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5.3 CULTURAL RESOURCES

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.

5.3.1 HECA Project Cultural Resources Study Areas

Cultural resources are defined as buildings, sites, structures, objects, or traditional cultural properties, each of which might have historical, architectural, archaeological, cultural, or scientific importance. Because archaeological and historic architectural resources are affected differently (i.e., historic architecture is subject to the potential for indirect effects), two different study areas are defined using CEC criteria to address potential impacts to cultural resources that could occur with implementation of the HECA Project. The study area for each of these cultural resources subdisciplines is described separately below. OEHI conducted the surveys for the portion of the CO_2 alignment south of the California Aqueduct, and the results of those surveys—along with record search data for this area—are presented in Appendix A-1,

Section 4.5, Cultural Resources, and Appendix A-2, Section 2.3, Cultural Resources. Appendix A also contains the cultural resource impact evaluation for the OEHI CO_2 EOR Processing Facility. The HECA Project Site, linear facilities, OEHI CO_2 pipeline, and the associated Cultural Resources Study Areas are shown on Figures 3.8-1 and 3.8-2.

5.3.1.1 Archaeology

The HECA Project Archaeological Resources Study Area (ARSA) analyzed in this section comprises the area where it can be reasonably expected that Project implementation could potentially affect archaeological resources. In accordance with CEC guidelines, this Study Area consists of the proposed facility (the 453-acre Project Site), all the areas within a 200-foot radius of the Project Site; the Project linear rights-of-way (ROW), including areas within a 50-foot radius of the ROWs (except where described otherwise), and the OEHI CO_2 pipeline. The efforts to address archaeological resources as they relate to the Project are discussed in further detail in the archaeological technical report, which is provided in Appendix G–3.

5.3.1.2 Historic Architecture

The HECA Project Historic Architectural Resources Study Area (HARSA) analyzed in this section comprises the area where it can be reasonably expected that Project implementation could potentially affect historic architectural resources. As per CEC guidelines, this study area consists of the proposed facility (the 453-acre HECA Project Site), all areas within a 0.5-mile radius of the HECA Project Site, all above-ground HECA linear ROWS, including areas within a 0.5-mile radius of the ROWs, and the OEHI CO_2 pipeline. The efforts to address historic architectural resources as they relate to the HECA Project are discussed in further detail in the historic architectural technical report by JRP Historical Consulting, LLC (JRP, 2012), which is provided in Appendix G-4.

This section documents the efforts undertaken to determine whether cultural resources could be adversely affected by the implementation of the Project. Section 5.3.1 presents the environment that could be affected; Section 5.3.2 identifies the environmental consequences; and Section 5.3.3 discusses the cumulative effects associated with the Project. Section 5.3.4 identifies the mitigation measures to be implemented to avoid identified impacts. The remaining sections present the regulatory context. Specifically, Section 5.3.5 identifies the cultural resources laws, ordinances, regulations, and standards (LORS) applicable to the Project; Section 5.3.6 lists the involved agencies and agency contacts; and Section 5.3.7 discusses permits and scheduling.

5.3.2 Affected Environment

The analysis of the ARSA and HARSA as defined above included a literature review and record search, archival research, review of collected data, geoarchaeological assessment, pedestrian surveys, archaeological monitoring of the geotechnical investigation, and consultations with the Native American Heritage Commission (NAHC). The literature review and record searches included ethnographic and historic literature and maps; federal, state, and local inventories of historic properties; archaeological base maps and site records; and survey reports on file at the Southern San Joaquin Valley Information Center at California State University, Bakersfield

(SSJVIC). Archival research was conducted at a variety of libraries and repositories, including the California State Library, Sacramento; and Shields Library, University of California, Davis; and data collected from the Water Resources Center Archives and Earth Sciences Map Library at the University of California, Berkeley were reviewed. Pedestrian surveys were performed for both archaeological and historic architectural resources of each cultural resource subdiscipline's Study Area. Consultation has been carried out with the State of California's NAHC, with subsequent contact with Native American groups and individuals identified by the NAHC.

5.3.2.1 Natural Environment

The San Joaquin Valley is bounded by the Sacramento-San Joaquin River Delta to the north, the Sierra Nevada Mountains to the east, the Tehachapi Mountains to the south, and the Coast Range to the west. The western slope of the Sierra Nevada Mountains is the source for rivers and streams that cross the San Joaquin Valley. The San Joaquin Valley is divided into two hydrologic sub-basins: (1) the San Joaquin Sub-Basin to the north; and (2) the Tulare Sub-Basin to the south. Rivers of the San Joaquin Sub-Basin join the San Joaquin River as it drains into the Sacramento River, flowing into San Francisco Bay. The rivers of the Tulare Sub-Basin have no natural perennial surface outlet; and in the past, formed large, shallow, semi-permanent inland lakes. Only in years of exceptional rainfall did water cross the divide and enter the San Joaquin Sub-Basin.

The San Joaquin Valley has a Mediterranean-type climate characterized by hot, dry summers and cool, moist winters. Summer daytime high temperatures frequently exceed 100 degrees Fahrenheit (°F). Mean annual temperature is 65°F. The San Joaquin Valley is separated from the influence of the ocean by the Coast Ranges, and is in a broad rain shadow. Precipitation primarily occurs from September through April, although in normal years, 90 percent of the rain falls between December 1 and April 1. The eastern side of the valley receives about 2 inches more than the western side. Average annual rainfall for the San Joaquin Valley is 4.7 inches, and soil water deficits characterize the grassland and scrub habitats for 4 to 8 months every year. A dense, persistent, ground fog known as "tule fog" can develop in the winter months, resulting in overcast, damp, cool weather.

Historically, the San Joaquin Valley included a variety of ecological communities, with vast areas of woodlands, freshwater marshes, and grasslands prior to the establishment of the present land use patterns. In upland areas, several distinct communities of grasses and shrubs grew along rainfall and edaphic gradients. Today, agricultural development dominates the flat lands in the center of the valley. Undisturbed open space is largely restricted to the sloping margins of the valley.

Section 5.2, Biological Resources, and Section 5.14, Water Resources provide detailed descriptions of the natural environment in the region that includes the Project Site.

5.3.2.2 Prehistoric Background

There is a long history of archaeological research in the southern San Joaquin Valley, with much of the early, purely academic investigations focused on the Buena Vista Lake and adjacent Elk Hills vicinities (portions of both of which fall within 5 miles of the Project). In the last decade of

the nineteenth century, professional and amateur archaeologists began investigating the numerous "Indian mounds" of the region. C.H. Merriam collected a large coiled basket that contained the mummified body of a child, found in a rock shelter near Bakersfield (Merriam, 1905 in Heizer, 1951:30). Other materials collected by Merriam included another basket, a net manufactured from the fibers of the milkweed, hemp cordage, portions of a rush mat, and fragments of a rabbit-skin blanket. In February 1909, N.C. Nelson of the University of California Archaeological Survey recovered a cache of baskets and other artifacts from a dry arroyo in the Elk Hills (Moratto, 1984:174).

In 1926, Gifford and Schenk of the University of California published their volume on the archaeology of the southern San Joaquin Valley. The report included the documentation of approximately 40 sites, the results of their excavation of nine sites, and the examination of private collections. The results of their findings were that the only discernible change in, or in addition to, the culture of the Southern San Joaquin Valley is represented by steatite in the "Slough and Lake regions" (Gifford and Schenk, 1926:118). This apparent lack of change in material culture resulted in their claim that the cultural remains recovered seemed to be as readily assignable to the "last century as to the last millennium" (Gifford and Schenk, 1926:118).

During the Depression years of 1933 and 1934, the Civil Works Administration excavated five sites (two middens, two cemeteries, and a small grave site) adjacent to the southwestern shore of Buena Vista Lake, the northwestern shore of which lies less than 5 miles from the southern reaches of the Project. The midden sites, CA-Ker-39 and CA-Ker-60, exhibited stratified deposits that represented both prehistoric and protohistoric/historic occupations. Materials recovered from the two cemeteries, CA-Ker-40 and CA-Ker-41, appeared contemporaneous with materials from the upper deposits of CA-Ker-39 and -60, suggesting that they may have been the burial grounds for the inhabitants of the midden sites. Reported upon by Wedel (1941), this investigation stands as the "most intensive scientific excavation work so far in the southern San Joaquin Valley" (Moratto, 1984:188).

In 1899, 1909, 1923, 1924, and 1925 test excavations took place at more than 20 different sites around Buena Vista Lake and Slough, and Tulare Lake, all focusing on the recovery of burials and grave goods from large village sites (Gifford and Schenck, 1926; Hartzell, 1992:122). This work was followed in the 1930s through 1960s by limited excavations in the southern San Joaquin Valley, primarily around Buena Vista Lake, by various researchers, including the Smithsonian Institute, Wedel, von Werlhof, Warren, and Fredrickson, also focusing on larger village and burial sites (Schiffman and Garfinkle, 1981:3-4).

CA-Ker-39 and -40 were subsequently found to be components of a much larger site, CA-Ker-116. Excavated in the mid-1960s by Fredrickson and Grossman (1977), CA-Ker-116 was found to contain a deeply buried component that was not identified by Wedel. Situated at depths of greater than 280 centimeters, this component was dated to circa 6250 B.C. (Moratto, 1984:99, 188).

From an archaeological perspective, research conducted in the southern San Joaquin Valley resulted in the identification and definition of a number of temporal components, periods, or phases that reflect prehistoric human lifeways and land use patterns. This research has predominately focused on sites along the ancient shoreline of Buena Vista Lake (Fredrickson and

Grossman, 1977; Gifford and Schenck, 1926; Hartzell, 1992; Riddell, 1951; Walker, 1947; Wedel, 1941) and in the Tulare Basin area (Angel, 1966; Hewes, 1946; Siefkin, 1999).

Wedel's (1941) investigations included excavations at five sites on the southwestern edge of Buena Vista Lake, including two shell middens, two large cemeteries, and an additional small site in the adjacent hills. A general chronological framework was defined based on stratigraphic analyses and comparison of artifact assemblages, resulting in a two-phase sequence of pre-European late occupation and an earlier cultural complex (Wedel, 1941). The early complex was correlated to the Oak Grove Culture of the Santa Barbara Coast, dated at 2,000 – 4,000 years ago (Meighan 1955) and 4000 - 7000 years ago (Heizer, 1964). The late complex was clearly separated from the earlier by both stratigraphy and artifact types. Wedel (1941) subdivided the late complex into two phases: the early late phase, and the later protohistoric period. Wedel suggested that the early late phase began about A.D. 1400, and reflected a simple complex with similarities to the Tulare Basin to the north. The later protohistoric period, after A.D. 1500 or 1600, revealed strong influence from Santa Barbara coastal cultures.

In the mid-1960s, additional investigations were conducted along the southwestern shoreline of Buena Vista Lake at CA-Ker-116 (Fredrickson and Grossman, 1977), a small part of an extensive occupation zone that parallels the shoreline for a distance of about 2 miles (Fredrickson, 1986). Incorporating data from both Wedel's (1941) study and his own 1960s work, Fredrickson (1986) has since proposed a four-phase cultural sequence for the Buena Vista Lake area.

The earliest occupation is represented by a meager inventory of distinctive artifacts, which include a ground-stone atlatl spur, three crescents, and fragments of several crude, leaf-shaped projectile points (Fredrickson, 1986). Radiocarbon age determinations provided three dates of suggested cultural association: two dates were 6250 B.C., and a third 5650 B.C. (Fredrickson, 1986; Fredrickson and Grossman, 1977). Fredrickson (1986) notes that although similar-style artifacts were recovered from Paleo-Indian period contexts at Tulare Lake (Riddell and Olsen, 1969), similar conclusions regarding such antiquity at CA-Ker-116 should not be made in the absence of corroborative stratigraphic data.

The ensuing phase is represented by sparse remains that reflect an early milling stone assemblage with possible cultural relationship to the Oak Grove and other milling stone complexes of southern California (Fredrickson, 1986). Hallmark attributes include handstones, milling stones, flake scrapers, and extended burial posture. This phase remains undated, but inferences may be drawn from the milling stone horizon elsewhere in southern California, which began as early as 5000 BC and persisted for 3,000 years or more (Fredrickson, 1986 citing Wallace, 1971).

The next cultural phase, the late period (ca. A.D. 900 – A.D. 1500), is separated from the milling stone complex by millennia, because no assemblage has been found along the southwestern lakeshore to fill in the presumed occupational gap (Fredrickson, 1986). Based on stylistic and technological differences in artifact forms, Fredrickson (1986) has tentatively divided the late phase into two subphases: the earlier subphase and the later subphase. The earlier subphase is distinguished by split-punched and whole spire-lopped *Olivella* beads and crudely made leaf-shaped points. The later subphase is defined by more finished and rough disk *Olivella* beads and by a local bead-making industry, which may have used rare whole-shell *Olivella* (Fredrickson,

1986). Small quantities of asphaltum are noted, as are hopper mortars, and clay-lined roasting ovens filled with freshwater clamshell; steatite is rare.

The final period at Buena Vista Lake is considered to represent the ancestral Yokuts' continuous use of the lakeshore environment. This protohistoric period, dating perhaps from A.D. 1500 to the ethnographic period, is represented by abundant use of asphaltum and steatite, the presence of baked clay objects, triangular projectile points, an elaborate bone technology, bowl hopper mortar, disk *Olivella* beads, *Haliotis* beads and ornaments, marine clam shell disk beads, and small pendants and carvings of steatite (Fredrickson, 1986).

More recent archaeological research conducted by Hartzell (1992) at sites along the southwestern margin of Buena Vista Lake (Wedel Site #1 and #2; CA-Ker-116) and near Buena Vista Slough (CA-Ker-180 and CA-Ker-1611) has resulted in the refinement of the lakeshore's chronological sequence as it relates to the Holocene epoch. A similar approach was taken by Siefkin and colleagues (1996) for the neighboring Tulare Basin area. Cumulatively, these studies provide definition of three broad temporal periods for the larger southern San Joaquin Valley area: (1) Early Holocene, (2) Middle Holocene, and (3) Late Holocene.

Early Holocene (12,000 to 7000 Years Before Present [B.P.]; 10,000 to 5000 B.C.)

The earliest known period of human use of the southern San Joaquin Valley dates to approximately 12,000 years ago (10,000 B.C.). During this time, native peoples lived in camps around lake margins and relied extensively on lacustrine resources (i.e., fish, turtle, freshwater mollusks, and waterfowls) and terrestrial resources (mainly rabbits and artiodactyls).

Populations are considered to have been small, considering the absence of imported items and the use of local resources from within a relatively small area centered on the lake marshes and the surrounding plains and foothills. Late Pleistocene/Early Holocene cultural deposits found in the Tulare Lake and Buena Vista Lake basins indicate that stemmed and lanceolate points and crescents were used (Hartzell, 1992:317-331; Siefkin, 1999:50). Also noted with these artifacts were species of extinct megafauna, although direct cultural association has not been proven (Siefkin, 1999:49).

Fluted points have yet to be identified at Buena Vista Lake, a factor that Sutton (1996) correlates with the absence of a lacustrine habitat during the early human occupation of the southern San Joaquin Valley. Artifact distribution at Tulare Lake, however, indicates that water levels were lower during the Late Pleistocene, a trend that was likely reflected by Buena Vista Lake (Wallace and Riddell, 1988:89). Siefkin (1999:51) considers the modern archaeological emphasis on the upper shorelines a more reasonable answer to the current lack of fluted points and other Paleo-Indian remains at Buena Vista Lake.

Middle Holocene (7000 to 4000 B.P.; 5000 to 2000 B.C.)

Few well-stratified archaeological deposits from the southern San Joaquin Valley date to this period. The paucity of such sites has been attributed to fluctuating lakeshores and the movement of campsites to locations above or below areas that have been previously studied by archaeologists (Hartzell, 1992:318; Siefkin, 1999:52).

This period is characterized by assemblages that are similar to Windmiller Pattern sites in the northern part of the San Joaquin Valley, although it has been speculated that local deposits more closely resemble the Oak Grove and other millingstone complexes of southern California. Hallmark artifacts include extended burials without funerary objects, Elko and Pinto projectile points, millingstones, handstones, flake scrapers, and charmstones (e.g., Gerow, 1974; Gifford and Schenk, 1926; Hartzell, 1992; Siefkin, 1999; Wallace, 1954:120-121). Mortuary patterns included extended burials without funerary objects. Also found during this period are imported items such as obsidian artifacts, and beads and ornaments made of marine shell. Worked bone and steatite implements occur in the archaeological record in limited amounts (Hartzell, 1992:322).

From archaeological evidence, it appears that year-round acquisition of fauna occurred at lakeshore sites, and many logistical bases were set up along lakeshores. Rises above the lakes were likely occupied by hunting parties when they needed to retool weaponry and process game (Hartzell, 1992:320).

Late Holocene (4000 B.P. to 150 B.P.; 2000 B.C. to A.D. 1850)

In contrast to earlier periods, the archaeological record of the Late Holocene period is significantly more complex. During the Late Holocene period, with the lowering of water levels and greater amounts of alkaline in the area lakes, a residential mobility pattern of land use began. This strategy involved more frequent moves, where an entire population or group traveled to resource areas.

Notable technological changes include the introduction of the hopper mortar, changes in *Olivella* shell bead forms, and the use of asphaltum in small quantities (Fredrickson, 1986; Hartzell, 1992:326). Also introduced into the tool kit were Cottonwood series projectile points, bi-pointed bone objects used as fish hooks, steatite H-shaped "reels," and tule-covered clay ball net weights. Late-Holocene–period sites often contain freshwater mussels, turtle remains, ground stone, and marine shell beads (Peak and Associates, 1991), and are generally found on knolls between ephemeral drainages (Hartzell, 1992:328; Moratto, 1984:189). Mortuary patterns included flexed or semi-flexed burials, somewhat similar to the Late Horizon of the Central Valley sequence.

The protohistoric period of the Late Holocene, dating from roughly 500 years B.P. (A.D. 1500) to the ethnographic period, is represented by a diversified artifact assemblage. Common implements included baked clay objects, triangular projectile points, elaborate bone work, bowl hopper mortars, *Olivella* disk beads, *Haliotis* beads and ornaments, clamshell disk beads, and small steatite pendants and carvings (Fredrickson, 1986).

Elk Hills/Buena Vista Lake

The Project Site is on the northeastern flanks of the Elk Hills, northwest of the ancient shores of Buena Vista Lake. A large number of sites are represented in the archaeological record in the vicinity of the Elk Hills and Buena Vista Lake, dating (very tenuously) to between 5000 and 4000 years B.P. These dates are based on radiocarbon samples associated with deeply stratified freshwater mussel shell in the Elk Hills (Jackson *et al.*, 1999).

As the environment began to normalize and approach near-modern conditions, the lakes, marshes, and sloughs on the valley floor began to revitalize. Oak trees and other temperate plant species began to spread to lower elevations along the river drainages and in the wetter valleys. Plant foods remained an important food supply, but freshwater mollusks, fish, water fowl, and elk returned as staple food sources. As the environment offered more and more stable food sources, the population of California began to steadily increase. By 3000 to 2000 B.P., this increase was leading many groups to the brink of starvation as more and more people competed for a large but limited food supply. It is believed that this stress led the people of California (as a whole) to the development of massive trade networks and their reliance on acorns, which remained relatively unchanged until European contact in the late sixteenth and early seventeenth centuries.

From 3000 B.P. to the near protohistoric contact period, the archaeological record of the Elk Hills area shows an almost continual period of use. The extensive marshlands of Buena Vista Lake, Kern Lake, and their huge interconnected sloughs were fed seasonally by spring and winter flooding of the Kern River. These were the center of the sub-region's human occupation, because much of the immediately surrounding areas were near-desert scrub lands, much as they are today.

The Buena Vista Basin's cultural chronology has been categorized and seriated by Hartzell (1992) based on excavations at several Buena Vista Lake and Slough sites, including the Buena Vista site (KER-116) and the Wedel Sites #1 and #2. Hartzell's first phase for the Late Holocene extends from 4000 B.P to 2000 B.P., and is identified by extended burials, Pinto and Elko projectile points, milling stones and manos, and an increase in the variety of lake fish and land mammals present in associated middens. This phase ends around 2000 B.P. and transitions into a second phase that lasts until approximately 1000 B.P.

This second phase is identified with flexed burials, Cottonwood triangular projectile points, the appearance of the first semi-permanent house structures, clay-lined storage pits, and an explosion in the variety and numbers of lake and land animal remains present in the site middens. This period also shows evidence of the revitalization of long-distance trade and the exploitation of animal and plant resources from well outside the immediate lakeshore area being brought back to the lake villages for processing and consumption.

The final phase begins around 1000 B.P. and continues until the historic period. Hartzell (1992) notes that in this late period, the lakeshore sites are not as continually occupied as in earlier periods. This change coincides with a warm period that would have lowered lakeshore levels and made the water more alkali. It is thought from sites along the eastern fringe of the Elk Hills and along the Buena Vista Slough that much of the area's population moved to where the pluvial environment was more stable, but also incorporated a larger amount of foraging and inter-area and regional trade. In this period, hopper-style mortars and associated groundstone pestles appear, suggesting the use of acorns as a dietary mainstay. An increase in trade material from the Santa Barbara Coast and Trans-Sierra locations gives evidence of this area being a possible focal point for inter-regional trade. The latter half of this phase correlates with a protohistoric period evidenced by the presence of glass trade beads. A primary village in this period is thought to be the historic Tulamni Yokut Village of *Tulamniu*, which was visited and attacked by the Spanish in the late eighteenth and early nineteenth centuries.

5.3.2.3 Ethnographic Background

The Project is within the homeland of the Southern Valley Yokuts (Wallace, 1978:448-449), a geographic division of the much larger Yokuts linguistic group who occupied the entire San Joaquin Valley and adjoining Sierra Nevada foothills (Kroeber, 1907, 1925, 1963; Latta, 1977; Newman, 1944). Yokutsan is one of four Penutian linguistic stocks that included Costanoan (Ohlonean); Miwok (Utian); Wintu, Nomlaki, and Patwin (Wintuan); and the Maidu, Nisenan, and Koncow (Maiduan) (Shipley, 1978). Figure 5.3-3 depicts the ethnographic territories of the Southern Valley Yokuts and their neighbors.

In contrast to the typical California cultural grouping known as the tribelet, the Yokuts were organized into "true tribes," in that each had "a name, a dialect, and a territory." Kroeber (1925:474) estimated that as many as 50 Yokuts tribes may have originally existed, but that only 40 were "sufficiently known to be locatable." Each tribe inhabited an area averaging "perhaps 300 square miles," or about the distance one could walk in any direction in half a day from the center of the territory. Some Yokuts tribes only inhabited a single village, while others occupied several (Kroeber, 1925:474-475).

The Southern Valley Yokuts territory was centered near the basins of Tulare, Buena Vista, and Kern lakes, their connecting sloughs, and the lower portions of Kings, Kaweah, Tule, and Kern rivers (Figure 5.3-3). Sixteen subgroups, each speaking a different dialect of the Yokut language, made up the Southern Valley Yokuts, and included the Apyachi, Choynok, Chuxoxi, Chunut, Hewchi, Hometwoli, Hoyima, Koyeti, Nutunutu, Pitkachi, Tachi, Telamni, Tulamni, Yawelmani, Wowol, and Wechihit. Three of the groups—the Tachi, Chunut, and Wowol—claimed the shores of Tulare Lake, while the Nutunutu inhabited the swampy area north of Tulare Lake, south of Kings River. The Wimilchi, Wechihit, and Apyachi occupied the area to the north of Kings River, with the Apyachi living near the river's outlet on the western side of the valley, and the Wimilichi and Wechithit to the east. The Choynok occupied an area east of Tulare Lake in the Kaweah River Delta, southwest of the Telamni and Choynok groups. The Koyeti's territory was in the swampy sloughs of the Tule River. The Tulamni occupied Buena Vista Lake, with the Chuxoxi living in the channels and sloughs of the Kern River Delta. The Hometwoli occupied the area surrounding Kern Lake, while the Kawelmani lived to the northeast near Kern River and Poso Creek (Wallace, 1978:449).

Subsistence strategies focused on fishing, hunting waterfowl, and collecting shellfish, seeds, and roots. Fish species commonly hunted included lake trout, chubs, perch, steelhead, salmon, and sturgeon. Waterfowl were mainly caught in snares and nets. Plant foods played a key part in the Yokuts diet; the most important resource was tule, whose roots and seeds were eaten. Other plant foods included various species of grasses, clover, fiddleneck, and alfilaria. Acorns were not readily available, and groups often journeyed into foothill zones to trade for the nut (Wallace, 1978:450).

Southern Valley Yokuts generally placed their settlements on top of low mounds near major watercourses, and constructed two types of permanent residences. The first was an oval, single-family dwelling with wooden framing covered by tule mats. The second type was a long, step-roofed communal residence that housed at least 10 families. Other structures included granaries and a communally owned sweathouse (Wallace, 1978:450-451).

Southern Valley Yokuts relied heavily upon tule reeds for making woven baskets and mats. Basketry tools, such as awls, were made from bone (Wallace, 1978:451-452). Flaked-stone implements included projectile points, bifacial and unifacial tools, and edge-modified pieces. Ground stone tools consisted of mortars, pestles, handstones, and millingstones.

5.3.2.4 Historical Background

Hispanic Period

Southern California and the Pacific Coast had been visited by Europeans since the early sixteenth century. With the development of the Spanish mission system and establishment of the first Franciscan mission at San Diego in 1769, California was firmly placed in the historic timeline. European trade goods were likely known to the inhabitants of the southern San Joaquin Valley, but direct contact was rarely made. The Southern Valley Yokuts were no doubt keenly aware of the Franciscan missions, because their southern and western neighbors, the Chumash, were strongly integrated into the mission system. European trade goods were not uncommon, and are often found in historic period burials in the form of trade beads. It is also well documented that many Chumash neophytes fleeing the oppressive mission system went to the *Tulares* area in the southern San Joaquin Valley and hid amongst the Yokuts inhabitants there (Castillo, 1978; Grant, 1978).

The southern San Joaquin Valley was not visited by Europeans until 1772, when Don Pedro Fages entered through the Tejon Pass, south and east of the Elk Hills, in a meandering overland search of southern California for fugitive Indian neophytes between San Diego and San Luis Obispo (Wallace, 1978; Cook, 1960). Fages' party traveled west along the foothills of the Tehachapi Mountain range, arriving at the Tulamni Yokut village of Tulamniu, along the shore of Buena Vista Lake. Fages named the village Buena Vista, making notes on the huge expanse of tule reeds, thus giving the region its historical Spanish name of *Tularenos*. The southern San Joaquin Valley was seen as uninhabitable and not suitable for settlement or a mission due to the marshy landscape and the perception of the interior Native population as dangerous heathens that actively aided in the corruption of the mission neophytes.

The next recorded visit by a European was Padre Francisco Garces in 1776. He entered the Valley through the Tehachapi Mountains and traveled around the Elk Hills and Bakersfield area looking for possible sites for a new mission, although no missions were constructed in the southern San Joaquin Valley. Other Franciscan monks came into the Elk Hills area, mainly traveling east from Santa Barbara and San Luis Obispo towards the Mojave Desert and the Colorado River. The region was only sporadically visited by Europeans over the following 50 years, usually by military or militia forces from the coastal missions and presidios searching for fugitive neophytes or stolen cattle or horses.

The largest incursion came in 1824, in the wake of the Chumash revolt at the Santa Barbara Mission. A vast majority of the Chumash neophytes, fighting against the oppressive mission system and rising death rate, took the Santa Barbara Mission and held it for several days against the Spanish military, trying to remove them. When the rebelling party, numbering over 400, left the mission, they fled north and east towards the southern San Joaquin Valley. This group of Chumash hid amongst the Tulamni villages along Buena Vista Lake and Slough. Several

Spanish-led military forces entered the valley to apprehend the rebels, but were foiled when they were defeated in small skirmishes with the Yokuts. Many of the Chumash rebels later returned to the mission after the Franciscan Padres, escorted by a military force, entered the Buena Vista Lake area and convinced them to return (Castillo, 1978; Grant, 1978).

The decades following this incident saw very few European visitors other than Spanish ranchers or militia attacking groups for punitive raids and to capture slaves. In 1833, a malaria epidemic swept through the tribes of the San Joaquin Valley, decimating the population. Many early American explorers of the mid-1800s commented on the land being essentially depopulated in the aftermath of the epidemic.

Explorers such as the American trapper Jedediah Smith passed through the area, and their routes became important transportation corridors used by later travelers, stage companies, and settlers. The Mexican government granted the first ranchos in the southern part of the valley in the early 1840s, the closest to the study area being the 17,710-acre *Rancho San Emigdio*, which was granted to Jose Antonio Dominguez in 1842 (Beck and Haase, 1974:34; Hoover *et al.*, 1990:123). These ranchos, however, did not result in permanent settlement. Instead, Mexican rancho owners along the California coast allowed their cattle to wander and graze as far afield as the San Joaquin Valley during this period (Robinson, 1961:1-12, 17-20, 28-29).

The American Period

A major factor leading to the disintegration of Mexican control of California was pressure from the United States. Initial contacts were made by private citizens, such as the aforementioned November 1826 visit by Jedediah Smith to the San Gabriel Mission. Settlement by United States citizens greatly increased after discovery of gold in 1848. California became part of the United States as a consequence of the Mexican War of 1846–1847. The territory was formally ceded in the treaty of Guadelupe Hidalgo in 1848, and was admitted as a state in 1850 (Bethel, 1969).

In 1851, the Yokuts, along with several other San Joaquin Valley tribes, agreed to relinquish their land, opening it to settlement under federal land law. These laws fundamentally shaped the early history of Kern County. The study area, which lies along the Buena Vista Slough and the marshy area connecting Buena Vista Lake and Tulare Lake, was sold under the Arkansas Act of September 28, 1850, whereby Congress ceded to certain states the swamp and overflowed lands on the federal public domain within their borders. The state was then to use the proceeds from the sale of such lands to reclaim them, thereby making them useful to the new landowners. The land act was subject to abuse and fraud. The seasonable nature of swamp land in California led to disagreements between state and federal surveyors regarding the boundaries of swamp land. In some instances, parcels sold as “dry” by the federal government were also sold by the state as swamp and allowed to be inundated. In the end, the state made its own surveys, and on December 5, 1871, the Secretary of the Interior accepted the state’s boundaries.

The state also struggled to find a means of reclaiming the swamp lands. The Green Act of 1855 placed settler’s payments into an earmarked fund. When the settler could prove that the land was ‘reclaimed,’ usually by affidavit, they were given a cash credit—about $1 an acre—for the purchase price. The Green Act also removed limits on acreage, allowing the assembly of large tracts. After 1868, the counties’ boards of supervisors served as reclamation commissioners.

The purchase price ($1 per acre) was paid into the county's swampland fund, but the county swampland commissioners could waive payment if independent commissioners attested that the land had been reclaimed and cultivated for 3 years (Thompson, Ph.D. dissertation, 1958, 185-207). Upon the selection of a parcel, a settler received a certificate denoting their claim; a certificate of purchase upon partial payment; and a state patent for the lands followed upon completion of payments and reclamation. It was under these provisions that Henry Miller, Charles Lux, John Redington, Horatio Stebbins, F.A. Tracy, H.L. Bonestell, and Horatio Livermore amassed their acreage on the lower Kern River west of Bakersfield. They acquired swampland certificates of purchase from would-be settlers or from local agents like Julius Chester, Duncan Beaumont, Richard Stretch, and Thomas Baker, whose earliest claims were made in the area dated to January 28, 1870 (Zonlight, 1979). In this manner, Miller and Lux secured their "Southern Division" in Kern and Kings Counties.

The partnership between Henry Miller and Charles Lux, both German immigrants, began in San Francisco where they both worked as butchers in the early 1850s. They cemented their business partnership in 1858 when they joined forces to purchase a herd of Texas cattle. From that point forward, they sought western lands to purchase for the purpose of operating ranches for their increasing herds (Igler, 2001; Introduction). After acquiring their Southern Division, they organized it into ranches, the largest being the Buttonwillow Ranch, which served as the headquarters ranch of that division. Originally, the headquarters complex known as "Old Headquarters" lay in the south at the base of Tupman Road before moving to Buttonwillow in 1885. The Buttonwillow Ranch consisted of 52,440 acres, and the Project study area lies entirely within its former limits. The area operated under this single ownership from the 1870s until 1927, when Miller and Lux Incorporated (Miller & Lux) started selling the land.

The system of drainage, irrigation, and flood control canals built by Miller & Lux has left an enduring legacy in the area. Although some of their southern lands could immediately accommodate their herds of cattle, other areas required an output of time, money, and effort, primarily in the form of water control features. Construction of the drainage and irrigation canals was critical to the reclamation efforts of their newly acquired swampland along the Buena Vista Slough. If the waters of the Kern River could be diverted away from the slough, the swamp could be dried and then irrigated. Under the Arkansas Act, the Buena Vista Slough was to be reclaimed as a part of the purchase agreement.

In accordance with Assembly Bill 54 of 1861, Swampland District 121 was formed in May 1871, including swamplands along Buena Vista Slough. Miller and Lux, along with a few others who had pastured their cattle in the slough, organized the Kern Valley Water Company in 1876. The Kern Valley Water Company acted as agents for the district. The principal works of the company would be canals for irrigation and for reclamation, known as the Kern Valley Water Company Canal (KVWCC). The following year, canal construction began along the western side of the slough. Fifty-horse teams pulling one-ton "Fresno Scrapers" excavated the bed of what would come to be known as the Kern Valley Water Company's Canal. When finished, the canal measured 125 feet wide and 24 miles long. It was a massive project that required a significant labor force. Fortunately for the Kern Valley Water Company, recently laid off Southern Pacific laborers gladly took the jobs.

The system of canals created during the Miller & Lux period consisted of canals dug and maintained by Miller and Lux, and a system of laterals dug and maintained by individual tenant farmers. After constructing the main flood control canal along the western side of the swamp, Miller & Lux also constructed the East Side and West Side canals for distribution, sometime prior to the early 1890s. As their names indicate, these canals bordered the eastern and western sides of the Buttonwillow Ranch, with the West Side canal running closely parallel to the KVWCC. Much smaller in scale than the flood canal, the West Side was only 30 feet wide and 2 feet deep, and the East Side 25 feet wide, and 3 to 5 feet deep. Miller & Lux also constructed a drainage canal, called Main Drain, from the southern end near the old headquarters northerly through the center of the ranch generally along the line of the original Buena Vista Slough (Barnes, 1920:9). Farmers in the north used the water from Main Drain, collected primarily by seepage, for irrigation. The remainder of the canals and laterals in the area were primarily the works of individual farmers who sought to hook in to the main canal system for irrigation of their farms (Miller, n.d.; USGS, 1898: 61-63; Lewis Publishing Company, 1892).

Miller & Lux also had an enduring water control feature built in the study area. Near Old Headquarters, a weir separated the KVWCC from the Outlet Canal that fed water directly from the Kern River. The weir allowed Kern River water to be diverted into the East Side and West Side canals for distribution. Originally, the first in a succession of timber weirs that controlled the flow of water up the canal, after decades of troublesome wash-outs and flood damage, Miller & Lux invested in a more permanent structure at the point where the main canals met, near Old Headquarters. In 1911, they hired John B. Leonard and W. P. Day to engineer a reinforced-concrete structure to serve as both weir and bridge over the massive flood control canal (Leonard and Day, 1913; Lippincott and Means, 1919).

The canal system allowed Miller & Lux to support settlement in the area. By 1919, Miller & Lux farmed the entire area south of Buttonwillow between the East Side and West Side canals south to Old Headquarters. Individual ranches made up of one to four sections and staffed by Miller & Lux employees operated independently of one another. Each had its own set of buildings and a water supply system. Four ranches, in addition to the headquarters, operated in the study area by 1918: Deep Wells, Poplar Grove, Willow Grove, and Morton Place. These ranches grew almost all of the alfalfa farmed by the company at Buttonwillow. North of the railroad that crosses through Buttonwillow, the company rented their land to tenant farmers. Generally, the farmers grew crops Miller and Lux agreed to buy in their entirety, which often translated to corn and grains to serve as hog feed and winter feed storage (Barnes, 1920:17-18). Milo maize and sorghum were also planted and then grazed by herds brought in the fall (Means, 1919:10-11; Stegman, 1918).

The town of Buttonwillow got its start when Miller & Lux established a ranch headquarters near a single landmark buttonwillow tree in the slough in 1885. They tried to name it Buena Vista, but the area had long been described relative to that Buttonwillow tree, and the name stuck (Burmeister, 1977:85). The Old Headquarters was not abandoned entirely; in 1919, an abattoir functioned at the site, supplying the company's ranches, Bakersfield, and the oil regions with a fresh supply of beef, pork, and mutton (Means, 1919).

At the new headquarters in Buttonwillow, a company store provided needed supplies to the ranch hands. In 1893, Miller & Lux sold 71 acres to the Pacific Improvement Company to establish a

station and town at Buttonwillow. In 1895, they advertised in San Francisco to promote the settlement of an Italian colony in the Buttonwillow region to grow wheat. A few families attracted by the offer established farms in the area on land leased from Miller & Lux (*Buttonwillow Times,* 3 March 1960). Angelo Toriginni was one of the Italians attracted from San Francisco to the Buttonwillow area. In 1899, he joined a brother already employed at the Buttonwillow Ranch. In 1950, he reminisced that 23 families lived in the area when he arrived, only 3 of which were not Italian. He also stated that he was the only one of those 23 families remaining in the Buttonwillow area (*Shafter Press* 3 August 1950). A post office established in 1895 indicated a stable population. The majority of the townsite reverted to Miller & Lux, though. In 1927, Miller & Lux Incorporated, under the direction of land agent C. E. Houchin, platted incarnation of the town (Burmeister, 1977:85; Smith Ph.D. Thesis, 1976:328). Eventually, this area became the focus of a large-scale international marketing campaign that brought families from Europe and the eastern U.S. to start farms and vineyards.

Charles Lux died in 1887, and Henry Miller carried on the business until his death in 1916. By this time, the company was in decline, unable or unwilling to meet the changing business environment. As the heirs to the company fought over the estate, the property was sold off following World War I, ushering in a new era for the Buena Vista Slough (Igler, 2001:180).

Miller & Lux entered a period of decline following the death of the two principals. Settlement of the estates and increasing competition resulted in a period of legal reorganization that would have a physical impact on the area south of Buttonwillow. Miller & Lux had both valuable land and valuable water rights. However, the profitability of the two was linked. In order to sell the land, a legal means of matching water to the land was necessary. In 1920, the California State Engineer released a report on the water resources of the Kern River and recommended that a large district, including the Haggin and Miller & Lux water rights, be formed to manage water distribution. Despite the effective implementation of the Miller-Haggin agreement, the two parties chose to protect their interests by forming two districts.

Miller & Lux's holdings became the nucleus for the Buena Vista Water Storage District. The district submitted a petition for formation to the State Engineer in 1922, and received approval in 1924 (Bonte, 1930:243). As a part of the district formation, Miller & Lux allocated water rights to the land in the district, making future sales possible. The district exchanged bonds with Miller & Lux for the existing canals, and additional bonds were sold for the construction of additional canals. The district, however, held off on construction until 1926 to see if it could work with other Kern River users to construct a mountain storage reservoir. Not seeing active progress, the district left the location of water storage flexible and continued operations. The first major construction project was to lessen water loss at the end of the Kern River through the construction of a direct connection to the canal system and a direct canal to Buena Vista Lake. Additional construction would focus on the northern portion of the district, because the southern end around Buttonwillow had been well developed by Miller & Lux (Harding, 1935).

With water rights allocated to the land and an operating water storage district, the area became suitable for sale. Buttonwillow had been first platted by Southern Pacific in 1893 in conjunction with Miller & Lux. Now, with the need for cash, the town was replatted in 1927. Miller & Lux land agent C.E. Houchin organized and promoted the kick-off sale. As discussed above, Miller & Lux had previously leased land north of Buttonwillow and induced Italian immigrants

to come to the Buttonwillow area. The descendants of some of the original immigrants now purchased former Miller & Lux land south of Buttonwillow. Along with the Italians, a few large-scale investors purchased land in the area, including Rhoda Rindge Adamson of Adohr Farms, and the Parsons.

A large oil deposit found in the Kern River Oil field near Bakersfield in 1899 sparked the interest of oil explorers throughout Kern County. By 1910, the entire Elk Hills had been bought. Standard Oil, Southern Pacific, and Associated Oil were the three largest land owners. The government, especially the Navy, became concerned at this rapid industrial growth and stepped in, stopping the sale of all public lands on the Elk Hills. In 1910, only 20 wells were dug, with minimal output. By 1918, only 35 wells had been dug. In the fall of 1918, Standard Oil began the drilling of Hay No. 1, and in January 1919, the well struck oil and produced a modest 200 barrels of oil a day.

By the mid-1920s, several other companies had opened oil camps that were producing up to 4,000 barrels of oil a day. These strikes proved that oil reserves were present on the Elk Hills and another land rush began. The Navy, concerned at the possible depletion of this resource, moved to prevent claim filings. The Navy also began to drill along the edge of federal lease land in an attempt to slow the depletion. Through the 1930s, it was seen as a race against time, and the Navy made several deals with private firms in an attempt to secure as much of the oil as possible.

At the height of World War II, the Navy began to post officers as guards throughout the Elk Hills oil camps. In 1944, an oil shortage compelled Congress to increase oil production from 15,000 barrels to 65,000 barrels per day. In June 1944, the federal government enacted Public Law 343, transferring all public land leases to the Navy's jurisdiction (Baker, 2000). In less than 8 months, 312 new wells had been dug for the Navy, ending in 1945 with the end of the war.

It was during this period that the Navy began to maintain a small force in the Elk Hills. A Construction Battalion (CB) was stationed on the Elk Hills, and their first priority was to build and improve the roads of the area. Well operation was usually undertaken by skilled workmen, leaving the CBs time for other undertakings. The CBs surveyed section lines; installed brass section markers; built barracks; staked over 750 oil wells; graded for over 400 wells; and staked over 100 miles of roads, water lines, and oil and gas mains.

As discussed above, under the control of Miller & Lux, the types of crops were limited, and supported the cattle and ranching operations of the company. In 1920, the area south of Wasco produced alfalfa, grain, and volunteer pasturage (hay). The exact percentages of these crops depended upon the amount of water available from the Kern River runoff. A report from Thomas Means on the Miller & Lux Southern Division in 1919 pointed to the potential for other crops; notably, cotton and fruits (Barnes, 1920:16-17; Raznoff, 1945:26; Means, 1919). The variable volume and seasonability of water, as well as the demands of the Miller & Lux operation, had limited the development of these new crops. However, in 1928, these limits eased enough for the introduction of cotton as a new major crop.

Cotton had been grown in Kern County since 1862. A knowledge base for the cultivation of the plant and its processing slowly developed. Bakersfield became a center for processing and

shipping of the processed fiber and oil. In 1906, the discovery of Acala cotton, a strong, long-fibered variety, at the Shafter Experimental Farm boosted the industry. In 1928, the first cotton crops were planted in the area south of Buttonwillow. No longer restricted to supporting the cattle, the new farmers could exploit this commercial crop. Production was also assisted by the exploitation of groundwater (Burmeister, 1977:81-82; Raznoff, 1945:26).

Groundwater had not been considered as a part of the water supply for the Buena Vista Water Storage District when it was formed. Early attempts to drive wells were thwarted by sandy subsoils, which collapsed into the wells. However, by 1928, new techniques were developed, including a 'gravel envelope' that protected the wells from collapse. A series of dry years had encouraged farmers to develop wells, and between 1928 and 1937, nearly 130 wells were drilled in the area surrounding Buttonwillow (Harding, 1935:24; Raznoff, 1945:45).

One of the largest and most successful enterprises in the study area following Miller & Lux's ranches was the Adohr Stock Farms, which occupied the southern portion of the study area. Adohr Stock Farms was a Southern California dairy company owned by Rhoda Rindge Adamson and her husband Merritt Adamson. Rhoda Rindge was the daughter of Frederick H. Rindge, a very wealthy, influential East-Coast transplant to California (Rindge, 1972; prologue). Rhoda attended one year of college at Wellesley before purportedly missing the West and returning to finish her education in California. After marrying Merritt Adamson, an attorney and sheep rancher's son, she used her family inheritance to start Adohr (her given name spelled backward) Farms with her husband (Los Angeles Times, August 31, 1930; Van Nuys News, January 10, 1949). By the late 1920s, they strove to vertically integrate their business, seeking to not only maintain a herd of productive dairy cows, but to rear "replacement" calves, and grow the alfalfa necessary to keep their herd fed (Ulery, 1930).

In 1929, the Adamsons had an area northwest of Tupman, owned by Miller & Lux, analyzed to determine if the soil and conditions would support an alfalfa farm and a herd of cattle (Los Angeles Times, September 30, 1934). They learned that the land had rich soil, lay on top of an artesian belt, and had already been successfully planted with corn and wheat. After being satisfied that the land met their requirements, they purchased 1,500 acres from Miller & Lux in July 1930 for $250,000. They designated $50,000 for immediate improvements. Their plans to build a ranch headquarters and make irrigation improvements quickly came to fruition. By the fall of the same year, a field had been planted with alfalfa, ten new wells had been sunk, and construction of a headquarters building, dormitory, and dining hall had been completed on the southeastern corner of what became Adohr Road and Dairy Road (*Los Angeles Times*, July 26, 1930; November 9, 1930).

By May 1933, Adohr had expanded its Buttonwillow satellite ranch to 2,600 acres. Although this location was subsidiary to the main San Fernando Valley branch, its significance lay in that it allowed Adohr to hail their "independence." Adohr ran an advertisement in the *Los Angeles Times* in 1933 with the headings, "Adohr grows its own feed; Adohr raises its own dairy cattle; Adohr operates its own stock farms; and Adohr, of course, has its own far-reaching delivery system" (*Los Angeles Times*, June 1, 1933). The rich land in Kern County, already in close proximity to numerous irrigation structures, played a pivotal role in allowing this southern California company to integrate their business model vertically and provide an affordable product to a broader clientele.

Although Adohr Farms reflected the continuing involvement of the stock industry in the study area, most of the area diversified. Between 1920 and 1935, cotton production grew to 3,800 acres, volunteer pasturage ceased, grain production nearly quadrupled, and milo was introduced (Raznoff, 1945:27). By 1945, the three major crops around Buttonwillow were alfalfa, cereal grains, and cotton. These commercial crops supported 187 farms, only 85 of which were tenant-operated. The others were both home and work for 102 families (Raznoff, 1945:26).

In 1954, a new crop—rice—was introduced to the Buttonwillow area. The new reservoir at Lake Isabella had been completed in 1953, promising better regulation of irrigation water. Local farmers Wayne Smith, William Buerkle, Jack Thomson, Nelson Lewis, Charles Parsons, R.L. Adams, and Hall Smalstig harvested their first rice crops in 1954. Two rice dryers were constructed: one at the corner of State Route 58 (SR 58) and Wasco Avenue, and a second on Palm Farms, the former Adohr Farms site. The northern rice dryer was a co-operative investment managed by R.L. Adams, who also managed the Farmer's Cooperative Gin. The first 7,500 acres were planted and treated with weed control via airplane. Combines were used to harvest the crops. Despite the arid conditions in most of Kern County, 3,377 acres of rice remained in production in 1980; however, production has since ceased (Dane, 1954; Day, 1954; Watson et al., 1980).

Despite the changing crops in the study area, the extensive network of canals constructed during the Miller & Lux period remained sufficient. With the advent of groundwater pumping, farmers used the canals to move water from the wells to their fields, a practice that continues today. Several years of groundwater pumping raised the water table in the area to less than 6 feet for almost 95 percent of the Buttonwillow area by 1943. This rapid rise from 1935 levels called for improvements to the drainage system, including Main Drain. At that time, Main Drain was 4 to 10 feet deep, and suggestions were made for deepening it. Between 1943 and 1944, 4.8 miles of new drains were constructed in the water storage district. The drains also needed improvements to remove obstacles to water flow. Culverts and bridges that were added as the road system developed were insufficient to keep the water flowing. Redwood culverts and corrugated metal pipe culverts, some installed by Miller & Lux, began to be replaced. The Buena Vista Water Storage District also instituted a canal maintenance program in 1943 that called for regular hand maintenance, and mechanized maintenance every 4 years. Today, the canals are reshaped twice a year and re-excavated approximately every 5 years (Raznoff, 1945:16, 18-19).

In 1948, the Navy and Standard Oil amended their unit plan, and Standard Oil was named the Elk Hills unit operator. By the 1950s, the Elk Hills produced nearly 20,000 barrels of oil a day. In 1976, the Elk Hills Reserve was opened to maximum production. The Elk Hills are currently privately owned by several oil companies; the Navy sold its reserves in 1998.

5.3.2.5 Resources Inventory

The methods used to inventory cultural resources for the HECA Project consisted of archival research, Native American consultation, and both archaeological and architectural pedestrian surveys of each cultural resource subdiscipline's respective Study Area. Comprehensive technical reports from the cultural resources subdisciplines of archaeology and historic

architecture are included as Appendix G-3 and Appendix G-4, respectively. Specifics of these efforts are presented below.

Archival Research

A records search of files of the California Historical Resources Information System (CHRIS) housed at the SSJVIC was conducted at the request of URS by the staff of the SSJVIC on February 11, 2009 (RS # 09-019). As the design of Project alternative linear alignments was refined, additional records searches of CHRIS were conducted on multiple occasions. The primary records search for the various linear alignments was conducted by the staff of the SSJVIC on February 17, 2009 (RS # 09-056). Supplemental records searches to both RS #09-019 and RS # 09-056 were conducted by URS staff at the SSJVIC to account for refinements in the configuration of the Project. The most recent supplemental search was conducted on February 13, 2012 (Appendix G-1). Record search data for the OEHI CO_2 line south of the California Aqueduct, as well as the OEHI Processing Facility within the EHOF, are discussed in Appendix A.

The purpose of the records searches for this analysis was to identify all previously conducted cultural resource surveys and studies, as well as all previously recorded archaeological (including both prehistoric and historic) sites and historic architectural resources in their respective Study Areas. The results of the records searches are provided in Appendix G-1. In addition to the historical resources files, the following publications, manuscripts, or correspondence were also consulted:

- National Register of Historic Places (NRHP).
- Office of Historic Preservation (OHP) Archaeological Determinations of Eligibility – Records entered into the OHP computer file, received quarterly (2012).
- OHP Directory of Historic Properties – Records entered into the OHP computer file of historic resources, received quarterly (2012).
- Five Views: An Ethnic Sites Survey for California (1988).
- California Historic Landmarks (1988).
- California Points of Historical Interest (1988).

In addition to the aforementioned sources, a review of historic maps (Table 5.3-1, List of Reviewed Historic Maps) and aerial photographs (Table 5.3-2, List of Reviewed Aerial Photographs: Tupman and Buttonwillow, Kern County, California) was also conducted: The records searches revealed that neither the Project Site nor the adjacent Controlled Area had been previously inventoried for cultural resources. Portions of the electric transmission, water (process and potable), natural gas, and rail road alignments had, however, been subjected to cultural resource inventory efforts. The complete results of the records searches are attached as a confidential appendix (Appendix G-1).

The information obtained in these records searches shows that 29 previous cultural resources investigations were conducted within either 1 mile of the Project Site and natural gas tie-in facility, and/or within 0.5 mile of the linear ROWs (see Table 5.3-3).

A review of the studies presented in Table 5.3-3 resulted in the identification of 37 cultural resources (35 archaeological, 2 historic architecture) sites in the records search area (Table 5.3-4, Previously Identified Cultural Resources within Records Search Area). Of the archaeological sites, two are in the ARSA as defined per CEC guidelines for archaeological resources, four others are in close proximity to the ARSA (within 200 feet), and the remainder are only within the records search area and will be given no further consideration. The two historic architectural resources are within the HARSA, as per CEC guidelines for built environment resources.

The records search efforts also revealed that a number of isolated artifacts have been previously identified in the ARSA. Because isolated artifacts do not represent significant cultural resources, they do not receive further consideration in this section.

Maps indicating the location of previous studies and Department of Parks and Recreation (DPR) 523 forms for the identified resources are provided in Appendix G-1.

JRP examined the aforementioned records searches and standard sources of information that list and identify known and potential historical resources, to determine whether any buildings, structures, objects, districts, or sites had been previously recorded or evaluated in or near the cultural resources study area. JRP reviewed the NRHP, California Register of Historical Resources (CRHR), California Historical Landmarks (1996), and California Points of Historical Interest (1992). These lists did not include any historical resources in or near the HARSA. None of the farmsteads or processing facilities in the HARSA has been previously identified as potential historic resources, nor do they appear to have been previously evaluated for listing in the NRHP or CRHR. The California Aqueduct has been previously evaluated and found eligible for the CRHR. None of the other canals in the HARSA have been evaluated.

Native American Consultation

The California NAHC has been contacted on seven occasions during the course of the Project as a result of previous Project modifications, including changes in the Project Site and linear alignments. On each occasion URS requested a records search of the Sacred Lands File (SLF) and a list of local Native American contacts (individuals and/or organizations) that might have knowledge of cultural resources within the defined Project Study Areas. Only one of the seven NAHC SLF searches indicated the presence of cultural resources within the SLF search area. Specifically, the response received from the NAHC on February 13, 2009 concerning all of the linear alignments (as defined at that time), stated that the SLF search "did indicate" the presence of cultural resources in the Project Study Area (as defined at that time). Although the aforementioned response was positive for cultural resources, the California Native American Heritage Commission is exempt from the disclosure of public records of Native American graves, cemeteries, and sacred places [CA GOV § 6254 (r)], and as such denied URS's request for more specific information on this "positive" search result.

The NAHC did, however, provide a list of local Native American representatives that they encouraged be contacted for information regarding issues of concern, including the location of known cultural resources in a given project area. Contact letters describing the HECA Project and a map depicting the HECA Project Site and Project linear alignments were sent to each of the identified parties on multiple occasions. It should be noted herein that the lists provided by

the NAHC were not exact duplicates of each other. Certain individuals only appeared on one list provided by the NAHC, and were thus only contacted once.

The letters inquired whether the individuals/organizations had any concerns regarding the Project or wished to provide input regarding cultural resources in the Project Area. Individuals that were no longer listed on the NAHC's contact list at this time were not contacted via telephone. No responses received to date have revealed specific information regarding the presence of cultural resources in the ARSA.

Copies of the NAHC request letters, NAHC response letters, mailing lists, consultation letters and responses, are appended to the Cultural Resources Technical Report, which is provided in a confidential appendix to this report. Any future responses received after the date of this report will be directly forwarded to the Applicant. A synthesis of the Native American consultation efforts is provided in Table 5.3-5, Native American Consultation Information, and in Appendix G-2.

Archaeological Field Reconnaissance

The pedestrian (field) reconnaissance required the use of both block survey for the Project Site and abutting Controlled Area; and linear survey for the Project linear ROWs [electrical transmission, water (process and potable), natural gas, railroad] where access had been secured; and the portion of OEHI CO_2 pipeline in the Controlled Area to the point that it enters the proposed horizontal directional drilling (HDD) pit north of the California Aqueduct. The block survey was completed by walking an alternating series of parallel transects spaced 15 to 20 meters (50 to 65 feet) apart over the block until the entire land area was covered, while the linear survey involved walking similarly spaced parallel transects in a single direction. In areas where nonagricultural vegetation obscured the ground surface, 20-centimeter by 20-centimeter patches were occasionally cleared using hand tools or footwear to increase ground visibility. It should be noted herein that the Controlled Area was also subject to pedestrian reconnaissance to allow for changes in the configuration of the facility and/or adjustments to the routes of linear alternatives. However, the Controlled Area, although inventoried for archaeological resources, is not part of the Project's ARSA (except for areas within 200 feet of the Project Site).

As sites were located during the survey, they were assigned temporary field designations (e.g., HECA-1, HECA-2, etc.) and their locations were plotted onto U.S. Geological Survey (USGS) topographic maps with the aid of handheld Global Positioning System (GPS) units. Site recordation included site mapping, completion of primary and archaeological site record forms, feature illustrations, and site photographs. All site recordation was completed using State of California DPR Forms.

Site mapping included boundary delineation, location of features, mapping of diagnostic artifacts and artifact concentrations, and location of natural features of assistance in relocating the site. In addition, to assist in the assessment of site integrity and recognition of the extent of previous impacts to sites, observable surface disturbances were also mapped. Distance and bearings to these cultural points and features were recorded from a datum established for the site.

The pedestrian reconnaissance of the ARSA, except the process water line, was conducted by Leroy Laurie (URS Staff Archaeologist), Joe Fayer (URS Staff Archaeologist), Joshua Peabody, M.A. (URS Archaeological Technician), Mark Kile, M.A. (URS Archaeological Technician), and Mark Hale (URS Senior Project Archaeologist). The pedestrian reconnaissance of the process water line was conducted by Joshua McNutt, M.A. (URS Senior Archaeologist), accompanied by Sarah Mattiussi (URS Staff Archaeologist), Kurt McLean (URS Archaeological Technician), and Brian Shaw (URS Architectural Historian).

All archaeological fieldwork for the ARSA, except the ROW for the process water line, was carried out under the supervision of Michael S. Kelly, M.A. (URS Principal Archaeologist), who meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS, 1983). Archaeological fieldwork along the process water line was carried out under the supervision of Reid Farmer, M.A., who likewise meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS, 1983). All fieldwork is consistent with the procedures for compliance with Section 106 of the NHPA, set forth at 36 Code of Federal Regulations (CFR) 800.

Surface visibility was generally good (greater than 80 percent) throughout the portion of the archaeological resources ARSA where the Project Site is situated. Surface visibility in the adjacent Controlled Area was similar to that experienced within the Project Site. As required by the revised CEC regulations, an examination of a 200-foot-wide buffer radius around the Project Site was also completed. The majority of the buffer falls within the Controlled Area; which, as described above, was completely surveyed for archaeological resources.

Along the course of the linear alignment ROWs [electrical transmission, water (process and potable), natural gas, railroad], surface visibility was variable, but generally was greater than 50 percent. As required by the revised CEC regulations, an examination of a 50-foot-wide buffer either side of the ROW for each of the linear alignments was completed. The exception was along the process water ROW. The process water pipeline is to be placed in the levee adjacent to the north-northeastern side of the West Side Canal, and construction would not occur on the south-southwestern side of the Canal. Because the Canal would act as a physical barrier for construction, impacts to archaeological deposits situated across the canal from the construction area would not occur; therefore, the area south-southwest of the canal was not surveyed.

As a result of the pre-field and field efforts, a total of twelve archaeological resources were identified within or in close proximity (within 200 feet) to the ARSA, as defined for the Project. Of these, six were previously recorded sites (see Table 5.3-4), and the remaining six were composed of newly discovered resources. Descriptions of these resources and their location in relationship to the proposed Project are presented in Section 5.3.3.4. The archaeological survey report documenting these efforts, including the DPR 523 forms, is provided as a confidential appendix (Appendix G-3).

In addition to the pedestrian reconnaissance, Mr. Laurie also conducted archaeological monitoring of the geotechnical investigation conducted within the Project Site (see Appendix P for the geotechnical investigation report). No archaeological materials were observed in any of the five geotechnical borings placed within the Project Site.

Geoarchaeological Study

URS also addressed the geoarchaeological sensitivity of the Project Site and the linear ROWs. The purpose of the geoarchaeological study was to identify specific areas in the ARSA that have sensitivity for buried archaeological sites—based on the existing geological, geomorphological, and archaeological literature and data. For a complete discussion of the methods, sources consulted, and findings of the geoarchaeological study, see Appendix G-3 Archaeological Reconnaissance, Project Study Area.

Several sources were used to assess the geomorphic setting and the potential for buried archaeological sites in the ARSA. The first sources included existing quaternary geological and geomorphological studies, generally produced as "open-file" reports by the USGS. These provide a broad context on the timing and formation of various landforms found throughout the ARSA. The second sources were existing soils data, including a compilation of radiocarbon (14C) dates and their association to specific mapped soil series in the Soil Survey Geographic (SSURGO) database, which provides a more accurate estimate of the age of a given land surface. Finally, reports from archaeological excavations and geomorphological field studies in the Project vicinity provide information on local depositional processes and known buried landforms.

The challenge associated with buried archaeological sites in the San Joaquin Valley, and more generally, the Central Valley as a whole, has been summarized as follows:

> The Central Valley's archaeological record, as we know it today, is biased by natural processes of landscape evolution. Surface sites are embedded in young sediments set within a massive and dynamic alluvial basin, while most older archaeological deposits have been obliterated or buried by ongoing alluvial processes. Consequently archaeologists have had to struggle to identify and explain culture change in portions of the Central Valley where available evidence spans only the past 2,500 years or in rare cases 5,500 years. (Rosenthal, White, and Sutton, 2007:150)

While the assumption that surface archaeological sites exist only in younger sediments is not necessarily accurate, the general problem of site visibility in a region that has been geomorphically dynamic over the past 13,500 years—roughly the period of human occupation in California—is highly relevant to the Project ARSA.

Based on an analysis of existing geological, geomorphological, soils, archaeological, and geoarchaeological studies relevant to the Elk Hills/Buttonwillow region, there is a moderate to high potential for encountering buried archaeological deposits throughout the majority of the Project ARSA. The potential for encountering buried archaeological sites with no surface manifestation is confirmed by the young age of the vast majority of the surface deposits and associated landforms—most of which appear to date to the latest Holocene, or the past ca. 1,000 years. Furthermore, these are predominantly fine-grained alluvial depositional landforms—especially the Buena Vista Slough basin deposits and the Kern River Alluvial Fan deposits—which are likely to contain and preserve formerly stable surfaces (paleosols).

Aside from the northern portion of the railroad and natural gas linears, which are on older Pleistocene alluvium, the Project Site and the remaining linear ROWs appear to be moderately to highly sensitive for buried archaeological deposits. Portions of the linear ROWs that are located on the Buena Vista Slough and Kern River Alluvial Fan landforms include the process water linear, the potable water/electric transmission linears, and southern portions of the railroad and natural gas linears, and have the greatest potential for buried archaeological sites. The process water linear and well field appear to be particularly sensitive. The sensitivity of the process water linear is, however, diminished, because it is to be placed in a levee constructed along the West Side Canal where intact buried archaeological resources are not anticipated to occur.

Built Environment Inventory

JRP conducted fieldwork in the study area and recorded the properties on the DPR 523 forms, included with the built environment technical report in Appendix G-4. Based on the results of the background investigation and the field survey, JRP conducted research at a variety of libraries and repositories, including: California State Library, Sacramento; Shields Library, University of California, Davis; Bancroft Library, University of California, Berkeley; Water Resources Center Archives, University of California, Berkeley; Beale Memorial Library, Bakersfield; and the Kern County Museum, Bakersfield.

JRP then used the research data collected to prepare a historic context to address pertinent themes of Kern County irrigation history and agricultural history, and evaluated properties under CRHR and HRHP criteria on DPR 523 forms. Historic themes are discussed in Section 3 of the appended technical report (Appendix G-4). JRP evaluated the resources in the study area in accordance with Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code, and also under NRHP and CRHR criteria listed on the DPR 523 forms included in Appendix G-4.

5.3.3 Environmental Consequences

5.3.3.1 Federal Cultural Resources Evaluation Criteria

Four evaluation criteria to determine a resource's eligibility to the NRHP, in accordance with the regulations outlined in 36 CFR 800, are identified at 36 CFR 60.4. To determine site significance through application of NRHP criteria, several levels of potential significance that reflect different (although not necessarily mutually exclusive) values must be considered. As provided in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

1. That are associated with events that have made a significant contribution to the broad patterns of our history;

2. That are associated with the lives of persons significant in our past;

3. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

4. That have yielded, or may be likely to yield, information important in prehistory or history.

These evaluation criteria are used to help determine what properties should be taken into account in any assessment or consultation (36 CFR 60.2).

5.3.3.2 State Cultural Resources Evaluation Criteria

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an "important archaeological resource" is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the criteria regarding resource eligibility to the CRHR.

Generally, under CEQA, a historical resource (these include built-environment historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5 and defined as any resource that:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Is associated with lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains, and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under Public Resources Code (PRC) Section 5097.98.

Impacts to "unique archaeological resources" are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that—without merely adding to the current body of knowledge—there is a high probability that it meets one of the following criteria:

1. The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information;

2. The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or

3. The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources that do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Section 15064.5, a project potentially would have significant impacts if it would cause substantial adverse change in the significance of one of the following:

1. A historical resource (i.e., a cultural resource eligible for the CRHR);

2. An archaeological resource (defined as a unique archaeological resource that does not meet CRHR criteria); or

3. Human remains (i.e., where the project would disturb or destroy burials).

A non-unique archaeological resource is given no further consideration, other than the simple recording of its existence, by the lead agency.

5.3.3.3 Conformity of Federal and State Evaluation Criteria

The criteria for eligibility for the CRHR are very similar to those that qualify a property for the NRHP, which is the significance assessment tool used under the NHPA. The criteria of the NRHP apply when a project has federal involvement.

A property that is eligible for the NRHP is also eligible for the CRHR. All potential impacts of a federal undertaking to an NRHP listed or eligible to be listed resource must be assessed and addressed under the procedures of Section 106 of the NHPA, set forth in 36 CFR 800. Eligibility for listing in either the NRHP or CRHR rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm historical significance a property may possess and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it must also be considered ineligible.

5.3.3.4 Archaeological Resources

Twelve archaeological resources have been identified in or within in close proximity of the ARSA as defined for the current Project. Of this total, six were previously identified, while the remaining six sites were discovered as a result of the efforts conducted for this study. Presented below are the archaeological sites situated in the current Project ARSA, defined for the Project using CEC guidelines, as discussed previously in Section 5.3.1.

Although those archaeological sites situated in close proximity to the ARSA (measured as a linear distance of 200 feet from edge of ARSA) may not be in the direct impact area, they are

situated close enough to warrant consideration to ensure their proper management. As such, a discussion of those sites is also presented in a subsequent section.

Archaeological Resources in the ARSA

P-15-171

P-15-171 (CA-KER-171) was originally recorded as an "occupation site" by Latta (1950). Site boundaries were not identified at the time of Latta's recordation, and no site constituent or condition information is provided. A relative site location is plotted in the Lokern 7.5´ USGS quadrangle. The site was not relocated during the current investigation. The purported site vicinity has been highly disturbed by various agricultural activities and the construction of the West Side Canal. The site, as it was plotted, is in the ARSA defined for the Process Water pipeline and well field. The Process Water pipeline is to be constructed in an existing artificial (i.e., constructed) levee that extends several feet above the natural ground surface. The pipeline is to be set into a trench with a maximum depth of 5 feet that is entirely within the soils used to construct the levee. The ARSA for the well field was established to allow for maximum flexibility in the placement of wells and connecting pipelines to allow for the avoidance of identified resources. Given the presence of this design flexibility, the wells and connecting pipelines will be placed in a manner to avoid this archaeological site. As such, no impacts to this site are anticipated from implementation of the Project.

P-15-3108

As originally recorded, P-15-3108 (CA-KER-3108) consisted of a sparse artifact assemblage comprised of lithic debitage and groundstone fragments (Everson, 1991). Everson's site record also describes disturbance to the site from the construction of adjacent railroad tracks and a state highway. Colleagues of Everson, Garcia and Valdez, revisited the site and noted that the area where Everson had plotted the site had been recently disked. During this subsequent visit to the site, no artifacts other than one "possible mano" were observed within the site area as identified by Everson (Garcia and Valdez, 1992:1). Evidently, several of the sites identified during initial field efforts could either not be relocated or had significantly changed when revisited.

According to Parr and Osborne:

> "… a number of sites were revisited to perform some follow up work several months after having been recorded. In a number of instances artifacts that had been visible on the site surface no longer were visible …" (Parr and Osborne, 1992:52).

Similarly to the efforts described above, no evidence of the site was observed during the current pedestrian survey. As plotted, P-15-3108 is within the ARSA as it pertains to the Natural Gas Supply Line. As subsequent efforts to identify the site within the plotted location (including by archaeologists from the same team a year later) have been unsuccessful it is possible that the site was miss-plotted and is in fact within an entire different location. Possibly confirming this premise is the fact that the UTM coordinates noted on Everson's site form place the site

approximately 230 meters to the southeast from where the site is plotted on the accompanying USGS topographic quadrangle (Everson, 1991).

Given that no archaeological materials have been identified within the plotted location, impacts to the site as a result of implementation of the HECA Project are not anticipated.

HECA-2008-1

This particular site consists of a prehistoric lithic scatter that was identified at the bottom of the West Side Canal. The site's artifact assemblage consists of lithic debitage, a projectile point tip fragment, and three pieces of burnt faunal bone. The debitage is composed of Monterey and Franciscan chert, which are both local source materials. This site is a small artifact scatter, but it is believed to represent a much larger site. The site was found at the bottom of a water canal along the eastern edge in a long, thin line. It was originally interpreted to be the re-deposition of artifacts from a site further up the canal. This was rejected because it was unlikely the artifacts would have deposited so regularly along one side of the canal. It is more likely that the canal construction and upkeep has cut horizontally into the edge of a deeply stratified site that is buried 1.8 meters below the modern ground surface; because this site is within the Buena Vista Slough, this is entirely probable. The presence of the artifacts suggests that further intact subsurface cultural context remain intact well below the levels of modern agricultural disturbances. The site is located in the ARSA defined for the Process Water pipeline; however, this is based on CEC guidelines where a 50-foot buffer is placed along either side of linear ROW. The Process Water pipeline is to be constructed within an existing artificial levee that extends several feet above the modern ground surface. The pipeline is to be set into a trench with a maximum depth of 5 feet, which is entirely within the introduced soils used to construct the levee. As such, no impacts to this site are anticipated.

HECA-2009-2

HECA-2009-2 consists of a low-density scatter of lithic artifacts including two chert bifaces, a steatite fragment, and three yellow-brown cryptocrystalline silicate (CCS) reduction flakes. The site appears to have been previously disturbed, because the deposit is situated primarily on the eastern slope of a dirt-road berm that parallels the Outlet Canal. Other modern disturbances in the site vicinity include the grading of two dirt roads, the construction of the Outlet Canal, and the West Side Canal. The location of the site is in close proximity to the CO_2 linear. Because the pipeline will be placed using HDD, and the route of the pipeline will be well below the current ground surface, no impacts to the site are anticipated.

HECA-2009-9

HECA-2009-9 consists of a relatively moderate-sized, low-density scatter of lithic debris, including a CCS core and approximately 25 CCS reduction flakes situated along the northern edge of the West Side Canal. The site is located in the ARSA defined for the proposed Process Water pipeline and well field. The Process Water pipeline is to be constructed within an existing artificial (i.e., constructed) levee that extends several feet above the natural ground surface. The pipeline is to be set into a trench with a maximum depth of 5 feet which is entirely within the introduced soils used to construct the levee. The ARSA for the well field was established to

allow for maximum flexibility in the placement of wells and connecting pipelines to allow for the avoidance of identified resources. Given the presence of this design flexibility, the wells and connecting pipelines will be placed in a manner to avoid this archaeological site. As such, no impacts to this site are anticipated from implementation of the Project.

HECA-2009-10

HECA-2009-10 consists of a relatively large, low-density scatter of CCS debris. The scatter is comprised entirely of debitage including approximately one hundred CCS reduction flakes. The site is located in a plowed agricultural field east, northeast of the West Side Canal. Besides extensive plowing, other modern disturbances in the site vicinity include the construction of the West Side Canal, a graded dirt road, and other associated agricultural activities. The site is located in the ARSA defined for the proposed Process Water pipeline and well field. The Process Water pipeline is to be constructed within an existing artificial (i.e., constructed) levee that extends several feet above the natural ground surface. The pipeline is to be set into a trench with a maximum depth of 5 feet, which is entirely within the introduced soils used to construct the levee. The ARSA for the well field was established to allow for maximum flexibility in the placement of wells and connecting pipelines to allow for the avoidance of identified resources. Given the presence of this design flexibility, the wells and connecting pipelines will be placed in a manner to avoid this archaeological site. As such, no impacts to this site are anticipated from implementation of the Project.

HECA-2010-2

At the time of recordation (2010), HECA-2010-2 consisted primarily of the foundation of a recently demolished farmhouse. The foundation consisted of a concrete footing measuring 7 inches wide, with a cinderblock-based addition at the northern side of the original foundation. These blocks displayed three circular holes in the center of each of the blocks. In the interior of the foundation perimeter, there occurred two rows of concrete pier blocks that would have supported beams running east/west. The building appeared to have undergone a series of changes and alterations, as evidenced by the presence of the cinderblocks, as well as the co-occurrence of original construction clay and cast-iron sewer/water pipes, and the more recent installation of polyvinyl chloride (PVC) plumbing. The contents of the debris observed in the building's footprint indicated that it was likely occupied until demolition. The building itself had been recently razed, and fragments of cinderblock were located in a canal situated approximately 55 meters south of the foundation. A review of archival sources, including aerial photographs and topographic maps, reveal the structure was in place prior to World War II, likely constructed during the 1920s or 1930s. Planted trees surrounding the resource included palm, Monterey pine, black walnut, mulberry, cottonwood, magnolia, and oleander. The site is in the ARSA for the proposed natural gas linear and railroad corridor.

Additional archival research indicates that the property was owned by Leland K. and Ruth B. Olsen from at least the mid-1930s. State voter registrations show the Olsens were ranchers living in the Los Angeles area in 1934; but in 1935, they were residing in Buttonwillow. At that time, Leland, his brother Teddy B. Olsen, and their father George W. Olsen began farming the Elk Hills district. It appears that Leland and Ruth inhabited their Buttonwillow home until Leland's death in 1992. Ruth retained the land, but moved to Bakersfield; she died in 2002.

Since the time of recordation in 2010, the site area has been completely graded by activities unrelated to the Project, removing evidence of the site. Because the structure had internal plumbing, as evidenced by sewer pipes (likely connected to a leach field), it is unlikely that an undiscovered "privy pit" occurs buried in the ARSA. Given its agricultural setting, it is plausible that domestic trash was deposited on site, either being buried or burned. No evidence of such a refuse disposal area was, however, observed at the time of original recordation. Given that all evidence of the site has been eradicated, impacts to HECA-2010-2 are not anticipated.

Archaeological Resources in Close Proximity to the ARSA

P-15-89

P-15-89 (CA-KER-89/H) consists of a prehistoric lithic scatter with human remains, and an associated historic trash scatter recorded by G.W. Laframboise (1990). The site was originally documented by Pilling (1950a) as an "Indian Burial Mound." Laframboise (1990) noted chert debitage, an *Olivella* split-punched shell bead, and purple glass. In addition, he indicates that human remains were present in the site, which suggests Pilling's original classification of the site was accurate.

As recorded by Laframboise (1990), P-15-89 is located on the south-southwestern side of the West Side Canal. The process water linear is to be placed adjacent to the north-northeastern side of the Canal, and no construction or other Project-related ground-disturbing activities would occur on the south-southwestern side of the Canal. Because the Canal would act as a physical barrier for construction, impacts to archaeological deposits situated across the canal from the construction area would not occur. Due to the location of the site and the negative findings of the pedestrian archaeological reconnaissance of the process water linear ROW in the vicinity of P-15-89, there is no indication that the site will be impacted by the Project.

P-15-124

P-15-124 (CA-KER-124) was originally recorded by L.A. Payen in 1963 as a site consisting of a sparse scatter of freshwater mussel shell (Payen, 1963). P-15-124 was not encountered during the any of the archaeological pedestrian reconnaissance surveys conducted for the current ARSA. As portrayed on the SSJVIC, the site is in close proximity to the route of the pipeline that will transmit CO_2 to the Elk Hills for sequestration. Because the pipeline will be placed using HDD, and the route of the pipeline will be well below the current ground surface, no impacts to the site are anticipated.

P-15-179

The site record supplied by the SSJVIC for this site indicates that the site was recorded by Pilling (1950b). Pilling's Archaeological Site Survey Record for P-15-179 (1950b) does not contain a detailed sketch map. According to the site record, the plotting of the site is based on an earlier version of the East Elk Hills 7.5´ USGS quadrangle, which depicted a "Burial Mound" in the location of P-15-179. No description of the site's dimensions, artifacts, or the presence of human remains is provided. Although the site is located within 200 feet of the process water linear

ARSA, the findings were negative during the pedestrian archaeological reconnaissance of the process water linear ROW in the vicinity of P-15-179.

The Process Water pipeline is to be constructed within an existing artificial levee that extends several feet above the modern ground surface. The pipeline is to be set into a trench with a maximum depth of 5 feet, which is entirely within the introduced soils used to construct the levee. As a result, there are no anticipated impacts to the site as a result of the Project.

P-15-2485

P-15-2485 (CA-KER-2485) consists of a lithic scatter recorded by Jackson (1989). He noted an artifact assemblage composed of lithic debitage, projectile points, and groundstone fragments. Jackson also describes extensive disturbance to the site from agricultural activities.

As recorded P-15-2485, is located on the south-southwestern side of the West Side Canal. The process water linear is to be placed adjacent to the north-northeastern side of the Canal, and no construction or other Project-related ground-disturbing activities would occur on the south-southwestern side of the Canal. Because the Canal would act as a physical barrier for construction, impacts to archaeological deposits situated across the canal from the construction area would not occur. Due to the location of the site and the negative findings of the pedestrian archaeological reconnaissance of the process water linear ROW in the vicinity of P-15-2485, there is no indication that the site will be impacted by the Project.

HECA-2012-1

HECA-2012-1 consists of a low-density scatter of CCS debris. The scatter is comprised entirely of debitage including approximately twenty CCS primary reduction flakes, shatter, cores, and core fragments. Modern disturbances within and near the site include a railroad line, agricultural development, two dirt roads which are subject to heavy equipment and vehicular traffic, and extensive evidence that this vehicular traffic is not confined to the existing dirt roads.

The site is situated in close proximity to the ARSA as it is defined for the Natural Gas pipeline, which is the only ground-disturbing Project component within the site vicinity. Although the site is located within 200 feet of the ARSA, impacts to the resource are not anticipated given the distance between the site boundary and the area to be disturbed by the Natural Gas pipeline.

5.3.3.5 Built Environment Resources

Built environmental resources in the HARSA defined for the Project include canals, farmsteads, residential buildings, and industrial sites, as well as utility and railroad corridors. Although some of the canals date from the late-nineteenth century, most of the buildings in the area date from the 1930s and later. This is the result of the dominance of Miller & Lux in the region until 1927.

JRP recorded and evaluated all built-environment resources constructed prior to 1964 in the HARSA. Many properties included buildings from several periods. In these cases, buildings constructed after 1964 may simply be noted in the forms and evaluation. Several mobile homes are installed within the study area; however, because these are movable structures, they were not evaluated. The California Aqueduct, which bisects the southwestern edge of the portion of the

HARSA associated with the plant site, has been previously evaluated and found eligible. This property was not recorded as a part of this Project.

The following subsections describe the buildings and facilities at the existing canals, farmsteads, industrial sites, utility lines, and transportation-related sites in the Project area. For more detailed descriptions of the properties discussed below, see the individual DPR 523 forms provided in Appendix G-4.

Canals

All the canals in the HARSA, except the California Aqueduct, are a part of the Buena Vista Water Storage District and are documented on one DPR 523 form (Appendix G-4). Water flows through the district in a generally southeasterly to northwesterly direction. Canals in the southern portion of the district where the Project Site will be located are all earthen-lined, with either a trapezoidal or U-shaped profile. The smaller canals and ditches, Depot Drain and Deep Wells Ditch, are considered district laterals. These ditches have trapezoidal profiles and are between 15 and 27 feet wide at the top and 6 to 12 feet deep. These canals have few water control features, most of which are modern. Culverts tend to be large pipes without headwalls, and delivery gates are widely spaced. The gates are along the sides of the canals, and have concrete headwalls and flanking walls, with circular metal gates operated with a vertical screw mechanism. The drains are fed through corrugated metal pipes.

The Main Drain is located in the center of the district. The drain constructed between 1916 and 1918 is slightly larger than the lateral canals. The drain follows the general route of the natural Buena Vista Slough, but straightens the route. Approximately 25 to 30 feet wide at the top, the canal is 5 to 9 feet deep. The drain becomes larger as it travels northwest. By the time it crosses under SR 58 in Buttonwillow, it requires a concrete bridge rather than a culvert.

The East Side and West Side canals were constructed in the late 1870s as the main canals for the irrigation system serving the Buena Vista Slough area. The East Side Canal is slightly smaller, at 45 feet across the top, compared to the 50 to 60 feet across for the West Side Canal. Both the East Side and West Side canals are controlled by concrete check gates with metal frames for the gates, and metal mesh walkways across the top. The East Side Canal has more checks along its southern route than the West Side Canal. Pumps divert water from the East Side Canal, along with turn-outs for lateral canals.

The oldest canal is the KVWCC, originally constructed in 1876 as a 125-foot-wide canal. The U-shaped canal was partially dug and leveed. As a result, the western slope of the canal appears as a hump of land in the flat plain. The height of the western side of the canal varies, because the original soil was not suitable for levies or compacted well. The eastern side of the canal is more regular because it also makes up the western side of the West Side Canal. The central channel is uneven, because flood waters have cut a meandering path in the center of the canal. The canal channel is trash- and debris-strewn and highly vegetated. Maintenance has included the removal of vegetation and reshaping by bulldozers. The Old Headquarters Weir is part of this system.

The California Aqueduct brings water from the San Joaquin Delta to Southern California. Over 210 feet across, the concrete-lined canal is a major feature in the Central Valley landscape. The

Aqueduct has been previously evaluated and found eligible for the NRHP/CRHR despite being less than 50 years old. An approximately 0.5-mile-long section of the California Aqueduct occurs in the HARSA defined for the Project. Specifically, an approximately 0.5-mile-long section of the California Aqueduct situated south of the Project Site falls within the portion of the HARSA delineated, as per CEC guidelines, to account for indirect effects (i.e., 0.5 mile from the proposed plant site).

Farmsteads and Residential Buildings

The farmsteads and individual residences in the study area are widely dispersed, and organization of the buildings on the properties depends upon the ownership, crop production, and individual property history. The architectural details and characteristics—combined with mapping and aerial photographs—indicate that many buildings have been moved in this area. Interviews with residents further corroborate this conclusion. Buildings can be divided into three types: early twentieth–century residences, mid– to late–twentieth century ranch houses, and utilitarian out-buildings. Several generations of buildings are usually visible on each property.

Adohr Farms also provided housing for agricultural workers, although the remaining structures are larger than the small buildings provided for single workers or their immediate family. The workers' housing is wood framed with a concrete foundation. The buildings have gable roofs and horizontal wood siding. Often, they are narrow rectangles. The remaining Adohr Farm building was most likely a dining hall for the workers. The building has a monitor roof and porches on either side.

Individual residences in the HARSA include two early twentieth–century-residences, and a house constructed in 1964. All are one-story, wood-frame buildings that have been heavily modified by replacement siding, windows, roofing, and/or porch enclosures. Examples of these buildings include the vernacular craftsman residence located at 6122 Tule Park; the residence at 7345 Adohr Road, which was originally built in 1930 as a headquarters building for Adohr Farms; and the mid-house at 6010 Buerkle Road, which was constructed in 1964.

Industrial

Industrial sites in the HARSA include the ca. 1935 Tupman Water Plant (P-15-15690) and a rice-processing plant, which was constructed in the 1950s at the former location of Adohr Farms. Buildings at these facilities include metal warehouses, sheds, or pump houses, metal tanks, and silos. An airfield is also at the rice processing plant. The airfield is a simple strip of packed earth used for landing small aircraft for either personal transportation or crop management, and includes a single hangar. The hangar uses a standard plan and materials (rectangular corrugated metal building with shed roof) that is common to small airfields across the country.

Miscellaneous

The HARSA included two transportation-related resources. The McKittrick Branch of the Southern Pacific Railroad parallels SR 58 and was constructed in 1893 to connected Bakersfield with Asphalto (now McKittrick). The line has been shortened and now ends in Buttonwillow. The lightweight metal rails are laid on wooden ties on gravel ballast, with trestles and culverts. In the southern portion of the study area, along Dairy Road and Stockdale Highway (near its

intersection with Dairy Road), are four simple board-formed concrete culverts constructed in 1940 by the Works Project Administration (WPA).

A small portion of the Tule Elk State Reserve is also located in the southeastern portion of the study area and contains the reserve's recreational and maintenance facilities, as well as a state park peace officer's residence. Although established in the 1930s, all of the buildings and structures in the study area date to 1956 or after. Buildings at this location are generally constructed of wood frame with wood siding or concrete block

Four PG&E and Southern California Edison transmissions lines pass through the northern and eastern part of the HARSA. These lines, constructed in the mid-twentieth century consist of steel-frame lattice towers carrying either single or double circuits. As with most transmission towers constructed during this period, these were constructed using standard plans, and were built in large quantities throughout the state.

Evaluations

In general, NRHP Criterion D (CRHR Criterion 4) is used to evaluate historic sites (as opposed to buildings, structures, or objects) and archaeological resources. Although buildings and structures can occasionally be recognized for the important information they might yield regarding historic construction or technologies, the properties in the study area for this Project are building types that are well documented. Thus, these properties are not principal sources of important information in this regard.

Certain property types are usually excluded from consideration for listing in the NRHP, but can be considered if they meet special requirements, in addition to meeting the regular criteria. The following are the seven Criteria Considerations that address properties usually excluded from listing in the National Register:

- Consideration A: Religious Properties
- Consideration B: Moved Properties
- Consideration C: Birthplaces and Graves
- Consideration D: Cemeteries
- Consideration E: Reconstructed Properties
- Consideration F: Commemorative Properties
- Consideration G: Properties that have Achieved Significance within the Past Fifty Years

Integrity is determined under NRHP guidelines through applying seven factors to the historic resource. Those factors are location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

The CRHR definition of integrity and its special considerations for certain properties are slightly different from those for the NRHP. Integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance." The CRHR further states that eligible resources must "retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance," and it lists the same seven aspects of integrity used for evaluating properties under the NRHP criteria. The CRHR's special considerations for certain properties types are limited to: 1) moved buildings, structures, or objects; 2) historical resources achieving significance within the past 50 years; and 3) reconstructed buildings.

Only two of the buildings or structures in the HARSA for the Project—Old Headquarters Weir and the California Aqueduct—appear to meet the criteria for listing in the NRHP. All buildings or structures in the study area around the Project site over 50 years old were evaluated. None of the more recently constructed buildings appear to meet the exacting standards of exceptional significance. Therefore, none of the buildings in the HARSA appear to be significant historic properties subject to Section 106, nor do they appear to be historical resources for the purposes of CEQA.

Old Headquarters Weir

Old Headquarters Weir appears eligible under Criterion 3 (C) at the local level as a significant example of the work of a master designer and as an early example of a significant new construction method applied to water structure/bridge building. The structure is important as a rare surviving example of Leonard & Day's design of a reinforced concrete bridge/water control structure combination. Old Headquarters Weir, built in 1911, represents an early example of the type, and is only one of two known to have been built in this period by Leonard & Day. The structure also stands as an early example of use of reinforced concrete in construction of weirs. Furthermore, the bridge appears to retain a sufficient degree of integrity, and therefore retains the ability to convey its historic significance. Its character-defining features are its reinforced concrete benchwalls and flat slab roadway. For these reasons, Old Headquarters Weir appears to meet the criteria for listing in the California Register and National Register, and would therefore qualify as a significant historic property under Section 106, and a historical resource for the purposes of CEQA.

Old Headquarters Weir does not appear eligible under National Register Criteria A, B, or D (California Register Criteria 1, 2, or 4). Although it is a part of the necessary infrastructure for the development of the area, it does not have significance beyond its normal use. Old Headquarters Weir was built to replace an existing timber weir whose maintenance had become too burdensome. Although Old Headquarters Weir was the first road bridge at this location, it did not fundamentally change transportation in the area. It connected an unimproved dirt road on the southwestern side of the canal to a more established road on the northeastern side of the canal. Its function as a bridge alone does not appear to represent a significant contribution to the transportation history of the area. Although it is the only structure remaining from Miller & Lux Old Headquarters, it alone does not convey the meaning of a ranch headquarters.

Under Criteria B (2), Old Headquarters Weir does not appear to be eligible for association with persons important in our history. It is not eligible for its association with Miller & Lux Inc., who commissioned the bridge.

In rare instances, buildings and structures themselves can serve as sources of important information about historic construction materials or technologies under Criteria D and 4; however, reinforced concrete bridge technology is well documented in published and photographic sources. Therefore, Old Headquarters Weir does not appear to be a source of important information in this regard.

California Aqueduct

The second eligible structure in the study area is the California Aqueduct, which was previously evaluated by other studies at various locations along its 444-mile length. It was found exceptionally significant under Criterion 1 or A for its association with the history of major water systems development in California; and as an exceptionally significant example of hydraulic engineering, under Criterion 3 or C.

Buena Vista Water Storage District Canals

The canals of the Buena Vista Water Storage District in the study area do not appear to meet the criteria for listing in the CRHR or the NRHP. The KVWCC, East Side Canal, and West Side Canal constructed in 1876, along with the Kern Island Canal (ca. 1870), and Calloway Canal (1874-1875), precipitated the seminal *Lux v. Haggin* litigation, which has shaped California water rights. However, on their own, the KVWCC, East Side Canal, and West Side Canal are not significant for their roles in the litigation. The upstream canals diverting water before it reached the Miller & Lux property also had a crucial role in setting the scene of the conflict. One particular canal or water diversion alone could not have been entirely responsible for *Lux v. Haggin*. Numerous conditions converged in Kern County to produce this fierce litigation over water. The shifting course of the Kern River, the construction of numerous canals and ditches diverting water from the river, and the competing interests of two large-scale landholders combined produced lengthy litigation. For this reason, the canals are not eligible under Criterion 1 or Criterion A.

Under Criterion 2 or Criterion B, the canals are not associated with a significant individual. Although the canals were constructed under the auspices of Miller & Lux, it is not directly associated with either of those individuals. Miller & Lux constructed numerous canals throughout their holdings to irrigate feed crops. Although Henry Miller did visit most of his holdings, including Buttonwillow, most of his time was spent in San Francisco or his home ranch, which are more appropriately associated with him and the business.

Under Criterion 3 or C, the canals were designed by S.W. Wible, a civil engineer who designed mines in El Dorado, Amador, and Calaveras counties before coming to Kern County, where he designed the Pioneer and Wible canals before designing the KVWCC. Despite his engineering knowledge, the KVWCC is not an engineering success, and is not significant for its design or construction. The smaller canals are farmer-dug, and were constructed according to the common practice at the time.

In addition, these canals lack integrity to any historical period of significance, owing to their regular realignment, reshaping, and replacement of control structures.

Farmsteads

None of the farmsteads or residences in the HARSA appears to meet the criteria for listing in the CRHR or the NRHP, because they lack significance. The farmsteads were constructed as a part of the general settlement of the area following land sales by Miller & Lux. Farming and irrigation were established by Miller & Lux beginning in the 1870s; the farmsteads represent the ensuing years of crop diversification and family farming as practiced throughout the Central Valley (Criterion 1 or A). None of the farmsteads appear to be associated with significant individuals (Criterion 2 or B). The area has a tradition of multi-generational farms like the Antongiovanni farm and Parsons farm; however, no evidence was found that any of these families or individuals in the families played a significant role in the development of local agriculture.

Charles Parsons is perhaps the best known of the residents of the study area. He was involved in the development of rice culture, banking in Buttonwillow, the Farmer's Cooperative board, and community boosterism. The rice culture, however, was a short-term development that has not resulted in a lasting impact. His involvement with other institutions involved group activity, and the success of any of the ventures cannot be directly attributed to him.

Under Criterion 3 or C, none of the farmsteads possess any distinctive characteristics or high artistic value that would render them eligible under these criteria. The farm residences are common examples of Craftsman and Ranch-style houses found throughout the Central Valley of California. The residence at 5865 Adohr Road is similar to plans and catalog houses available from the end of the nineteenth century through the 1930s. The farm outbuildings are utilitarian and lack distinctive characteristics or artistic value. In rare instances, buildings themselves can serve as sources of important information about historic construction materials or technologies (Criteria D or 4); however, the building does not appear to be a principal source of important information in this regard.

In addition to their lack of significance, the farmsteads in the study area have frequently been altered, thus affecting their integrity. In addition, study of the architectural characteristics, style, and materials of the buildings, along with evidence from maps from various periods, indicates that many of the farm buildings in the study area have been relocated to their current locations. This relocation has by definition degraded their integrity, because moving the buildings and structures has separated them from their original setting, which may have included worker camps, and thereby removed their association with an important aspect of local history.

Industrial and Miscellaneous Properties

None of the industrial properties in the study area appear to meet the criteria for listing in the CRHR or the NRHP. Under CRHR Criterion 1 or NRHP Criterion A, none of the properties is eligible for their association with significant events or trends. The McKittrick branch of the Southern Pacific Railroad, while an important piece of infrastructure for petroleum production southeast of Buttonwillow, is not significant for its association with petroleum production. Production had begun before the construction of the railroad in 1893. The railroad merely

provided additional infrastructure supporting production. The rice elevators and processing plants were associated with the recent and brief period of rice culture in the area between 1954 and the 1980s. Rice culture was practiced as a means of conditioning the soil for other crops, and did not become a significant crop in the area. Numerous airfields exist in the area for crop management and private transportation. The only airfield in the study area is not significant for its roles in transportation or agriculture. The PG&E and SCE transmission lines were constructed to augment the existing electrical grid in the mid-twentieth century, and are not significant in the context of power transmission development in Kern County. The portion of Tule Elk State Reserve in the study area was developed in the mid-twentieth century, and is only associated with the acquisition of the property by California State Parks and their continued management of the remaining elk population. Lastly, while the culverts near the intersection of Dairy Road and Stockdale Highway were constructed by the WPA, they are minor drainage features and do not appear significant in the context of the WPA project in Kern County.

Under CRHR Criterion 2 or NRHP Criterion B, none of the industrial and miscellaneous properties are associated with significant individuals. The industrial properties were developed by groups of individuals. Under CRHR Criterion 3 or NRHP Criterion C, none of the industrial and miscellaneous properties have any distinctive characteristics or high artistic value that would render them eligible under these criteria. The industrial properties are all utilitarian in nature and use standard engineering available at the time of their construction. In rare instances, buildings themselves can serve as sources of important information about historic construction materials or technologies (CRHR Criterion 4 or NRHP Criterion D); however, these resources do not appear to be a principal source of important information in this regard.

In addition to their lack of significance, some properties have lost integrity. The McKittrick branch of the Southern Pacific Railroad has undergone regular maintenance, which has altered with materials and workmanship. The line has also been shortened; tracks between Buttonwillow and McKittrick have been removed, significantly shortening the line and affecting the design, materials, workmanship, and association of the branch line.

These properties have been evaluated in accordance with Section 106 of the National Historic Preservation Act using criteria described in 36 CFR Part 60, and in accordance with Section 15064.5(a) (2)-(3) of the CEQA Guidelines, using the criteria outlines in Section 5024.1 of the California Public Resources Code, and do not appear to be historical resources for the purposes of CEQA.

5.3.3.6 Impacts Analysis

For the Project, potential significant impacts to known cultural resources, as well as inadvertent discoveries, have been evaluated using the criteria listed below. Under criteria based on the state CEQA Guidelines, the Project would be considered to have a significant impact on cultural resources if it would result in any of the following:

- A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing on the NRHP, the CRHR, or a local register of historic resources;
- A substantial adverse change in the significance of a unique archaeological resource; or
- Disturbance of any human remains, including those interred outside of formal cemeteries.

Archaeological Resources

From the list of known archaeological sites presented in Section 5.3.2.4 and summarized in Table 5.3-6, the ARSA contains a wide and varied collection of archaeological resources. As a result of the current effort, it has been determined that twelve archaeological sites are situated either in or within close proximity (within 200 feet) to the archaeological ARSA, as defined for the Project using the CEC-mandated guidelines. Because archaeological sites are generally only physically affected, only impacts resulting from Project-related construction were analyzed. Indirect impacts from Project operation are not expected to occur.

The current analysis finds that none of the identified archaeological sites situated in the ARSA will be impacted with Project implementation. Although the resources identified as a result of this investigation are within the ARSA or in close proximity, all site locations are avoidable, save for P-3108 and HECA 2010-2. Although these latter two sites are within the ARSA—as described in Section 5.3.3.4—impacts are not anticipated, because no evidence of either site was identified during the current inventory effort. There is some question as to whether or not P-3108 was plotted in the correct location, because subsequent surveys—including work by the same team—failed to confirm the presence of the site in its plotted location. In contrast, HECA-2010-2 is no longer present within the ARSA, the result of post-recordation heavy-earth-moving activities not associated with the HECA Project. Below, by Project component, are the resources either in or within close proximity to the ARSA, and their physical relationship to potential direct impacts.

Well Field

Avoidable resources either in or within close proximity to the ARSA for the Well Field include P-15-171, HECA 2009-9, and HECA 2010-10. As discussed previously, the ARSA for the Well Field was established to allow for maximum flexibility in the placement of wells and connecting pipelines to allow for the avoidance of identified resources. Given the presence of this design flexibility, the wells and connecting pipelines will be placed in a manner to avoid the archaeological sites in this portion of the ARSA. These three sites also fall in or within close proximity to the ARSA for the process water pipeline. As with the other sites in the ARSA for the process water pipeline (see discussion below), these sites are situated in the agricultural fields bordering the constructed levee that parallels the West Side Canal. It is within this levee that the process water pipeline is to be constructed. The pipeline is to be placed in a 5-foot-deep trench, where construction is confined to the soils used to construct the levee. Because the construction is confined to the levee, with the implementation of safeguards, including the limiting of all work activities to the crown of the levee, impacts to these archaeological sites would not occur.

CO_2 Pipeline

Avoidable resources in close proximity to the CO_2 pipeline include P-15-124 and HECA 2009-2. Current plans for the CO_2 pipeline in this vicinity call for the use of HDD procedures. The bore to be drilled for the installation of the CO_2 pipe will pass well below these two recorded archaeological sites. Because the resources are thus effectively avoided, no impacts to these resources are anticipated.

Process Water Pipeline

Resources that are located either in or in close proximity to the ARSA for the process water pipeline include P-15-89, P-15-179, P-15-2485, and HECA 2008-1. As discussed previously, P-15-89 and P-15-2485 are both situated on the opposite side of the West Side Canal from where the proposed process water pipeline is to be placed. Although this location falls in close proximity to the ARSA, because the Canal would act as a physical barrier for construction, impacts to these archaeological sites would not occur.

P-15-179 is situated in the agricultural fields bordering the constructed levee that parallels the West Side Canal. HECA 2008-1 is situated entirely in the West Side Canal. The process water pipeline is to be constructed within the levee that parallels this canal. The pipeline is to be placed in a 5-foot-deep trench, where construction is confined to the soils used to construct the levee. Because the construction is confined to the levee, with the implementation of safeguards, including the limiting of all work activities to the crown of the levee, impacts to these archaeological sites would not occur.

Natural Gas Pipeline/Railroad Corridor

Two archaeological sites are situated in the ARSA defined for the natural gas and railroad linears, and a third site has been identified in close proximity (within 200 feet) of the pipeline construction area.

HECA-2010-2 comprises the remnants of a twentieth-century farmhouse. As discussed previously, when recorded in 2010, the site comprised the foundation and other structural remnants of a recently demolished farm house. When recently revisited, the parcel where the foundation and structural remains occurred had been heavily graded. Because there is no longer a site at this location, no impacts to the archaeological resource would occur.

Similarly, it is not anticipated that P-15-3108 will be affected by Project implementation, even though the plotted location of the site places it within the ARSA defined for the natural gas linear. As discussed previously, there are discrepancies in the site record that draw doubt on the exact site location. In addition, archaeologists from the same team that originally recorded the site could not confirm the presence of the site a year later (Parr and Osborne, 1992). The current effort to identify the site in the plotted location was likewise unsuccessful. Lacking evidence of the site in this specific area, impacts to the resource in question are unlikely.

HECA-2012-1 will not be affected by the railroad linear because the new railroad spur would not extend to the site (the spur would have joined with the existing railroad tracks by the point where the site occurs). It is not anticipated that the site will be impacted by installation of the natural gas linear either, because the site is situated on the other side of two existing parallel railroad tracks from where the pipeline will be installed. No evidence of the site was observed in the proposed construction area for the natural gas pipeline. Because a distance of approximately 180 feet separate the site boundary from the limits of the CEC-mandated impact area (i.e., construction ROW plus 50 feet either side), the site will be avoided by construction impacts.

It should be noted herein that it is possible that archaeological deposits could be inadvertently exposed during Project-related construction activities. Previously unidentified archaeological

sites exposed during construction, if any, must be treated as important resources until formally determined otherwise. Measures for the management of inadvertently exposed archaeological resources are thus also provided.

Built Environment Resources

As discussed in Section 5.3.2.5, JRP recorded and evaluated all buildings constructed before 1964 in the HARSA. Table 5.3-7, Historic Architectural Resources in the Project HARSA, below includes all historic-era resources formally evaluated as part of this Project. For more detailed descriptions of these properties, see the individual DPR 523 forms attached to the Historic Architecture Technical Report (JRP, 2012) attached to this document as Appendix G-4.

The following provides reference to the Project description as it relates to the two eligible resources in the HARSA, Old Headquarters Weir and the California Aqueduct, and provides an impact analysis for both historical resources identified in this report. The Project activities will be situated primarily in Township 30 South, Range 24 East, Section 10, Mount Diablo Baseline, and Meridian. The Project excludes parcels in the northwestern and southeastern corners of the Section. The California Aqueduct and Old Headquarters Weir adjoin property controlled by the Project, but are not included in the Project area. None of the Project components or construction activities, therefore, will cause a substantial adverse change to the Aqueduct or weir such that they will be materially impaired and unable to continue to convey their significance. Potential impacts to these resources are to the surrounding setting.

The Project will not directly affect the Aqueduct and weir, but represent a change to the setting from agricultural to industrial use. This change of use does not affect the aspects of the setting that allow the Aqueduct or weir to convey their significance, and therefore does not pose a significant impact.

The weir is significant as an example of early reinforced-concrete construction. Additional significance is a result of the early use of this technique for a structure operating as both a weir and bridge. As a result, the important aspects of the setting for this resource are the KVWCC canal and the gravel access roads. The significant aspects of the weir are not conveyed by the surrounding land use. The Project will not affect the construction of the weir, canal, or roadway, only the surrounding land use. The Aqueduct is a long, linear resource that passes through a variety of settings, many of which have changed over time. Like the weir, this loss of setting does not significantly impact the Aqueduct's ability to convey its significance. Neither the aqueduct nor the weir will be directly affected by the Project in terms of design, materials, workmanship, feeling, location, or association. Therefore, the Project does not pose a significant impact under CEQA, and does not require mitigation.

OEHI Project

The impacts of the OEHI Project on cultural resources are analyzed in Appendix A-1, Section 4.5, Cultural Resources, and Appendix A-2, Section 2.3, Cultural Resources. The analysis in Appendix A concludes that, with implementation of proposed mitigation measures, the OEHI Project will not result in significant adverse impacts to cultural resources.

5.3.4 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.

Each of the projects identified in Appendix I was assessed in conjunction with the Project to ascertain the potential contribution of the Project to cumulative impacts to the cultural resources base. From this analysis, it has been concluded that cumulative impacts from the Project on the regional cultural resources base are limited, because implementation of the mitigation measures proposed below for cultural resources will reduce Project-related impacts to less-than-significant levels. These measures would thus limit the contribution of the Project to cumulative impacts on the regional cultural resources base.

The cumulative impacts of the OEHI Project on cultural resources are analyzed in Appendix A-1, Section 4.5, Cultural Resources, and Appendix A-2, Section 2.3, Cultural Resources. The analysis in Appendix A concludes that, with implementation of proposed mitigation measures, the OEHI Project will not result in significant adverse cumulative impacts to cultural resources.

5.3.5 Mitigation Measures

This section discusses mitigation measures proposed that will be implemented in accordance with applicable laws and regulations; in particular, CEQA Sections 15064.5 and 15126.4, and Section 106 of the NHPA, to reduce Project-related impacts to cultural resources. It should be noted herein that as described in Section 5.3.2.6, impacts to built environment resources (i.e., historic architecture) are not anticipated. As such, mitigation measures specifically targeting the management of built environment resources are not included. In addition, as discussed previously, none of the known archaeological resources situated in the Project ARSA are anticipated to be impacted with Project implementation. Although no impacts to known archaeological resources are anticipated, mitigation measures will be implemented to ensure the proper management of both known and currently unknown archaeological resources that could be inadvertently exposed with Project implementation.

As detailed in Section 5.3.3.4, all identified archaeological resources except two are situated in areas where avoidance is a feasible option. The avoidance of archaeological resources has thus been adopted as a mitigation measure in the current document.

The site areas of P-3108 and HECA-2010-2 will not be avoided by Project construction. These sites, although in the ARSA, will not be impacted as there currently are no identifiable resources within these locations. As described in Section 5.3.3.4, archaeological site P-3108 has not been positively relocated subsequent to original recordation. Also, as detailed in Section 5.3.3.4, archaeological site HECA-2010-2 has been graded away by non-HECA–related construction activities.

It should be mentioned herein that none of the archaeological resources located in the ARSA delineated for the Project, as per CEC guidelines, have been formally evaluated for listing to either the NRHP or CRHR. As such, all archaeological resources in the Project ARSA must be considered NRHP and/or CRHR eligible until formally determined otherwise. In the event that archaeological resources are inadvertently exposed during earth-moving activities implemented as a result of the Project, or at some point avoidance is found to be infeasible, formal evaluation (i.e., testing) will need to be performed.

CUL-1 Retain a Qualified Professional Archaeologist

Prior to the start of Project-related vegetation clearance, earth-disturbing activities, or Project Site preparation, a qualified professional archaeologist will be retained by HECA as the cultural resources specialist (CRS) who will be responsible for implementation of Mitigation Measures CUL-2 through CUL-7.

CUL-2 Avoidance

Because site avoidance is HECA's preferred treatment of archaeological resources, avoidance of archaeological sites, where feasible, will be implemented. Furthermore, if a potentially significant cultural resource is discovered during Project construction, the construction plans will be modified (if possible) to avoid that resource. If there are no feasible means to avoid the resource, then the cultural resource will be tested. If the cultural resource is found to be

significant, the measures for mitigation described below will be implemented in consultation with the CEC.

For any archaeological resource that can be avoided by modification of Project plans, the archaeological resource will be temporarily fenced or otherwise demarcated on the ground, and the area will be designated environmentally sensitive. Construction equipment will be directed away from the cultural resource, and construction personnel will be directed to avoid entering the area. Where cultural resource boundaries are unknown, the protected area will include a buffer zone with a 50-foot radius. In some cases, additional archaeological work could be required to demarcate the boundaries of the cultural resource to ascertain and ensure avoidance.

CUL-3 Testing

In the event avoidance of an archaeological site becomes infeasible; or an archaeological site is inadvertently discovered during construction, HECA and the CRS will prepare and submit to the CEC for review and approval an archaeological testing plan (ATP). The ATP will identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the proposed Project, the testing method to be used, and locations recommended for testing. The purpose of the archaeological testing program will be to determine—to the extent possible—the presence or absence of archaeological resources, to identify any archaeological resources found, and to evaluate the significance of any archaeological resources found as an historical resource.

At the completion of the archaeological testing program, the CRS will submit a written report of the findings to the CEC. If the CRS finds that significant archaeological resources may be present, based on the archaeological testing program, the CEC, in consultation with HECA and the CRS, shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. If the CRS, in consultation with the CEC, determines that a significant archaeological resource is present, and that the resource could be adversely affected by the Project, at the discretion of HECA, in consultation with the CEC, either:

- the Project shall be re-designed to avoid any adverse effect on the important archaeological resource; or
- a data recovery program shall be implemented.

If the archaeological resource being subject to archaeological testing is associated with the Native American inhabitation of the region, it is further recommended that a Native American monitor be present during the implementation of this mitigation measure.

CUL-4 Data Recovery

Data recovery shall be implemented in the event an adverse impact to an important archaeological resource cannot be avoided. The archaeological data recovery program shall be conducted in accord with an archaeological data recovery plan (ADRP). HECA, the CRS, and the CEC shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. HECA and the CRS shall submit a draft ADRP to the CEC. The ADRP shall identify how the

proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed Project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical. If the archaeological resource being subject to data recovery is associated with the Native American inhabitation of the region, it is further recommended that a Native American monitor be present during the implementation of this mitigation measure.

CUL-5 Construction Monitoring

Given the archaeological sensitivity of the Project ARSA as determined in the prefield research, including the geotechnical analysis, an archaeological monitoring program shall be implemented. A Cultural Resource Monitor (CRM) will be appointed who will be responsible for keeping a daily monitoring log of construction activities, observations, types of equipment used, problems encountered, and any new archaeological discovery (including the cultural material observed and location). Photographs will be taken as necessary to supplement the documentation. These logs will be signed and dated by the CRM and included in the monitoring report. It may be necessary to appoint multiple CRMs, given the geographical extent of the Project.

The archaeological monitoring program shall minimally include the following provisions:

- The CEC in consultation with HECA and the CRS, shall determine what Project activities shall be archaeologically monitored. In most cases, any soils-disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), site remediation, etc., shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context;

- The applicant and the CRS shall advise all Project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of apparent discovery of an archaeological resource;

- The CRM(s) shall be present on the Project Site until the CEC has, in consultation with HECA and the CRS, determined that Project construction activities could have no effects on significant archaeological deposits;

- The CRM(s) shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;

- If an intact archaeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The CRM(s) shall be empowered to temporarily redirect demolition/excavation/pile driving/construction activities, and equipment until the resource is evaluated. In the case of pile-driving activity (foundation, shoring, etc.), if the CRM(s) has

cause to believe that the pile-driving activity may affect an archaeological resource, the pile-driving activity shall be terminated until an appropriate evaluation of the resource has been made, in consultation with the CEC. The CRS shall immediately notify the CEC of the encountered archaeological deposit. The CRS shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, and present the findings of this assessment to the CEC.

If unanticipated resources are discovered during construction, they will be addressed under the procedures set forth in CEQA Section 15064.5. If possible, the resource will be avoided first through design modification, or second through protective measures as described above. If the resource cannot be avoided, HECA and CRS will consult with the CEC with regard to implementation of testing. If it is determined through testing that that the resource is important, then measures to mitigate impacts will be devised in consultation with the CEC, and will be carried out by HECA.

Whether or not significant archaeological resources were encountered, HECA and the CRS shall submit monthly monitoring progress reports and a written report of the findings of the monitoring program to the CEC.

CUL-6 Crew Education

Prior to the beginning of construction, the construction crew will be informed of the regulatory protections afforded to cultural resources. The crew will also be informed of procedures relating to the inadvertent exposure of archaeological resources. The crew will be cautioned not to collect artifacts, and asked to inform a construction supervisor if cultural remains are uncovered.

CUL-7 Discovery of Human Remains

Some of the sites in the Project ARSA are suspected to contain human remains. Human remains are often fragile, and should be treated with care and respect at all times. The discovery of human remains involves both legal and archaeological issues. Discovery of any human remains in the Project's ARSA is subject to criteria set forth by the Native American Graves Protection and Repatriation Act, 43 CFR Part 10, as amended, 1999. As such, immediately upon the discovery of human remains, the following procedures will be implemented:

- Stop all excavation work, and using appropriate safety precautions, with a minimum of further disturbance to the remains, allow the monitoring archaeologist to verify that the discovery is, in fact, human skeletal material.

- If the remains are determined to be human, the Project Supervisor will call the Public Works Department, who will in turn contact the Kern County Sheriff Department to report the discovery. In addition to the Sheriff, the County Coroner will also be contacted and informed of the discovery.

- In the event of the Coroner's determination that the human remains are Native American, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). HECA, the

CRS, and the MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Work in the immediate vicinity of the find shall remain halted until the CEC, after consultation with HECA, CRS, MLD, and relevant agencies, provides written authorization for work to resume in the vicinity of the discovery.

5.3.6 Laws, Ordinances, Regulations, and Standards

The proposed Project will be constructed and operated in accordance with all LORS applicable to cultural resources. Federal, state, and local LORS applicable to cultural resources are discussed below and summarized in Table 5.3-8, Applicable Laws, Ordinances, Regulations, and Standards.

5.3.6.1 Federal

Federal laws, procedures, and policies affecting the treatment of cultural resources include the Antiquities Act of 1906, Public Law 59-209, Executive Order 11593, Section 106 of the NHPA of 1966 (Public Law 89-665), as amended, Public Law 93-291, the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190), the Federal Land Policy Management Act (Public Law 94-94-579), and regulations 36 CFR 60 and 36 CFR 800.

For management purposes, a cultural resource must be recommended as either eligible or not eligible for the NRHP to determine effect, and the need for mitigation of effect. If the property (cultural resource) is determined eligible, then a determination of effect, in accordance with 36 CFR 800, must be provided. If the property is identified as not eligible, then no determination of effect or mitigation measures are necessary. Recommendations are reviewed and approved by the SHPO and the Advisory Council on Historic Preservation (ACHP).

The NHPA requires all federal agencies to assess the effects of any agency-sponsored undertaking on cultural resources. The federal agency is responsible for project compliance with Section 106 of the NHPA and its implementing regulations, set forth by the ACHP at 36 CFR 800. As lead federal agency for the undertaking, in accordance with Section 106 of the NHPA, the DOE will consult with SHPO, federally recognized Indian Tribes, and the ACHP.

Four evaluation criteria to determine a resource's eligibility to the NRHP, in accordance with the regulations outlined in 36 CFR 800, are identified at 36 CFR 60.4. To determine site significance through application of NRHP criteria, several levels of potential significance that reflect different (although not necessarily mutually exclusive) values must be considered. As provided in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

1. That are associated with events that have made a significant contribution to the broad patterns of our history;

2. That are associated with the lives of persons significant in our past;

3. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

4. That have yielded, or may be likely to yield, information important in prehistory or history.

These evaluation criteria are used to help determine what properties should be taken into account in any assessment or consultation (36 CFR 60.2).

5.3.6.2 State

The basic goal of CEQA is to develop and maintain a high-quality environment now and in the future. The CEQA Guidelines provide a framework for the analysis of impacts to archaeological resources.

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as a "historical resource" is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the criteria regarding resource eligibility to the CRHR.

Generally, under CEQA, a historical resource (these include built-environment historic and archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5 and defined as any resource that:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Is associated with lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under Public Resources Code (PRC) Section 5097.98.

Impacts to "unique archaeological resources" are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that — without merely adding to the current body of knowledge — there is a high probability that it meets one of the following criteria:

1. The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information;

2. The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or

3. The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources that do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Appendix G, a project would potentially have significant impacts if it would cause substantial adverse change in the significance of one of the following:

1. A historical resource (i.e., a cultural resource eligible for the CRHR);

2. An archaeological resource (defined as a unique archaeological resource that does not meet CRHR criteria); or

3. Human remains (i.e., where the project would disturb or destroy burials).

A non-unique archaeological resource is given no further consideration other than the simple recording of its existence by the CEQA lead agency.

Potential impacts to identified cultural resources need only be considered if the resource is an "historical" or "unique archaeological resource" under the provisions of CEQA Sections 15064.5 and 15126.4 and the eligibility criteria. If a resource cannot be avoided, then the resource must be examined vis-à-vis the provisions of CEQA Sections 15064.5 and 15126.4 and of the eligibility criteria as an "historical" or "unique archaeological resource." In many cases, determination of a resource's eligibility can only be made through extensive research and archaeological testing. No mitigation measures are required unless previously undiscovered cultural resources are detected. Mitigation under CEQA must address impacts to the values for which a cultural resource is considered important. To mitigate adequately, it must therefore be determined what elements make a site eligible for the CRHR. The first line of mitigation is complete avoidance, when feasible, of all cultural resources.

5.3.6.3 Local

On the local level, compliance with the Kern County General Plan (Kern County, 2007) is also necessary. According to the General Plan, the County shall address archaeological resources for discretionary projects in accordance with CEQA. As such, compliance with CEQA satisfies the County's concerns for cultural resources.

5.3.7 Involved Agencies and Agency Contacts

Kern County was contacted regarding information about their General Plans. Unless consultation with SHPO becomes necessary, the NAHC is the only agency involved with the management of cultural resources for the Project. Appendix CUL-2 contains the correspondence with the NAHC concerning this Project.

Specific contacts for the NAHC and Kern County are listed in Table 5.3-9, Involved Agencies and Agency Contacts.

5.3.8 Permits Required and Permit Schedule

Other than certification from the CEC, no state, federal, or local permits are required by the Project for the management of cultural resources.

5.3.9 References

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Table 5.3-1
List of Reviewed Historic Maps

Map Name	Type	Date
Buena Vista Lake	USGS 1:25,000	1912
Buttonwillow	USGS 1:24,000	1954
East Elk Hills	USGS 1:24,000	1932
East Elk Hills	USGS 1:24,000	1954
East Elk Hills	USGS 1:24,000	1973
Tupman	USGS 1:31,680	1933
Tupman	USGS 1:24,000	1954
Tupman	USGS 1:24,000	1968
Map of 1918 - Kern County	Ownership Survey; County Map	1918
Township 29 South/Range 22 East	Government Land Office (GLO)	1856
Township 29 South/Range 22 East	Government Land Office (GLO)	1868
Township 29 South/Range 23 East	Government Land Office (GLO)	1856
Township 29 South/Range 23 East	Government Land Office (GLO)	1868
Township 29 South/Range 24 East	Government Land Office (GLO)	1856
Township 29 South/Range 24 East	Government Land Office (GLO)	1868
Township 30 South/Range 24 East	Government Land Office (GLO)	1856
Township 30 South/Range 24 East	Government Land Office (GLO)	1868
Township 30 South/Range 24 East	Government Land Office (GLO)	1894
Township 30 South/Range 25 East	Government Land Office (GLO)	1855
Township 31 South/Range 2 East	Government Land Office (GLO)	1855
Township 31 South/Range 25 East	Government Land Office (GLO)	1868

Notes:
USGS = U.S. Geological Survey

Table 5.3-2
List of Reviewed Aerial Photographs:
Tupman and Buttonwillow,
Kern County, California

Year	Scale	Source
1946	1:1,000	Fairchild
1956	1:1,000	Robinson
1967	1:1,000	Western
1974	1:1,000	NASA
1994	1:1,000	USGS
2002	1:1,000	USGS

Notes:
NASA = National Aeronautics and Space Administration
USGS = U.S. Geological Survey

Table 5.3-3
Previous Cultural Resource Investigations as Identified in Records Search

Report Number	Title	Author	Affiliation	Date
KE-065	Negative Archaeological Survey Report	Osborne, Richard and Dominique Comeyne	Caltrans	1994
KE-142	A Cultural Resources Assessment and Plan for the Kern Water Bank Authority Project Near Bakersfield, Kern County, California Addendum I-Emergency Flood Area	Pruett, Catherine L., Peggy Murphy, and Dorothy Fleagle	Three Girls and a Shovel, LLC.	1997
KE-403	West Coast Cogeneration Project: Belridge	Fredrickson, David A, Ph.D.	Sonoma State University Academic Foundation, Inc.	1985
KE-578	Archaeological Survey Report for the Proposed Buena Vista Slough Bridge Replacement 06-KER-58 P.M. 24.01 Bridge 50-03 06200-225500	Levulett, Valerie	Caltrans	1982
KE-714	Negative Archaeological Survey Report	Noble, Daryly	Caltrans	1987
KE-751	Caltrans Archaeological Survey Report	O'Connor, Dennis	Caltrans	1981
KE-866	Archaeological Survey Report for the Proposed Route Adoption Study Highway 58, Bakersfield, Kern County, California	Parr, Robert E. and Richard Osborne	Cultural Resource Facility California State University Bakersfield	1992
KE-1089	Archaeological Evaluation for the Proposed Belridge Field Cogeneration Plant Kern County, California	Schiffman, Robert A.	Archaeological Research, Bakersfield College	1982
KE-1098	Archaeological Investigation of Proposed Project Site A.P.N 103-080-6 and -07 Kern County, California	Schiffman, Robert A.	Archaeological Research, Bakersfield College	1984
KE-1485	Archaeological Evaluation for the Proposed Belridge Field Cogeneration Plant Kern County, California	Shiffman, Robert A. and Nyle Monday	Dames & Moore	1982
KE-1810	Proposed Capture Pen and Buried Telephone Lines	Woodward, Jim	DPR	1983
KE-1811	Hunter-gatherer Adaptive Strategies and Lacustrine Environments in the Buena Vista Lake Basin, Kern County, California	Hartzell, Leslie Louise	Ph.D. Dissertation University of California, Davis	1992
KE-1813	Supplemental Report Cultural Resources Inventory South Belridge Cogeneration Project Application for Certification	Unknown	Woodward-Clyde	1985

Table 5.3-3
Previous Cultural Resource Investigations as Identified in Records Search

Report Number	Title	Author	Affiliation	Date
KE-2015	Tule Elk State Reserve Cultural Resource Survey	Reinoehl, Gary	California Department of Parks and Recreation	1991
KE-2162	Cultural Resources Technical Report for the La Paloma Generating Project	Hatoff, Brian W.	URS Greiner Woodward-Clyde	1998
KE-2268	Prehistoric Archaeological Resources Inventory and Evaluation at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California	Jackson, Thomas L, Ph.D. and Lisa Jackson, M.A.	Pacific Legacy, Inc.	1998
KE-2271	Cultural Resources Technical Report for the La Paloma Generating Project Supplement #2 to Appendix L	Hatoff, Brian W.	URS Greiner Woodward-Clyde	1999
KE-2278	Cultural Resources Inventory Report for Williams Communication, Inc., Fiber Optic Cable System Installation Project San Luis Obispo to Bakersfield	Avina, Mike A.	Jones and Stokes Associates, Inc.	1999
KE-2323	Cultural Resources Inventory Report for the AT&T Corp, Cable Upgrade Project Los Angeles, Kern, and San Luis Obispo Counties, California	Jones and Stokes Associates, Inc.	Jones and Stokes Associates, Inc.	1999
KE-2375	Prehistoric Archaeological Resources Inventory and Evaluation at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California	Jackson, Thomas L., Lisa Shapiro, and Jerome King	Pacific Legacy, Inc.	1999
KE-2391	Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project: Addendum for Route B and Valley Acres Substation Surveys	Jackson, Thomas L. Ph.D. and William A. Shapiro	Pacific Legacy, Inc.	1999
KE-2394	Negative Archaeological Survey Report: Installation of Traffic Surveillance Stations at 21 Locations CALTRANS District 6	Laylander, Don	Caltrans	1999
KE-2452	Western Midway Sunset Cogeneration Company Project	Unknown	WZI Inc.	2000

Table 5.3-3
Previous Cultural Resource Investigations as Identified in Records Search

Report Number	Title	Author	Affiliation	Date
KE-2527	Archaeological Survey for the CALPEAK #3, Midway Kern County, California	Jones, Donna	Latham and Watkins	2001
KE-2885	Archaeological Testing Report for the Restroom Replacement Project at Tule Elk State Reserve	Mealy, Marla M.	California State Parks	2004
KE-3045	Final Cultural Resources Report for the Sunrise Power Project Phase I	Jackson, Thomas L. Ph.D. and Brendan Culleton	Pacific Legacy, Inc.	2003
KE-3054	New Tower Submission Packet: Semi-Tropic CA-3224A	Billat, Scott	Earth Touch, Inc.	2005
KE-3344	Archaeological Monitoring Report Central Valley District	Bissonnette, Linda	California State Parks	2006
KE-3691	Archaeological Reconnaissance Survey of the Perimeter at the Buttonwillow Ecological Reserve	Gorden, Mary A.	State of California Department of Fish and Game	2008

Note:
Caltrans = California Department of Transportation

Table 5.3-4
Previously Identified Cultural Resources within Records Search Area

(P-15) or Temporary Designation	Trinomial (CA-KER-)	Site Type	Prehistoric/ Historic/Historic Architecture	NRHP/CRHR Status*	Within Records Search Area Only	Within ARSA or HARSA as applicable to resource type	Within Close Proximity of the ARSA (200')
34	34	Habitation Site	Prehistoric	Not Evaluated	Yes	No	No
35	35	Habitation Site	Prehistoric	Not Evaluated	Yes	No	No
36	36	Habitation Site	Prehistoric	Not Evaluated	Yes	No	No
86	86	Burial Mound	Prehistoric	Not Evaluated	Yes	No	No
88	88	Burial Mound	Prehistoric	Not Evaluated	Yes	No	No
89	89/H	Lithic and Trash Scatter/Burials	Prehistoric/Historic	Not Evaluated	No	No	Yes
124	124	Lithic and Shell Scatter	Prehistoric	Not Evaluated	No	No	Yes
125	125	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
171	171	Habitation Site	Prehistoric	Not Evaluated	No	Yes	
179	179	Burial Mound	Prehistoric	Not Evaluated	No	No	Yes
359	359	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
1493	1493	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
1611	1611	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
2414	2414	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
2415	2415	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
2417	2417	Lithic scatter	Prehistoric	Not Evaluated	Yes	No	No
2420	2420	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
2464	2464	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
2485	2485	Lithic Scatter	Prehistoric	Not Evaluated	No	No	Yes
2718	2718	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
2719	2719	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
2720	2720	Habitation Site/Burials	Prehistoric	Not Evaluated	Yes	No	No
2721	2721	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No

Table 5.3-4
Previously Identified Cultural Resources within Records Search Area

(P-15) or Temporary Designation	Trinomial (CA-KER-)	Site Type	Prehistoric/ Historic/Historic Architecture	NRHP/CRHR Status*	Within Records Search Area Only	Within ARSA or HARSA as applicable to resource type	Within Close Proximity of the ARSA (200')
3102	3102	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
3103	3103	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
3104	3104	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
3105	3105/H	Lithic and Trash Scatter	Prehistoric/Historic	Not Evaluated	Yes	No	No
3107	3107	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
3108	3108	Lithic Scatter	Prehistoric	Not Evaluated		Yes	No
3355	3355/H	Lithic and Trash Scatter	Prehistoric/Historic	Not Evaluated	Yes	No	No
5984	5018	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
6768	5393	Shell Scatter	Prehistoric/Historic	Recommended Ineligible	Yes	No	No
9734	None	Lithic Scatter	Prehistoric	Not Evaluated	Yes	No	No
11157	6504	Lithic and Shell Scatter	Prehistoric	Not Evaluated	Yes	No	No
15688	8662/H	Lithic, Shell and Trash Scatter	Prehistoric/Historic	Not Evaluated	Yes	No	No
15690	None	Pump House	Historic Architecture	Recommended Ineligible	No	Yes	No
None	None	California Aqueduct	Historic Architecture	Listed	No	Yes	No

Notes:
ARSA = Archeological Resources Study Area
CRHR = California Register of Historical Resources
HARSA = Historic Architectural Resources Study Area
NRHP = National Register of Historic Places

Table 5.3-5
Native American Consultation Information

Contact Name and Title	Address and Native American Groups Represented	Date Contacted By Letter	Date Contacted by Telephone	Comments Received/Notes
Clarence Atwell, Chairperson	Santa Rosa Rancheria P.O. Box 8 Lemoore, CA 93245 Tache, Tachi, Yokuts	March 14, 2008 June 24, 2008 April 1, 2009 December 9, 2009	August 26, 2010	Rancheria Representative Lalo Franco requested that a Cultural Resources Monitoring Plan and a Burial Agreement be considered. Mr. Atwell is no longer Chairperson and was unavailable at this number for a follow up call made on August 26, 2010. A message was left with the Tribal Secretary asking if there was anyone who could comment on the Project. No response has been received to date.
Chairperson	Santa Rosa Rancheria P.O. Box 8 Lemoore, CA 93245	July 28, 2010 August 3, 2010	August 26, 2010	See comment above.
Neil Peyron, Chairperson	Tule River Indian Tribe P.O. Box 589 Porterville, CA 93258 Yokuts	March 14, 2008 June 24, 2008 April 1, 2009 December 9, 2009 July 28, 2010	August 26, 2010	Mr. Peyron is no longer Chairperson and no successor had been named at the time of the follow up call on August 26, 2010
Ron Wermuth	P.O. Box 168 Kernville, CA 93238 Tubatulabal, Kawaiisu, Koso, Yokuts	March 14, 2008 June 24, 2008 April 1, 2009 December 9, 2009 May 18, 2010 July 28, 2010 August 3, 2010	August 26, 2010	Mr. Wermuth stated that there are known internments in the region and suggested that cultural resource monitoring take place during Project activities.
Kathy Morgan, Chairperson	Tejon Indian Tribe 2234 – 4th Street Wasco, CA 93280 Yowlumne, Kitanemuk	March 14, 2008 June 24, 2008 April 1, 2009 December 9, 2009 May 18, 2010 July 28, 2010 August 3, 2010	August 26, 2010	Asked to be kept informed of Project's progress.

Table 5.3-5
Native American Consultation Information

Contact Name and Title	Address and Native American Groups Represented	Date Contacted By Letter	Date Contacted by Telephone	Comments Received/Notes
Kenneth Woodrow Chairperson	1179 Rock Haven Court Salinas, CA 93906 Foothill Yokuts, Mono	March 14, 2008 June 24, 2008 April 1, 2009 December 9, 2009 July 28, 2010 August 3, 2010	August 26, 2010	Mr. Woodrow requested an additional set of Project maps for review, which were emailed to him on August 26, 2010. Mr. Woodrow stated that upon review of the maps, he would provide any comments that he had regarding the Project. No response has been received to date.
Donna Begay, Tribal Chairwoman	Tubatulabals of Kern Valley P.O. Box 226 Lake Isabella, CA 93240 Tubatulabal	March 14, 2008 June 24, 2008 April 1, 2009 December 9, 2009 May 18, 2010 July 28, 2010 August 3, 2010	August 26, 2010	Ms. Begay stated that the Project is outside of her traditional area and that she has no specific comments regarding the Project.
James R. Leon Chairperson	Chumash Council of Bakersfield P.O. Box 902 Bakersfield, CA 93302	March 14, 2008	N/A	No
Arianne Garcia Chairperson	Chumash Council of Bakersfield P.O. Box 902 Bakersfield, CA 93302	April 1, 2009 December 9, 2009 May 18, 2010 July 28, 2010 August 3, 2010	August 26, 2010 August 27, 2010	Ms. Garcia did not answer follow up calls made on August 26 and 27, 2010. A message was left with her voicemail service requesting any information she may have regarding the Project area. No response has been received to date.
Robert L. Gomez, Jr.	2619 Driller Avenue Bakersfield, CA 93306	March 14, 2008	N/A	No
Delia Dominguez Tribal Chairwoman	Kitanemuk & Yowlumne Tejon Indians 981 N. Virginia Covina, CA 91722 Yowlumne, Kitanemuk	April 1, 2009 December 9, 2009 May 18, 2010 July 28, 2010 August 3, 2010	August 26, 2010 August 27, 2010	Ms. Dominguez did not answer follow up calls made on August 26 and 27, 2010. A message was left with her voicemail service requesting any information she may have regarding the Project area. No response has been received to date.

Table 5.3-5
Native American Consultation Information

Contact Name and Title	Address and Native American Groups Represented	Date Contacted By Letter	Date Contacted by Telephone	Comments Received/Notes
David Laughinghorse Robinson	Kawaiisu Tribe of Tejon Reservation P.O. Box 1547 Kernville, CA 93238	January 4, 2010 May 18, 2010 July 28, 2010 August 3, 2010	August 26, 2010	The NAHC provided two telephone numbers for Mr. Robinson. The first was disconnected and the second was not answered and there was no voicemail service.
Ryan Garfield Chairperson	Tule Indian Tribe P.O. Box 589 Porterville, CA 93258	January 4, 2010 May 18, 2010 July 28, 2010 August 3, 2010	N/A	No
Robert Robertson Historic Preservation Officer	Kern Valley Indian Council P.O. Box 401 Weldon, CA 93238	August 4, 2010	N/A	No
Carol A. Pulido	165 Mountainview Street Oak View, CA 93022	January 4, 2010 28 July 2010	August 26, 2010	Ms. Pulido had no comment on the Project.

Note:
NAHC = Native American Heritage Commission

Table 5.3-6
Archaeological Sites in or within Close Proximity (within 200 Feet) to the Project ARSA

Primary # (P-15) or Temporary Designation	Site Type	Prehistoric/ Historic	Associated Project Component	NRHP/ CRHR Status	Trinomial (CA-KER)	Within ARSA	Within Close Proximity to ARSA
89	Lithic and Trash Scatter with Human Remains	Prehistoric/ Historic	PRO H_2O	Not Evaluated	89/H	No	Yes
124	Shell and Lithic Scatter	Prehistoric	CO_2, Controlled Area	Not Evaluated	124	No	Yes
171	Burial Mound	Prehistoric	PRO H_2O	Not Evaluated	171	Yes	No
179	Burial Mound	Prehistoric	PRO H_2O	Not Evaluated	179	No	Yes
2485	Lithic Scatter	Prehistoric	PRO H_2O	Not Evaluated	2485	No	Yes
3108	Lithic Scatter	Prehistoric	NG and Railroad	Not Evaluated	3108	Yes	No
HECA-2008-1	Lithic and Shell Scatter	Prehistoric	PRO H_2O	Not Evaluated	N/A	Yes	No
HECA-2009-2	Lithic Scatter	Prehistoric	CO_2, Controlled Area	Not Evaluated	N/A	Yes	No
HECA-2009-9	Lithic Scatter	Prehistoric	PRO H_2O, Well Field	Not Evaluated	N/A	Yes	No
HECA-2009-10	Lithic Scatter	Prehistoric	PRO H_2O, Well Field	Not Evaluated	N/A	Yes	No
HECA-2010-2	Foundation and Trash Scatter	Historic	NG and Railroad	Not Evaluated	N/A	Yes	No
HECA-2012-1	Lithic Scatter	Prehistoric	NG and Railroad	Not Evaluated	N/A	No	Yes

Notes:
CO_2 = Carbon Dioxide Pipeline
NG = Natural Gas Pipeline
ARSA = Archaeological Resources Study Area
CRHR = California Register of Historical Resources
HECA = Hydrogen Energy California
NG = Natural Gas Pipeline
NRHP = National Register of Historic Places
PRO H_2O = Process Water Pipeline

Table 5.3-7
Historic Architectural Resources in the Project HARSA

Address or Resource Name	Year Built	NRHP/CRHR Status
Relocated Structures North of SR 58	Unknown, moved to site after 1973	Ineligible
Southern Pacific McKittrick (Asphalto) Branch	1893	Ineligible
Pacific Gas & Electric/Southern California Edison Transmission Lines & Towers	ca. 1943-53 ca. 1956-68 ca. 1968-73	Ineligible
6010 Buerkle Road	1964	Ineligible
35034 Stockdale Highway	ca. 1940s	Ineligible
Works Projects Administration Culverts	1940	Ineligible
7307 Adohr Road (Adohr Farms)	1930	Ineligible
7307 Adohr Road (Palm Farms)	1953	Ineligible
7345 Adohr Road	1930	Ineligible
Old Headquarters Weir	1911	Eligible
California Aqueduct	1961-72	Eligible
6122 Tule Park Road	1941	Ineligible
Tupman Water Plant	ca. 1935, 1974-81	Ineligible
Canals	1876-1918	Ineligible

Notes:
CRHR = California Register of Historical Resources
HARSA = Historic Architectural Resources Study Area
NRHP = National Register of Historic Places

Table 5.3-8
Applicable Laws, Ordinances, Regulations, and Standards

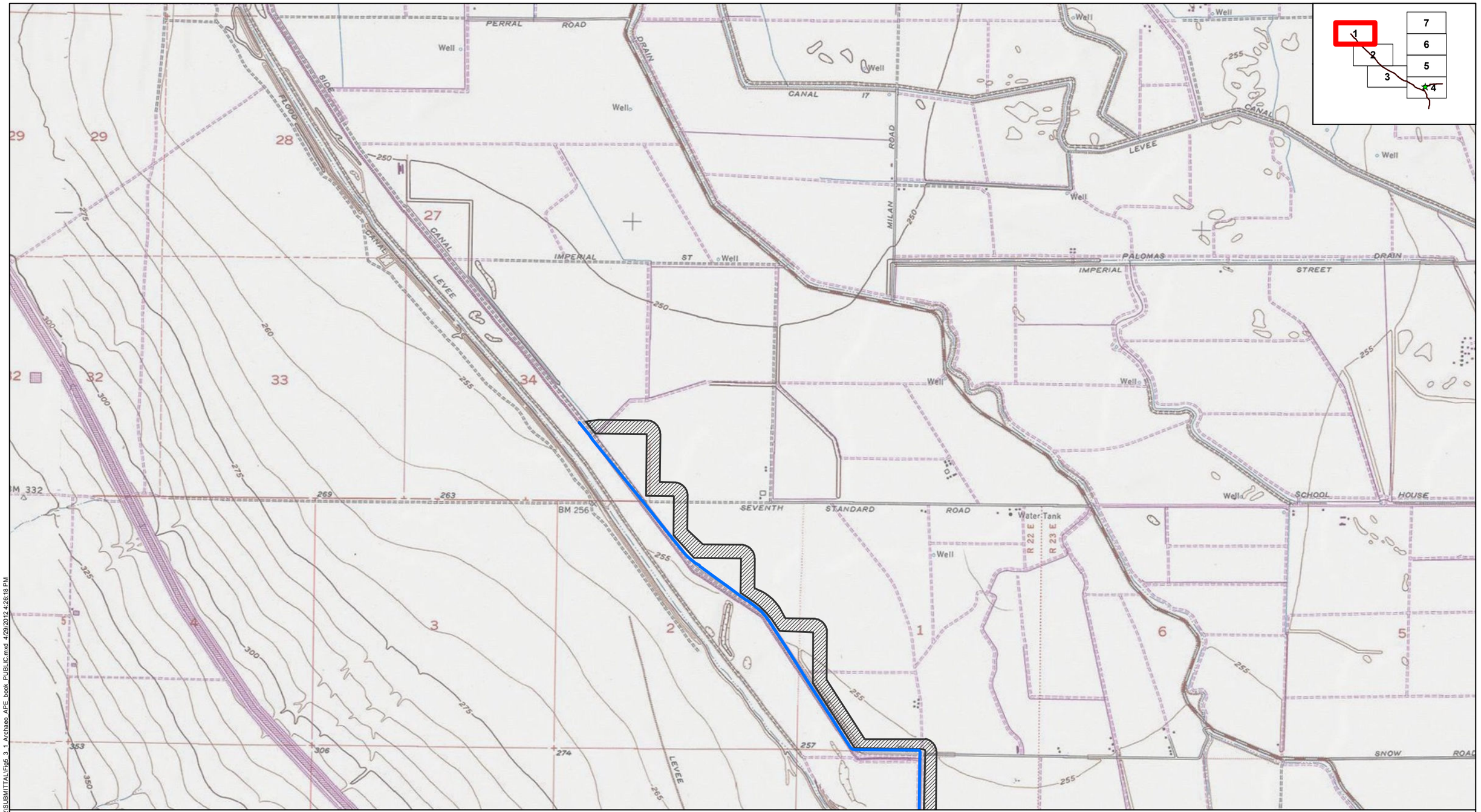
LORS	Applicability	Administering Agency	AFC Section
Federal			
Section 106 of the National Historic Preservation Act	Federal regulation affecting the treatment of cultural resources.	State Historic Preservation Office	5.3.5.1
State			
California Environmental Quality Act	Requires evaluation of impacts of Project on cultural resources.	California Energy Commission	5.3.5.2
Local			
Kern County General Plan	The County shall address archaeological resources for discretionary projects in accordance with CEQA	Kern County Planning Department	5.3.5.3

Notes:
AFC = Application for Certification
CEQA = California Environmental Quality Act of 1970
LORS = laws, ordinances, regulations, and standards

Table 5.3-9
Involved Agencies and Agency Contacts

Issue	Agency/Address	Contact/Title	Telephone
Native American traditional cultural properties	Native American Heritage Commission 915 Capitol Mall, Room 364 Sacramento, CA 95814	Ms. Debbie Pilas-Treadway Associate Government Program Analyst	(916) 653-4038
County compliance with CEQA	Kern County Planning Agency	Lorelei H. Oviatt, AICP Division Chief	(661) 862-8866

Notes:
AICP = American Institute of Certified Planners
CEQA = California Environmental Quality Act of 1970



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ARCHAEOLOGICAL RESOURCES STUDY AREA

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

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FIGURE 5.3-1 - SHEET 1

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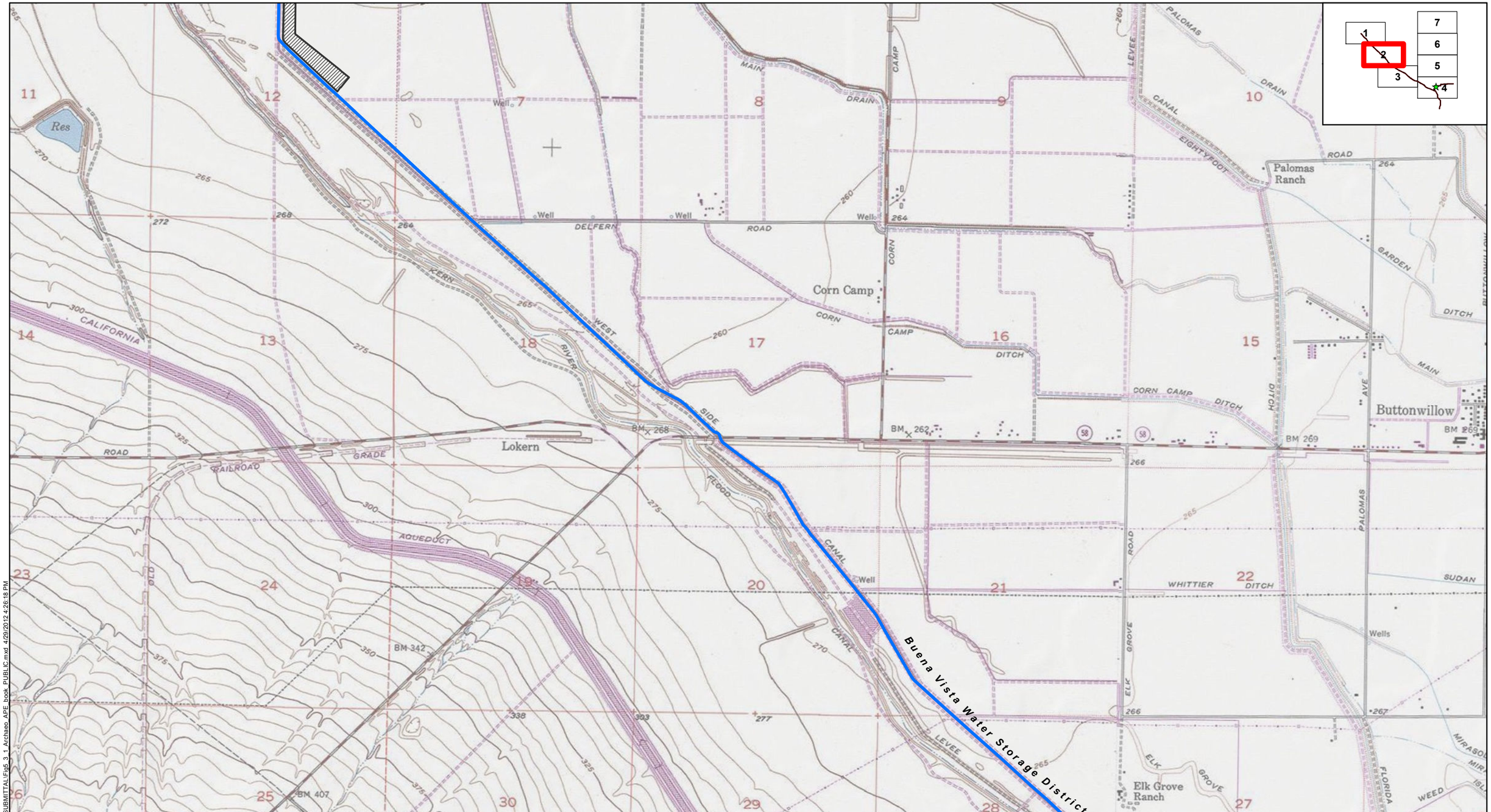

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

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

Note:
1. Feature temporarily designated as confidential

N

0 1,000 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

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Kern County, California

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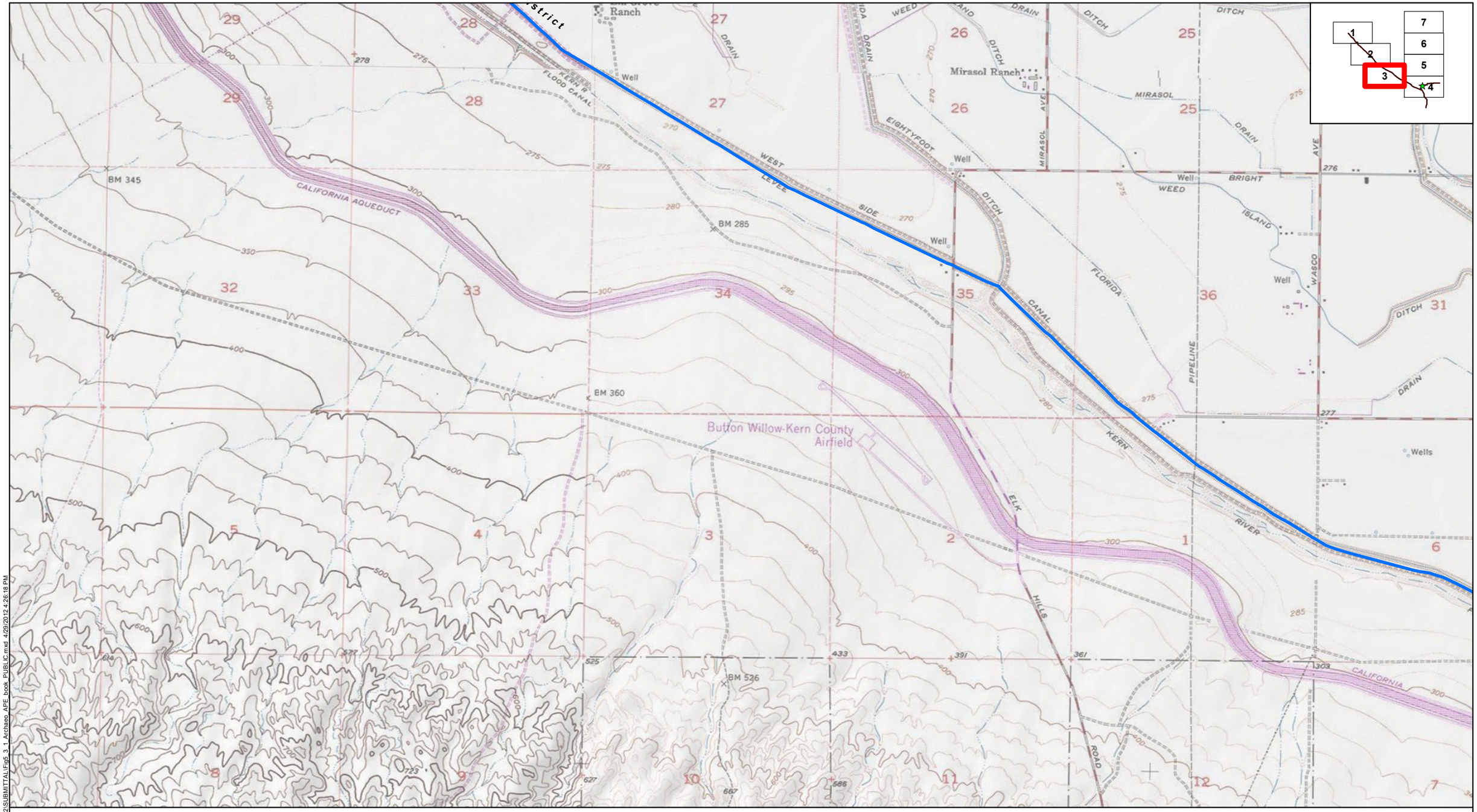
FIGURE 5.3-1 - SHEET 2



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

0 1,000 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

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Kern County, California

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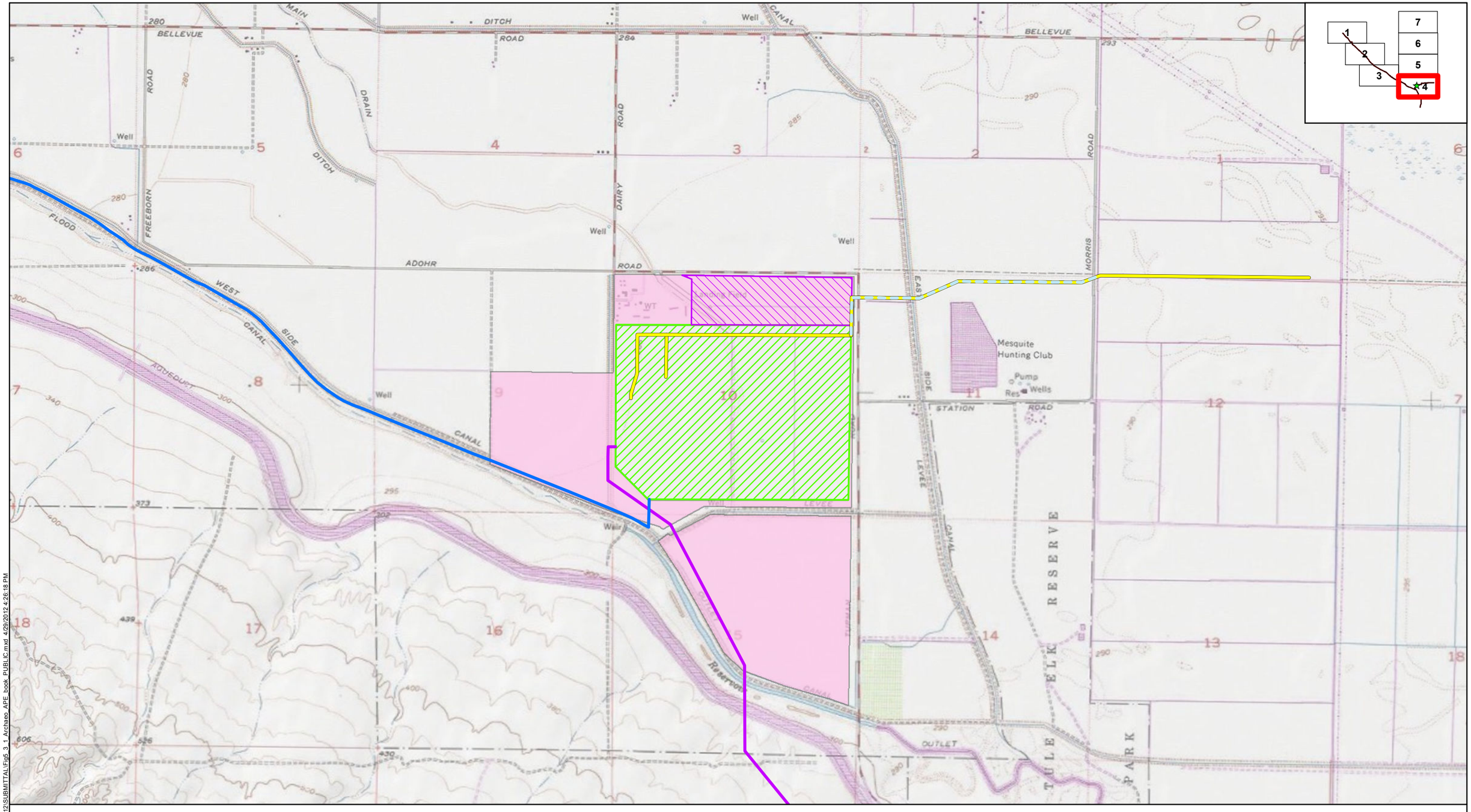
FIGURE 5.3-1 - SHEET 3



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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Kern County, California

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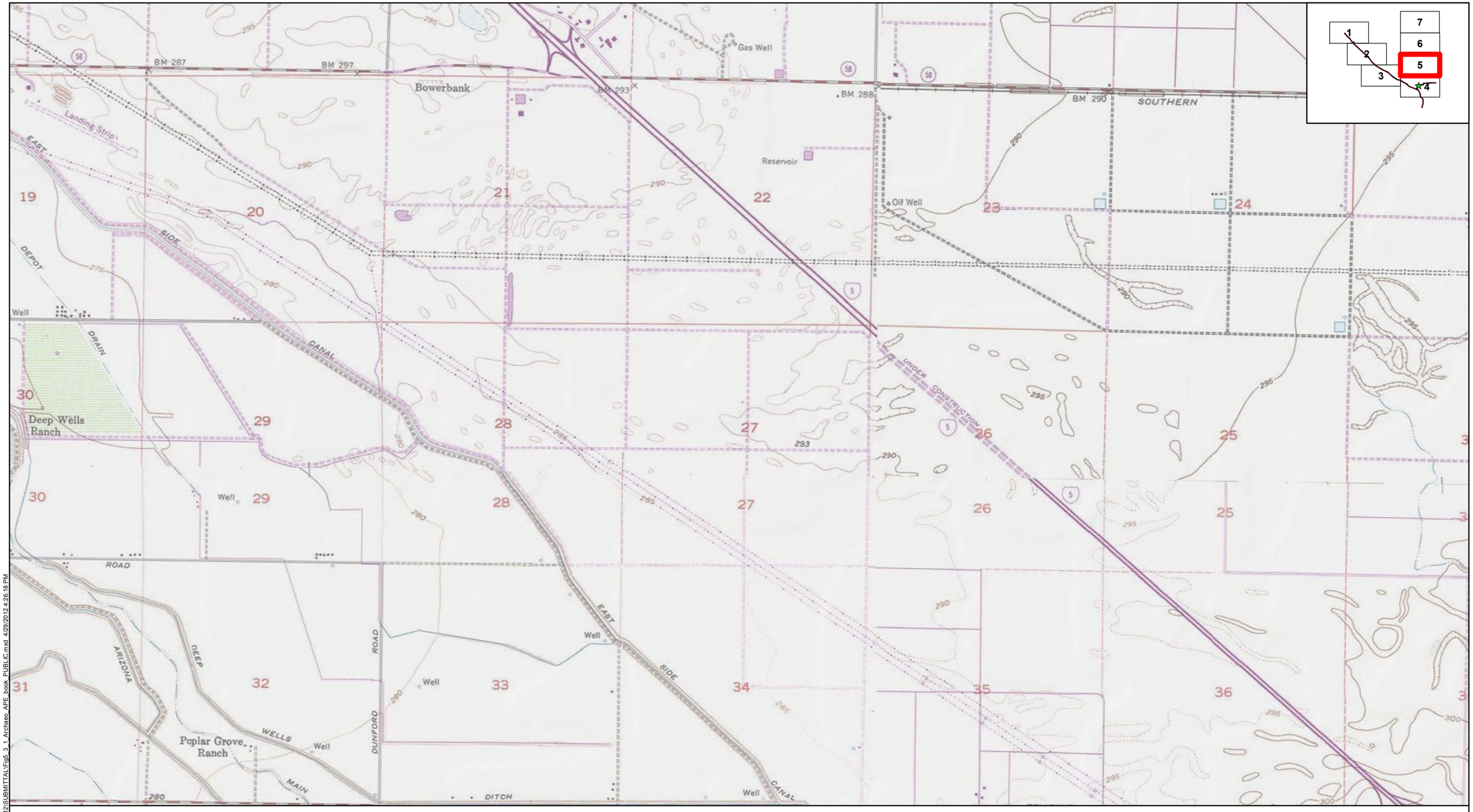
FIGURE 5.3-1 - SHEET 4



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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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.3-1 - SHEET 5

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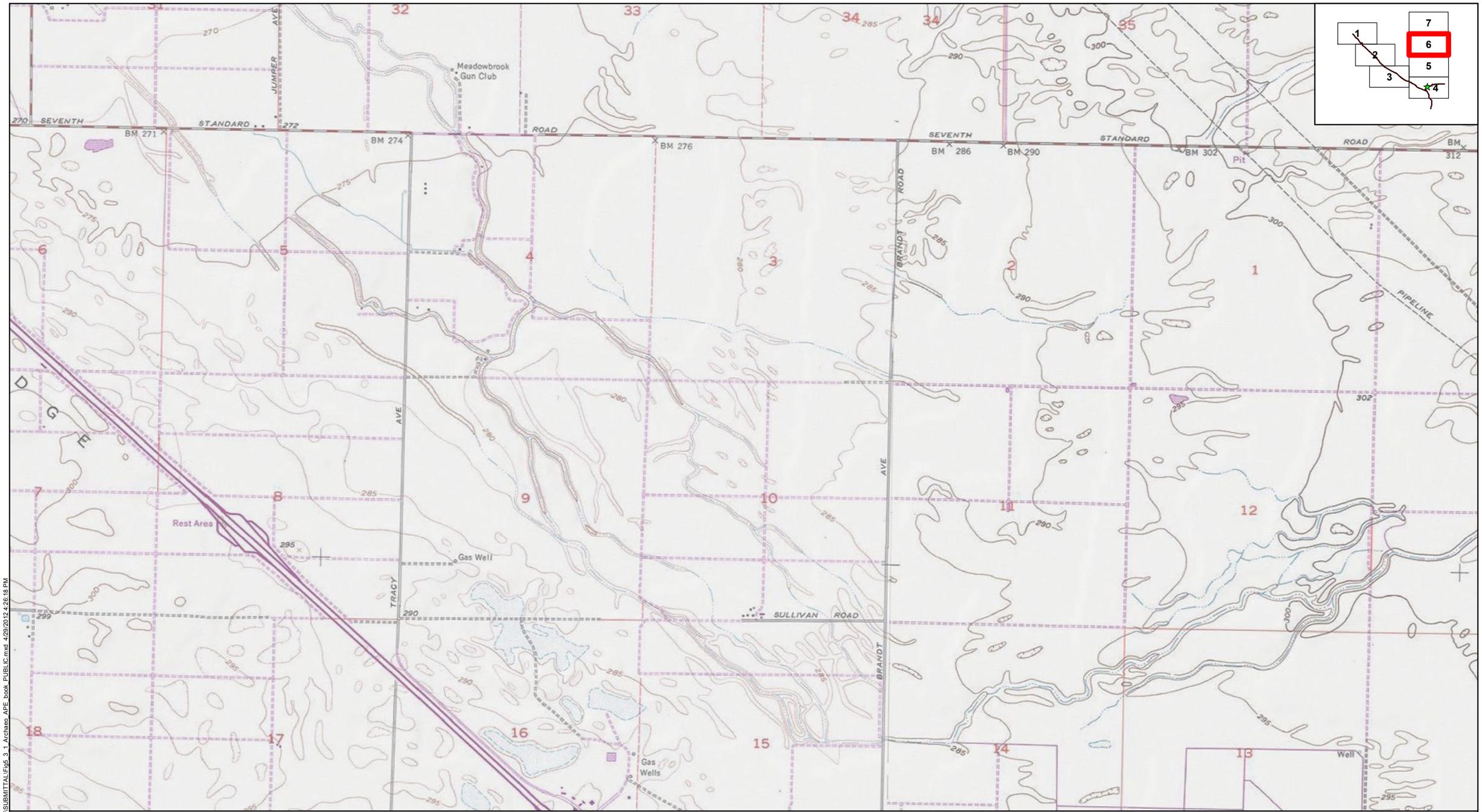

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

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

Note:
1. Feature temporarily designated as confidential

N

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Source: Aerial Imagery, Bing Maps, 2009.

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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.3-1 - SHEET 6

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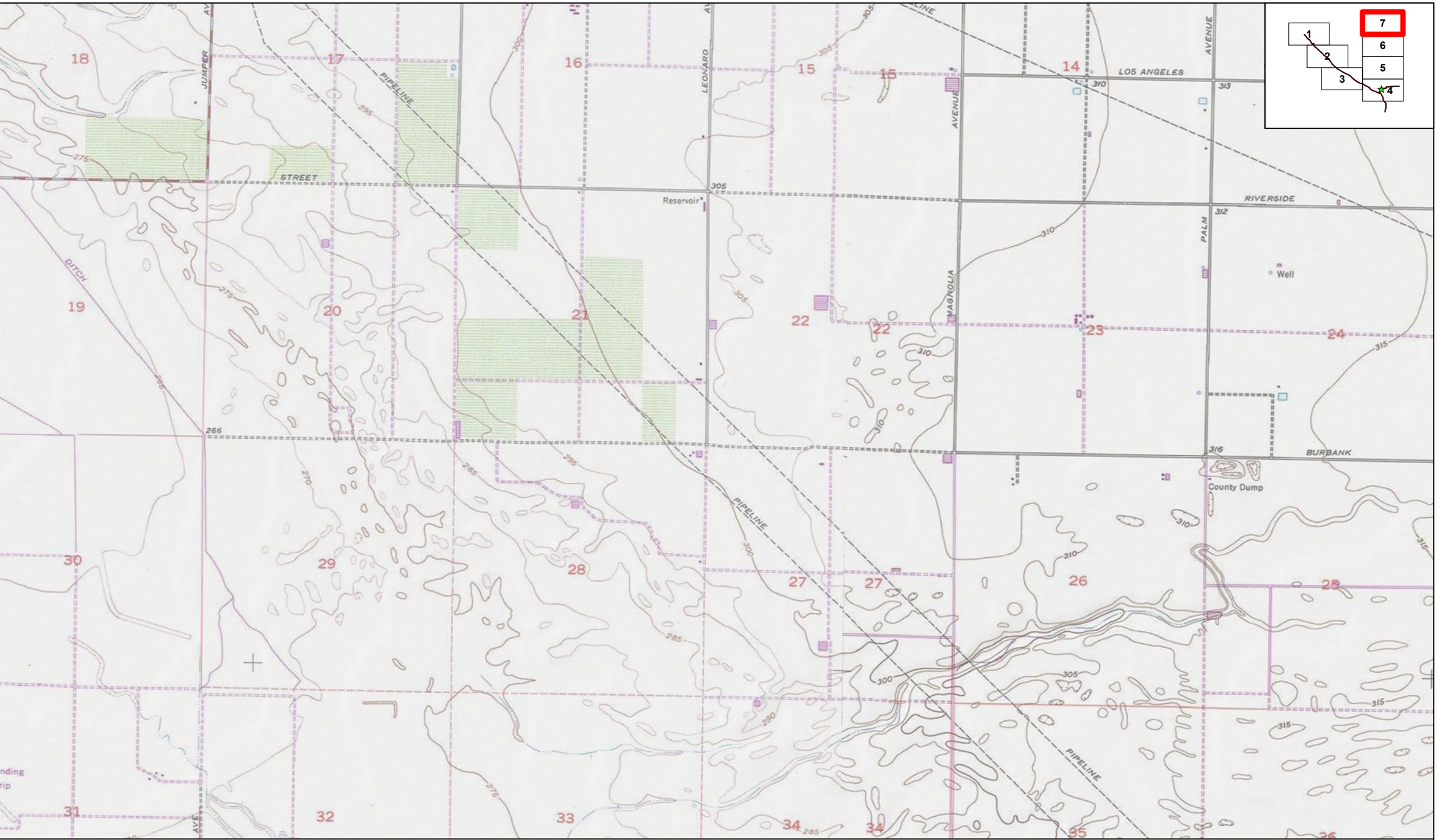

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

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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Kern County, California

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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

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Hydrogen Energy California (HECA)
Kern County, California

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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

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Source: Aerial Imagery, Bing Maps, 2009.

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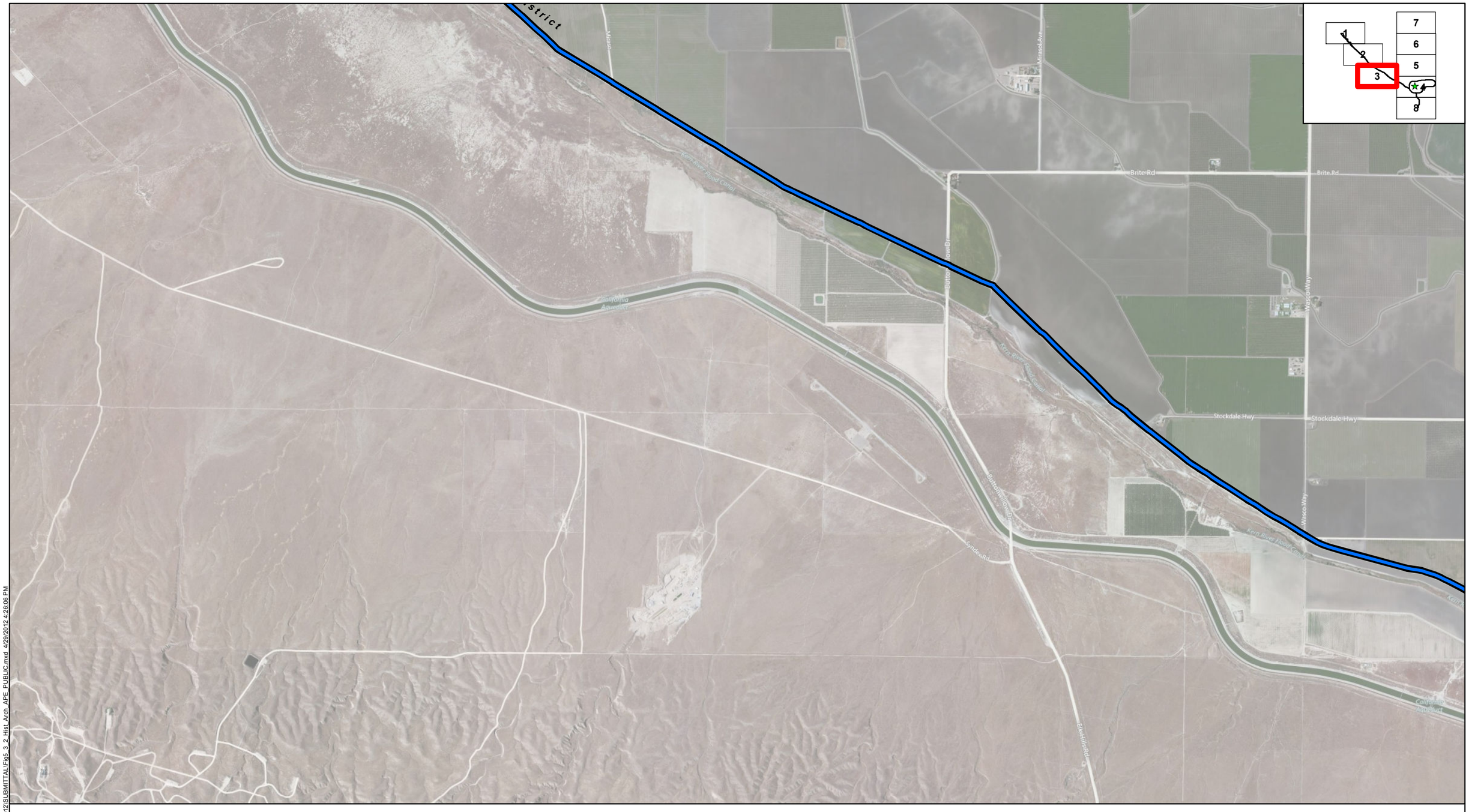
FIGURE 5.3-2 - SHEET 2



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

Carbon Dioxide
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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FIGURE 5.3-2 - SHEET 3

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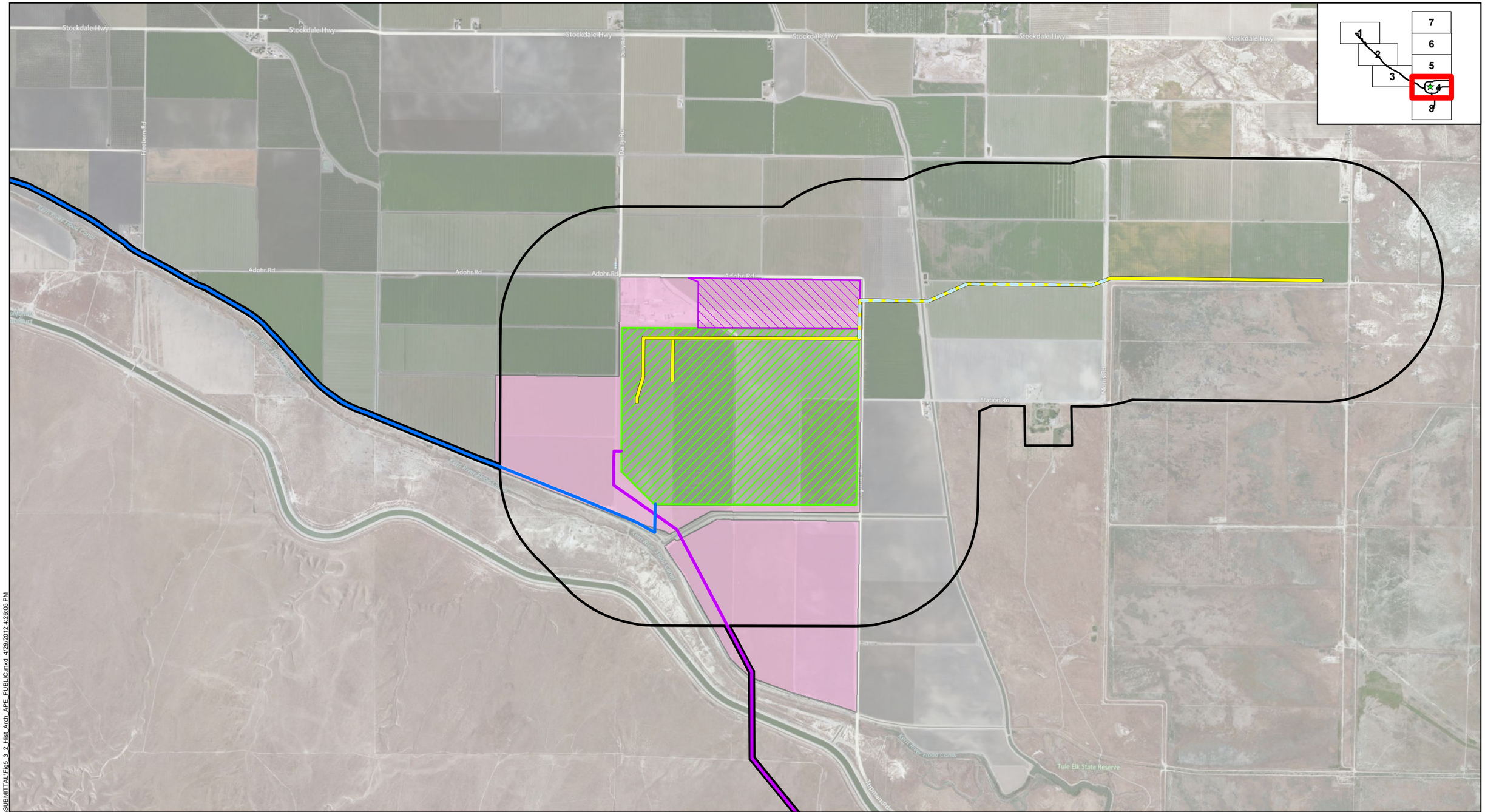

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Historic Architecture Area of Potential Effects

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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Kern County, California

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FIGURE 5.3-2 - SHEET 4

Source: Aerial Imagery, Bing Maps, 2009.

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Kern County, California

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FIGURE 5.3-2 - SHEET 5

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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N

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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 6

Source: Aerial Imagery, Bing Maps, 2009.

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HISTORIC ARCHITECTURAL RESOURCES STUDY AREA

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Hydrogen Energy California (HECA)
Kern County, California

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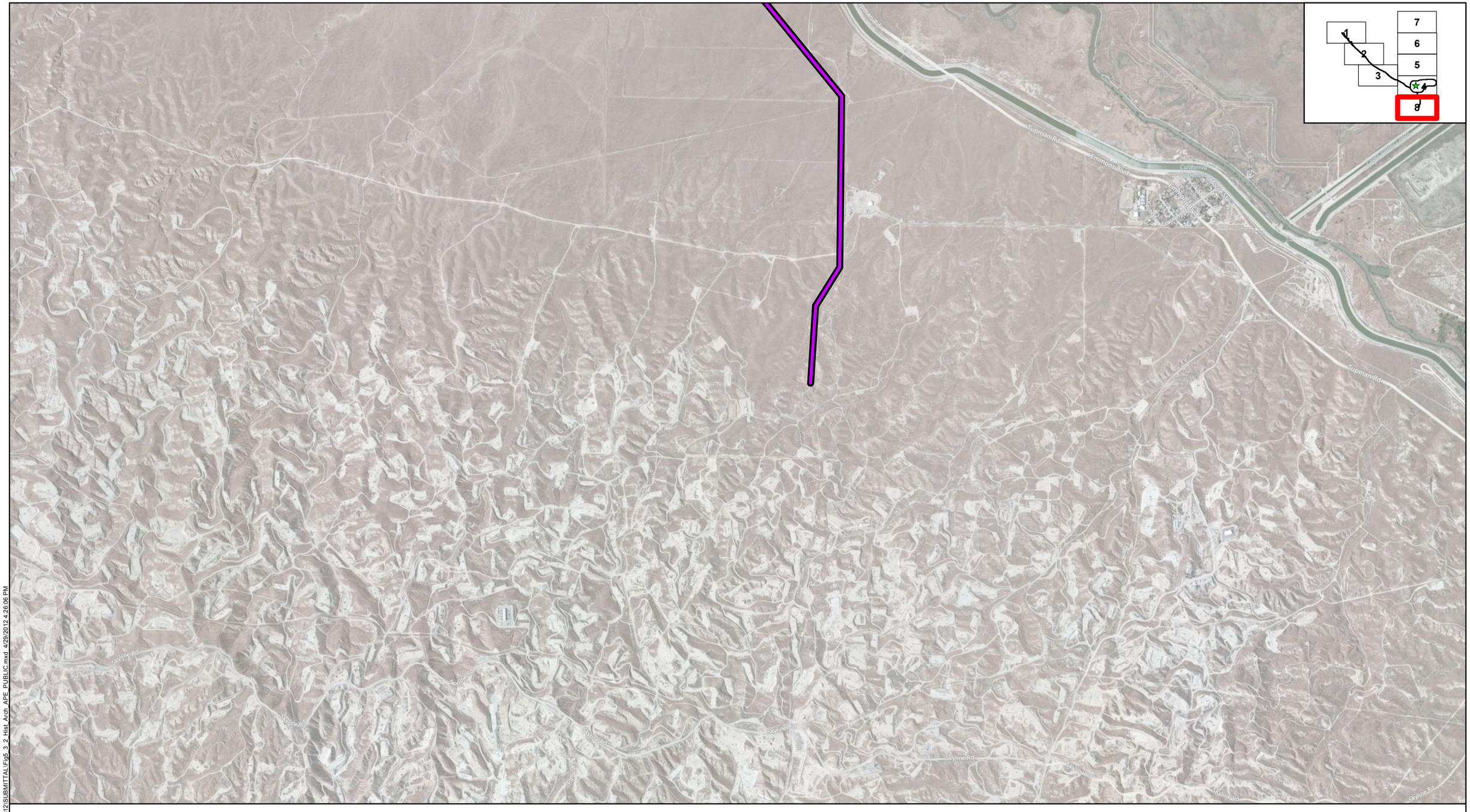
FIGURE 5.3-2 - SHEET 7



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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N

0 1,000 2,000 4,000 FEET

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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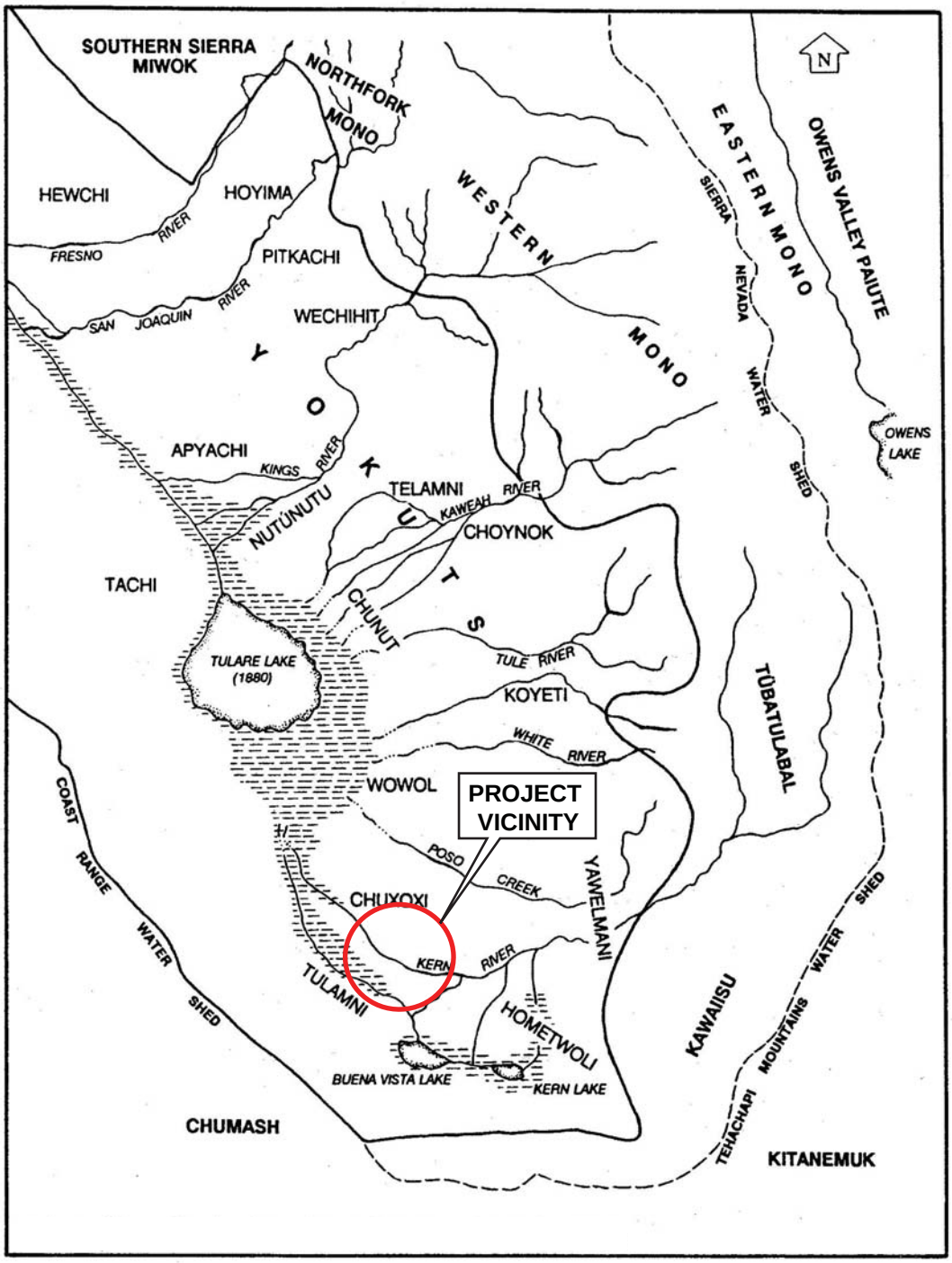

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ETHNOGRAPHIC TERRITORIES

April 2012
28068052

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.