions of acetaldehyde, arsenic, formaldehyde, manganese, and mercury are presented in Table 5.6-6, Acute Hazard Index for TACs with 8-Hour RELs Predicted from Peak HECA Emissions, along with the summation of the health indices by target organ to obtain the 8-hour total hazard index per organ.

The estimated cancer risk at all locations is below the significance criterion of 10 in 1 million; thus, the Project emissions are expected to pose a less-than-significant increase in terms of carcinogenic health risk.

The estimated chronic and acute THIs are below the significance criterion of 1.0; thus, the Project emissions of noncarcinogenic TACs would not be expected to pose a significant risk.

5.6.2.8 Uncertainty in the Public Health Impact Assessment

Sources of uncertainty in the results of HRAs include emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals to humans. For this reason, assumptions used in HRAs are typically designed to provide sufficient health protection to avoid underestimation of risk to the public. Some sources of uncertainty applicable to this HRA and the procedures and assumptions used to ensure health-protective results are discussed below.

The turbine emission rates were derived from emission factors from a similar project and using vendor data regarding ammonia slip and mercury rates. Both the short- and long-term turbine emissions estimates were developed assuming that the turbine will operate continuously, and at the maximum fuel energy input rate. Under actual operating conditions, the turbine will typically operate fewer hours per year and at lower loads. Consequently, the emissions used for this HRA are likely to be higher than what would be experienced under power plant operation.

Dispersion models approved for regulatory applications contain assumptions that lead to over-prediction of ground-level concentrations. For example, the modeling performed in the HRA assumed a conservation of mass (i.e., all of the pollutants emitted from the sources remained in the atmosphere while being transported downwind). During the transport of pollutants from

sources toward receptors, none of the emitted material was assumed to be removed from the source plumes by means of chemical reactions or losses at the ground surface due to reactions, gravitational settling, or turbulent impaction. In reality, these mechanisms work to reduce the level of pollutants remaining in the atmosphere during plume travel.

The exposure characteristics assessed in the HRA included the assumption that residents will be exposed to turbine emissions continuously at the same location for 24 hours per day, for 70 years. It is extremely unlikely that any resident will actually experience such exposure to the maximum predicted concentrations of TACs over this period. The conservative exposure assumption leads to over-predicted risk estimates in the HRA modeling.

The toxicity data used in the HRA contain uncertainties due to the extrapolation of health effects data from animals to humans. Typically, safety factors are applied when doing the extrapolation. Furthermore, the human population is much more diverse, both genetically and culturally, than bred experimental animals. The intraspecies variability is expected to be much greater among humans than in laboratory animals. With all of the uncertainty in the assumptions used to extrapolate toxicity data, significant measures are taken to ensure that sufficient health protection is built into the available health effects data.

Conservative measures to compensate for all of these uncertainties and ensure that potential health risks are not underestimated are compounded in the final HRA predictions. Therefore, the actual risk numbers are expected to be well below the values presented in this analysis.

5.6.2.9 Criteria Pollutants

The dispersion of the Project's emissions of criteria pollutants (nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter with an aerodynamic diameter of 10 and 2.5 microns or less [PM_{10} and $PM_{2.5}$]) was modeled, and an evaluation of their impacts on air quality is presented in Section 5.1, Air Quality. The federal and state AAQS set limits on the allowable levels of air pollutants in the ambient air necessary to protect public health. The results of the air quality analysis show that the Project will not cause a violation of any state or federal AAQS, and will not significantly contribute to existing violations of federal standards. Therefore, no significant adverse health effects are anticipated to result from the Project's criteria pollutant emissions.

5.6.3 Alternatives

Under Alternative 2, truck transport would be via existing roads from an existing coal transloading facility northeast of the Project Site. The truck route distance is approximately 26.5 miles.

Under this alternative, the on-site railroad spur would not be developed. Therefore, there would be no trains on site for feedstock delivery or product removal. Coal would be transported via trucks on existing roads from an existing coal transloading facility in the town of Wasco, northeast of the Project Site. All product would be transported by truck.

The main difference between Alternative 1 (rail transportation) and Alternative 2 (truck transportation) is that the approximately 5-mile railroad spur that would connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site, would not be built; thus, no feedstock or product would be transported to or from the site via train. The coal would still be transported from New Mexico via train, but would be off-loaded at the transloading facility in Wasco, then trucked to the site. All product would be transported off site by truck; therefore, there would be more trucks accessing the site, but no trains. There are no changes to the stationary sources.

The only TAC affected by the change would be DPM. At the Project Site, the increase in emissions from the delivery trucks would be more than offset by the decrease in emissions from the trains. Section 5.1.3, Air Quality Alternatives, presents the transportation-related emissions associated with Alternative 2 (truck transportation), and the difference in emissions from Alternative 2 (truck transportation) to Alternative 1 (rail transportation) by air basin. Emission calculations are provided in Appendix E-12, Operational Transportation Emissions for Alternative 2.

HRA modeling was not conducted for Alternative 2 (truck transportation) because the on-site DPM emissions decrease, and all other TACs remain the same; thus, health risks associated with Alternative 2 (truck transportation) should be lower than predicted for Alternative 1 (rail transportation). Therefore, the TAC emissions from Alternative 2 (truck transportation) would have a less-than-significant health risk impact.

5.6.4 Cumulative Impact Analysis

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts (CEQA Guidelines Section 15130) A "cumulative impact" consists of an impact that is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines Section 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines Section 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines Section 15065 [a][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines Section 15130[a]). It is also possible that a project's contribution to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines Section 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines Section 15130[b]). The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines Section 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects within a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines Section 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines Section 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects, which is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

A cumulative HRA is not presented in this AFC Amendment. There are no major sources of HAPs near the Project Site, and none are known to be proposed or under development.

An analysis of the public health impacts associated with the OEHI Project is included in Appendix A, Section 4.3, Air Quality and Section 4.7, Hazards and Hazardous Materials, of this AFC Amendment. That analysis concludes that the OEHI Project will not result in significant adverse cumulative impacts to public health.

5.6.5 Mitigation Measures

The criteria pollutant emissions from the Project will be mitigated by the use of Best Available Control Technology (BACT) and through emissions offsets. These measures are described in Section 5.1, Air Quality. In addition, pollution control technologies employed to control criteria pollutants (for example, the oxidation catalyst in the HRSG and the high-efficiency drift eliminators on the cooling towers) will further reduce emissions of TACs associated with the Project. These measures satisfy the SJVAPCD requirements for toxics (TBACT). Emissions from the cooling system will be limited by the use of high-efficiency drift control eliminators, and a biocide will be used to control bacterial growth and thereby minimize the possibility of Legionella being transmitted from the cooling system.

Strict controls for fugitive dust during construction will mitigate the potential for Valley Fever by reducing the amount of airborne dust particles potentially containing the spores.

The HRA presented in the foregoing subsections shows that the health effects impacts of the Project will be well below the significance thresholds identified in Section 5.6.2.6, Health Effects Significance Criteria. Therefore, no further mitigation of emissions from the Project is required to protect public health.

5.6.6 Laws, Ordinances, Regulations, and Standards

The Project will be constructed and operated in accordance with all laws, ordinances, regulations, and standards (LORS) applicable to protecting public health. This section briefly discusses the identified LORS. Table 5.6-7, Summary of LORS – Public Health, provides a summary of the requirements of the applicable LORS, the agencies that are principally responsible for public health, and the locations in this document where each of these issues is addressed.

5.6.6.1 Federal

The federal CAA of 1970, 42 United States Code 7401 *et seq*., as amended in 1977 and 1990, requires that the public be protected from unhealthful exposure to air pollutants. Based on the results of the risk assessment, health risks due to Project emissions of air toxics will not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT to the facility. Increases in emissions of criteria pollutants will be fully offset.

This act requires new sources that emit more than 10 tons per year of any specified HAP or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology. HECA will not emit more than 10 tons per year of any HAP, or more than 25 tons per year of any combination of HAPs.

Under the federal CAA, on April 16, 2012, USEPA promulgated a new national emission standard for hazardous air pollutants (NESHAP) for both major HAPs and area sources for IGCC electric generating units (EGUs) that limits emissions of mercury, hydrogen chloride, and filterable particulate matter. Emissions of these pollutants from the HECA Project will comply with this standard.

5.6.6.2 State

California Public Resource Code § 25523(a); 20 CCR § 1752.5, 2300-2309, and Division 2 Chapter 5, Article 1, Appendix B, Part (1), requires that protection of environmental quality be ensured and that a quantitative HRA be performed. The HRA discussed in this section satisfies this requirement.

The California Clean Air Act, TAC Program, HSC § 39650, *et seq*. requires quantification of TAC emissions, use of BACT, and preparation of an HRA. The Project will not cause unsafe exposure to TACs based on results of the HRA discussed in this section, and a BACT assessment for the Project has been performed (see Section 5.1, Air Quality).

California Health and Safety Code, Part 6, § 44300 *et seq*. (Air Toxics "Hot Spots") requires inventorying of TACs and HRA, as well as public notification of predicted health risks. The HRA discussed in this section satisfies this requirement.

California Health and Safety Code § 41700 prohibits emissions in quantities that adversely affect public health, other businesses, or property. Section 5.1, Air Quality, and the HRA discussed in this section satisfy this requirement.

California Code of Regulations, Title 22, Section 60306 requires use of a drift eliminator and biocides to minimize the possibility of Legionella being transmitted from the cooling system.

5.6.6.3 Local

SJVAPCD Rule 2550 requires use of TBACT for major HAP sources to achieve maximum available control technology. The Project will not be a major source of HAPs. Therefore, this regulation does not apply, although the Project will apply controls that meet TBACT for the turbine and cooling towers.

SJVAPCD Rule 4102, Section 4.1 requires an HRA to estimate the maximum potential public exposure and health risk for purpose of approving the permit to operate and issuing public notice, if necessary. The HRA discussed in this section satisfies this requirement.

5.6.7 Involved Agencies and Agency Contacts

Agencies likely to be involved in the Project are shown in Table 5.6-8, Involved Agencies and Agency Contacts.

5.6.8 Permits Required and Permit Schedule

The Authority to Construct permitting process that would otherwise apply is superseded in the case of CEC power plant licensing projects by the Determination of Compliance process, which is its functional equivalent. The CEC's final decision on this AFC Amendment will serve as the principal approval required to ensure that the Project's impacts to public health will be within acceptable levels. However, a Permit to Operate will be awarded after SJVAPCD confirmation that the Project has been constructed to operate as described in the permit application(s).

5.6.9 References

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Table 5.6-1
Annual Average Concentrations and Cancer Risks for Year 2007 from the Bakersfield-5558 California Avenue Monitoring Station

TAC	Annual Concentration	Health Risk
Acetaldehyde	1.240	6
Benzene	0.310	29
1,3-Butadiene	0.050	19
Hexavalent Chromium	0.038	6
Formaldehyde	2.610	19
Methylene Chloride	0.100	<1
Perchloroethylene	0.041	2
Total Health Risk		81

Source: ARB Almanac 2009 – Appendix C: Emissions, Air Quality, and Health Risk for Ten Toxic Air Contaminants (http://www.arb.ca.gov/aqd/almanac/almanac09/appc09.htm)

Notes:

1. Concentrations for Hexavalent Chromium are expressed as ng/m^3, Concentrations for all other TACs are expressed as ppb.
2. Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. Total Health Risk represents only those compounds listed in this table and only those with data for the year. There may be other significant compounds for which monitoring and/or health risk information is not available.

TAC = toxic air contaminants

Table 5.6-2
Summary of Operational TACs and Toxicity Values Used to Characterize Health Risks

Compound	CAS #	Acute REL ($\mu g/m^3$)	8-Hour Inhalation REL ($\mu g/m^3$)	Chronic REL ($\mu g/m^3$)	Inhalation Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$
3-Methylchloranthrene	56-49-5	–	–	–	2.2E+01
7,12-Dimethylbenz(a)anthracene	57-97-6	–	–	–	2.5E+01
Acetaldehyde	75-07-0	4.7E+02	3.0E+02	1.4E+02	1.0E-02
Ammonia*	7664-41-7	3.2E+03	–	2.0E+02	–
Arsenic	7440-38-2	2.0E-01	1.5E-02	1.5E-02	1.2E+01
Benz(a)anthracene	56-55-3	–	–	–	3.9E-01
Benzene	71-43-2	1.3E+03	–	6.0E+01	1.0E-01
Benzo(a)pyrene	50-32-8	–	–	–	3.9E+00
Benzo(b)fluoranthene	205-99-2	–	–	–	3.9E-01
Benzo(k)fluoranthene	207-08-9	–	–	–	3.9E-01
Beryllium	7440-41-7	–	–	7.0E-03	8.4E+00
Cadmium	7440-43-9	–	–	2.0E-02	1.5E+01
Carbon Disulfide	75-15-0	6.2E+03	–	8.0E+02	–
Chromium, (hexavalent)	18540-29-9	–	–	2.0E-01	5.1E+02
Chrysene	218-01-9	–	–	–	3.9E-02
Copper*	7440-50-8	1.0E+02	–	–	–
Cyanides	57-12-5	3.4E+02	–	9.0E+00	–
Dibenzo(a,h)anthracene	53-70-3	–	–	–	4.1E+00
Dichlorobenzene	106-46-7	–	–	8.0E+02	4.0E-02
Diesel Particulate Matter*	DPM	–	–	5.0E+00	1.1E+00
Fluoride*	–	2.4E+02	–	1.3E+01	–
Formaldehyde	50-00-0	5.5E+01	9.0E+00	9.0E+00	2.1E-02
Hexane	110-54-3	–	–	7.0E+03	–
Hydrochloric Acid	7647-01-0	2.1E+03	–	9.0E+00	–
Hydrogen Fluoride (Hydrofluoric Acid)	7664-39-3	2.4E+02	–	1.4E+01	–
Hydrogen Sulfide	7783-06-4	4.2E+01	–	1.0E+01	–
Indeno(1,2,3-cd)pyrene	193-39-5	–	–	–	3.9E-01
Lead	7439-92-1	–	–	–	4.2E-02
Manganese	7439-96-5	–	1.7E-01	9.0E-02	–
Mercury	7439-97-6	6.0E-01	6.0E-02	3.0E-02	–

Table 5.6-2
Summary of Operational TACs and Toxicity Values Used to Characterize Health Risks (Continued)

Compound	CAS #	Acute REL ($\mu g/m^3$)	8-Hour Inhalation REL ($\mu g/m^3$)	Chronic REL ($\mu g/m^3$)	Inhalation Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$
Methanol	67-56-1	2.8E+04	–	4.0E+03	
Methyl Bromide (Bromomethane)	74-83-9	3.9E+03	–	5.0E+00	–
Methylene Chloride (Dichloromethane)	75-09-2	1.4E+04	–	4.0E+02	3.5E-03
Naphthalene	91-20-3	–	–	9.0E+00	1.2E-01
Nickel	7440-02-0	6.0E+00	–	5.0E-02	9.1E-01
Nitric Acid*	7697-37-2	8.6E+01	–	–	–
Phenol	108-95-2	5.8E+03	–	2.0E+02	–
Propylene*	115-07-1	–	–	3.0E+03	–
Selenium	7782-49-2	–	–	2.0E+01	–
Sulfuric Acid and Sulfates*	7664-93-9	1.2E+02	–	1.0E+00	–
Toluene	108-88-3	3.7E+04	–	3.0E+02	–
Vanadium*	7440-62-2	3.0E+01	–	–	–

Source: HECA 2012; OEHHA/CARB (2011)
Notes:
CAS # = Chemical Abstracts Service Registry Number
DPM = diesel particulate matter
REL = reference exposure level
$\mu g/m^3$ = micrograms per cubic meter
mg/kg-day = milligrams per kilogram per day
* Denotes pollutants that are not listed as Federal HAPs.

Table 5.6-3
HECA Total Toxic Air Contaminant Annual Emission Rates

Compound	CAS #	Annual Rate (TPY)	CTG/ HRSG Stack (lb/yr)	Coal Dryer Stack (lb/yr)	Cooling Tower (Power Block) (lb/yr)	Cooling Tower (Process Area) (lb/yr)	Cooling Tower (ASU) (lb/yr)	Auxiliary Boiler (lb/yr)	Ammonia Plant Startup Heater (lb/yr)	Emergency Generators (lb/yr)	Fire Water Pump (lb/yr)	Gasification Flare (lb/yr)	SRU Flare (lb/yr)	Rectisol® Flare (lb/yr)	TG Thermal Oxidizer (lb/yr)	CO_2 Vent (lb/yr)	Manufact-uring Complex (lb/yr)	On-site Truck (lb/yr)	On-site Train (lb/yr)	Fugitives (lb/yr)
Acetaldehyde	75-07-0	2.15E-02	3.66E+01	6.46E+00																
Ammonia*	7664-41-7	1.57E+02	1.56E+05	2.75E+04				1.03E+03									1.18E+05			1.14E+04
Antimony	7440-36-0	1.32E-02	2.24E+01	3.95E+00																
Arsenic	7440-38-2	2.88E-02	4.88E+01	8.61E+00	5.33E-02	8.70E-02	2.40E-02	8.89E-02	1.47E-03			1.43E-02	7.75E-04	3.78E-03	2.13E-02					
Benzene	71-43-2	2.94E-02	4.88E+01	8.61E+00				9.33E-01	1.54E-02			1.50E-01	8.14E-03	3.97E-02	2.24E-01					
Beryllium	7440-41-7	3.11E-03	5.28E+00	9.33E-01				5.33E-03	8.80E-05			8.56E-04	4.65E-05	2.27E-04	1.28E-03					
Cadmium	7440-43-9	1.15E-01	1.95E+02	3.44E+01				4.89E-01	8.07E-03			7.85E-02	4.26E-03	2.08E-02	1.17E-01					
Carbon Disulfide	75-15-0	5.50E-01	9.35E+02	1.65E+02																
Carbonyl Sulfide	463-58-1	2.69E+00														5.32E+03				5.94E+01
Chromium	7440-47-3	6.55E-03	1.04E+01	1.83E+00				6.22E-01	1.03E-02			9.99E-02	5.42E-03	2.64E-02	1.49E-01					
Chromium (hexavalent)	18540-29-9	1.83E-03	3.11E+00	5.49E-01																
Cobalt	7440-48-4	3.14E-03	5.28E+00	9.33E-01				3.73E-02	6.16E-04			5.99E-03	3.25E-04	1.59E-03	8.95E-03					
Copper*	7440-50-8	2.93E-04			1.03E-02	1.69E-02	4.66E-03	3.78E-01	6.23E-03			6.06E-02	3.29E-03	1.61E-02	9.06E-02					
Cyanides	57-12-5	6.87E-02	1.16E+02	2.04E+01																1.15E+00
Fluoride*	1101	1.44E-03			9.31E-01	1.52E+00	4.20E-01													
Formaldehyde	50-00-0	2.28E-01	3.46E+02	6.10E+01				3.33E+01	5.50E-01			5.35E+00	2.91E-01	1.42E+00	7.99E+00					
Hexane	110-54-3	5.87E-01						8.00E+02	1.32E+01			1.28E+02	6.97E+00	3.40E+01	1.92E+02					
Hydrochloric Acid	7647-01-0	1.55E-01	2.64E+02	4.66E+01																
Hydrogen Fluoride (hydrofluoric acid)	7664-39-3	5.98E-01	1.02E+03	1.79E+02																
Hydrogen Sulfide	7783-06-4	2.64E+00														3.01E+03				2.28E+03
Lead	7439-92-1	6.70E-03	1.14E+01	2.01E+00																
Manganese	7439-96-5	1.67E-02	2.11E+01	3.73E+00	2.66E+00	4.35E+00	1.20E+00	1.69E-01	2.79E-03			2.71E-02	1.47E-03	7.18E-03	4.05E-02					
Mercury	7439-97-6	7.71E-03	1.03E+01	4.98E+00				1.16E-01	1.91E-03			1.85E-02	1.01E-03	4.91E-03	2.77E-02					
Methanol	67-56-1	7.09E+00																		1.42E+04
Methyl Bromide (Bromomethane)	74-83-9	5.70E-01	9.70E+02	1.71E+02																
Methylene Chloride (Dichloromethane)	75-09-2	2.63E-02	4.47E+01	7.89E+00																
Naphthalene	91-20-3	3.01E-02	5.08E+01	8.97E+00				2.71E-01	4.47E-03			4.35E-02	2.36E-03	1.15E-02	6.50E-02					
Nickel	7440-02-0	5.35E-03	7.93E+00	1.40E+00				9.33E-01	1.54E-02			1.50E-01	8.14E-03	3.97E-02	2.24E-01					
Nitric Acid*	7697-37-2	8.19E-01																		1.64E+03
Phenol	108-95-2	4.40E-01	7.48E+02	1.32E+02																

Table 5.6-3
HECA Total Toxic Air Contaminant Annual Emission Rates (Continued)

Compound	CAS #	Annual Rate (TPY)	CTG/ HRSG Stack (lb/yr)	Coal Dryer Stack (lb/yr)	Cooling Tower (Power Block) (lb/yr)	Cooling Tower (Process Area) (lb/yr)	Cooling Tower (ASU) (lb/yr)	Auxiliary Boiler (lb/yr)	Ammonia Plant Startup Heater (lb/yr)	Emergency Generators (lb/yr)	Fire Water Pump (lb/yr)	Gasification Flare (lb/yr)	SRU Flare (lb/yr)	Rectisol® Flare (lb/yr)	TG Thermal Oxidizer (lb/yr)	CO_2 Vent (lb/yr)	Manufact-uring Complex (lb/yr)	On-site Truck (lb/yr)	On-site Train (lb/yr)	Fugitives (lb/yr)
Propylene*	115-07-1	6.33E+00																		1.27E+04
Selenium	7782-49-2	6.77E-03	1.14E+01	2.01E+00	4.43E-02	7.23E-02	2.00E-02	1.07E-02	1.76E-04			1.71E-03	9.30E-05	4.53E-04	2.56E-03					
Sulfuric Acid and Sulfates*	7664-93-9	1.14E+00	1.93E+03	3.41E+02																
Toluene	108-88-3	1.50E-03	6.71E-01	1.18E-01				1.51E+00	2.49E-02			2.43E-01	1.32E-02	6.42E-02	3.62E-01					
Vanadium*	7440-62-2	7.50E-04						1.02E+00	1.69E-02			1.64E-01	8.91E-03	4.34E-02	2.45E-01					
Diesel Particulate Matter*	DPM	7.72E-02								4.51E+01	1.84E+00							1.48E+01	9.26E+01	
2-Methylnaphthalene	91-57-6	7.83E-06						1.07E-02	1.76E-04			1.71E-03	9.30E-05	4.53E-04	2.56E-03					
3-Methylchloranthrene	56-49-5	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
7,12-Dimethylbenz(a)anthracene	57-97-6	5.22E-06						7.11E-03	1.17E-04			1.14E-03	6.20E-05	3.02E-04	1.71E-03					
Acenaphthene	83-32-9	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Acenaphthylene	208-96-8	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Anthracene	120-12-7	7.83E-07						1.07E-03	1.76E-05			1.71E-04	9.30E-06	4.53E-05	2.56E-04					
Benz(a)anthracene	56-55-3	2.81E-05	4.68E-02	8.25E-03				8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Benzo(a)pyrene	50-32-8	3.91E-07						5.33E-04	8.80E-06			8.56E-05	4.65E-06	2.27E-05	1.28E-04					
Benzo(b)fluoranthene	205-99-2	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Benzo(g,h,i)perylene	191-24-2	3.91E-07						5.33E-04	8.80E-06			8.56E-05	4.65E-06	2.27E-05	1.28E-04					
Benzo(k)fluoranthene	207-08-9	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Chrysene	218-01-9	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Dibenzo(a,h)anthracene	53-70-3	3.91E-07						5.33E-04	8.80E-06			8.56E-05	4.65E-06	2.27E-05	1.28E-04					
Dichlorobenzene	106-46-7	3.91E-04						5.33E-01	8.80E-03			8.56E-02	4.65E-03	2.27E-02	1.28E-01					
Fluoranthene	206-44-0	9.78E-07						1.33E-03	2.20E-05			2.14E-04	1.16E-05	5.67E-05	3.20E-04					
Fluorene	86-73-7	9.13E-07						1.24E-03	2.05E-05			2.00E-04	1.08E-05	5.29E-05	2.98E-04					
Indeno(1,2,3-cd)pyrene	193-39-5	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Phenanathrene	85-01-8	5.54E-06						7.55E-03	1.25E-04			1.21E-03	6.59E-05	3.21E-04	1.81E-03					
Pyrene	129-00-0	1.63E-06						2.22E-03	3.67E-05			3.57E-04	1.94E-05	9.44E-05	5.33E-04					
Total Combined HAPs and TACs (tpy)		**181.47**	**81.44**	**14.37**	**0.00**	**0.00**	**0.00**	**0.93**	**0.01**	**0.02**	**0.00**	**0.07**	**0.00**	**0.02**	**0.10**	**4.17**	**59.17**	**0.01**	**0.05**	**2.11E+01**
Total HAPs* (tpy)		**15.94**	**2.46**	**0.44**	**0.00**	**0.00**	**0.00**	**0.42**	**0.01**	**0.00**	**0.00**	**0.07**	**0.00**	**0.02**	**0.10**	**4.17**	**0.00**	**0.00**	**0.00**	**8.25E+00**

Note:
* Denotes pollutants that are not listed as Federal HAPs. These pollutants are not included in the HAP total provided. As shown, combined annual HAP emissions are less than 25 tons per year. Additionally, individual HAP emissions are below 10 tons per year.
This table presents transportation emissions associated with Alternative 1 (rail transportation).ASU = Air Separation Unit
CAS = Chemical Abstracts Service Registry Number
HAPs = hazardous air pollutant
lb/yr = pounds per year
TACs = toxic air contaminants

Table 5.6-4
Estimated PM_{10} Concentration, Cancer Risk, and Chronic Non-Cancer THI Due to On-site Construction Equipment DPM Exhaust

Location	AERMOD PM_{10} Results ($\mu g/m^3$)	DPM Cancer Risk	DPM Chronic Non-Cancer Total Hazard Index (THI)
Point of maximum impact	0.228	5.5 excess risk in 1 million	0.046
Peak risk at nearest off-site worker (MEIW) (Tule Elk State Reserve Ranger Station)	0.0244	0.16 excess risk in 1 million	0.0049
Peak risk at nearest residence (MEIR) (Residence at Station Rd/Tule Park Rd)	0.0499	1.21 excess risk in 1 million	0.00997
Peak risk at nearest Sensitive Receptor (Elk Hills School, Tupman, CA)	0.0051	0.12 excess risk in 1 million	0.001
Significance threshold	NA	10 in 1 million	1
Below significance?	NA	Yes	Yes

Source: HECA 2012.
Notes:
1. DPM cancer risk is based on 4.1 year exposure to match with the construction duration.
$\mu g/m^3$ = micrograms per cubic meter
DPM = diesel particulate matter
MEIR = maximally exposed individual resident
MEIW = maximally exposed individual worker
NA = not applicable
PM_{10} = particulate matter less than 10 microns in diameter
THI = total hazard index

Table 5.6-5
Estimated Cancer Risk, Acute and Chronic Non-Cancer THI Due to HECA Operations

Location	Cancer Risk	Chronic Non-Cancer Total Hazard Index	Acute Non-Cancer Total Hazard Index
Point of maximum impact	8.97 excess risk in 1 million	0.42	0.88
Coordinates of PMI in UTM NAD83 (m) easting northing	283,967 3,911,925	283,959 3,911,625	282,663 3,912,844
Peak risk at off-site worker MEIW (Tule Elk State Reserve Ranger Station)	1.90 excess risk in 1 million	0.13	0.23
Coordinates of MEIW in UTM NAD83 (m) easting northing	285,106 3,911,707	285,106 3,911,707	285,106 3,911,707
Peak risk at MEIR	4.29 excess risk in 1 million	0.29	0.33
Coordinates of MEIR in UTM NAD83 (m) easting northing	283,989 3,910,951 (Residence along the southeastern side of the property line on Tupman Road)	283,989 3,910,951 (Residence along the southeastern side of the property line on Tupman Road)	284,401 3,912,477 (Residence on Tule Park Road near Station Road)
Peak risk at nearest Sensitive Receptor (Elk Hills School, Tupman, California)	0.96 excess risk in 1 million	0.07	0.11
Coordinates of Sensitive Receptor in UTM NAD83 (m) easting northing	285,878 3,908,605	285,878 3,908,605	285,878 3,908,605
Significance threshold	10 in 1 million	1	1
Below significance?	Yes	Yes	Yes

Source: HECA, 2012.
Notes:
1. MEIW cancer risk is conservatively based on a residential risk calculation; i.e., a 70 year exposure.
This table presents health risks associated with transportation emissions from Alternative 1 (rail transportation).
m = meters
MEIR = maximally exposed individual resident
MEIW = maximally exposed individual worker
PMI = point of maximum impact
THI = total hazard index
UTM = Universal Transverse Mercator

Table 5.6-6
Acute Hazard Index for TACs with 8-hour RELs Predicted from Peak HECA Emissions

TAC	8-hour Inhalation Risk Value µg/m^3	Hazard Index	Hazard Index Target Organs
Acetaldehyde	300	0.000005	Respiratory system
Arsenic	0.015	0.1267	Development; cardiovascular system; nervous system; lung; skin
Formaldehyde	9	0.0320	Respiratory system
Manganese	0.17	0.0097	Nervous system
Mercury	0.06	0.0187	Nervous system
Total Hazard Index – Respiratory system		**0.0320**	**Respiratory system**
Total Hazard Index - Nervous system		**0.1550**	**Nervous system**
Total Hazard Index – Other organs		**0.1267**	**Development; cardiovascular system; lung; skin**

Notes:
RELs = reference exposure levels
TACs = toxic air contaminants
µg/m^3 = micrograms per cubic meter

Table 5.6-7
Summary of LORS – Public Health

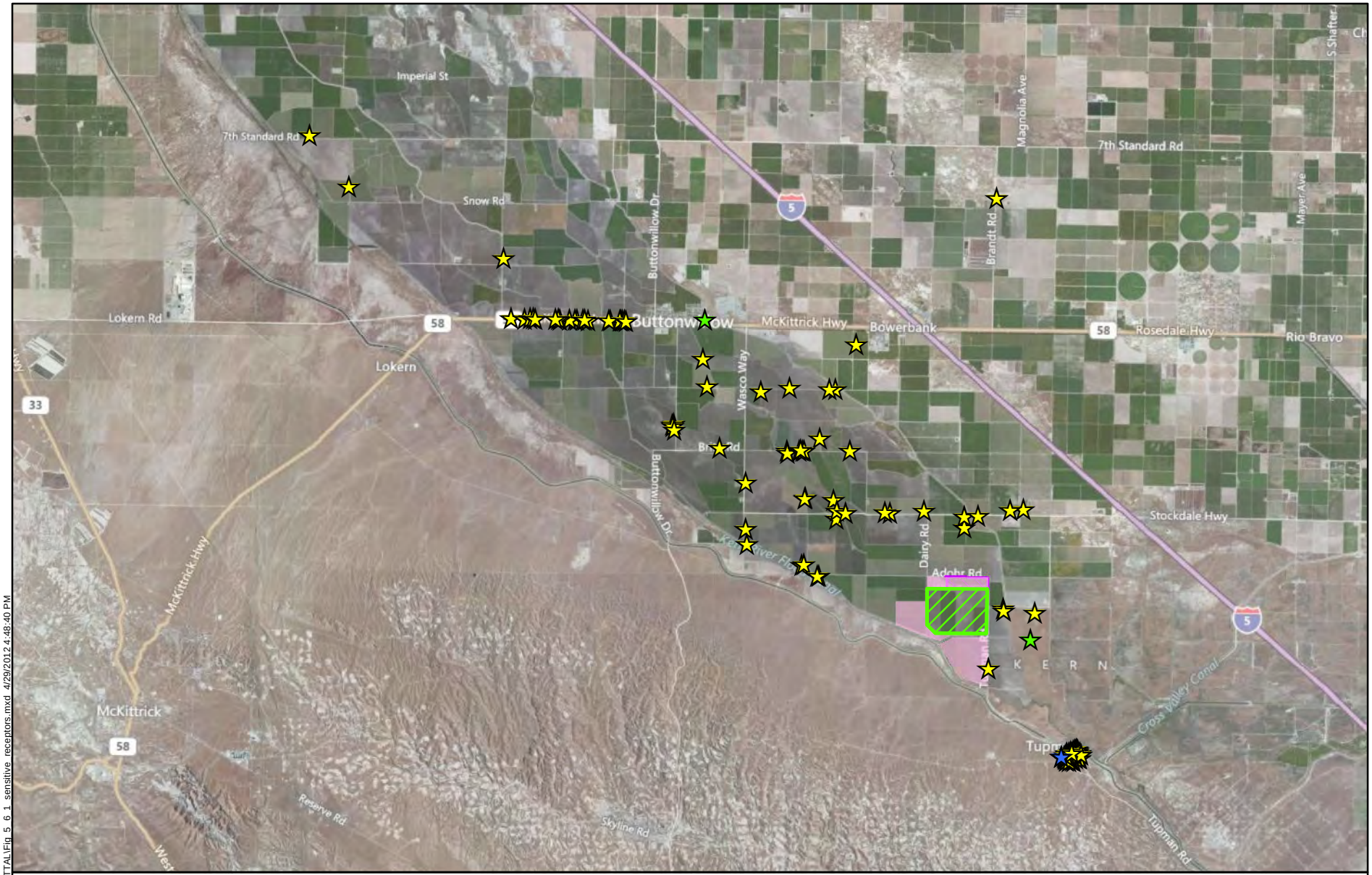
Authority	Administering Agency	Requirement	AFC Amendment Section(s)
Federal			
Clean Air Act (CAA) Section 112	USEPA CARB SJVAPCD	Protect public from unhealthful exposure to air pollutants.	5.6, 5.1
State			
California Public Resource Code § 25523(a); 20 CCR § 1752.5, 2300-2309, and Division 2 Chapter 5, Article 1, Appendix B, Part (1)	CEC	Ensure protection of environmental quality; requires quantitative HRA.	5.6.
California Clean Air Act, TAC Program, H&SC § 39650, et seq.	SJVAPCD with CARB oversight	Requires quantification of TAC emissions, use of BACT, and preparation of an HRA.	5.6, 5.1
H&SC, Part 6, § 44300 et seq. (Air Toxics "Hot Spots")	SJVAPCD with CARB/OEHHA oversight	Requires inventorying of TACs and HRA, as well as public notification of predicted health risks.	5.6.2
H&SC § 41700	SJVAPCD with CARB oversight	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	5.1
Local			
SJVAPCD Rule 2520, Section 2.1	SJVAPCD	Requires Federally Mandated Operating Permit for major sources of air toxics	The Project will not be a major source of HAPs, thus this regulation does not apply.
SJVAPCD Rule 2550	SJVAPCD	Requires use of TBACT for major HAP sources to achieve MACT.	5.6
SJVAPCD Rule 4102, Section 4.1 and Policy APR 1905	SJVAPCD	Requires sources to not discharge air toxics detrimental to public health and prepare a HRA.	5.6

Notes:

AFC = Application for Certification
BACT = Best Available Control Technology
CARB = California Air Resources Board
CCR = California Code of Regulations
CEC = California Energy Commission
H&SC = Health and Safety Code
HAP = hazardous air pollutant
HRA = Health Risk Assessment
LORS = laws, ordinances, regulations, and standards
MACT = Maximum Available Control Technology
OEHHA = Office of Environmental Health Hazard Assessment
SJVAPCD = San Joaquin Valley Air Pollution Control District
TAC = toxic air contaminant
TBACT = Toxic Best Available Control Technology
USEPA = U.S. Environmental Protection Agency

Table 5.6-8
Involved Agencies and Agency Contacts

Agency	Contact/Title	Telephone
California Energy Commission	Gerry Bemis Air Quality Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4960
	Dr. Alvin Greenberg Public Health Specialist 1516 Ninth Street Sacramento, CA 95814	(415) 479-7560
California Air Resources Board	Mike Tollstrup 1001 I Street Sacramento, CA 95814	(916) 322-6026
San Joaquin Valley Air Pollution Control District	Leland Villalvazo Supervising Air Quality Specialist 1990 E. Gettysburg Avenue Fresno, CA 93726	(559) 230-5881



Project Site
Construction Staging Area
Controlled Area

Dwelling
Park/Reserve
School

N

0 1 2 Miles

Source: Aerial Imagery, (c) 2010 Microsoft Corporation and its data suppliers.

SENSITIVE AND RESIDENTIAL RECEPTORS NEAR THE PROJECT SITE

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.6-1

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Tables

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5.7 WORKER SAFETY AND HEALTH

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

This section addresses safety and health issues for the HECA Project and for the CO_2 linear. It describes or outlines systems and procedures that will be developed and implemented to provide occupational safety and health protection for the Project workers ("workers" as used in this Section refers to employees, contractors, or subcontractors). These systems and procedures will be designed to comply with applicable worker health and safety laws, ordinances, regulations, and standards (LORS), including those established by Title 8 California Code of Regulations (CCR), Chapter 4 Division of Industrial Safety, Subchapter 4 Construction Safety Orders, Subchapter 5 Electrical Safety Orders, Subchapter 7 General Industry Safety Orders (GISO), Industrial Railroads, and Subchapter 7 GISO with special attention paid to § 3203, Injury and Illness Prevention Program (IIPP).

The analysis included in this section focuses on the HECA Project as well as the CO_2 pipeline associated with the OEHI Project. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in Appendix A-1, Section 4.7, Hazards and Hazardous Materials, of this AFC Amendment.

5.7.1 Affected Environment

The Project includes the construction, commissioning, and operation of the gasification and Project facilities, as well as the Manufacturing Complex and linear facilities. Maps depicting the Project Site layout are presented in Figure 2-5, Preliminary Plot Plan.

5.7.2 Environmental Consequences

5.7.2.1 Occupational Health and Safety

Construction, commissioning, operation, and maintenance activities may expose workers to the hazards identified in Table 5.7-1, Potential Worker Hazards during Facility Construction, Commissioning and Operation. Exposure to these hazards will be minimized through adherence to appropriate engineering design criteria and administrative controls, use of appropriate personal protective equipment (PPE), and compliance with applicable health and safety LORS as described in this section. The programs, regulations, and preventative measures intended to control potential worker health and safety impacts associated with these hazards are described in the remainder of this section.

Construction/Commissioning Health and Safety Program

To protect the health and safety of workers during construction and commissioning of the Project, the construction contractor will implement a Construction Health and Safety Program consistent with all applicable LORS. As a result of the implementation of the Construction Health and Safety Program, and the other construction protection programs described below, potential impacts to worker health and safety during construction will be less than significant.

Construction/Commissioning Injury and Illness Prevention Program

The Construction/Commissioning Health and Safety Program will meet the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) IIPP requirements. The IIPP will include requirements for:

- A written Code of Safe Practices for construction activities.
- Identification of the person or persons responsible for implementing the program.
- IIPP training for responsible supervision
- Posting the Code of Safe Practices at a conspicuous location at each job site office or providing it to each supervisor who will have it readily available.
- A system for identifying workplace hazards, including inspections.
- A system for ensuring worker compliance with the IIPP.
- Conducting “toolbox” or “tailgate” meetings to discuss job hazards and controls.

- Methods of communicating with workers that encourage workers to identify and report unsafe activities and conditions.
- Procedures for correcting unsafe conditions and activities.
- Training of employees who are newly employed on the Project.

Construction/Commissioning Written Health and Safety Programs

Written safety programs will be implemented in conjunction with the Code of Safe Practices. These may include:

- Accident, Incident, and Near-Miss Reporting Procedures
- Bloodborne Pathogens Exposure Control Program
- Compressed Gas and Air Handling System Procedures
- Confined Space Entry Procedures
- Contractor Safety Program
- Electrical Safety Procedures
- Emergency Action Plan and Emergency Response Procedures
- Ergonomics
- Excavation, Trenching, and Shoring Procedures
- Fall Protection Program
- Fire Protection
- Hand Tools and Equipment Guarding Safety Procedures
- Hazard Communication Plan, including California's Proposition 65 requirements
- Hazardous Materials Handling Procedures
- Hazardous Waste Handling Procedures and Awareness Training
- Hearing Conservation Program
- Heat Stress/Cold Stress Prevention
- Heavy Equipment Procedures
- Hoist/Chain/Wire Rope/Webs/Slings/Crane Procedures
- Hot Work Procedures (welding, cutting, and brazing)
- Job Safety Analysis
- Industrial Hygiene Program
- Industrial Truck (Forklift) Procedures
- Ladder, Scaffold, and Work Platform Procedures
- Lockout/Tagout Procedures
- Motor Vehicle Safety Procedures
- Musculoskeletal Disorder Prevention Program (ergonomics, lifting)
- New Employee Orientation and Training
- Personal Protective Equipment Program
- Portable Electric and Pneumatic Tool Procedures
- Respiratory Protection Program
- Root Cause Analysis
- Safety and Housekeeping Inspection Program
- Safety Committee and Toolbox/Tailgate Safety Meetings

- Security Program
- Signs, Tags, and Barricade Procedures
- Slip, Trip, and Fall Prevention Program
- Subcontractor safety management policy
- Tool (Power-Operated) Procedures
- Powder actuated tool procedures
- Vehicle Traffic Control Program – Railroad Yard

Construction/Commissioning Safety Training Program

Table 5.7-2, Worker and Contractor Training Programs, outlines the basic types of information and training that workers will receive prior to the start of work, throughout construction/ commissioning, and into operation/maintenance. The Project site construction contractor will incorporate these programs and training sessions into its Construction Health and Safety Plans.

Construction/Commissioning Personal Protective Equipment Program

Workers must use the required PPE during construction/commissioning. Required PPE will be approved for use by the construction safety manager. PPE will be distinctly marked to facilitate identification, and will be used only in accordance with the manufacturer's instructions. The construction safety manager will ensure that the PPE will be of such design, fit, and durability as to provide adequate protection against the hazards for which it is designed. The type of PPE required for each job task will be described in the job safety analysis (JSA) for that task, which will be provided to workers as appropriate. The use of PPE required for Project site activities includes, but is not limited to, the items specified in Table 5.7-3, Basic Protective Equipment Guide, and will comply with Cal/OSHA requirements. All protective insulating PPE will comply with the Electrical Safety Codes.

A Respiratory Protection Program will be implemented in compliance with Title 8 of the CCR § 5144 and GISO requirements. The program will include respirator training, fit testing (qualitative or quantitative), monitoring, selection, and other necessary provisions. The work atmosphere will be tested/sampled per the Program in order to determine the need for respiratory protection and the effectiveness of controls.

Construction/Commissioning Fire Protection and Prevention Plan

The Project will rely on both on-site fire protection systems and local fire protection services. A Fire Protection and Prevention Plan will be developed consistent with Kern County requirements and other applicable LORS. The plan will be followed throughout all phases of construction. The specified firefighting equipment and training will be provided to Project site personnel.

During construction and commissioning, the permanent facility fire protection system will be placed in service as early as practicable. An interim fire protection system will be in place during construction and commissioning until the permanent system is completed. The fire protection systems for the Project site are described in Section 2.9.12, Plant Auxiliaries. Construction fire regulations in 8 CCR § 1620 *et seq*. will be followed as necessary to prevent construction-related fires. Applicable local fire requirements include but are not limited to:

- The most recent edition of the California Fire Code and all applicable National Fire Protection Association (NFPA) standards (24 CCR Part 9)

- Uniform Fire Code Standards, NFPA 1, 2009

- California Building Code Title 24, CCR (24 CCR § 3, *et seq*.)

The local responding fire officials will be given information (Hazardous Materials Business Plan) on the Project site hazards and the location of these hazards, and the information will be included in the emergency response plans. Special attention will be paid to operations involving open flames, such as welding and use of flammable materials. Personnel involved in such operations will be given appropriate training. A fire watch utilizing appropriately classed extinguishers or other equipment will be maintained during hot work operations. However, Project site personnel will not be expected to fight fires past the incipient stage.

Materials brought on site must conform to contract requirements, particularly regarding flame resistance or fireproof characteristics. Specific materials in this category include fuels, paints, solvents, plastic materials, lumber, paper, boxes, and crating materials. Specific attention will be given to compressed gas, fuel, solvent, and paint storage. Electrical wiring and equipment located inside storage rooms used for Class I liquids will be in accordance with applicable regulations. Outside storage areas will be graded to divert (possible) spills away from buildings, and will be kept clear of vegetation and other combustible materials. Precautions will be taken to protect storage areas against tampering where necessary.

On-site fire prevention during construction will consist of portable and fixed firefighting equipment. Portable firefighting equipment will consist of hand-held fire extinguishers and small hose lines in conformance with Cal/OSHA and the NFPA for potential types of fire associated with construction activities. Project site personnel will be trained in on-site fire prevention and response as part of the Fire Protection and Prevention Plan. Periodic fire prevention inspections will be conducted per the Fire Protection and Prevention Plan.

The Fire Protection and Prevention Plan will require that fire extinguishers are inspected routinely and replaced immediately if defective or in need of recharge. All firefighting equipment will be conspicuously located and marked with unobstructed access. A water supply of sufficient volume, duration, and pressure to operate the required firefighting equipment will be provided on site. Designated, approved storage areas and properly identified containers for flammable materials will be used with adequate fire control services.

5.7.2.2 Plant Operational Safety Program

The locations of potential worker hazards during the operational phase are listed in Table 5.7-4, Location of Potential Worker Hazards at the Project (Operational Phase). Programs that address, mitigate, and avoid these potential hazards to worker safety will include:

- Regular worker education and training in safe work practices for general and particular task areas, as summarized in Table 5.7-2, Worker and Contractor Training Programs.

- Communication to Project site workers of hazards in accordance with federal and state standards
- Accident, incident and near-miss evaluations
- Administrative safety procedures
- Emergency response
- Fire prevention and fire response
- Security
- Maintenance of safety performance data
- Vehicle Traffic Control (including Railroad Yard for Alternative 1 [Rail Transportation])

All operations personnel will be provided with written safety guidance. Construction safety programs and procedures that apply to facility operations will be incorporated into the operational safety program for the plant. With the implementation of the protection programs described below, impacts to worker health and safety during operations will be less than significant.

5.7.2.3 Operations Injury Illness Prevention Program

The primary mitigation measures for worker hazards during operation will be contained in the IIPP, which is required by 8 CCR § 3203. The written IIPP will require implementation of the following:

- Identity of person(s) with authority and responsibility for implementing the program
- A system for ensuring that workers comply with safe and healthy work practices
- A system for communicating with workers in a readily understandable form
- Procedures for identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions
- Methods for correcting unhealthy/unsafe conditions in a timely manner
- Methods of documenting inspections and training and maintaining records
- A training program for:
  - Establishing the program initially
  - New, transferred, or promoted workers
  - New processes and equipment
  - Periodic refresher training

The IIPP will designate a safety representative who is responsible for implementing the program. It will also describe safety training for new workers and procedures for tracking safety training. The IIPP will provide a JSA for each job. The JSA will identify safety hazards related to each work task and establish procedures for avoiding, correcting, reporting, and notifying workers of these hazards.

5.7.2.4 Operational Written Safety Programs

The IIPP will be used in conjunction with other written safety programs to help safeguard worker health and safety. These programs may include the following:

- Accident, Incident, and Near-Miss Reporting Procedures
- Bloodborne Pathogens Exposure Control Program
- Chemical Hygiene Plan for laboratory chemical use
- Code of Safe Practices for Equipment and Operation
- Compressed Gas and Air Handling Systems
- Confined Space Entry Procedures
- Electrical Safety Procedures
- Emergency Action Plan
- Emergency Response Procedures
- Fall Protection Program
- Fire Protection and Prevention Plan
- First Aid/cardiopulmonary resuscitation/automated external defibrillator
- Hand Tools and Equipment Guarding Safety Procedures
- Hazard Communication Plan, including California's Proposition 65 requirements
- Hazardous Materials Handling Procedures
- Hazardous Waste Handling Procedures and Awareness Training
- Hearing Conservation Program
- Heat Stress/Cold Stress Prevention
- Heavy Equipment Procedures
- Hoist/Chain/Wire Rope/Webs/Rope Slings/Cranes Procedures
- Hot Work Program (welding, cutting, and brazing)
- Industrial Hygiene Program
- Industrial Truck (Forklifts) Procedures
- Ladders, Scaffolds, and Work Platform Procedures
- Lockout/Tagout Procedures
- Motor Vehicle Safety Procedures
- Musculoskeletal Disorder Prevention Program (ergonomics, lifting)
- New Employee Orientation and Training
- Personal Protective Equipment Program
- Portable Electric and Pneumatic Tool Procedures
- Process Safety Information and Management Procedures
- Respiratory Protection Program
- Safety and Housekeeping Inspection Program
- Safety Committee and Toolbox/Tailgate Safety Meetings
- Security Program
- Stop Work Authority
- Signs, Tags, and Barricades
- Slips, Trips, and Falls Prevention Program
- Subcontractor Safety Management Policy
- Tools (Power and powder actuated-Operated) Procedures
- Vehicle Traffic Control Program – Railroad Yard

These programs will be reviewed as appropriate to determine if they are affected by any new regulations and to determine the effectiveness of their implementation. Other written programs

or plans may relate to worker safety in that they enable work to be performed in a safe manner. These include standard operating procedures, worker qualifications programs, and Project site security.

5.7.2.5 Operations Safety Training Program

All Project workers will be given instructions regarding their responsibility for safe conduct of their work at the time the worker is first hired or retained, and as an ongoing training program of hazard recognition and avoidance. Table 5.7-2, Worker and Contractor Training Programs, outlines the basic types of information and training required for workers of the Project during operations and maintenance.

Workers will be instructed in the safety regulations pertinent to their employment tasks. Information and training on safe working conditions, work practices, and protective equipment requirements will be communicated in the following manner:

- New, promoted, or transferred workers will receive safety training orientation.
- Weekly and/or monthly safety meetings will be held with workers.
- Toolbox/tailgate safety meetings will be conducted routinely and prior to engaging work activities for each crew. General safety topics and specific hazards that may be encountered will be discussed. Comments and suggestions from all workers will be encouraged and shared.
- Regularly scheduled health and safety meetings will be held for supervisors.
- Hazard communication training, including California's Proposition 65 warnings and discharge prohibitions, will be conducted for each new hazardous material that is introduced to the workplace.
- Material Safety Data Sheets will be provided and maintained for all appropriate chemicals.
- A bulletin board with required regulatory postings and other information will be maintained at the Project site.
- Warning signs will be conspicuously posted in hazardous areas.

Safety training including the information below will be required for each new worker as described below:

- A list of safe work rules for the Project will be explained to each new worker.
- A copy of the applicable Safe Work Practices will be given to each new worker.
- The Hazard Communication Program and other applicable training and requirements for personal protection for the types of hazards that may be encountered at the Project site will be explained to workers. This training will be documented.

- Unusual hazards that are found on site will be explained in detail to each new worker, including any specific requirements for personal protection.

- Safety requirements for the new worker's specific job assignment will be explained by the worker's supervisor upon initial assignment and upon any reassignment.

5.7.2.6 Operations Personal Protective Equipment Program

In accordance with the Operations Personal Protective Equipment program, personal protective clothing and equipment will be used during specified work operations. Each worker will be provided the following information pertaining to the protective clothing and equipment:

- Proper use and maintenance
- When the protective clothing and equipment are to be used
- Benefits and limitations
- When and how the protective clothing and equipment are to be replaced

Each worker will be checked for proper fit and to see if the worker is medically capable of wearing the equipment.

All safety equipment will meet National Institute of Occupational Safety and Health or American National Standards Institute standards and will have all required markings, numbers, or certificates of approval. Table 5.7-3, Basic Protective Equipment Guide, contains a list of the basic protective equipment that will be used at the Project site.

5.7.2.7 Hazardous Materials Handling and Storage

Various hazardous materials will be stored and used during construction and operation of the Project. Chemicals will be stored, handled, and used so as to minimize risks to workers. All hazardous materials will be appropriately labeled and stored in hazardous materials storage facilities, as described in more detail in Section 5.12, Hazardous Materials.

Bulk hazardous liquids will be stored in aboveground storage tanks. Other hazardous materials will be stored in their delivery containers. Hazardous materials storage and chemical feed areas will be installed within secondary containment or curbing to contain leaks and spills. The containment areas will be sized to hold an appropriate volume (considering the potential for the local hazard contingencies) as designated by a California registered Professional Engineer. At a minimum, this volume will equal the full contents of the largest single tank plus sufficient capacity for precipitation from a 25-year, 24-hour storm event in the case of outdoor storage tanks.

A risk management plan (RMP) will be developed for the storage and use of any of the substances, as defined in § 112(r) of the Clean Air Act, in excess of their specific regulatory threshold. Specific California Accidental Release Prevention and/or RMP program requirements will be to be fulfilled. The RMP will detail specific safety requirements, procedures, and training to protect workers from exposure.

Depending on applicability, a Process Safety Management program consisting of an initial process hazard analysis (hazard evaluation) on processes covered by 29 CFR 1910.119 will be performed. The process hazard analysis shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the process. At least every five years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated to assure that it is consistent with current processes.

Safety showers and eyewash stations will be provided in or adjacent to corrosive chemical storage areas and in required areas in accordance with regulatory requirements. The PPE and spill response equipment for the exposure and cleanup will be readily available for plant personnel for use during spill containment and cleanup activities. A hazardous material emergency response team, trained in the handling of these emergencies and accidental releases of hazardous materials, will be available to the Project through contracted services. Emergency contact numbers will be available for spill response contractors and for notification of local agencies of spill incidents. These and other emergency procedures will be detailed in the Project Emergency Action Plan.

5.7.2.8 Evaluation of the CO_2 Vent Impacts on Worker Safety

The CO_2 vent stack will allow for start-up and intermittent emergency venting of produced CO_2 when the CO_2 compression, transportation, or injection system is unavailable. The CO_2 vent exhaust stream will be nearly all CO_2. A 260-foot stack height was chosen to satisfy HECA's inherently safe design practices to minimize ground-level CO_2 concentrations in the event of a CO_2 vent under very low wind speeds. To ensure workers are not exposed to high levels of CO_2, a dispersion modeling analysis was conducted with the PHAST (Process Hazard Analysis Software Tool) model. The model evaluated four venting scenarios (reduced to full venting rate) and four meteorological conditions (unstable to stable atmosphere).

The model predictions were compared to the Immediately Dangerous to Life and Health concentration, which is the threshold of unacceptable exposure to plant personnel based on a 30-minute exposure and the Cal/OSHA permissible exposure time weighted average for an 8-hour period.

The model predicted that neither exposure threshold was exceeded at ground level or off-site for any of the meteorological conditions examined. The closest location where workers could be at an elevated height is on the work platforms located on the gasifier structure about 330 feet southwest from the CO_2 vent and 260 feet above grade. The model predicted that workers would not be exposed to the Immediately Dangerous to Life and Health threshold at this location but could be exposed to the Cal/OSHA time-weighted average threshold if they remained on the gasifier structure for 8 hours.

Administrative controls, including CO_2 detectors (with alarms) on the gasifier platform, air packs, and worker training, would ensure that workers could vacate areas exposed to high levels of CO_2 to prevent prolonged exposure. A description of the modeling, including input parameters and output graphics, is provided in Appendix E-13, CO_2 Vent Study.

5.7.2.9 Operations Emergency Action Plan/Emergency Response Plan

In addition to the incorporation of various safety and environmental features and design measures to minimize emergencies and their effects on public and worker safety, the Project will develop a site-specific Emergency Action Plan/Emergency Response Plan. A typical plan outline is provided in Table 5.7-5, Sample Emergency Action/Emergency Response Plan Outline. This plan will be designed to address potential emergencies, including hazardous materials releases, fires, bomb threats, pressure vessel ruptures, and other catastrophic events. It will describe evacuation routes, warning devices, points of contact, assembly areas, responsibilities, and other actions to be taken in the event of an emergency. The plan will include a layout map and a fire extinguisher location list, and will describe arrangements with local emergency response agencies for responding to emergencies. The plan will be reviewed and updated, as appropriate, by the Operations Safety Manager.

5.7.2.10 Operations Fire Protection and Prevention Plan

In accordance with the Operations Fire Protection and Prevention Plan, fire protection at the Project site will include measures to safeguard human life, prevent personnel injury, preserve property, and minimize downtime due to fire or explosion. It will address sprinkler systems, water supplies, fire extinguishers, adequate exits, fire-safe construction, reduction of ignition sources, and control of fuel sources.

The Fire Protection and Prevention Plan will provide for fire protection practices, including routine inspections of the Project site by the designated safety representative. The plan will require prompt action to correct situations deemed to be a fire hazard, and it will identify firefighting equipment and systems at the Project site as well as methods to safely store flammable and combustible materials. Facilities will be designed by a California Registered Fire Protection Engineer, and fire protection equipment will be installed and maintained in accordance with all applicable NFPA standards and recommendations. A fire reporting protocol and an investigation protocol will be detailed in the Fire Protection and Prevention Plan. The plan will be reviewed and updated annually.

The comprehensive on-site fire protection system and procedures will be designed and implemented to protect both personnel and property. A Program Fire Protection and Prevention Plan will be developed to address:

- Names and/or job titles responsible for maintaining equipment and accumulation of flammable or combustible material control
- Procedures in the event of fire, including evacuation procedures
- Fire alarm and protection equipment
- System and equipment maintenance
- Monthly inspections
- Annual inspections
- Firefighting demonstrations
- Housekeeping practices
- Training

Fire Suppression

The following fire suppression systems will be incorporated into the Fire Protection and Prevention Plan as needed for proper protection from fire hazards:

- **CO_2 Fire Protection System.** This system protects the combustion turbines and accessory equipment compartments from fire. The system will have fire detection sensors in all compartments.

- **Aqueous Fire-Fighting Foam.** This system will be used for fire protection at the methanol tanks.

- **Deluge Spray System.** This system provides fire protection to the generator transformers, auxiliary power transformer, and lube-oil equipment in the event of fire. The deluge system will be fed by the firewater storage and supply system.

- **Fire Hydrants/Hose Stations.** This system will supplement the plant fire protection system. Water will be supplied from the plant firewater system. These will be located at approximately 300-foot intervals around the facility in accordance with NFPA 850 and local fire codes.

- **Sprinkler System.** This system will provide protection to the administration and maintenance buildings.

- **Smoke Detectors, Combustible Gas Detectors, and Hand-Held Fire Extinguishers.** These will be provided at all locations having potential fire hazards due to the presence of combustible liquids, solids, or other highly flammable materials, and where major property damage could result. Hand-held fire extinguishers will be strategically located at code-approved intervals throughout the facility and selected for the appropriate class of service.

Water will be used as the primary extinguishing agent. Chemical and gas extinguishing agents (permanently installed or in portable extinguishers) will be provided in special hazard areas where water will be ineffective or harmful to the equipment being protected.

The Project on-site fire suppression systems will be backed up by fire suppression support from the Kern County Fire Department. Both fire and emergency services will be provided from Kern County Fire Department Station 26 and other Kern County resources as needed. Firewater will be supplied from the firewater distribution system as described in Section 2.9.9, Fire Protection System.

5.7.2.11 OEHI Project

An analysis of worker safety in connection with the OEHI Project is included in Appendix A-1, Section 4.7, Hazards and Hazardous Materials, of this AFC Amendment. Appendix A-1 concludes that the OEHI Project will not have significant adverse impacts on worker safety.

5.7.3 Mitigation Measures

With the implementation of the health and safety protection programs described above, the Project would not result in any significant environmental impacts to worker health or safety during construction or operations. As a result, no mitigation measures for worker health or safety are necessary.

5.7.4 Laws, Ordinances, Regulations, and Standards

The following LORS are applicable or potentially applicable to the Project in the context of the public and occupational safety and health protection measures addressed in this section and in Section 5.6, Public Health. LORS applicable to worker safety are summarized in Table 5.7-6, Summary of LORS – Worker Safety.

5.7.4.1 Federal

Occupational Safety and Health Act of 1970 (Occupational Safety and Health Administration), 29 United States Code § 651 et seq.*; 29 Code of Federal Regulations § 1910* et seq.*; and 29 Code of Federal Regulations § 1926* et seq.

The authority establishes occupational safety and health standards (§1910) (i.e., permissible exposure limits for toxic air contaminants [§ 1910.100], electrical protective equipment requirements [§ 1910.137], Process Safety Management [§ 1910.119], electrical workers safety standards [§ 1910.269], and the requirement that information concerning the hazards associated with the use of all chemicals is transmitted from employers to workers [§ 1910.1200]) and safety and health regulations for construction (§ 1926). Subpart I of § 1910 and Subpart E of § 1926 address PPE.

Under the Operational Status Agreement of October 5, 1989 between the federal Occupational Safety and Health Administration (OSHA) and Cal/OSHA, the state resumed full enforcement responsibility for most of the relevant federal standards and regulations (55 Federal Reg. 18610 [July 12, 1990]; 29 CFR § 1952.172). Federal OSHA has retained concurrent enforcement jurisdiction with respect to certain federal standards, including standards relating to hazardous materials at 29 CFR § 1910.120).

The administering agencies for the above authority are OSHA and Cal/OSHA.

Department of Labor, Safety and Health Regulations for Construction Promulgated Under § 333 of the Contract Work Hours and Safety Standards Act, 40 United States Code 327 et seq.

The code establishes safety and health regulations for construction. The requirements for this regulation are all addressed in Title 8 CCR, Chapter 4, Subchapter 4, General Construction Safety Orders.

The administering agencies for the above authority are OSHA and Cal/OSHA.

Uniform Fire Code Article 80

The article includes provisions for storage and handling of hazardous materials. Considerable overlap exists between this code and Chapter 6.95 of the Health and Safety Code. However, the fire code does contain independent provisions regarding fire protection and neutralization systems for emergency venting (§ 80.303, D, Compressed Gases). Other articles that may be applicable include Article 4, Permits, and Article 79, Flammable and Combustible Liquids.

The administering agency for the above authority is the Kern County Environmental Health Services Department.

National Fire Protection Association

The NFPA prescribes minimum requirements necessary to establish a reasonable level of fire safety and property protection from the hazards created by fire and explosion. The standards apply to the manufacture, testing, and maintenance of the equipment.

The administering agency for the above authority is the Kern County Fire Prevention Division.

Site Security

Chemical Facility Anti-Terrorism Standards 6 Code of Federal Regulations Part 27

The standards establish a Chemical Security Assessment Tool, Ammonium Nitrate Security Program, Chemical-Terrorism Vulnerability Information (CVI), and chemical sector/facility training.

The administering agency for the above authority is the Department of Homeland Security.

Compliance

The Project will comply with all federal LORS by developing appropriate plans and policies as well as by measures described in Section 5.7.2, Environmental Consequences, and Section 5.7.4, Mitigation Measures.

5.7.4.2 State

Title 8 California Code of Regulations

These authorities prescribe general occupational safety and health regulations and standards in addition to the construction and industrial safety regulations, standards, and orders. The Project will comply with applicable sections of 8 CCR, Chapter 4, Subchapter 7 and 24 CCR. Specifically, 8 CCR § 1509 (Construction) and § 3203 (General Industry) include requirements for ensuring that employers have an effective work site IIPP. The CCR, Title 8, § 5189, requires facility owners to develop and implement effective Safety Management Plans to ensure that large quantities of hazardous materials are handled safely. Although such requirements primarily

provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Health and Safety Code § 25500

This code requires companies that handle hazardous materials in sufficient quantities to develop a Hazardous Materials Business Plan (HMBP). The HMBP includes the basic information on the location, type, quantity, and health risks of hazardous materials handled, stored, used, or disposed of that could be accidentally released into the environment; training new personnel; and annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. It also includes an emergency response plan and identifies the business representative assigned to assist emergency personnel in the event of a release.

The California Health and Safety Code § 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop an RMP and submit it to appropriate local authorities, the U.S. Environmental Protection Agency, and the designated local administering agency for review and approval. The RMP includes an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any pre-existing evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan and is known as the California Accidental Release Program. The Project will develop and submit an RMP prior to initial operation.

Compliance

The Project will comply with all state LORS by developing appropriate plans and policies as well as by measures described in Section 5.7.2, Environmental Consequences, and Section 5.7.4, Mitigation Measures.

5.7.4.3 Local

The Kern County Environmental Health Services Department is the administering local authority, and Certified Unified Program Agency, responsible for the HMBP and RMP.

Compliance

The Project will comply with all local LORS and will develop an HMBP for construction and operation of the new facility, and will develop an RMP for operation of the new facility. In addition, the Project will continue compliance by updating the appropriate plans and policies as well as by the measures described in Section 5.7.2, Environmental Consequences, and Section 5.7.4, Mitigation Measures.

5.7.5 Involved Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to worker safety are shown in Table 5.7-7, Agency Contacts.

5.7.6 Safety-Related Permits/Plans Required and Schedule

The safety-related permits/plans required for this Project are listed in Table 5.7-8, Applicable Permits. An HMBP will be developed prior to construction and will be updated prior to operation. An RMP will be developed and a Process Safety Management program initial process hazard analysis will be performed prior to the on-site production and storage of anhydrous ammonia.

5.7.7 References

American Conference of Governmental Industrial Hygienists, 2008. Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices.

CCR (California Code of Regulations), ND. Title 8. "General Industry Safety Orders, Construction Safety Orders, and High Voltage Electrical Safety Orders."

Cal/OSHA (California Department of Industrial Relations, Division of Occupational Safety and Health) Title 8 CCR, Division 1, Chapter 4 Division of Industrial Safety, Subchapter 4 Construction Safety Orders, and Subchapter 7 General Industry Safety Orders, Group 2 Safe Practices and Personal Protection – Article 7, Misc. Safe Practices, and Group 4 General Mobile Equipment and Auxiliaries – Article 29, Industrial Railroads.

Cal/OSHA (California Department of Industrial Relations, Division of Occupational Safety and Health) Title 8 CCR, Division 1, Chapter 4 Division of Industrial Safety, Subchapter 4 Construction Safety Orders, and Subchapter 7 General Industry Safety Orders.

CFR (Code of Federal Regulations) Title 6 Part 27 Chemical Facility Anti-Terrorism Standards.

CFR (Code of Federal Regulations). Title 29 Part 1910. " Occupational Safety and Health Standards."

CFR (Code of Federal Regulations), ND. Title 29 Part 1926. "Safety and Health Regulations for Construction."

CFR (Code of Federal Regulations). Title 49 Part 172. "Department of Transportation."

HECA (Hydrogen Energy California) Project Team, 2008. Field work and observations.

NFPA (National Fire Protection Association), 2006. *A Compilation of NFPA Codes, Standards, Recommended Practices and Guides*. Quincy, Massachusetts.

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Table 5.7-1
Potential Worker Hazards during
Facility Construction, Commissioning and Operation

Activity	Potential Hazard
Facility Construction and Commissioning	
All	Heat stress, slips/trip/falls, insects, small biting animals/insects, poison plants, severe weather, earthquake
Materials Handling, heavy equipment	Slips/trips/falls, musculoskeletal injury, crushing hazards, load hazards
Elevated Work	Slips/trips/falls, objects falling from above
Welding	Flash burns, explosion, thermal burns, toxic welding fumes
Excavations	Excavation/trench wall collapse, spoil movement, oxygen deficiency, buildup of toxic gases, fumes, vapors, dusts or mists, wet exposures, crushing hazards, confined spaces, potentially contaminated soil/waste
Cement/Forms/Steel Work	Slips/trips/falls, protruding objects, caustics, punctures, and lacerations
Equipment Operation	Noise, vehicle accidents, load hazards, induced current
Cranes, suspended loads	Dropped loads, tipping cranes, caught between hazards
Transmission Line/ Transformer Station	Slips/trips/falls, electrocution, arc-flash burns
Painting	Paint solvents, paint vapors, chemical burns, fire/explosion, slips/trips/falls
Abrasive Blasting	Dust, flying particles, pressure vessels, noise
Powered Hand Tools	Noise, dust, flying particles, cuts, amputation, crushing, spark
Fueling	Fire, explosion, environmental contamination
Chemical Delivery/Off-loading	Release, exposure
Steam	Burn
Confined Space Entry	Entrapment, hazardous atmosphere/internal temperature
Lockout/Tagout	Released energy
Electrical	Shock, burn
Pneumatic	Face/eye exposure
Hydraulic	Burn, face/skin/eye exposure
Railroad Yard/Rail Car Offloading	Dust, slips/trips/falls, foot, body/material storage/rail car clearances
Truck Delivery/Offloading	Dust, slips/trips/falls, foot, body/material storage/clearances
Facility Operations	
Materials Handling	Slips/trips/falls, musculoskeletal injury, crushing hazards, load hazards
Generation Enclosure	High voltage
Operations Building	High voltage, repetitive trauma

Table 5.7-2
Potential Worker Hazards during
Facility Construction, Commissioning and Operation (Continued)

Activity	Potential Hazard
Cooling Unit	Slips/trips/falls, noise, wet exposure, chemical exposure, rotating equipment
CO_2 Vent	Displacement of oxygen in the breathing zone
Transformer	Electrocution, flash burns
Battery Rooms	Chemical splashes, burns, reactions, gases, vapors, fumes
Gas Compressor	Fire, noise, temperature, rotating equipment, pressure
Compressed Gas Storage	Fire, explosion
Chemical Delivery, Off-loading and Storage	Chemical splashes, burns, reactions, gases, vapors, fumes
Machinery, General	Noise, temperature extremes, rotating equipment, pinch points, sharp edges, electrocution
Equipment Operation	Noise, vehicle accidents, load hazards, induced current, rotating equipment
Steam	Burn
Confined Space Entry	Entrapment, hazardous atmosphere
Lockout/Tagout	Released energy
Electrical	Shock, burn
Pneumatic	Face/eye exposure
Hydraulic	Burn, face/skin/eye exposure

Source: HECA Project.

Table 5.7-3
Worker and Contractor Training Programs

Training Course	Project Phase	Target Workers
Site Safety Orientation	C, O, and M	All
Injury and Illness Prevention Plan	C, O, and M	All
Project Emergency Action Plan	C, O, and M	All
Heavy Equipment Safety Plan	C, O, and M	Those working on or near heavy equipment
Compressed Gas and Pressurized Systems Safety	C, O, and M	Those working with or near compressed gas or pressurized systems
Thermal Stress (Heat/Cold)	C, O, and M	All
Forklift Operation	C, O, and M	Workers operating forklifts and working in close proximity to forklifts
Trenching and Excavation Safety/Use of Cal/OSHA Excavation Permits	C, O, and M	Workers involved in trenching and excavation activities
Fall Protection Program	C, O, and M	Workers required to wear fall protection
Hot Work	C, O, and M	Workers who may be required to perform hot work
Flammable and Combustible Liquids/Gases	C, O, and M	Workers who will handle flammable or combustible material
Scaffold Safety Program	C, O, and M	Workers who erect scaffolding
Hoisting and Rigging Safety Program	C, O, and M	Workers who conduct or oversee hoisting or rigging operations
Platform Lift Safety	C, O, and M	Workers who operate aerial platform or scissor lift
National Commission for the Certification of Crane Operators	C, O, and M	Workers who operate small and large telescoping cranes
Hazardous Energy Control	C, O, and M	Workers performing lockout/tagout
Electrical Safety	C, O, and M	Workers who work on or in close proximity to live electrical systems
Confined Space Entry Permit Program	C, O, and M	Workers who perform or supervise confined space work
Hand, Power and Powder Actuated Tool Safety	C, O, and M	All
Housekeeping Policy and Program	C, O, and M	All
Hearing Conservation	C, O, and M	All
Safe Lifting	C, O, and M	All
Vehicle Safety	C, O, and M	All
Hazard Communication	C, O, and M	All

Table 5.7-4
Worker and Contractor Training Programs (Continued)

Training Course	Project Phase	Target Workers
First Line Break	C, O, and M	Workers involved with maintenance or line breaking activities
Personal Protective Equipment and Respiratory Protection Program	C, O, and M	Workers who are required to wear PPE and/or respiratory protective equipment
Fire Prevention Program	C, O, and M	All
Process Safety Information and Management Procedures	O, and M	All
Process Hazard Analysis	O, and M	All
Equipment Integrity	O, and M	All
Management of Change	O, and M	All
Employee Participation	O, and M	All
DOT HazMat	C, O, and M	Workers required to handle, store, and prepare for shipment, hazardous material/waste
First Aid/CPR/AED	C, O, and M	All
Root Cause	O and M	Staff management and selected workers
HAZWOPER	O and M	Workers assigned to handle and store hazardous material/waste
Railroad Yard Vehicle Traffic Control	C, O and M	Workers working in and around the railroad yard

Source: HECA Project.
Notes:
AED = automated external defibrillator
C = Construction/Commissioning
Cal/OSHA = California Department of Industrial Relations, Division of Occupational Safety and Health
CPR = cardiopulmonary resuscitation
DOT = U.S. Department of Transportation
HazMat = hazardous materials
HAZWOPER = Hazardous Waste Operations and Emergency Response
M = Maintenance
O = Operations
PPE = personal protective equipment

Table 5.7-3
Basic Protective Equipment Guide

Body Area	Hazards	Recommended Protection
Eyes/Face	Low-velocity flying particles	Safety glasses with side shields
	High-velocity chips and sparks	Impact goggles or safety glasses with full face shield
	Corrosive liquid splash during transfer	Splash-proof goggles and face shield
	Breaking into an acid storage system	Acid hood
	Welding – injurious light rays	Welding hood with appropriate filter lenses
Head/Ears	General wear, overhead rigging, material handling, maintenance, and general construction processes	Hard hat
	High noise level	Ear plugs and/or muff
Respiratory System	Low-hazard inert dusts	Dust mask
	Low concentration solvent vapors	Cartridge-type organic vapor respirator
	Acid mists	Cartridge-type acid mist respirator
	High-concentration dusts or vapors	Air-line respirator or self-contained breathing apparatus
	Oxygen deficiencies or gases	Self-contained breathing apparatus
Hands and Arms	Handling rough or sharp objects	Leather gloves
	Handling hot objects	Insulated gloves
	Using solvents or other hazardous chemicals	Chemical-resistant synthetic gloves
Feet and Legs	General wear for light handling Handling heavy objects	Safety-toe shoes Metatarsal safety shoes
	Using brush hooks or scythes	Shin guards
	Working with corrosive liquids	Chemical-resistant safety-toe boots
	Underground work	Safety-toe synthetic boots
Trunk and Full Body	Hot or corrosive liquids	Synthetic apron
	Struck-by	High-visibility vest
	Punctures, impact, or cuts	Canvas or leather kickback apron or metal mesh apron
	Arc-flash, burns	Full body arc-flash PPE
	Breaking acid containers	Full body chemical-resistant coveralls
Fall Protection/ Rescue	Working from elevated structure or platform without standard railings	Full-body harness and lanyard
	Vessel entry	Harness and lifeline or wristlets and lifeline
	Suspended scaffolds	Lifeline, full-body harness/lanyard

Source: HECA Project.
Note:
PPE = personal protective equipment

Table 5.7-4
Location of Potential Worker Hazards at the Project
(Operational Phase)

Location	Slips, Trips and Falls	Powered Industrial Trucks	Acid[1]	Flammable Material/ Explosive dust	Hazardous Material	High Voltage	Noise[2]	Pressure Vessel	Gas Cylinders	Moving Equip-ment	High Temp.
Chemical Manufacturing Storage Areas/Tanks	X	X	X	X	X				X		
Control Room	X		X			X					
Cooling Units	X		X				X				
CO_2 Vent					X						
Feedstock Storage/Conveyors	X	X		X			X			X	
Gasification	X		X	X			X	X			X
Maintenance Shop/Warehouse	X	X		X	X		X		X	X	
Power Blocks	X		X	X	X	X	X	X	X	X	X
Switchyards	X				X	X					
Stacks	X								X		
Water Treatment Plant	X		X		X		X			X	
Battery Rooms	X		X		X						
Railroad Yard/Rail Car Offloading	X			X							
Delivery Truck Offloading	X			X							

Source: HECA Project.
Notes:
[1] Acid: Areas containing acids (sulfuric acid in batteries or sulfuric acid and hydrochloric acid for pH control).
[2] Noise: Area requiring noise protection.
CO_2 = carbon dioxide

Table 5.7-5
Sample Emergency Action/Emergency Response Plan Outline

Section Number	Description
1.0	**Introduction**
1.1	Purpose
1.2	Scope
2.0	**Responsibilities**
2.1	Incident Command System
	Emergency Response Coordinator
	Emergency Evacuation Coordinator
	Alternate
	Safety Coordinator
2.2	Position Description Assignments
	Construction/Facility Manager
	Construction/Facility Supervisor
	Operators
	Health and Safety Manager
	Security
3.0	**Response and Notification Plan (Points of Contact)**
3.1	Supervisor/Emergency Coordinator
3.2	Health and Safety Manager
4.0	**Response Procedures**
4.1	Evacuation Routes and Procedures
4.2	Accidents Involving Serious Injury and/or Death
4.3	Fire
4.4	Hazardous Waste or Chemical Spills
4.5	Earthquake
4.6	Bomb Threat
4.7	Emergency Plant Shutdown and Critical Operations
4.8	Site Security
4.9	Emergency Medical Treatment and First Aid
4.10	Decontamination
4.11	Documentation and Recordkeeping
4.12	News Media
4.13	Emergency Notification List

Table 5.7-5
Sample Emergency Action/Emergency Response Plan Outline
(Continued)

Section Number	Description
4.14	Emergency Telephone Numbers List
5.0	**Reference Procedures**
5.1	Evacuation Plan
5.2	Emergency Equipment Locations
5.3	Fire Extinguisher/Systems Locations
5.4	Security
5.5	Accident Reporting and Investigation
5.6	Lockout/Tagout
5.7	Hazard Communication
5.8	Spill Containment and Reporting
5.9	First Aid and Medical Response
5.10	Respiratory Protection
5.11	Personal Protective Equipment
5.12	Sanitation
5.13	Work Site Inspections

Source: HECA Project.

Table 5.7-6
Summary of LORS—Worker Safety

LORS	Applicability	Conformance (Section)
Federal		
Occupational Health and Safety Act of 1970, 29 USC 651 *et seq.*; 29 CFR 1910 *et seq.*; and 29 CFR 1926 *et seq.*	Worker health and safety standards for general industry and the construction industry	5.7
Department of Labor, Safety and Health Regulations for Construction Promulgated Under § 333 of the Contract Work Hours and Safety Standards Act, 40 USC 327 *et seq.*	Worker health and safety standards for construction activities; requirements addressed by CCR Title 8, General Construction Safety Orders	5.7
National Fire Protection Association	Standards necessary to establish a reasonable level of safety and property protection from the hazards created by fire and explosion	5.7
State		
CCR, Title 8	Requirements for a safe and hazard-free working environment; categories of requirements include General Industry Safety Orders, General Construction Safety Orders, Electrical Safety Orders, Industrial Railroads	5.7
California Clean Air Act, California Health and Safety Code 39650 *et seq.*	Requirements for best available control technology to minimize exposure limits to toxic air pollutants and possible risk assessments for carcinogen pollutants	5.1 and 5.6
California Public Resources § 25523(a); 20 CCR § 1752, 1752.5, 2300.2309, and Division 2, Chapter 5, Article 1, Appendix B, Part (I), CEC California Health and Safety Code § 25500 to 25541; 19 CCR §§ 2720-2734	Requirements for estimating emissions for listed air toxic pollutants and submitting inventory to air district for major sources of criteria air pollutants; follow-up from air district may require a health risk assessment	5.1 and 5.6
Local		
Kern County Zoning Ordinance, Title 19 of the Kern County Ordinance Code	Provide required setbacks	5.11
Kern County Environmental Health Services Department	Oversees administration of state hazardous materials programs including Hazardous Materials Business Plans, Risk Management Plans, and Uniform Fire Code	5.7.4

Source: HECA Project.
Notes:
CCR = California Code of Regulations
CEC = California Energy Commission
CFR = Code of Federal Regulations
LORS = laws, ordinances, regulations, and standards
USC = United States Code

Table 5.7-7
Agency Contacts

Agency/Address	Telephone	Title
California Occupational Safety and Health Administration District Office 6150 Van Nuys Boulevard, Suite 405 Van Nuys, CA 91401	818-901-5403 818-901-5578 (fax)	Trenching and Excavation Permit Permit to erect fixed tower crane Erection and dismantle scaffolds, false work, or vertical shoring systems Elevator and material lift permits Site Construction Safety Plans Injury and Illness Prevention Program
Kern County Environmental Health Services Department – Hazardous Materials Management Specialist	661-862-8700	Hazardous Materials Business Plans and Risk Management Plans
Kern County Fire Department – Station 26, Buttonwillow	661-764-5225	Construction Fire Protection and Prevention Plan Operational Fire Protection and Prevention Plan

Source: Cal/OSHA; Kern County Environmental Health Services Department.

Table 5.7-8
Applicable Permits/Plans

Permit/Approval Required	Schedule
Federal	
Process Safety Management	30 days prior to production/storage of ammonia
State	
Permit for Construction Activities – includes a copy of the Construction Injury and Illness Prevention Plan and Code of Safe Practices	60 days prior to construction activities
Tower Crane Permit	60 days prior to erecting a tower crane
Permit to Operate Pressure Vessels	60 days prior to pressurizing vessels
Elevator and Material Lift Permits	60 days prior to operating lifts
Local (Kern County)	
Risk Management Plan (RMP)	30 days prior to ammonia production and storage
Hazardous Materials Business Plan (HMBP)	30 days prior to hazardous materials storage at the site

Source: CFR and Cal/OSHA; Kern County Environmental Health Services Department.

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5.8 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

This section describes potential impacts to the social and economic environment in the vicinity and region resulting from construction and operation of the Project. The section presents estimated impacts to population, housing, employment, public services (fire protection and emergency services, hospitals, law enforcement, and schools), utilities, tax revenue, and economic activity attributable to the Project. The section also includes a discussion of compliance with permits and laws, ordinances, regulations, and standards (LORS) relevant to socioeconomics.

Socioeconomic information related specifically to the OEHI Project is contained in the following sections of Appendix A to this AFC Amendment:

- Section 4.12: Population and Housing
- Section 4.13: Public Services
- Section 4.14: Recreation
- Section 4.16: Utilities and Service Systems
- Section 4.17: Environmental Justice

5.8.1 Affected Environment

This subsection describes existing economic and demographic conditions at varying geographic levels. First, the section presents information for Kern County and the City of Bakersfield, and for Los Angeles County, which borders Kern County to the south. Information for Los Angeles County is presented because while it is expected that the majority of the construction labor force will be drawn from Kern County, it is also possible that some portion of the labor force will be drawn from Los Angeles County. Next, the section presents information for the Project Site and the nearby unincorporated communities of Tupman and Buttonwillow. In addition, this section also presents information for the existing coal storage/transfer facility, which is located in Wasco. Figure 5.8-1, Socioeconomic Study Area, shows the socioeconomic study area.

5.8.1.1 Economy: Labor Force, Employment, and Income

Kern County

Primary components of the Kern County economy are value-added agriculture; transportation, logistics and warehousing; energy and chemicals; aerospace and defense; business and professional services; and tourism, recreation, and entertainment. Defense and space activities include: Edwards Air Force Base, China Lake Naval Weapons Center, the National Aeronautics and Space Administration-Dryden Flight Research Center, and the East Kern (Mojave) Airport District. Edwards Air Force Base and China Lake Naval Weapons Center are two of Kern County's major employers, joined in that category by Kern County government and Giumarra Farms (Greater Bakersfield Chamber of Commerce, 2012). Kern County is the largest oil-producing county in California, containing approximately 70 percent of California's oil reserves (Kern County Assessor's Office, 2012). Kern County ranked third among California counties, as well as among U.S. counties, in terms of the value of agricultural production in 2007 (USDA, 2012).

In 2010, the Kern County civilian labor force of 368,500 represented 2.0 percent of the California civilian labor force of 18,541,318. The Kern County civilian labor force increased by 2.0 percent, annually, between 2000 and 2010, and 1.3 percent, annually between 1990 and 2000. From 2000 to 2010, the Kern County civilian labor force grew faster than the civilian labor force in California by 2 percentage points (Table 5.8-1, Kern County Labor Force, Employment, and Industry).

The industries with the highest employment in Kern County in 2010 were government; trade, transportation, and utilities; and farming. Kern County construction employment in 2010 was approximately 12,200, representing approximately 5 percent of total industry employment (Table 5.8-1, Kern County Labor Force, Employment, and Industry) (CEDD, 2010a).

From 2000 to 2010, the fastest-growing industries were natural resources and mining; manufacturing; education and health services; leisure and hospitality; and government. Notably, farming employment declined 3.0 percent annually during the period from 2000 to 2010 (CEDD 2010a; CEDD, 2010b).

Kern County's unemployment rate decreased from 10.9 to 8.2 percent during the period from 1990 to 2000, and increased from 8.2 to 15.9 percent during the period from 2000 to 2010. Compared to California, the Kern County unemployment rate was 15.9, 3.5 percentage points higher than the California rate of 12.4 percent in 2010 (Table 5.8-1, Kern County Labor Force, Employment, and Industry) (CEDD, 2010a). U.S. unemployment rates increased during the recent nationwide economic recession, but are expected to decrease in the near future as the economy improves. The projected unemployment rates for Kern County and California are expected to reduce to 7.7 percent and 5.4 percent, respectively, in 2020 as illustrated in Table 5.8-2, Current and Projected Unemployment Rates (Caltrans, 2011).

Between 2008 and 2018, employment in Kern County is expected to grow approximately 1.35 percent annually, and for the same time period, the state of California is expected to grow at approximately 0.97 percent annually. Kern County industries that are anticipated to grow the most during the period 2008 to 2018 are education services, health care, and social assistance; professional and business services; leisure and hospitality; and trade, transportation, and utilities. Education services, healthcare, and social assistance employment is anticipated to grow by 40 percent, with an average annual rate of 4.04 percent (CEDD, 2010c).

The value of agricultural production in 2007 in Kern County was $4.1 billion; 75 percent of this was in crop sales. Kern County ranked third among California counties, as well as among U.S. counties, in terms of the value of agricultural production in 2007 (USDA, 2012).

In 2010, wage and salary disbursements in Kern County were $12.5 billion. The average wage per job that year was $44,223, compared to $54,399 in California on average (BEA, 2010). Total personal income in 2009 in Kern County was approximately $23.9 billion. Per capita income in 2009 was $29,630 in Kern County and $42,395 in the state of California (BEA, 2009). Taxable sales in Kern County in 2010 were $2.7 billion, increasing 10.5 percent from year to year (CBOE, 2010).

Kern County residents commuted approximately 23 minutes to work, on average, in 2010 (City Data, 2011). Approximately 94 percent of Kern County residents work in Kern County and approximately 3 percent work in Los Angeles County (U.S. Census Bureau, 2012a).

In 2007, 16,556 business establishments existed in Kern County. Approximately 59 percent of the establishments were services firms. Over half of the businesses had between one and four employees, and 95 percent of the businesses had fewer than 50 employees (CDOF, 2007).

Kern County adopted the *County of Kern Economic Development Strategy* on September 2, 2009 (updated 2009, adopted 2010). The strategy includes five initiatives: (1) cluster network development strategies, (2) human resources and skills development, (3) land use and infrastructure planning, (4) tourism marketing and branding Kern County, and (5) financing entrepreneurship and innovation. Kern County plans to strengthen its industry clusters, which

include value-added agriculture; transportation, logistics, and warehousing; energy and chemicals; aerospace and defense; business and professional services; tourism, recreation, and entertainment (KC, 2010a).

Kern County attracts new residents and businesses through its land availability, lower costs of living, shorter commute times, and lower costs of doing business when compared to areas west of Kern County near the coast. *The Path to Sustainable Prosperity: Kern County's Economic Development Strategy* (KC, 2012b) summarizes the Kern County economic development plan and states that Kern County faces the following challenges related to economic development:

- Balancing demand for residential development with commercial and industrial uses
- Cyclical and uncertain nature of the oil and aerospace industry
- Seasonal nature of the agricultural industry
- Modest growth in new business
- Limited educational and skills attainment by the Kern County labor force
- Out-migration of young people
- Air quality issues in Kern County
- High percentage of low-to-moderate income residents

City of Bakersfield

The City of Bakersfield is located in central Kern County, equidistant from Fresno, 110 miles to the north, and Los Angeles, 110 miles to the south. Bakersfield is the county seat, and the central commercial and business location for Kern County, covering 135 square miles, beginning approximately 7 miles east of the Project Site. Top employers in Bakersfield include government entities such as Edwards Air Force Base, Kern County, and China Lake Naval Weapons Center; and private entities such as Giumarra Farms, Grimmway Farms, and Wm. Bolthouse Farms, Inc. Meadows Field Airport is operated by Kern County, and is located 7 miles north of downtown Bakersfield. Meadows Field Airport serves approximately 700,000 people in the San Joaquin Valley (Meadows Field, 2012).

In 2010, 64 percent of the over-16 labor force in Bakersfield is employed, compared to 59 percent in Kern County and 58 percent in California. The unemployment rate in Bakersfield in 2010 was 16.4 percent, which was higher than the rate for Kern County (15.9 percent) and higher than the statewide rate of 12.4 percent) (U.S. Census Bureau, 2010a; U.S. Census Bureau, 2009a; City of Bakersfield, 2010; Caltrans 2011). The relatively high unemployment rate in Bakersfield, compared to some other areas in the state and county, is in part due to the cyclical (oil production and aerospace) and seasonal (agricultural) nature of employment, and is a challenge for the area's economy.

Occupations in Bakersfield with the most employees in 2010 were management, business, science, and arts occupations (33 percent); sales and office occupations (25 percent); and service occupations (19 percent) (ACS, 2010). Industries with the highest employment levels were trade, transportation, and utilities (15 percent); local government (15 percent); educational and health services (10 percent); and retail trade (10 percent) (U.S. Census Bureau, 2010c).

Bakersfield median household income in 2010 was $53,038, compared to $45,524 in Kern County, and $58,931 in California (U.S. Census Bureau, 2010a). The percentage of Bakersfield individuals living below the poverty level in 2010 was 19 percent, compared to 21 percent in Kern County and 14 percent in California (U.S. Census Bureau, 2010d).

Approximately 77 percent of Bakersfield residents' work commute is less than 30 minutes, while another 7 percent have a work commute of 60 minutes or more (U.S. Census Bureau, 2010b). The mean travel time to work for Bakersfield residents in 2009 was 22.2 minutes, compared to 27 minutes for California residents (City Data, 2011).

Taxable sales in Bakersfield in 2010 were $1,155,082,000, $886,545,000 of which occurred at retail sales establishments (CBOE, 2010).

The housing market in Bakersfield experienced a recent downturn, similar to many other markets across the United States. From 2002 to 2005, when prices in areas such as Los Angeles, San Francisco, and San Diego increased substantially, buyers recognized the affordability of inland cities such as Fresno, Bakersfield, and Modesto. Sales in the inland cities, including Bakersfield, increased. Beginning in 2006, the incidence of foreclosure increased in Bakersfield, similar to the rest of California and the United States. In September 2006, housing supply and home sale time-frames had increased substantially. The bottom of the market was April 2009, when the median sale price was approximately $115,000. The housing market has continued to fluctuate since that time, with the price of an existing single-family home in the Bakersfield area being $119,975 in February 2012, which is down 7.7 percent from January and down 4 percent from a year earlier (Bakersfield.com, 2012).

The 2011 Comprehensive Annual Financial Report for the City of Bakersfield reports that between 2010 and 2011, Bakersfield experienced decreases in property tax revenues, and improvements in sales tax revenue, compared to 2008–2010. Property tax is anticipated to decrease again in 2011–2012, and sales tax projections remain uncertain (City of Bakersfield, 2011).

Los Angeles County

Primary components of the Los Angeles County economy are trade, transportation, and utilities; professional and business services; government; education and health services; and leisure and hospitality. In 2007, 395,181 business establishments existed in Los Angeles County. Approximately 70 percent of the establishments were services firms. Over half of the businesses had between one and four employees (CDOF, 2012). Major employers in Los Angeles County include the following companies (CEDD, 2012b).

- All Nations Church
- American Honda Motor Co Inc.
- California Institute of Technology
- California State University-Northridge
- Columbia Broadcasting System Television City
- Cedars-Sinai Medical Center
- Century Plaza Towers

- Columbia Tri Star Motion
- Dispensary
- Long Beach Memorial Medical Center
- Los Angeles County Sheriff
- Los Angeles Police Department
- Martin Luther King Jr. Multi-Service Ambulatory Care Center
- Nestle USA
- Providence Health-San Fernando
- Providence Health-Southern California
- Santa Monica College
- Six Flags Magic Mountain Inc.
- Sony Pictures Entertainment
- Torrance Memorial Medical Center
- University of California, Los Angeles
- University of California, Los Angeles Health System
- Walt Disney Company
- Woodlands Hills Medical Center
- Worldwide Corporate Housing

In 2010, the Los Angeles County labor force of 4.9 million represented over one quarter of the California labor force of 18.3 million. The Los Angeles County labor force increased by 0.3 percent (annually) between 1990 and 2000, and 0.4 percent (annually) between 2000 and 2010 (Table 5.8-3, Los Angeles County Labor Force, Employment, and Industry) (CEDD, 2010b; CEDD, 2012c). Construction employment in Los Angeles County in 2010 was approximately 104,300, representing approximately 3 percent of total industry employment in Los Angeles County (Table 5.8-3).

From 2000 to 2010, the fastest-growing industries in Los Angeles County were government; education and health services; other services; trade, transportation, and utilities; and leisure and hospitality. Notably, manufacturing employment declined 3.3 percent annually from 2000 to 2010 (CEDD 2010b; CEDD 2012a).

The unemployment rate in Los Angeles County decreased from 5.8 percent to 5.4 percent from 1990 to 2000, and increased from 5.4 percent to 12.6 percent during the period 2000 to 2010. Compared to the state of California, the Los Angeles County unemployment rate was 0.3 percentage points higher than the California rate of 12.4 percent in 2010, indicating a higher concentration of unemployed residents in Los Angeles County (Table 5.8-3, Los Angeles County Labor Force, Employment, and Industry) (CEDD, 2010c; U.S. Census Bureau, 2010a). The unemployment rate in Los Angeles County was 12.7 percent in 2010, and is projected to be 5.8 percent in 2020, 5.8 percent in 2030, and 5.7 percent in 2040 (Caltrans, 2011).

Between 2008 and 2018, employment in Los Angeles County is expected to grow 0.94 percent annually. The same measure for the state of California is higher, at 0.97 percent. Los Angeles County industries that are anticipated to grow the most between 2008 and 2018 are education and health services; professional and business services; and wholesale trade. Construction employment is anticipated to grow by 0.9 percent annually (CEDD, 2010c).

Los Angeles County residents commuted approximately 29 minutes to work, on average, in 2005 (CDOL, 2008). Approximately 93 percent of Los Angeles County residents work in Los Angeles County. An additional 4 percent (approximately) of Los Angeles County residents work in Orange County. San Bernardino County and Ventura County employers each employ 1 percent of the Los Angeles County labor force. Less than 1 percent of Los Angeles County labor force participants work in Kern County (U.S. Census Bureau, 2008).

Community of Tupman

The unincorporated community of Tupman encompasses approximately 0.5 square mile, and the center of the community is located approximately 2 miles southeast of the Project Site.

In 2009, 10 business establishments existed in the Tupman zip code area (93276), including three health care and social assistance firms, three mining companies, two wholesale trade companies, one finance and insurance company, and one professional and business services firm. One of the two mining companies employed the most people in the zip code area (between 250 and 499 employees) (U.S. Census Bureau, 2009b).

Between 2005 and 2009 the residents of Tupman were most commonly employed by retail trade or in the administrative and support and waste management services. The estimated median house and condominium value in 2009 was $54,877, compared to $384,200 for California. Median household income was $24,854 in 2009, representing 42 percent of the California median household income that year ($58,931) (City Data, 2011).

Community of Buttonwillow

The unincorporated community of Buttonwillow occupies approximately 7 square miles, and its center is located approximately 7 miles northwest of the Project Site.

In 2009, 48 business establishments existed in the Buttonwillow zip code area (93206), the majority of which were in accommodation and food services (25 percent of firms) and retail trade (21 percent). One of the retail companies and one of the manufacturing companies employed the most people (50 to 99 employees) (U.S. Census Bureau, 2009b).

Agriculture and related activities are also important in Buttonwillow. For example, BW Implement is a business establishment that manufactures agricultural supplies and equipment in the community.

The estimated median house and condominium value in 2009 in Buttonwillow was $134,134, compared to $384,200 for California. Median household income was $41,272 in 2009, representing 70 percent of the California median household income ($58,931) that year (City Data, 2011).

City of Wasco

The incorporated city of Wasco is approximately 7.6 square miles, and its center is located approximately 17.5 miles north of the Project Site.

In 2009, 173 business establishments existed in Wasco's zip code area (93280), the majority of which were retail trade (22 percent of firms) and accommodation and food services (14 percent). Health care and social assistance, retail trade, manufacturing, and forestry, fishing, hunting, and agriculture support employed the most people (between 100 and 249 employees) (U.S. Census Bureau, 2009b).

The estimated median house and condominium value in 2009 in Wasco was $143,385, compared to $384,200 for California. Median household income was $39,046 in 2009, representing 66 percent of the California median household income ($58,931) that year (City Data, 2011).

5.8.1.2 Population, Housing, and Demographics

Kern County

The population of Kern County was 839,631 in 2010, representing 2.2 percent of the state population (Table 5.8-4, Population Trends and Projections). Table 5.8-4 shows that average annual growth rates in Kern County population were 1.6 percentage points higher than the same rates for California, during the period from 2000 to 2010. The gap between the state growth rate and Kern County growth rate is expected to widen in future years (2010 to 2050) as the Kern County population growth rate increases. During the period from 2010 to 2020, the Kern County population is expected to grow 2.5 percent per year, on average, which is almost double the expected rate for California for the same period (CDOF, 2007).

Approximately 64 percent of the population in Kern County (534,051 people) resided in the incorporated cities in 2010. Of the 11 cities in Kern County, Bakersfield had the most residents (approximately 347,483 people), followed by Delano (54,447 people), Ridgecrest (28,726 people), and Wasco (25,541 people) in 2010. Arvin, Shafter, Tehachapi, McFarland, and California City were home to between 13,000 and 17,000 people. Taft had approximately 9,000 residents and Maricopa had slightly over 1,000 residents in 2010 (CDOF, 2010).

Kern County had approximately 281,735 housing units in 2010, including 73 percent single-family homes, 18 percent multi-family homes, and 9 percent mobile homes. The vacancy rate in 2010 was 9.9 percent, 4.0 percentage points higher than the California vacancy rate. Kern County had approximately 2 percent of the total housing units in the state, as well as higher percentages of multi-family homes and mobile homes when compared to the state (Table 5.8-5, Regional Housing Characteristics, January 2010).

Kern County residents were 62 percent minority in 2010. Also in 2010, approximately one-fifth of Kern County residents lived below the poverty level (Table 5.8-6, Race and Poverty Data in 2010).

City of Bakersfield

The population of Bakersfield was estimated at 347,483 in 2010, representing approximately 41 percent of the Kern County population (Table 5.8-4, Population Trends and Projections). During the period from 2000 to 2010, Bakersfield grew 2.9 percent per year on average, equal to Kern County and faster than California as a whole.

In 2010, the City of Bakersfield contained approximately 116,692 housing units, including 74 percent single-family homes, 24 percent multi-family homes, and 2 percent mobile homes. Bakersfield has more single-family and multi-family homes and fewer mobile home units as a percentage of total housing units when compared to Kern County. The Bakersfield housing unit vacancy rate in 2010 was 5.5 percent, which was lower than the same measure for Kern County, and slightly lower than the same measure for California as a whole (Table 5.8-5, Regional Housing Characteristics, January 2010).

Approximately 39 hotels with 5,400 rooms are located in Bakersfield. The most recent annual occupancy estimate is 63 percent occupancy for Bakersfield hotels for calendar year 2011, representing a 13 percent increase from the previous year. The trend is expected to slightly increase this year as the local and national economy recovers and both leisure and corporate travel increase. Hotel occupancy rates can range from low to very high depending on events and conventions in Bakersfield (Lyman, 2012).

Over half of Bakersfield residents were minorities in 2010. The percentage of residents living below poverty levels was 19 percent of the Bakersfield population in 2010 (Table 5.8-6, Race and Poverty Data). The poverty percentage is 2 percentage points less than the same measures for Kern County as a whole.

Community of Tupman

Tupman is a small, unincorporated community of approximately 161 people. The Tupman Census Designated Place was 7.5 percent minority and 40 percent low-income in 2010. The percentage minority for Tupman was substantially lower than the same measure for Kern County and California. The low-income percentage of population in Tupman in 2010 was substantially higher than the same measure for Kern County and California (see Table 5.8-6, Race and Poverty Data in 2010).

Community of Buttonwillow

Buttonwillow is a low-income, predominantly Spanish-speaking, farmworker community of approximately 1,508 residents (in 2010). The Buttonwillow Census Designated Place was 65 percent minority and 27 percent low-income in 2010. The low-income percentage of population in Buttonwillow is substantially higher than the same measure for Kern County and California as a whole (Table 5.8-6, Race and Poverty Data in 2010), but lower than that of Tupman.

City of Wasco

Wasco had approximately 25,545 residents in 2010. The City of Wasco was about 50 percent minority and 20 percent low-income in 2010. The low-income percentage of population in Wasco is substantially higher than that of the state of California, but lower than that of neighboring towns of Tupman and Buttonwillow.

Los Angeles County

The population of Los Angeles County was 9.8 million in 2010, representing 26 percent of the state population (U.S. Census Bureau, 2010a). Table 5.8-4 shows that average annual population growth rates in Los Angeles County were 0.5 percentage points lower than the same rates for California, during the period from 2000 to 2010. The growth rate for Los Angeles County for the period from 2010 to 2020 is expected to be 0.7 percent annually, compared to 1.3 percent for California (CDOF, 2010).

Approximately 90 percent of the population in Los Angeles County (9.8 million people) resided in the incorporated cities in 2010. Of the 88 cities in Los Angeles County, the city of Los Angeles had the most residents (approximately 4 million people), followed by Long Beach (495,000 people), Glendale (208,000 people), and Santa Clarita (178,000 people) in 2010. Twelve additional cities had populations over 100,000, and an additional 23 cities had populations over 50,000 (U.S. Census Bureau, 2010a; CDOF, 2010).

Los Angeles County had approximately 3.4 million housing units in 2010, including 55 percent single-family homes, 43 percent multi-family homes, and 1.7 percent mobile homes. The vacancy rate that year was 4.2 percent, 1.7 percentage points lower than the California vacancy rate. Los Angeles County has approximately one-quarter of the total housing units in the state, as well as higher percentages of multi-family homes when compared to the state (Table 5.8-5, Regional Housing Characteristics, January 2010).

Los Angeles County residents were 72 percent minority in 2010, and approximately 18 percent of Los Angeles County residents lived below the poverty level (Table 5.8-6, Race and Poverty Data in 2010).

Immediate Project Vicinity

As shown in Figure 5.8-2, Census Tracts within a 6-Mile Radius of the Project Site, census tracts 33.04 and 37.00 lie within 6 miles of the Project Site. Census Tract 33.04 covers over 622 square miles and includes the communities of Valley Acres, Dustin Acres, McKittrick, Derby Acres, and a portion of the city of Taft. The population within Census Tract 33.04 was 17 percent minority and 24 percent low-income in 2010. Census Tract number 37.00 encompasses approximately 186 square miles and includes the community of Buttonwillow. The population living in Census Tract 37.00 was 50 percent minority and 37 percent low-income in 2010 (Table 5.8-6, Race and Poverty Data in 2010).

More than 1,000 hotel rooms are located within a 30-minute drive of the Project Site. In Buttonwillow, two hotels are located east of the center of town near the Interstate 5 interchange, and have approximately 196 rooms (Roadside America, 2012). Excluding Bakersfield (which has a total of approximately 5,400 hotel rooms), the next closest cluster of hotels is in Lost Hills, located 20 miles northwest of Buttonwillow, along Interstate 5 (Lyman, 2008).

5.8.1.3 Public Services and Utilities

Fire Protection and Emergency Response

The Kern County Fire Department (KCFD) provides the Project Site with fire prevention and protection and emergency medical services. KCFD provides these services to unincorporated Kern County and the cities of Arvin, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco. The KCFD staffs 46 full-time fire stations, divided into seven battalions, with 546 firefighters (KCFD, 2012).

The fire station closest to the Project Site is Fire Station Number 25, located at 100 Mirasol Avenue in Buttonwillow, approximately 6 miles northwest of the Project Site. The second closest fire station is Fire Station Number 24, located at 23246 2nd Street, in McKittrick, approximately 7 miles (by road) south of the Project Site (Tisinger, 2012; KCFD, 2012). No fire stations are located within 1 mile of the Project Site.

The KCFD works in the same location and in conjunction with the Kern County branch of the California Office of Emergency Services. The joint Kern County/City of Bakersfield Dispatching facility provides dispatch and emergency communications for the unincorporated area of Kern County (which includes the Project Site) and all cities in Kern County. The KCFD has a mutual aid agreement with the only other fire department in Kern County, the Bakersfield Fire Department, as well as 14 other neighboring fire suppression organizations (Tisinger, 2012; Cal EMA, 2012; KCFD, 2012).

The first alarm response to the Project Site for a medical emergency will be one engine company staffed with three personnel from Buttonwillow Fire Station Number 25. For a more serious emergency such as a structure fire, additional response units will include an engine company from Station Number 25, two from Station Number 24, and three from Taft Fire Station Number 21. Additionally, a total of 11 units would be dispatched for a larger scale fire-related emergency. A hazardous materials unit based in Bakersfield is also available to respond to emergencies near the Project Site (Tisinger, 2012).

Hall Ambulance Service provides emergency ambulance services to the majority of Kern County at a level of advanced life support. Hall Ambulance Service is based in Bakersfield and includes helicopter response service. Hall Ambulance Service would respond to a situation at the Project Site that requires ambulance service (Hall Ambulance, 2012a).

Medical Facilities

Eight hospitals are within 48 miles of the Project Site, as shown on Table 5.8-7, Hospitals in the Project Vicinity. The hospitals closest to the Project Site are Mercy Southwest and HealthSouth Bakersfield, located approximately 21 miles northeast and 25 miles east of the site, respectively. Table 5.8-7 shows each hospital's distance from the Project Site, as well as the number of beds at each facility (KEDC, 2009; Hospital-Data.com, 2012).

Law Enforcement

The Kern County Sheriff's Department provides law enforcement services to the unincorporated portion of Kern County, which includes the Project Site. The department has approximately 1,240 employees, of which approximately 46 percent (572) are in sworn positions. These include deputies in the Bakersfield Metropolitan Patrol Division, officers at 13 substations, detention officers, detectives, and other support positions. The location of the department's administrative office is 1350 Norris Road, approximately 30 miles northeast of the Project Site.

The Taft substation of the Kern County Sheriff's Department would provide law enforcement services to the Project Site. The Taft substation is located at 311 North Lincoln Street in Taft, approximately 16 miles southwest of the Project Site. Staff at this substation includes nine deputies, two detectives, a school resource deputy, and an assigned bailiff (KCS, 2012).

Schools

The Project Site is located within the boundaries of the Elk Hills Elementary School District and the Taft Union High School District (Elk Hills Boundaries, 2009; Taft Union Boundaries, 2009).

The Elk Hills Elementary School District operates one school (Elk Hills Elementary), at which 81 students were enrolled during the 2009-–2010 school year. The six full-time equivalent teachers at Elk Hills teach Kindergarten through Grade 8. Elk Hills Elementary School is located at 501 Kern Street in Tupman, approximately 2 miles southeast of the Project Site. Students from Elk Hills Elementary feed into Taft High School, which is part of Taft Union High School District, approximately 2 miles southeast of the Project Site. Taft Union High School District operates one other high school and one continuation school, in addition to Taft High School, with a total enrollment of 1,043 students during the 2009–2010 school year. Seventy-five teachers teach at Taft Union High School District schools (CA HomeTownLocator, 2010).

These two school districts combined had an annual average rate of growth of less than 1 percent for the period from the 1993–1994 school year through the 2010–2011 school year, as shown on Table 5.8-8, School Enrollment Trends. During this period, enrollment at the high school increased slightly, while enrollment in the elementary school nearly doubled. The enrollment capacity of Elk Hills Elementary School District is 225 students. Elk Hills Elementary School District does not publish enrollment projections; however, the District anticipates meeting capacity within the next 10 years (Neufeld, 2012). Taft Union High School District currently has an enrollment capacity of slightly over 1,000 students; although current enrollment is near capacity, the school district does not believe that student enrollment within the next 10 years would overburden the district (Gregory, 2012).

Colleges and universities with more than 200 students that are located within 50 miles of the Project Site include Bakersfield College and California State University – Bakersfield. Bakersfield College had approximately 33,235 students enrolled in the 2007–2008 school year and is located approximately 26 miles east of the Project Site (Bakersfield College, 2012). California State University – Bakersfield had an enrollment of approximately 7,639 day students in the fall of 2007 and is located approximately 31 miles east of the Project Site (CSUB, 2009). Several trade schools are also located in Bakersfield.

Utilities

West Kern Water District provides drinking water to the Project Site area. No municipal sanitary system is available on site or near the Project Site. Century Link provides local and long distance telephone service to businesses and homes near the Project Site, and several cellular telephone companies, such as Verizon, provide service to the area. PG&E supplies natural gas and electricity to homes and businesses near the Project Site. Southern California Gas Company also provides natural gas to homes and businesses in this area.

The Kern County Waste Management Division serves the area surrounding the Project Site, and operates seven landfills, five transfer stations, and three bin sites around the county. The landfills closest to the Project Site are the Taft Landfill and the Shafter–Wasco Landfill. The estimated closure year for the Taft Landfill is 2052; however, an expansion is currently proposed that would extend the closure year to 2078 (Bakersfield Environmental Health Division, 2011). The estimated closure year for the Shafter–Wasco Landfill is 2027; however, an expansion is currently proposed that would expand the closure year to 2053 (Cal Recycle, 2012). The two closest transfer stations are in Buttonwillow and the McFarland/Delano area. The Metro Kern County Special Waste Facility accepts hazardous waste at its facility at 4951 Standard Street in Bakersfield (Kern County Waste Management, 2012).

5.8.1.4 Public Finance and Fiscal Issues

The Project Site is located within the taxing jurisdiction of Kern County. Total revenues for Kern County for the fiscal year 2010–2011 were $1.635 billion (Kern County Final Budget 2010–2011). The total projected revenue for Kern County for the fiscal year 2011–2012 is $1.641 billion, a 0.36 percent increase from the previous fiscal year's revenues (Kern County Final Budget 2011–2012).

Top revenue categories are intergovernmental (30 percent), patient (29.4 percent), and miscellaneous revenue (16.5 percent). Top appropriations categories are public protection (35 percent), public assistance (28.4 percent), and health and sanitation (15.2 percent) (Kern County Final Budget 2011–2012, 2012).

In 2010, total taxable sales in Kern County for the third quarter were approximately $2.7 billion, representing 2 percent of the state taxable sales ($121 billion), and have increased 5 percent since 2009. Total taxable retail sales the same year were $1.6 billion for the county. The sales and use tax rate for Kern County (including state, local, and district) is 7.25 percent (CBOE, 2011).

Kern County's assessed value of property was $84.1 billion for the fiscal year 2011–2012, representing an increase in property values of approximately 2.5 percent (Kern County Assessor's Office, 2012).

Under Proposition 13, the county-wide property tax rate is limited to 1.0 percent of assessed value. Additional levies are permitted for voter-approved general obligation debt. For the fiscal year 2011–2012, the average county-wide tax rate was 1.38 percent (Kern County Tax Rates & Assessed Valuations, 2012). Property tax revenues in Kern County for fiscal year 2011–2012 were allocated to schools (59 percent), county government (21 percent), fire protection

(10 percent), cities (5 percent), and special districts (5 percent) (Table 5.8-9, Base Factor Property Tax Disbursement, Fiscal Year 2011–2012) (CLAO, 2011; KCA, 2012). The total property tax revenue for Kern County for fiscal year 2011–2012 was approximately $336 million (Kern County Assessor's Office, 2012).

The Project Site is located on parts of Assessor Tax Numbers (ATNs) 159-040-18-00-2 and 159-040-16-00-6.

The net assessed value of ATN 159-040-18-00-2 is $334,906. This parcel is located within Tax Rate Area 067-007. Property taxes for fiscal year 2008–2009 were $3,562.97 (KCTTC, 2009c), and were broken down among funds as shown in Table 5.8-10, Assessor Tax Numbers 159-040-18-00-2 and 159-040-16-00-6, Property Tax Allocation, Fiscal Year 2008-2009 (KCTTC, 2009d). The net assessed value of ATN 159-040-16-00-6 is $1,066,087. This parcel is located within Tax Rate Area 067-007. Property taxes for fiscal year 2008–2009 were $11,341.81 (KCTTC, 2009e), and were broken down among funds as shown in Table 5.8-10 (KCTTC, 2009f).

5.8.2 Environmental Consequences

Significance Criteria

The criteria used in determining whether Project-related socioeconomic impacts would be significant are presented in Appendix G of the California Environmental Quality Act Guidelines. Impacts attributable to the Project are considered significant if they will:

- Induce substantial growth or concentration of population
- Induce substantial increases in demand for public services and utilities
- Displace a large number of people
- Disrupt or divide the physical arrangement of an established community
- Result in substantial long-term disruptions to businesses

Direct Economic Impacts

Construction

The on-site construction workforce would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. Table 5.8-11, Site Preparation and Construction Employment by Trade, shows construction labor by month for the Project. The average size of the workforce over the approximately 49-month construction and commissioning period would be 1,159 workers (including construction workers and contractor staff), corresponding to the creation of 6,216 job years (i.e., one job year is one full-time equivalent construction job for one year). The peak construction workforce would occur during Month 31 of construction and include 2,090 craft workers (on site) and 371 contractor staff. Pre-construction and construction is forecasted to begin in June 2013 and truck deliveries and ground disturbance is forecasted to begin in August 2013 and end in February 2017. Pre-commissioning and commissioning is forecasted to begin in March 2016, with commercial operation to initiate in September 2017.

Peak construction employment would represent approximately 20 percent of construction jobs in Kern County in 2010, and approximately 2 percent of construction jobs in Kern County and Los Angeles County combined. The majority of the workforce (approximately 60 percent) is expected to be hired from within Kern County.

Given the available construction labor force in Kern County and Los Angeles County, it is expected that an adequate available labor force within daily or weekly commute distance would be found to supply the workforce associated with construction of the Project. Kern County includes one city with a population over 100,000; the city of Bakersfield had 338,952 residents in 2010.

Sixteen cities in Los Angeles County have populations over 100,000. Construction workers typically tend to have longer commute times because the jobs are temporary. Given that there is a wide availability of construction workers within a daily or weekly commute of the Project Site, the Project would not result in an influx of a significant number of construction workers. Impacts of construction would provide benefits to the local labor force because of the current relatively high unemployment rates.

Construction of the Project is estimated to cost approximately $3.15 billion. The total direct labor for construction is projected to cost approximately $1.37 billion. This figure includes direct labor costs for the Project, the linears, and the OEHI Project. The remaining cost of construction, $1.78 billion, is the cost for engineering, procurements, and construction of the Project. An estimated 60 percent of non-labor construction cost is anticipated to be spent within Kern County on materials and supplies. The remaining materials (comprising approximately 40 percent of non-labor cost), including the turbines, would be purchased outside Kern County.

Businesses in the local area surrounding the Project Site could experience impacts due to construction nuisances (noise, dust, traffic); however, these businesses are predominantly agricultural (e.g., dairy, orchards) and therefore these impacts are not anticipated to interfere with operations. See Section 5.5, Noise, for information on noise impacts from construction. Due to the temporary nature of construction, substantial and long-term disruptions to businesses would not occur. As a result, impacts to businesses from construction would be less than significant.

Operation

HECA LLC estimates that the staffing of the Project during the operational phase would require 200 full-time permanent jobs, including 22 operating technicians on four 12-hour rotating shifts, and 110 administrative, engineering, and maintenance personnel working on a day shift. The Project would also require qualified staffing in the following areas: production planning; equipment maintenance; instrument, electrical, and control support; material coordinating, inventory, and procurement; health, safety, and security; environmental protection; administrative support; benefits and human resource; training; and laboratory functions. HECA LLC has committed to give local preference in hiring and procurements, to the extent practicable. Most of the labor income earned by permanent employees at the Project would be spent in their place of residence.

In addition to the permanent staff, maintenance workers would be hired on contract for scheduled and unscheduled outages, maintenance activities, and the routine startup and shutdown of the gasifiers. Also, contract workers would be hired for the gas turbine scheduled inspection maintenance cycle, which typically occurs annually. Contract maintenance would typically include inspections and overhauls for the large compressors and rotating machinery; the combustion turbine, generators, and electrical transmission equipment; the steam turbine and other steam-generating boilers and heat exchangers; gasifier refractory repair and replacement; catalyst and sorbent change out; tower and vessel inspection and repair/replacement of internals; and other non-routine maintenance.

HECA LLC estimates that annual direct labor income of operations for the Project would be approximately $30 million. Approximately 30 percent of material and supply purchases would occur within Kern County. The annual operation labor income and materials spending related to the Project would represent a permanent economic benefit to Kern County.

Project operation is not expected to result in substantial and long-term disruptions to area businesses. The closest businesses to the Project Site are located in the unincorporated communities of Buttonwillow and Tupman. Due to the distance from the businesses to the Project Site, disruptions to area businesses would be less than significant. Other impacts to the Kern County economy due to Project operations (increased number of jobs, labor income, and spending) would benefit the Kern County economy.

Indirect and Induced Economic Impacts

Construction

Construction activity would result in secondary economic benefits (indirect and induced) within Kern County. Secondary employment effects would include indirect employment due to the purchase of goods and services by firms involved with construction, and induced employment due to construction workers spending their income in their local area. Secondary impacts were estimated using IMPLAN® economic modeling software, an input/output model using economic data specific for Kern County from 2009. The IMPLAN data included both the HECA Project and the OEHI Project.

Estimated secondary effects of construction would be the creation of more than 6,950 job years. Based on IMPLAN estimates, construction of the Project and the OEHI Project would produce approximately $1.67 billion in labor income, of which approximately $294 million would be a result of indirect and induced effects of construction. This indirect and induced effect would contribute approximately $843 million of increased economic output, primarily to the Kern County economy during the construction period. These beneficial effects would be temporary, occurring over the site preparation, construction, and commissioning/start-up period, and would lag behind the direct effects of construction by approximately 6 to 12 months. Because a portion of the construction workforce is assumed to be non-local, some of these secondary benefits are expected to be experienced in Los Angeles County; however, the majority of this impact is anticipated to benefit Kern County. These economic benefits would not result in significant adverse impacts.

Operation

Similar to construction, operation of the Project and OEHI Project would result in indirect and induced economic impacts that would occur within Kern County. Indirect and induced impacts were estimated using IMPLAN for Kern County and data for the Project and OEHI Project. Unlike indirect and induced impacts from construction, indirect and induced impacts from operation would represent permanent increases in area economic variables, but are anticipated to lag behind direct effects in timing.

Estimated indirect and induced effects of annual operation in Kern County would be approximately 430 additional job years annually, $21 million in annual labor income, and $68 million in annual economic output, based on 2012 dollars, for the life of the project. These economic effects would represent a long-term economic benefit to Kern County. This economic benefit would be concentrated in Kern County; however, some secondary benefits are expected to occur in Los Angeles County, because some non-local workforce and associated spending occurs over the life of the project. No significant adverse impacts would result from indirect or induced economic effects related to Project operations.

Population

Construction

HECA LLC estimated that approximately 60 percent of the construction workforce would be from the Kern County labor force. Although non-local workers do not typically permanently relocate to a project area due to the temporary nature of construction, it is possible that a few workers could relocate to communities near the Project Site due to the length of the construction and commissioning period. It is assumed for the purposes of this analysis, as a worst-case scenario, that one-quarter of the non-local workers (116 workers, on average) would relocate to Kern County. The remaining 75 percent (348 workers, on average) of non-local workers would commute on a daily or weekly basis.

Under the assumption that 116 workers (one quarter of the non-local workers) would relocate to Kern County, population in communities near the Project Site would permanently increase by an estimated 364 people. This estimate is based on a 2006–2010 household size of 3.14 for Kern County (U.S. Census Bureau, 2012c). A gravity model was used to approximate where these new permanent residents would live within Kern County. A gravity model is based on the concept that where people relocate is directly proportional to the population size of the chosen community (as a proxy for the number and type of community amenities available) and inversely proportional to the distance from the Project Site. The gravity model for the Project assumed that commute time (travel time) was a greater influence for relocation than straight-line distances.

The results of the gravity model indicate that the majority of the 364 people relocating as a result of construction would locate in Bakersfield (approximately 275 people), with approximately 10 to 20 people locating in Taft, Shafter, Wasco, Delano, and less than 10 people relocating into each of eight other communities elsewhere in the County. This population impact would represent a less-than-significant impact on the Kern County population because the worst-case

scenario of 364 new Kern County residents would generally result in population changes of 0.15 percent or less in individual Kern County communities.

The model does forecast a 2.2 percent increase in population in Tupman (an additional 4 people) and 0.5 percent increase in Buttonwillow (an additional 7 people) due to the short drive times from these unincorporated areas to the Project Site; however, based on a family size of approximately 3.14 people, this would represent no more than 2 to 3 families in each community. The temporary nature of construction means that even the estimate of 364 people relocating is a worst-case scenario and would not represent a significant increase in local population. Impacts would be less than significant.

Operation

The Project would require 200 full-time employees during operation. HECA LLC anticipates that approximately 60 percent of operations employees would originate from the Kern County labor force. The remaining employees would originate outside of Kern County. Of the 40 percent non-local workers (80 workers), it is assumed for the purposes of this analysis that half (40 employees) would relocate to Kern County. The other half (40 employees) would commute on a daily or weekly basis.

Under the assumption that 40 employees (one-half of the non-local workers) would relocate to Kern County, population in communities near the Project Site would increase by approximately 126 people. This estimate is based on a 2006–2010 household size of 3.14 for Kern County (U.S. Census Bureau, 2012c). The results of the gravity model indicate that the majority of the new population would locate in Bakersfield (approximately 95 people), and 6 or fewer people would locate in each of the following areas: Taft, Wasco, Shafter, Delano, and in each of several other communities in other parts of the County. These population changes would represent a less-than-significant impact on the Kern County population because the worst-case scenario of 126 new Kern County residents would generally result in population changes of less than 0.1 percent in individual Kern County communities.

The model forecasts a 0.8 percent increase in population in Tupman (an additional 1 person) and 0.2 percent increase in Buttonwillow (an additional 3 people) due to the short drive times from these unincorporated areas to the Project Site; however based on a family size of approximately 3.14 people, this would represent no more than 1 additional family in each community. Even if the population changes due to construction were to occur at the same time as the population changes due to operation, the greatest population changes to an individual community would be a total increase in population (from both construction and operation) of 383 in Bakersfield (0.11 percent increase) and a 3 percent increase in Tupman (5 additional people), neither of which would represent a significant increase in population. Therefore, impacts would be less than significant.

Housing

Construction of the Project (due to its temporary nature) would not displace a large number of people, disrupt or divide an established community, or cause any substantial permanent population increase or changes in population concentration. As a worst-case scenario,

156 workers (construction and operation) and their families (total of 490 people) could require permanent housing in Kern County communities. Based on a vacancy rate of 9.9 percent and a housing unit supply of 281,735 in Kern County in 2010, an estimated 27,900 housing units are available. Using the same methodology, approximately 6,420 housing units are available in Bakersfield. The increased demand for housing (under the worst-case assumption that 156 housing units would be needed) would be spread out among communities and would represent a less-than-significant impact because a more-than-adequate nearby housing supply exists to accommodate the influx of workers from construction and operations.

Approximately 5,400 hotel or motel rooms exist in Bakersfield, as discussed in Section 5.8.1.2, Population, Housing, and Demographics, to serve the non-local or local construction workers and operations employees who choose to commute on a weekly basis (stay in local lodging Monday through Friday). Approximately 1,000 rooms are within 30 minutes of the Project Site, with 196 rooms in the Buttonwillow area. The most recent annual occupancy estimate is 63 percent occupancy for Bakersfield hotels for calendar year 2011 (Lyman, 2012). Assuming a worst-case scenario where all remaining non-local (out-of-county) workforce commutes weekly, there would be an average of 388 workers inhabiting local hotels for the construction and commissioning period.

Construction and operation of the Project may increase the demand for temporary lodging in the Project Site area. Given the expected low demand for temporary lodging and the relatively large availability of nearby hotel and motel rooms, impacts related to the availability of hotels or motels would be less than significant.

Public Services and Utilities

Fire Protection and Emergency Response

The KCFD would provide fire protection services to the Project. KCFD is adequately staffed and equipped to serve the additional population associated with Project construction and operation (Tisinger, 2012). The response time from the closest fire station, Fire Station Number 25, located at 100 Mirasol Avenue in Buttonwillow, is approximately 10 to 12 minutes (KCFD, 2012). The potential for increased fire protection calls is not expected to induce substantial additional demand on the local fire department that could not be met by current staff.

The fire protection program for the Project would include fire prevention and protection measures, as described in more detail in Section 2.4.11, Fire Protection, of the Project Description. Emergency services would be coordinated with the local fire department and hospital. An urgent care facility would be contacted to set up non-emergency physician referrals. First-aid kits would be provided around the Project Site and regularly maintained. At least one person trained in first aid would be part of construction staff upon mobilization. Fire extinguishers would be located at strategic locations throughout the Project Site at all times during construction.

The fire protection and suppression systems would comply with applicable city, state, and national codes, insurer requirements, and industry standards, and would also comply with the Fire Protection Program. Section 2.4.11, Fire Protection, includes detailed information on the

Fire Protection Program, including applicable LORS. The potential for increased fire protection calls is not expected to induce substantial additional demand on local fire departments that could not be met by current staff.

Hall Ambulance Service provides emergency ambulance services to the majority of Kern County and would respond to a situation at the Project Site that requires ambulance service (Hall Ambulance, 2012a). The ambulance response time to the Project Site would be approximately 20 to 25 minutes with lights and sirens for a priority phone call, and 30 minutes for a lower-priority call (Hall Ambulance, 2012a and 2012b).

Thus, impacts to fire protection services and emergency response are expected to be less than significant.

Law Enforcement

The Kern County Sheriff's Department (KCSD) would provide law enforcement services to the Project. KCSD could not estimate an expected response time to the Project Site, but KCSD has staff and equipment to adequately serve the additional population associated with Project construction and operation (KCSD, 2012; Downs, 2012). In addition, it is not expected that the potential for increased police service calls would induce substantial additional demand on law enforcement agencies that could not be met by current staff. HECA LLC would establish a security system at the Project Site. Thus, impacts are expected to be less than significant.

Schools

Individual schools are not expected to experience a substantial impact due to the low number of expected new residents resulting from Project construction and operation, and because the new families who could potentially relocate would likely spread out among school districts. An estimated maximum of 122 worker-families during construction and 40 employee-families during operation would relocate for the Project. Approximately 84 (construction) and 28 (operation) additional school children could require educational services. These estimates of school children are based on 0.693 children between the ages of 5 and 17 per household in Kern County in 2010 (U.S. Census Bureau, 2012c). Taft Union High School and Elk Hills Elementary school districts would be able to accommodate the additional school children (Gregory, 2012; Neufeld, 2012). The impacts to local school districts are expected to be less than significant due to the low number of new students in any one school district that would be associated with the Project. The Elk Hills Elementary School District and Taft Union High School District have not prescribed developer school impact fees (Gregory, 2012; Kern County Superintendent of Schools, 2012).

Medical Facilities

Emergency services would be coordinated with the local fire department and hospital. An urgent care facility would be contacted to set up non-emergency physician referrals. First-aid kits would be provided around the Project Site and regularly maintained. The appropriate number of personnel trained in first aid would be part of construction staff upon mobilization. Fire

extinguishers would be located at strategic locations throughout the Project Site at all times during construction.

The medical facilities listed in Section 5.8.1.3, Public Services and Utilities, and Table 5.8-7, Hospitals in the Project Vicinity, could accommodate the increase in demand for services associated with the construction workforce and the operations workforce. In addition, see Section 5.7, Worker Safety and Health, for a discussion of worker health and safety. Project construction and operation could result in an additional 382 residents (construction) and 126 residents (operation) in Kern County. The majority of these new residents are estimated to locate in Bakersfield, with small numbers of new residents in the cities of Taft, Wasco, Shafter, and Delano. The impact on area hospitals would be less than significant.

Utilities

Construction

During construction, temporary utilities would be provided for the construction offices, laydown area, and Project Site. Temporary construction power would be initially generator-powered and would transition to utility-furnished power.

Storm water and natural runoff from off site would be directed through channels or culverts around the Project Site boundary.

For construction activities such as hydrotesting, water will be supplied from on-site wells and/or the WKWD. Consequently, impacts to utilities during construction of the Project would be less than significant.

Operation

The BVWSD would supply brackish groundwater to the Project. The Project would treat this impaired water supply on site to increase quality to Project standards, and would use the water for non-sanitary water consumption needs. The West Kern Water District would supply potable water to the Project Site from its location east of the Project Site.

No municipal sanitary wastewater system is available in the immediate area to serve the Project. Sanitary wastewater from plant restrooms and other facilities would be disposed of in an on-site leach field, as discussed in Section 5.14, Water Resources. Because the septic tank and leach field would be constructed in ground that has been determined to be acceptable by a percolation test, the impact would be less than significant.

Fiscal Impacts

Property Taxes

The current property tax rate for the Project Site, ATNs 159-040-18-00-2 and 159-040-16-00-6, is 1.07 percent. The current assessed value of the Project Site ATNs is $1,705,016. Therefore, the Project is estimated to annually yield approximately $22,078 in local property tax revenues to

the County. This amount represents less than 0.007 percent of the County's projected share of property tax dollars (i.e., $336 million [Kern County Assessor's Office, 2012]) for the 2011–2012 fiscal year.

The value of the property would be reassessed as new construction occurs on the Project Site. According to the allocation of taxes for the Project Site ATNs, the General Local Government (1.0 percent) and Kern County WA ZN 19 Debt (0.024 percent) would be the largest beneficiaries of the property tax revenue, as shown in Table 5.8-10, Assessors Tax Numbers 159-040-18-00-2 and 159-040-16-00-6 Property Tax Allocation, Fiscal Year 2011–2012 (Kern County Recorder and Assessor, 2012).

Sales Taxes

Sales tax revenues for Kern County would increase as a result of (1) local equipment and supply purchases for Project construction and operation, and (2) construction and operation worker purchases (i.e., gas, food, and lodging).

The Project is expected to generate approximately $77.4 million in taxable sales (7.25 percent sales tax multiplied by $1.06 billion worth of locally purchased materials) during Project construction. Most of this revenue, $67.3 million, would go to the state of California. An estimated $10.1 million would be retained in Kern County. After construction is complete, additional sales tax revenues would continue as materials are purchased during operation..

Environmental Justice

In recent environmental justice analyses, the California Energy Commission (CEC) has used methodology consistent with U.S. Environmental Protection Agency (USEPA) guidelines. Under current USEPA methodology and CEC practice, for potential environmental justice impacts to exist, an environmental justice population must be present within 6 miles of the Project Site and the Project must result in "high and adverse" environmental impacts that affect the environmental justice populations disproportionately. As the discussion below demonstrates, the Project would not have "high and adverse" environmental impacts that affect the environmental justice populations disproportionately.

The CEC defines an environmental justice minority population when a minority population of the potentially affected area or the Census area (tract or block) is greater than 50 percent, or when it is meaningfully greater than the reference population. An environmental justice low-income population is identified as an area where the low-income population percentage is meaningfully greater than the low-income population percentage in the general population. For the purposes of this analysis, this threshold figure with respect to the Project Site would be any minority population greater than 50 percent, and a low-income population of 31 percent, which would be 10 percent greater than the Kern County low-income population of 21 percent. Census tract demographic data are typically reviewed to screen for the potential presence of environmental justice populations.

There are two census tracts partially within a 6-mile radius of the Project Site. These census tracts and their distance to the Project Site are depicted in Figure 5.8-2, Census Tracts within a

6-Mile Radius of the Project Site. Neither of these census tracts has a total minority population greater than 50 percent; however, one of them had a percentage very close to 50 percent, so additional analysis was performed, as discussed below. Census Tract 33.04 has a minority population of 17.3 percent and Census Tract 37.00 has a minority population of 49.5 percent, which is also approximately 12 percent below the comparative percentage in Kern County. Census Tract 33.04 has a low-income population of approximately 10 percent, substantially lower than the general (countywide) population or the populations in the other analyzed geographies. However, Census Tract 37.00 has a low-income population of 36 percent, 15 percent above the low-income population percentage of Kern County as a whole.

In addition to the low-income population environmental justice community in Census Tract 37.00, there could be concentrations of minority or low-income persons within the study area census tracts, or in Wasco, where the coal storage/transfer facility is located. Therefore, census data for Tupman and Buttonwillow, as well as Wasco, were reviewed, as presented in Table 5.8-6. Tupman is located within a 6-mile radius of the Project Site. Tupman could be considered an environmental justice community because of its high percentage of low-income population. In 2010, Tupman had a population that was approximately 40 percent low-income, substantially greater than that of either Kern County or the state of California. Similarly, a portion of Buttonwillow, whose minority population comprises 64 percent of the overall population, is located within 6 miles of the Project Site. Wasco, which is located over 17 miles north of the Project Site, also contains a minority population percentage (50.3 percent) high enough to be considered an environmental justice community.

Low-income environmental justice communities were identified in Census Tract 37.00 and in Tupman, and minority environmental justice communities were identified in Buttonwillow and Wasco; therefore, the Project was evaluated to determine whether or not these communities might experience disproportionately high and adverse effects as a result of the Project. As discussed below, these populations would not be disproportionately affected by any significant and adverse impacts associated with the Project.

This AFC Amendment includes a detailed analysis of the Project's potential to result in adverse health or environmental impacts on the surrounding community, including the immediate Project area, and the communities of Tupman, Buttonwillow, and Wasco. It concludes that with proper design and implementation of proposed mitigation measures, the Project would not result in any significant impacts. The following is a summary of the analysis completed in certain areas that are typically the focus of an environmental justice evaluation.

As discussed in Sections 5.1, Air Quality, and 5.6, Public Health, HECA LLC has analyzed the potential for the Project's air emissions to have an adverse impact on the surrounding community. This included an analysis of "criteria air pollutants," which are pollutants typically produced by combustion processes, including nitrogen oxides, sulfur oxides, carbon monoxide, volatile organic compounds, and particulate matter. At certain concentrations, criteria air pollutants can result in adverse health impacts, such as exacerbation of respiratory conditions, including asthma. HECA LLC also analyzed "toxic air contaminants," which are pollutants emitted in much smaller quantities. At certain concentrations, toxic air contaminants can pose a risk of cancer and certain non-cancer health effects.

The Project includes a number of design features to reduce the emissions of both criteria air pollutants and toxic air contaminants, including Best Available Control Technology to control emissions. As a result of implementation of these design features, as discussed in Section 5.1, Air Quality, the project will not cause or significantly contribute to an exceedance of either the state or federal ambient air quality standards. These standards are set at a level necessary to protect the most sensitive populations from the potentially adverse impacts associated with criteria pollutants. Further, as discussed in Section 5.6, Public Health, the Project would not result in emissions of toxic air contaminants that would increase the ambient cancer risk, or result in increases in non-cancer health effects, above established significance thresholds. In addition, emissions from the Project would be further mitigated through the purchase of emissions offsets. The modeling analyses conducted to demonstrate whether or not Project emissions exceed applicable air quality standards do not "take credit" for the emission offsets. Therefore, emission offsets provide additional mitigation above and beyond the design features of the Project. With implementation of these measures, and as discussed in further detail in Sections 5.1 and 5.6, the Project will not result in significant adverse impacts to air quality or public health.

As discussed in Section 5.5, Noise, acoustical calculations were performed to evaluate noise impacts associated with the Project. Extensive noise control features incorporated into the Project design ensure that Project operations would result in less than significant noise impacts. If the Project does not develop coal transportation Alternative 1 (rail transportation), there will be operational traffic noise impacts associated with Alternative 2 (truck transportation) along the truck route. In addition, the noise analysis identified that there would be no noise impacts to the environmental justice community in Wasco, located near the transloading facility. Mitigation measures will be incorporated to reduce potential noise impacts due to truck traffic to less-than-significant levels.

As discussed in Section 5.10, Traffic and Transportation, with proposed mitigation, the Project is not expected to have a significant impact on traffic or transportation. Although implementation of the project would result in some impacts to traffic and transportation, proposed mitigation would reduce those impacts to less than significant levels. Further, these impacts would apply equally to all residents and roadway users in the area who may concurrently use those affected traffic and transportation facilities with the Project and, therefore, would not disproportionately impact the identified environmental justice communities.

In summary, the Project is designed to employ state-of-the art environmental controls and would employ mitigation measures to reduce any potential impacts to a less-than-significant level. Consequently, no significant and adverse impacts would occur that could disproportionately impact minority or low-income populations, including those in Census Tract 37.00, Tupman, Buttonwillow, and Wasco. In addition, as discussed further in this section, the Project is expected to have a positive economic impact on the surrounding area.

As documented in Appendix Q, Public Information, Outreach, and Communications Plan, minority and low-income populations have been and will continue to be provided a variety of opportunities to comment on the Project. In September of 2009, an Information Hearing and site visit for HECA was conducted at the Elk Hills Elementary School in Tupman. In April 2010, CEC Staff also conducted a publicly noticed Data Response and Issues Resolution workshop in

Tupman and discussed the topics of air quality, cultural resources, biological resources, public health/hazardous materials, hazardous waste, and soil and water resources. The 2009 HECA Revised AFC was distributed to libraries in Wasco, Taft, Tehachapi, Boron, Bakersfield, and Buttonwillow. Information was provided at these meetings in both English and Spanish, and a Spanish interpreter was present. In addition, documents were sent to state libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco. Project representatives have also met with the Wasco City Manager, to provide information and obtain input on the project, and further meetings are planned be held in Wasco in 2012.

On February 1, 2011, HECA LLC opened an information center at 189 East Front Street, in Buttonwillow. The information center is staffed during weekdays, and can also be visited by appointment to accommodate individuals with work schedules that conflict with the centers' hours. The center is staffed by representatives who speak both English and Spanish, and provides both English and Spanish-language materials about the project. In addition, the project website offers Spanish language materials for download.

HECA LLC communicates through periodic newsletter updates to area residents as well as over 1,000 stakeholders. HECA LLC has also been interacting with residents and community leaders in the course of funding several programs and initiatives to enhance the quality of life in western Kern County, particularly in these identified environmental justice communities. These programs include scholarships for local students, community foodbanks, healthy-start programs, community park initiatives, school field trip grants, women's and homeless shelters, and assistance with educational programs such as Head Start for elementary-school age children and the Kern Adult Literacy Council.

HECA LLC is committed to providing continued outreach to the interested public, and providing opportunities for environmental justice populations to obtain information and provide input into the decision making process. During continuing public outreach efforts, HECA continue to implement outreach strategies for the environmental justice communities, including the Wasco area, and will continue to provide Spanish language materials and use Spanish interpreters at public outreach events. Refer to Appendix Q for a copy of the Public Information, Outreach, and Communications Plan.

OEHI Project

Information and analysis related to the socioeconomic impacts of the OEHI Project are contained in Appendix A to this AFC Amendment. The conclusions of that analysis are summarized below.

Construction

According to the analysis contained in Appendix A-1, construction of the OEHI Project would not result in significant adverse impacts to population and housing (Section 4.12), public services (Section 4.13), recreation (Section 4.14) or utilities and service systems (Section 4.16). Nor would the OEHI Project result in disproportionate adverse impacts to an environmental justice community (Section 4.17).

Operation

According to the analysis contained in Appendix A-1, operation of the OEHI Project would not result in significant adverse impacts to population and housing (Section 4.12), public services (Section 4.13), recreation (Section 4.14) or utilities and service systems (Section 4.16). Nor would the OEHI Project result in disproportionate adverse impacts to an environmental justice community (Section 4.17).

5.8.3 Cumulative Impacts Analyses

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts (CEQA Guidelines Section 15130). A "cumulative impact" consists of an impact which is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines Section 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines Section 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines Section 15065 [a][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines Section 15130[a]). It is also possible that a project's contribution to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines Section 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines Section 15130[b]). The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines Section 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects within a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines Section 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines Section 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects within a 6-mile radius of the Project Site. This list is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

For purposes of Socioeconomics, cumulative impacts were assessed by reviewing other projects proposed within the Project Site vicinity where overlapping construction schedules would create a demand for workers that may not be met by the labor force in Kern County. Seventeen proposed developments within 6 miles of the Project Site may affect construction workforce availability. These proposed developments are listed in Table 5.8-12.

These developments could temporarily deplete certain types of trade labor. However, these impacts are not considered significant because of the specialized nature of Project construction and because there is a large supply of construction workers and laborers in Kern County that could be supplemented by the Los Angeles County labor force. Therefore, cumulative impacts during construction would be less than significant.

According to the analysis contained in Appendix A-1, construction and operation of the OEHI Project would not result in significant cumulative adverse impacts to population and housing (Section 4.12), public services (Section 4.13), recreation (Section 4.14) or utilities and service systems (Section 4.16). Nor would the OEHI Project result in disproportionate cumulative adverse impacts to an environmental justice community (Section 4.17).

5.8.4 Mitigation Measures

No potentially significant adverse impacts were identified. Therefore, no mitigation measures beyond those identified in other sections of this AFC Amendment are necessary to reduce impacts to a less-than-significant level.

HECA LLC is committed to providing continued outreach to the interested public, and providing opportunities for environmental justice populations to obtain information and provide input into the decision-making process.

5.8.5 Laws, Ordinances, Regulations, and Standards

Federal, state, and local LORS applicable to the Project are listed in Table 5.8-13, Summary of LORS—Socioeconomics/Environmental Justice, and discussed below.

Federal

Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, national origin, age, sex, or disability in programs and activities receiving federal financial assistance.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires USEPA to develop environmental justice strategies. As a result of the Executive Order, USEPA-issued guidelines requiring federal agencies and state agencies receiving federal funds to develop strategies to address environmental justice issues (USEPA, 1998). The agencies are required to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

State

Government Code § 65040.12(e) defines environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

California Government Code § 65302 requires each city and county to adopt a general plan that contains seven mandatory elements to guide the area's physical development. Kern County manages the county's development through the Kern County General Plan.

California Government Code § 65996-65997 (amended by Senate Bill 50) states that public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities. However, the code does include provisions for levies against development projects near schools. School fees are paid directly to the school district and a receipt shown to the permit center technician.

California Public Resources Code § 71113 charges the California Environmental Protection Agency with a mission to ensure that its activities that substantially affect human health or the environment are conducted such that the fair treatment of people of all races, cultures, and income levels, including minority populations and low-income populations of the state, is ensured.

Local

The Project Site is located in an unincorporated area of Kern County. The Kern County General Plan contains an economic development section within the General Provisions of the Land Use Element. The Kern County General Plan establishes goals and policies to address the county's land use and development in the Land Use, Open Space, and Conservation Element. A goal of the Land Use, Open Space, and Conservation Element is to "provide for mixed land uses that offer a variety of employment opportunities and enhance the County's economic assets to allow the capture of regional growth" (Kern County General Plan, 2009). The Project is consistent with this land use goal because the Project would make a positive contribution to Kern County's economy through purchasing Project materials locally and hiring locally.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is responsible for implementing air quality regulations, including developing plans and control measures for stationary sources of air pollution; implementing permit programs for the construction, modification, and operation of sources of air pollution; and enforcing air pollution statutes and regulations governing stationary sources. The SJVAPCD adopted an Environmental Justice Strategy in 2007 (amended in 2010). The Environmental Justice Strategy is intended to identify and address any gaps in existing programs, policies, and activities that may impede the achievement of environmental justice, and it establishes the mission and goals to guide the SJVAPCD in further integrating environmental justice into programs, policies, and activities.

5.8.6 Involved Agencies and Agency Contacts

Various public service agencies were contacted in the course of the socioeconomics investigation to check on levels of activity and expected impacts of the Project. Table 5.8-14, Involved Agencies and Contacts, lists those agencies.

5.8.7 Permits Required and Permit Schedule

No applicable permits related to socioeconomics are required.

5.8.8 References

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Table 5.8-1
Kern County Labor Force, Employment, and Industry

Industry	1990	2000	2010
Civilian Labor Force	257,000	293,500	368,500
Civilian Employment	228,900	269,300	310,000
Civilian Unemployment Rate (%)	10.90	8.20	15.9%
Percent of Employment, by Industry			
Farm	15	20	17
Natural Resources and Mining	6	3	4
Construction	6	5	5
Manufacturing	5	4	5
Trade, Transportation, and Utilities	17	15	15
Information	2	1	1
Financial Activities	3	3	3
Professional and Business Services	8	9	9
Education and Health Services	6	8	10
Leisure and Hospitality	7	7	8
Other Services	3	3	3
Government (non-military)	22	21	19

Source: CEDD, 2010a.

Table 5.8-2
Current and Projected Unemployment Rates

Year	Kern County (%)	California (%)
2010	15.9	12.4
2020	7.7	5.4
2030	7.6	5.3
2040	7.5	5.3

Source: Caltrans, 2011.

Table 5.8-3
Los Angeles County Labor Force, Employment, and Industry

Industry	1990	2000	2010
Civilian Labor Force	4,523,700	4,677,300	4,879,500
Civilian Employment	4,259,700	4,424,900	4,262,300
Civilian Unemployment Rate	5.8 %	5.4 %	12.7 %
Percent of Employment, by Industry (%)			
Farm	0	0	0
Natural Resources and Mining	0	0	0
Construction	3	3	3
Manufacturing	20	15	10
Trade, Transportation, and Utilities	19	19	20
Information	4	6	5
Financial Activities	7	6	6
Professional and Business Services	13	14	14
Education and Health Services	9	10	14
Leisure and Hospitality	7	8	10
Other Services	3	3	4
Government (non-military)	13	14	14

Source: CEDD, 2010b.

Table 5.8-4
Population Trends and Projections

Year	Bakersfield	Buttonwillow	Tupman	Wasco	Kern County	Los Angeles County	State
2000	247,057	1,266	227	21,263	661,645	9,519,338	33,871,648
AARG, 2000-2010	28.9%	16%	-40.1%	17%	21.2%	3.1%	9.1%
2010	347,483	1,508	161	25,545	839,631	9,818,605	37,253,956
AARG, 2010-2020	N/A	N/A	N/A	N/A	2.5%	0.7%	1.3%
2020	N/A	N/A	N/A	N/A	1,086,113	11,214,237	44,135,923
AARG, 2020-2030	N/A	N/A	N/A	N/A	2.5%	0.6%	1.2%
2030	N/A	N/A	N/A	N/A	1,352,627	11,920,289	49,240,891
AARG, 2030-2040	N/A	N/A	N/A	N/A	2.62%	0.48%	1.02%
2040	N/A	N/A	N/A	N/A	1,707,239	12,491,606	54,266,115
AARG, 2040-2050	N/A	N/A	N/A	N/A	2.34%	0.46%	0.97%
2050	N/A	N/A	N/A	N/A	2,106,024	13,061,787	59,507,876

Source: U.S. Census Bureau 2009c; U.S. Census Bureau 2010a data used for 2000 and 2010 numbers; CDOF, 2007 for projections.

Notes:

- = negative
AARG = Average Annual Rate of Growth
N/A = not available

Table 5.8-5
Regional Housing Characteristics, January 2010

Location	Total Housing Units	Single-Family	Multi-Family	Mobile Homes	Vacancy Rate (%)
City of Bakersfield	116,692	86,230	27,713	2,749	5.5
Kern County	281,735	205,494	49,841	26,400	9.9
Los Angeles County	3,431,588	1,893,202	1,481,659	56,727	4.2
California	13,591,866	8,747,293	4,247,635	596,938	5.9

Source: CDOF, 2010

Table 5.8-6
Race and Poverty Data in 2010

Area	Population	Minority Population[1]	Percentage Minority[2]	Population Living Below Poverty Level[2]	Percentage Living Below Poverty Level[2]
Geographic Areas					
Tupman CDP	161	12	7.5	48	40
Buttonwillow CDP	1,508	974	64.6	456	27
City of Wasco	25,545	12,845	50.3	5,088	20
City of Bakersfield	347,483	216,172	62.2	66,891	19
Kern County	839,631	515,837	61.4	171,950	21
Los Angeles County	9,818,605	7,090,284	72.2	1,697,465	18
State of California	37,253,956	15,800,022	42.2	5,290,061	14
Individual Census Tracts Within a 6-Mile Radius of the Project Site					
CT 33.04	5,248	906	17.3	543	10
CT 37.00	3,953	1,956	49.9	1,420	36

Sources: U.S. Census Bureau, 2010d, U.S. Census Bureau, 2010e ; and U.S. Census Bureau, 2009a.

Notes:

[1] The minority percentage represents the number of residents that, in 2010, were included in the following race or ethnicity categories (defined by the U.S. Census): White Hispanic/Latino, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Some Other Race, and Two or More Races.

[2] Low-income percentage represents the number of residents living below the poverty level, based on their 2009 income, taken as a percentage of the population for whom poverty status is determined (which includes all persons except institutionalized persons, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old).

CDP = Census Designated Place
CT = Census Tract

Table 5.8-7
Hospitals in the Project Vicinity

Name	Distance from Project Site and Address	Number of Beds and Type of Care
Mercy Southwest Hospital	21 miles 400 Old River Road, Bakersfield	78-bed general acute care
Good Samaritan Hospital	28 miles 901 Olive Drive, Bakersfield	64-bed general acute care
Bakersfield Heart Hospital	27 miles 3001 Sillect Avenue, Bakersfield	47-bed acute cardiac care
San Joaquin Community Hospital	28 miles 2615 Eye Street, Bakersfield	255-bed acute care
Bakersfield Memorial Hospital	32 miles 420 34th Street, Bakersfield	418-bed tertiary acute care
Mercy Hospital	26 miles 2215 Truxtun Avenue, Bakersfield	211 certified
Kern Medical Center	32 miles 1830 Flower Street, Bakersfield	222-bed acute care
Delano Regional Medical Center	48 miles 1410 Garces Highway, Delano	156-bed general acute care
HealthSouth Bakersfield Rehabilitation Hospital	25 miles 5001 Commerce Drive, Bakersfield	60-bed physical rehabilitation

Sources: KEDC, 2009; Hospital-Data.com, 2012.

Table 5.8-8
School Enrollment Trends

	1993-1994 School Year	1998-1999 School Year	2002-2003 School Year	2006-2007 School Year	2010-2011 School Year
Elk Hills Elementary School District	79	70	65	73	136
Taft Union High School District	991	974	983	1,100	1,045

Source: CDOED, 2011.

Table 5.8-9
Base Factor Property Tax Disbursement, Fiscal Year 2011-2012

Beneficiary Agency	Property Tax Allocation Percentage of Base Factor (%)
County Government	0.2076
County Fire	0.0962
Cities	0.0519
Special Districts	0.0543
Schools	0.5900
Total	**1.0000**

Source: CLAO, 2011; KCA, 2012.

Table 5.8-10
Assessors Tax Numbers 159-040-18-00-2 and 159-040-16-00-6
Property Tax Allocation, Fiscal Year 2010-2011

Taxing Agency	Rate (%)
General Local Government	1.000000
Kern County WA ZN 17 Debt	0.014797
Kern County WA ZN 19 Debt	0.023717
Elk Hills GOB 04A	0.006945
Elk Hills GOB 04B	0.005712
Elk Hills GOB 04C	0.007913
West Kern Com Col 04B	0.000002
West Kern Com Col 04C	0.004364
West Kern Col 05 Ref	0.006734
West Kern Com Col 04A	0.003365
Total	**1.014797**

Source: KCTTC, 2012

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Table 5.8-11
Preliminary Estimate of Monthly Construction Labor Power By Craft

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	Months after Construction Mobilization																																																
Job Category	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
CRAFT																																																	
Boilermakers													6	6	6	14	14	20	20	30	30	40	60	80	100	120	120	140	140	140	140	120	120	100	80	80	60	60	40	40	20	20	10	10	10	10	10	6	6
Carpenters		4	4	8	10	14	18	24	30	50	50	60	70	90	100	120	140	140	140	150	150	160	160	180	180	180	200	200	210	210	220	220	200	200	200	180	160	140	100	100	50	50	50	50	50	50	40	40	20
Cement Finishers								6	6	6	6	6	20	20	20	20	20	20	20	15	15	15	15	15	15	15	15	10	10	10	10	10	10	10	8	8	8	8	8	4	4	4							
Electricians		4	4	8	8	10	12	16	18	20	20	30	40	60	60	80	90	90	100	100	120	120	140	140	160	160	180	220	240	280	300	340	360	400	400	400	400	350	300	250	200	100	100	100	100	50	50	50	20
Insulation Workers									10	10	10	10	10	10	10	10	20	20	20	30	30	30	40	40	40	40	40	40	50	50	60	60	80	80	100	120	140	160	180	220	220	150	50	50	50	50	50	30	20
Iron Workers		2	2	4	6	10	10	20	20	30	30	40	40	40	60	60	80	100	120	140	160	180	200	220	240	260	260	280	280	260	240	200	180	140	100	80	60	40	30	20	20	10	10	10	10	6	6	4	4
Laborers		11	13	22	45	54	60	71	68	60	61	66	83	133	149	138	138	143	143	131	131	155	155	155	138	115	115	115	104	76	76	54	54	54	52	49	40	40	30	30	20	20	20	20	20	20	20	10	10
Millwrights						2	2	2	2	2	4	4	6	6	6	10	10	14	20	26	40	60	80	80	100	40	120	120	100	80	80	80	80	80	80	60	60	60	60	40	30	20	20	20	20	20	20	10	10
Operators	16	16	20	20	30	30	30	40	40	50	50	50	60	60	60	70	70	80	80	90	90	110	120	140	140	160	160	180	200	200	200	160	160	140	120	100	100	100	80	60	40	40	20	20	20	20	10	10	5
Painters			2	2	2	2	2	4	4	4	4	4	4	6	6	6	8	8	8	10	10	16	16	16	20	20	20	26	26	26	30	30	40	40	50	50	40	40	30	30	20	10	10	10	10	10	5	5	3
Pipefitters		2	2	4	10	20	30	40	50	70	90	110	120	120	200	240	260	280	300	320	340	380	420	460	500	540	600	640	680	720	720	720	700	660	600	600	500	500	400	200	150	50	50	50	50	50	30	20	10
Sheet Metal Workers														4	4	6	6	8	8	10	10	10	10	10	10	12	12	12	12	14	14	14	14	14	12	12	12	8	8	6	4	4	4	4	4	4	2	2	2
Teamsters																																																	
Off plot Construction craft [2]											26	26	44	44	44	54	54	39	39	40	26	26																											
Craft Subtotal	**16**	**39**	**47**	**68**	**111**	**142**	**164**	**223**	**248**	**302**	**351**	**406**	**503**	**599**	**725**	**828**	**910**	**962**	**1018**	**1092**	**1152**	**1302**	**1416**	**1536**	**1643**	**1662**	**1842**	**1983**	**2052**	**2066**	**2090**	**2008**	**1998**	**1918**	**1802**	**1739**	**1580**	**1506**	**1266**	**1000**	**778**	**478**	**344**	**344**	**344**	**290**	**243**	**187**	**110**
STAFF																																																	
Management	10	10	20	20	20	20	30	40	40	50	90	90	90	100	110	120	127	139	140	140	140	140	140	140	140	140	140	140	140	140	140	140	130	100	95	90	80	80	60	60	50	30	30	30	30	30	20	20	10
Engineering	2	2	2	2	2	4	4	6	10	10	10	10	10	12	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	10	5	5	5	5	5	5	5	5	5
Document Control	2	2	2	2	2	2	4	4	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	4	3	2	2	2	2	2	2
Subcontractors Staff	4	6	8	10	14	20	22	28	32	36	40	44	48	54	74	82	90	96	104	108	116	136	146	156	166	170	188	202	210	210	210	206	204	196	184	174	156	144	124	96	68	44	40	40	40	40	20	20	10
Off plot construction staff [2]											4	4	6	6	6	6	6	6	6	5	4	4																											
Commissioning (by Owner)																																10	10	20	20	30	30	30	30	30	30	40	40	40	40	30	20	20	20
Admin / Operating Staff (Owner)																																40	40	40	50	50	50	75	75	75	75	87	87	87	87	110	120	140	140
Staff Subtotal	**18**	**20**	**32**	**34**	**38**	**46**	**60**	**78**	**87**	**101**	**149**	**153**	**160**	**178**	**210**	**229**	**244**	**262**	**271**	**274**	**281**	**301**	**307**	**317**	**327**	**331**	**349**	**363**	**371**	**371**	**371**	**417**	**405**	**377**	**370**	**365**	**332**	**344**	**304**	**276**	**233**	**210**	**205**	**204**	**204**	**217**	**187**	**207**	**187**
Project Total	**34**	**59**	**79**	**101**	**149**	**188**	**224**	**301**	**335**	**403**	**500**	**559**	**663**	**777**	**935**	**1057**	**1154**	**1224**	**1289**	**1366**	**1432**	**1603**	**1723**	**1853**	**1970**	**1993**	**2192**	**2347**	**2423**	**2437**	**2461**	**2425**	**2403**	**2295**	**2172**	**2104**	**1912**	**1850**	**1570**	**1276**	**1011**	**688**	**549**	**548**	**548**	**507**	**430**	**394**	**297**
Schedule																																																	
Site Mobilization																																																		
Site Prep																																																	
Construction																																																		
Commissioning & Start-Up																																																	

Notes:

(1) These are approximate values

(2) Off plot includes preliminary estimates for work that may be performed outside of the plot (plot linears, facility upgrades, site interfaces, rail spur, etc.)

Table 5.8-12
Proposed Developments within a 6-Mile Radius of the Project Site

Project Location	Project Description
At the intersection of Dairy Road and Adohr Road in the unincorporated area of Kern County.	A conditional use permit to establish a 121-acre dairy and 935-acre crop area.
At the intersection of 7th Standard Road and Brandt Road in the unincorporated area of Kern County.	A conditional use permit to establish a 589-acre dairy and 1,973-acre crop area.
On Tracy Avenue in the community of Buttonwillow.	A development for a "La Quinta" hotel.
345 Driver Road in the unincorporated area of Kern County.	A development for a concrete batch plant.
At the intersection of 7th Standard Road and Superior Road in the community of Rosedale.	A conditional use permit to establish a 20 MW alternating current photovoltaic solar panels.
31139 7th Standard Road in the city of Bakersfield.	A conditional use permit to establish agriculture-related uses.
1 mile west of Elk Hill Road South of Aqueduct in the city of Taft.	A conditional use permit to establish SMARA enforcement proceedings.
Elk Hills in Kern County.	A conditional use permit to establish a 7 MW solar project.
At the intersection of Enos Lane and Baker Road in the city of Bakersfield.	A conditional use permit to establish a 5 MW solar project.
At the intersection of Acacia St and Cherry Ave, in the city of Taft.	A conditional use permit to establish a 20 MW solar project.
At the intersection of Enos Lane and Snow Road, in the community of Rosedale.	A conditional use permit to establish a rock gravel sand distribution and asphalt batch plant.
28323 SR 119, in the community of Dustin Acres.	A conditional use permit to establish an agricultural supply service.
Southeast Enos Lane, 1 mile north of Panama Lane, in the city of Bakersfield.	A conditional use permit to establish a public agency building.
West of Elk Hills Road, 1 mile north of SR 119, in the city of Taft.	A conditional use permit to establish SMARA enforcement proceedings.
Olen Avenue, West of Enos Lane, in the city of Bakersfield.	A precise development for warehouse & mobile homes.
22356 Rosedale Highway, in the city of Bakersfield.	A precise development for recreational vehicle storage.
At the intersection of SR 58 and SR 43, in the community of Rosedale.	A development for a lumber truss manufacturing and warehouses.

Notes:
MW = megawatt
SMARA = Surface Mining and Reclamation Act
SR = State Route

Table 5.8-13
Summary of LORS—Socioeconomics/Environmental Justice

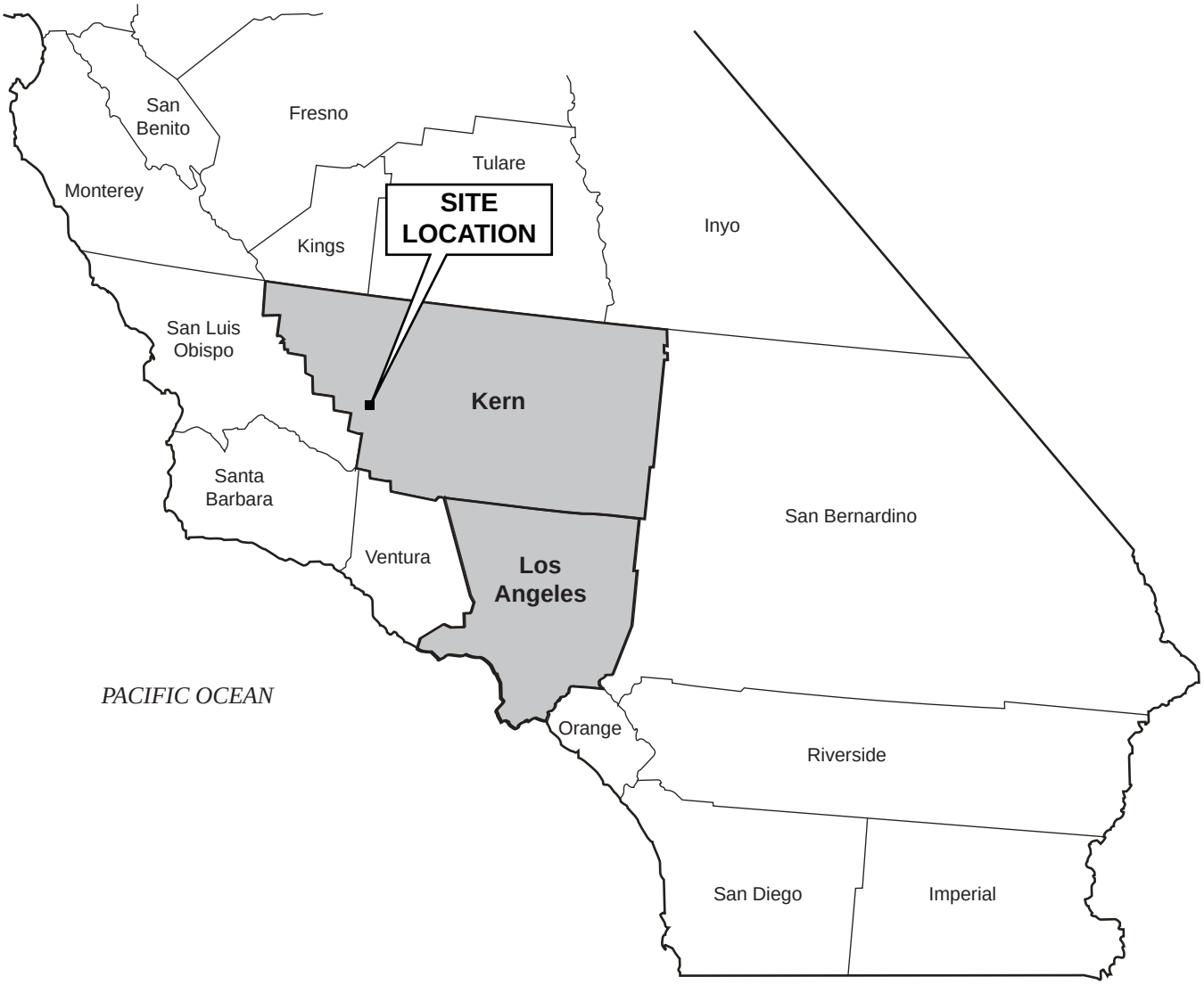
LORS	Applicability	Administering Agency	AFC Section
Federal Jurisdiction			
Executive Order 12898	Agencies are required to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.	USEPA	Section 5.8.5
State Jurisdiction			
Government Code § 65996-65997	Includes provisions for levies against development projects in school districts.	CEC	Section 5.8.5
Government Code § 65302	Kern County has a general plan to guide the development of the area over which it has jurisdiction.	CEC	Section 5.8.5
Local Jurisdiction			
Kern County	The Project is consistent with a goal of the Kern County General Plan Land Use Element.	Kern County	Section 5.8.5

Notes:
AFC = Application for Certification
CEC = California Energy Commission
LORS = laws, ordinances, regulations, and standards
USEPA = U.S. Environmental Protection Agency

Table 5.8-14
Involved Agencies and Contacts

Subject	Agency	Contact/Title	Telephone
Education	Kern Union High School District	Dennis Scott, Assistant Superintendent	661-827-3127
Public Finance and Fiscal Issues (School Impact Fees)	Kern County Office of the Superintendent of Public Instruction	Chris Davis, Representative	661-636-4493
Fire Protection Services	Kern County Fire Department	Derek Tisinger, Fire Captain	661-330-0133
Emergency Services	Hall Ambulance	Jennifer LaFavor, Manager, Communications Division	800-422-0656
Law Enforcement	Kern County Sheriff's Department	Sergeant Marty Downs	661-763-8550
Lodging	City of Bakersfield Convention and Visitors Bureau	David Lyman, Representative	661-852-7282

Sources: Scott, 2008; Lyman, 2012; Tisinger, 2012; Downs, 2012; Hall Ambulance, 2012a; KCT, 2008; Kern County Superintendent of Schools, 2012.



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SOCIOECONOMIC STUDY AREA

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.8-1

vsa_4/02/12...U:\GIS\HECA\Projects\HECA_2012\Illustrator_Files\Fig_5_8-1_socio_study_area.ai