APPENDIX E

Cultural Resources Report

Cultural Resources Inventory and Evaluation Report The Farm at Alamo Creek

Solano County, California

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MANAGEMENT SUMMARY

In 2017, ECORP Consulting, Inc. was retained to conduct a cultural resources inventory for the proposed Farm at Alamo Creek Specific Plan Project. Vacaville S2 Investors LLC proposes construct a residential subdivision on approximately 220 acres of land plus three off-site culvert improvements near Vacaville in Solano County, California.

The inventory included a records search, literature review, and field survey. The records search results indicated that three previous cultural resources studies have been conducted within the Project Area. As a result of those studies, one cultural resource has previously been recorded within the Project Area: P-48-1025, an abandoned segment of the Vaca Valley Railroad.

As a result of the field survey, two cultural resources were recorded inside the Project Area: FAC-001, an historic-period portion of the Byrnes Canal; and FAC-004, an historic-period garage and foundation; ECORP evaluated P-48-1025, FAC-001, and FAC-004 for eligibility for the National Register of Historic Places and California Register of Historical Resources and found them not eligible under any criteria. There are no identified Historic Properties or Historical Resources in the project area. Recommendations for the management of unanticipated discoveries are also provided.

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LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
APE	Area of Potential Effects
APNs	Assessor Parcel Numbers
BLM	Bureau of Land Management
BLM	Bureau of Land Management
BP	before present
CCR	California Code of Regulations
CCTS	Central California Taxonomic System
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DPR	Department of Parks and Recreation
GLO	General Land Office
MLD	Most Likely Descendant
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Soil Service
NRHP	National Register of Historic Places
NRHP	National Register of Historic Places
NWIC	North Western Information Center
OHP	Office of Historic Preservation's
SHPO	State Historic Preservation Officer
USACE	U.S. Army Corps of Engineers'
USC	U.S. Code
USC	U.S. Code
USGS	U.S. Geologic Survey

1.0 INTRODUCTION

In 2017, ECORP Consulting, Inc. was retained by Vacaville S2 Investors, LLC to conduct a cultural resources inventory of the proposed Farm at Alamo Creek Specific Plan Project Area located near the City of Vacaville, Solano County, California. A survey of the property was required to identify potentially eligible cultural resources (archaeological sites and historic buildings, structures, and objects) that could be affected by the Project.

1.1 Project Location

The Project Area consists of ±220 acres of property plus one off-site culvert improvement area and one blackberry vegetation removal area located in the northwest and northeast quarters of Section 24 and the southwest quarter of Section 19 of Township 6 North, Range 1 West, Mount Diablo Base and Meridian as depicted on the 1980 Elmira, California U.S. Geological Survey (USGS) 7.5' topographic quadrangle map (Figures 1 and 2). It is also known as Assessor's Parcel Numbers (APNs) 0138-010-10, 0138-010-020, 0138-010-030, 0138-010-040, 0138-010-050, 0138-010-080, 0142-092-020, and 0142-092-030. The main block of the Project Area is located north of Elmira Road, east of Leisure Town Road, and south of Hawkins Road west of Elmira and east of Vacaville. The off-site blackberry removal area is located south of where Elmira Road turns into Water Street just west of Elmira, and the culvert improvement area is located on the southwest side of Water Street in Elmira.

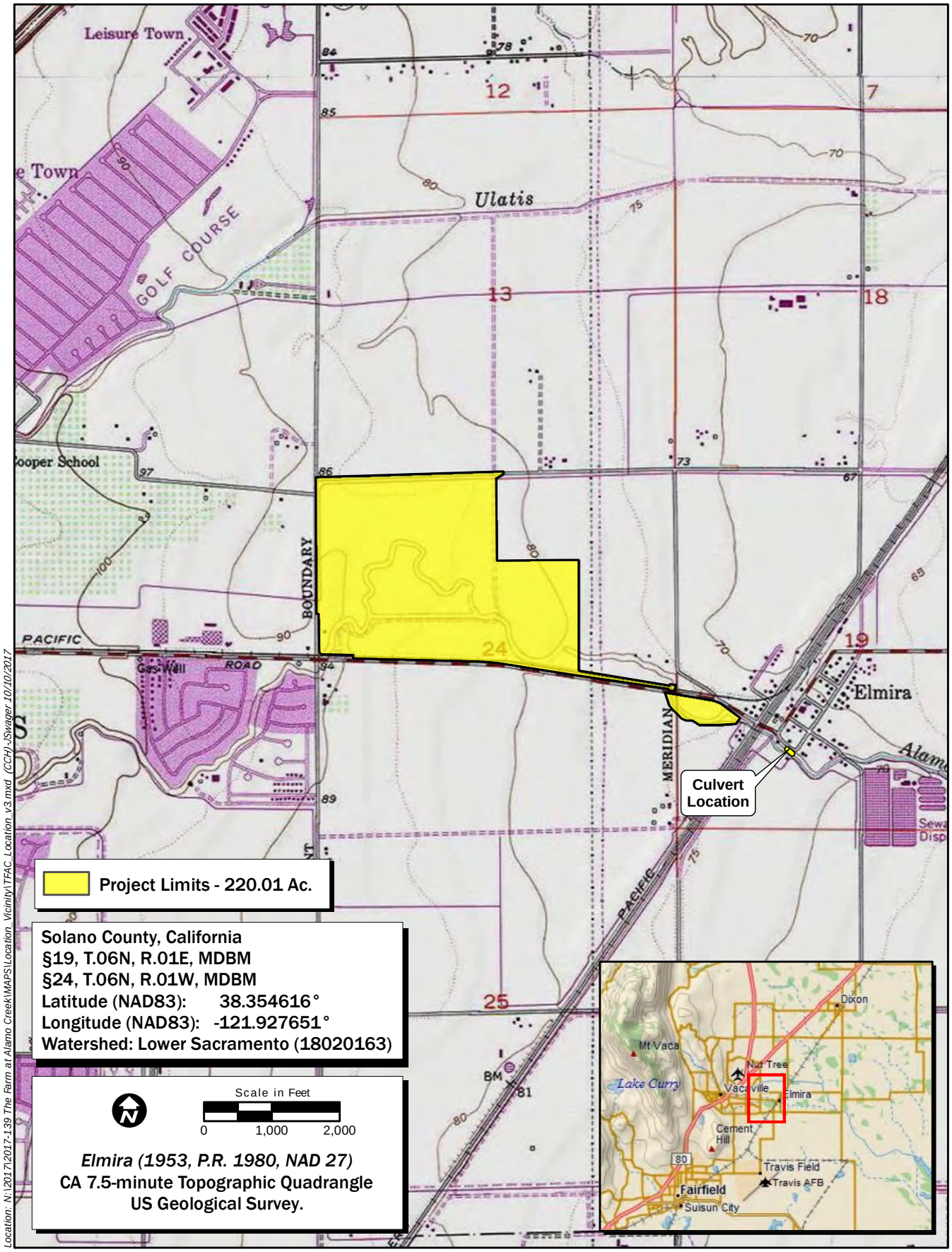
1.2 Project Description and Project Area

The proposed Project entails the construction of a residential subdivision on approximately 220 acres of land in the valley between Elmira and Vacaville in Solano County. One off-site blackberry removal area and one culvert improvement areas are also included.

The Area of Potential Effects (APE) consists of the horizontal and vertical limits of the project and includes the area within which significant impacts or adverse effects to Historical Resources or Historic Properties could occur as a result of the project. The APE is defined for projects subject to regulations implementing Section 106 (federal law and regulations). For projects subject to the California Environmental Quality Act (CEQA), the term Project Area is used rather than APE. For the purpose of this document, the term Project Area will be used.

The horizontal Project Area consists of all areas where activities associated with the Project are proposed and in the case of the current project, equals the Project Area subject to environmental review under the National Environmental Policy Act and CEQA. This includes areas proposed for construction, vegetation removal, drainage improvement, grading, trenching, stockpiling, staging, paving, and other elements described in the official Project description. The horizontal Project Area is illustrated in Figures 1 and 2 and also represents the survey coverage area. It measures approximately 0.5 mile in length by 0.5 mile in width.

The vertical Project Area is described as the maximum depth below the surface to which excavations for Project foundations and facilities will extend. Therefore, the vertical Project Area includes all subsurface areas where archaeological deposits could be affected. The subsurface vertical Project Area is anticipated to vary across the Project Area, and no further information was available at the time of this report.



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Map Date: 8/23/2017

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Figure 1. Project Location and Vicinity

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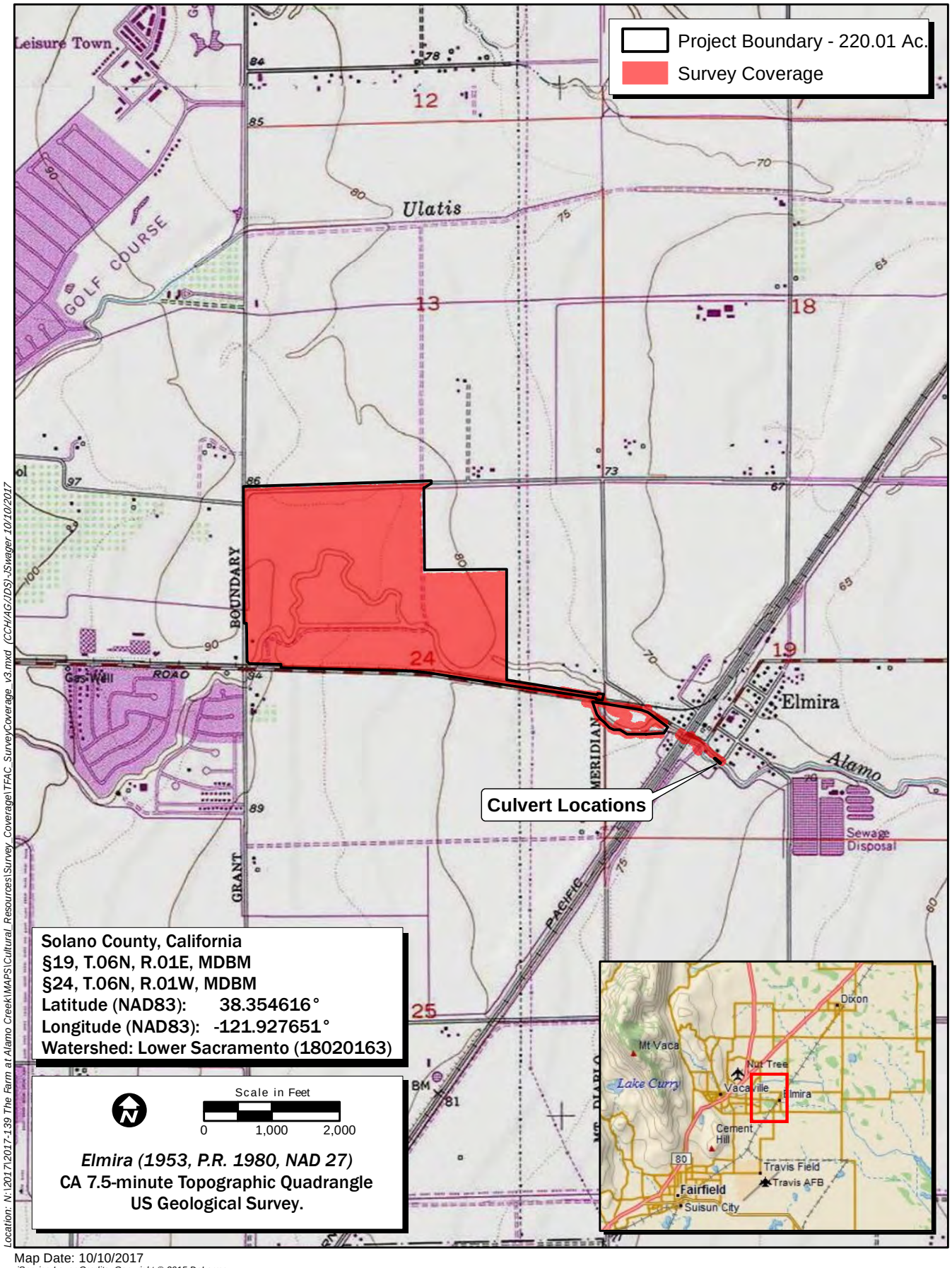

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Figure 2. Survey Coverage

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The vertical Project Area also is described as the maximum height of structures that could impact the physical integrity and integrity of setting of cultural resources, including districts and traditional cultural properties. For the current Project, the above-surface vertical Project Area varies, but is anticipated to be up to at least 50 feet above the surface.

1.3 Regulatory Context

To meet the regulatory requirements of this Project, this cultural resources investigation was conducted pursuant to the provisions for the treatment of cultural resources contained within Section 106 of the National Historic Preservation Act (NHPA) and in CEQA (Public Resources Code § 21000 et seq.) The goal of NHPA and CEQA is to develop and maintain a high-quality environment that serves to identify the significant environmental effects of the actions of a proposed Project and to either avoid or mitigate those significant effects where feasible. CEQA pertains to all proposed projects that require state or local government agency approval, including the enactment of zoning ordinances, the issuance of conditional use permits, and the approval of development project maps. The NHPA pertains to projects that entail some degree of federal funding or permit approval.

The NHPA and CEQA (Title 14, California Code of Regulations [CCR], Article 5, § 15064.5) apply to cultural resources of the historical and prehistoric periods. Any project with an effect that may cause a substantial adverse change in the significance of a cultural resource, either directly or indirectly, is a project that may have a significant effect on the environment. As a result, such a project would require avoidance or mitigation of impacts to those affected resources. Significant cultural resources must meet at least one of four criteria that define eligibility for listing on either the California Register of Historical Resources (CRHR) (Public Resources Code § 5024.1, Title 14 CCR, § 4852) or the National Register of Historic Places (NRHP) (36 Code of Federal Regulations [CFR]60.4). Cultural resources eligible for listing on the NRHP are considered Historic Properties under 36 CFR Part 800 and are automatically eligible for the CRHR. Resources listed on or eligible for inclusion in the CRHR are considered Historical Resources under CEQA.

In anticipation of the possibility that the Project may affect Waters of the United States (U.S.), thereby requiring the project proponent to meet the requirements of Section 404 of the Clean Water Act and obtain a permit from the U.S. Army Corps of Engineers' (USACE) Sacramento District Regulatory Division, this report is also in compliance with the 2014 *Sacramento District Regulatory Branch Guidelines for Compliance with Section 106 of the National Historic Preservation Act of 1966, as amended*. Moreover, because this Project qualifies as a federal undertaking, regulations (36 CFR 800) implementing Section 106 of the NHPA require that cultural resources be identified and evaluated using NRHP eligibility criteria.

1.4 Report Organization

The following report documents the study and its findings and was prepared in conformance with the California Office of Historic Preservation's (OHP) *Archaeological Resource Management Reports: Recommended Contents and Format.* Attachment A includes a confirmation of the records search with the California Historical Resources Information System (CHRIS) and historical society coordination. Attachment B contains documentation of a search of the Sacred Lands File. Attachment C presents

photographs of the Project Area, and Attachment D contains a map of confidential cultural resource site locations and site records.

Sections 6253, 6254, and 6254.10 of the California Code authorize state agencies to exclude archaeological site information from public disclosure under the Public Records Act. In addition, the California Public Records Act (Government Code § 6250 et seq.) and California's open meeting laws (The Brown Act, Government Code § 54950 et seq.) protect the confidentiality of Native American cultural place information. Under Exemption 3 of the federal Freedom of Information Act (5 U.S. Code 5 [USC]), because the disclosure of cultural resources location information is prohibited by the Archaeological Resources Protection Act of 1979 (16 USC 470hh) and Section 304 of the NHPA, it is also exempted from disclosure under the Freedom of Information Act. Likewise, the Information Centers of the CHRIS maintained by the OHP prohibit public dissemination of records search information. In compliance with these requirements, the results of this cultural resource investigation were prepared as a confidential document, which is not intended for public distribution in either paper or electronic format.

2.0 SETTING

2.1 Environmental Setting

The Project Area is located in central Solano County. The Project Area is relatively flat and elevations range from 74 to 90 feet above mean sea level. The Project Area consists of agricultural fields with irrigation canals at the northern and western Project boundaries, and the off-site culvert improvement area is located in the town of Elmira. Alamo Creek runs through the Project Area, however, the original waterway has been rerouted through the farm and no longer follows its original channel. A single-family residence is located in the southwestern corner of the Project Area. The Project Area is surrounded by agricultural fields to the north, east, and south. There is recent residential development west of the Project Area.

2.2 Geology and Soils

According to the Natural Resources Conservation Soil Service (NRCS) Web Soil Survey website (NRCS 2017), five soil types are located within the Project Area: Brentwood clay loam (BrA), 0 to 2 percent slopes; Capay silty clay loam (Ca); Rincon clay loam (RoA), 0 to 2 percent slope; Yolo loam (Yo), 0 to 4 percent slopes, MLRA 17; Yolo loam (Yr), clay substratum. All of these soil types are classified as prime farmland of irrigated.

Due to the presence of alluvium along Alamo Creek, and given the likelihood of prehistoric archaeological sites located along perennial waterways, there exists the potential for buried prehistoric archaeological sites in the Project Area.

2.3 Vegetation and Wildlife

The dominant plant community within the Project Area includes Italian wild rye (*Festuca perennis*), soft chess (*Bromus hordeaceus*), foxtail barley (*Hordeum marinum* ssp. *gussoneanum*), ripgut brome (*Bromus diandrus*), common tarweed (*Centromadia pungens*), wild oat (*Avena fatua*), and Italian thistle (*Carduus pycnocephalus*) (Napa-Solano Audubon Society 2017).

Wildlife species that may occur in the Project Area include Swainson's hawk (*Buteo swainsoni*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), and American crow (*Corvus brachyrhynchos*), Western pond turtle (*Emys marmorata*), great egret (*Ardea alba*), burrowing owl (*Athena cunicularia*), and northern harrier (*Circus cyaneus*) (Napa-Solano Audubon Society 2017).

3.0 CULTURAL CONTEXT

3.1 Regional Prehistory

It is generally believed that human occupation of California began at least 10,000 years before present (BP). The archaeological record indicates that between approximately 10,000 and 8000 BP, a predominantly hunting economy existed, characterized by archaeological sites containing numerous projectile points and butchered large animal bones. Animals that were hunted probably consisted mostly of large species still alive today. Bones of extinct species have been found, but cannot definitely be associated with human artifacts. Although small animal bones and plant grinding tools are rarely found within archaeological sites of this period, small game and floral foods were probably exploited on a limited basis. A lack of deep cultural deposits from this period suggests that groups included only small numbers of individuals who did not often stay in one place for extended periods (Wallace 1978).

Around 8000 BP, there was a shift in focus from hunting towards a greater reliance on plant resources. Archaeological evidence of this trend consists of a much greater number of milling tools (e.g., metates and manos) for processing seeds and other vegetable matter. This period, which extended until around 5000 years BP, is sometimes referred to as the Millingstone Horizon (Wallace 1978). Projectile points are found in archaeological sites from this period, but they are far fewer in number than from sites dating to before 8000 BP. An increase in the size of groups and the stability of settlements is indicated by deep, extensive middens at some sites from this period (Wallace 1978).

In sites dating to after about 5000 BP, archaeological evidence indicates that reliance on both plant gathering and hunting continued as in the previous period, with more specialized adaptation to particular environments. Mortars and pestles were added to metates and manos for grinding seeds and other vegetable material. Flaked-stone tools became more refined and specialized, and bone tools were more common. During this period, new peoples from the Great Basin began entering southern California. These immigrants, who spoke a language of the Uto-Aztecan linguistic stock, seem to have displaced or absorbed the earlier population of Hokan-speaking peoples. During this period, known as the Late Horizon, population densities were higher than before and settlement became concentrated in villages and communities along the coast and interior valleys (Erlandson 1994; McCawley 1996). Regional subcultures also started to develop, each with its own geographical territory and language or dialect (Kroeber 1925; McCawley 1996; Moratto 1984). These were most likely the basis for the groups encountered by the first Europeans during the eighteenth century (Wallace 1978). Despite the regional differences, many material culture traits were shared among groups, indicating a great deal of interaction (Erlandson 1994). The introduction of the bow and arrow into the region sometime around 2000 BP is indicated by the presence of small projectile points (Wallace 1978; Moratto 1984).

3.2 Local Prehistory

This section provides a regional overview with contextual elements drawn from California's Central Valley Region, the Western Foothills Region, and from the transition zone itself where the Project lies. There has been more extensive research and study of Central Valley prehistory than the prehistory of the Sierra Nevada foothill zone, but a fair amount of cultural overlap exists within these regions. This section includes the most recent and readily available research of both regions (Rosenthal et al. 2007), and includes some reference to the climactic changes that swept the Sierra Nevada being a catalyst for population movement that led to cultural change in the foothills.

California's Great Central Valley has long held the attention of archaeologists, and was a focus of early research in California. Archaeological work during the 1920s and 1930s led to the cultural chronology for central California presented by Lillard, Heizer, and Fenenga in 1939. This chronology was based on the results of excavations conducted in the lower Sacramento River Valley. This chronology identified three archaeological cultures, named Early, Transitional, and Late (Lillard et al. 1939).

Heizer (1949) redefined the description of these three cultures. He subsumed the three cultural groups into three time periods, designated the Early, Middle, and Late horizons. He primarily focused his research and reexamination of Lillard et al. (1939) on the Early Horizon, which he named Windmiller. He also intimated that new research and a reanalysis of existing data would be initiated for cultures associated with the Middle and Late Horizons; however, he did not complete this work and other research filled in the gaps.

Following years of documenting artifact similarities among sites in the San Francisco Bay region and the Delta, Beardsley (1948, 1954) formatted his findings into a cultural model known as the Central California Taxonomic System (CCTS). This system proposed a linear, uniform sequence of cultural succession in Central California, and explicitly defined Early, Middle, and Late horizons for cultural change. Archaeological researchers have subsequently refined and redefined aspects of the CCTS. For instance, Fredrickson (1973, 1974, and 1994) reviewed general economic, technological, and mortuary traits between archaeological assemblages across the region. He separated cultural, temporal, and spatial units from each other and assigned them to six chronological periods: Paleo-Indian (12,000-8000 BP); Lower, Middle, and Upper Archaic (8000 BP to AD 500) and Upper and Lower Emergent (AD 500 to 1800).

Fredrickson further defined three cultural patterns: The Windmiller (named after Heizer 1949 and Lillard et al. 1939), the Berkeley, and the Augustine patterns, and assigned them to the Early, Middle, and Late horizons of the CCTS. These patterns were defined to reflect the general sharing of lifeways within groups in a specific geographic region. The Windmiller pattern of the Early Horizon included cultural patterns dating from 5000 to 3000 BP; the Berkeley Pattern of the Middle Horizon (also known as the Cosumnes cultural pattern after Ragir 1972), included cultural patterns dating from 3000 BP to AD 500, and the Augustine Pattern of the Late Horizon included the cultural patterns from AD 500 to the historic period.

Fredrickson's (1974) Paleo-Archaic-Emergent cultural sequence was redefined by Rosenthal et al. (2007). Rosenthal et al.'s recalibrated sequence is divided into three broad periods: The Paleoindian Period (11,550 to 8550 cal. BC); the three-staged Archaic period, consisting of the Lower Archaic (8550 to 5550 cal. BC), Middle Archaic (5550 to 550 cal. BC), and Upper Archaic (550 cal. BC to cal.

AD 1100); and the Emergent Period (cal. AD 1100 to Historic) (Rosenthal et al. 2007). The three divisions of the Archaic Period correspond to climate changes. This is the most recently developed sequence and is now commonly used to interpret Central California prehistory. The aforementioned periods are characterized by the following:

3.2.1 Paleo-Indian Period

This period began when the first people began to inhabit what is now known as the California culture area. It was commonly believed these first people subsided on big game and minimally processed foods, (i.e., hunters and gatherers), presumably with no trade networks. More recent research indicates these people may have been more sedentary, relied on some processed foods, and traded (Rosenthal et al. 2007). Populations likely consisted of small groups traveling frequently to exploit plant and animal resources.

3.2.2 Archaic Period

This period was characterized by an increase in plant exploitation for subsistence, more elaborate burial accoutrements, and increase in trade network complexity (Bennyhoff and Fredrickson 1994). The three divisions that correspond to prehistoric climate change are characterized by the following aspects (Rosenthal et al. 2007):

- *Lower Archaic Period* — this period is characterized by cycles of widespread floodplain and alluvial fan deposition. Artifact assemblages from this period include chipped stone crescents and early wide-stemmed points, marine shell beads, eastern Nevada obsidian, and obsidian from the north Coast Ranges. These types of artifacts found on sites dating to this period indicate trade was occurring in multiple directions. A variety of plant and animal species were also utilized, including acorns, wild cucumber, and manzanita berries.
- *Middle Archaic Period* — this period is characterized by a drier climate period. Rosenthal et al. (2007:153) identified two distinct settlement/subsistence patterns in this period: the Foothill Tradition and the Valley Tradition. Functional artifact assemblages consisting primarily of locally sourced flaked stone and groundstone cobbles characterize the foothills tradition, while the Valley Tradition was generally characterized by diverse subsistence practices and extended periods of sedentism.
- *Upper Archaic Period* — this period is characterized by abrupt change to wetter and cooler environmental climate conditions. Much greater cultural diversity is evident from this period. More specialized artifacts, such as bone tools, ceremonial blades, polished and groundstone plummets, saucer and saddle *Olivella* shell beads, *Haliotis* shell ornaments, and a variety of groundstone implements are characteristic of this period.

3.2.3 Emergent Period

This period is most notably marked by the introduction of the bow and arrow, the emergence of social stratification linked to wealth, and more expansive trade networks signified by the presence of clam disk beads that were used as currency (Moratto 1984). The Augustine pattern (the distinct cultural pattern of the Emergent Period) is characterized by the appearance of small projectile points (largely obsidian), rimmed display mortars, flanged steatite pipes, flanged pestles, and chevron-designed bird-

bone tubes. Large mammals and small seeded resources appear to have made up a larger part of the diet during this period (Fredrickson 1968; Meyer and Rosenthal 1997).

The following discussion summarizes the cultural patterns and the different local developments that are represented in archaeological deposits in the region surrounding the current Project Area.

The Windmiller Pattern of the Early Horizon (as defined by Beardsley 1948), dates to the Middle Archaic (as defined by Rosenthal et al. 2007) and may be the most extensively studied of all the cultural patterns defined for the Central Valley. In fact, the similarity noted between elements of Windmiller and materials from other sites may have been the catalyst for early archaeologists identifying the material cultural "blending" of groups in the Central Valley during this period. The temporal span for Windmiller has been updated and reanalyzed several times in the archaeological literature (Fredrickson 1973, 1974; Heizer 1949; Moratto 1984; Ragir 1972). The date originally proposed for the emergence of Windmiller was 4500 BP (Lillard et al. 1939; Ragir 1972), because the culture at 4000 years ago appeared to have been fully developed and seemed to have been well integrated into the regional economic system.

Characteristics to identify the Windmiller pattern have been presented by multiple authors over time (Fredrickson 1973, 1974; Heizer 1949; Moratto 1984; Ragir 1972). Most notable characteristics are:

- large, heavy stemmed and leaf-shaped projectile points commonly made of a variety of materials other than obsidian;
- perforate charmstones;
- Haliotis and Olivella shell beads and ornaments;
- trident fish spears;
- baked clay balls (presumably for cooking in baskets);
- flat slab milling stones;
- small numbers of mortars; and
- ventrally extended burials oriented toward the west.

The subsistence pattern of Windmiller groups probably emphasized hunting and fishing, with supplemental seed collecting (possibly including acorns) (Heizer 1949; Moratto 1984; Ragir 1972).

Windmiller groups acquired obsidian from at least two Coast ranges and three trans-Sierran sources, Haliotis and Olivella shells and ornaments from the coast, and quartz crystals from the Sierra Nevada foothills (Heizer 1949; Ragir 1972). It is widely hypothesized that the bulk of these materials were acquired through trade, however some may have been acquired as part of seasonal movements between the Central Valley and the Sierra Nevada foothills.

There is evidence for seasonal transhumance in the distribution of Windmiller artifacts, sites, and burial patterns. Johnson's work (1967; 1970) along the edge of the Sierra Nevada foothills at Camanche Reservoir and CA-AMA-56, the Applegate site, suggests a link between Windmiller groups of the Central Valley and the Sierra Nevada mortuary caves. Johnson (1970:119) suggested that his data reveals a pattern of gradual change from the Early through the Middle Horizon (as defined by

Beardsley 1948), rather than a displacement of local groups by foreign populations as theorized by Baumhoff and Olmstead (1963) based on ethnolinguistic evidence. Rondeau (1980), also working at the edge of the Central Valley at CA-ELD-426, the Bartleson Mound, identified components of the Early Horizon (as defined by Beardsley 1948). He (1980:58) even postulated a potential relationship between the Early Horizon cultures and the Martis Complex (a basalt preferring culture in the Martis Valley of the Sierra Nevada). In addition, analysis of Windmiller burial orientation (Schulz 1970) and skeletal analyses (e.g., Harris Lines) by McHenry (1968) suggest a high percentage of winter death among Windmiller groups. Incorporating all of this data, Moratto (1984:206) postulated that Windmiller groups were exploiting the foothills of the Sierra Nevada during the summer and returning in the winter to villages in the Central Valley as early as 4000 BP.

Excavations at CA-PLA-500 (Wohlgemuth 1984), the Sailor Flat site located near CA-PLA-101, sites at the Twelve Bridges Golf Course in Rocklin, and Spring Garden Ravine site CA-PLA-101 provide examples of Windmiller sites that had items in their cultural assemblages similar to the material culture of groups elsewhere in California and the foothills.

The succeeding Middle Horizon, namely the Cosumnes Culture after Ragir (1972), the Berkeley Pattern after Fredrickson (1974), and absorbed into the Middle and Upper Archaic designations by Rosenthal et al. (2007) was first recognized at site CA-SAC-66. Much less published material discusses the patterns defined for this era than does Windmiller, none the less, some of the most notable characteristics are:

- tightly flexed burials with variable orientation;
- red ochre stains in burials;
- distinctive Olivella and Haliotis beads and ornaments;
- distinctive charmstones;
- cobble mortars and evidence of wooden mortars;
- numerous bone tools and ornaments;
- large, heavy foliate and lanceolate concave base projectile points made of materials other than obsidian; and
- objects of baked clay.

Further classification of the Middle Archaic (as defined by Rosenthal et al. 2007) into the Foothill Tradition and Valley Tradition helped to clarify the different types of cultural sequences which occurred during these time periods. Functional artifact assemblages consisting primarily of locally sourced flaked stone and groundstone cobbles characterize the Foothills Tradition, with very few trade goods. Sites that represent the Valley Tradition are much fewer in number, and are generally characterized by much more diverse subsistence practices and extended periods of sedentism. Specialized tools, trade goods, and faunal refuse that indicate year-round occupation are evident on sites of the Valley Tradition (Rosenthal et al. 2007). Distinct artifacts attributed to this tradition include one of the oldest dated shell bead lots in central California (4160 BP) and a particular type of pestle used with a wooden mortar (Meyer and Rosenthal 1997).

The Sierra Nevada experienced significant climactic shifts and concomitant vegetation change throughout the Holocene, but pollen analysis and climactic records indicate that the current climate pattern and primary constituents of vegetation communities were in place by the Middle Archaic around 1000 BC (Hull 2007). Seasonal transhumance practiced by indigenous populations of the Sierra may have become more consistent during this period of relative environmental stasis.

Paleobotanical analysis from sites of the Foothill Tradition including CA-CAL-789, CA-CAL-629, and CA-CAL-630 confirm that acorns and pine nuts were preferred for subsistence (Rosenthal and McGuire 2004; Wohlgemuth 2004) Sites near the Project Area associated with the Valley Tradition are rare in the early Middle Archaic (ca. 5550 to 2050 cal. BC) but include the Reservation Road site (CA-COL-247), and two buried sites in the northern Diablo range (CA-CCO-637 and CA-CCO-18/548). Sites associated with later portions of the Middle Archaic (post-2050 cal. BC) near the Project Area include CA-SAC-107 and CA-BUT-233, both of which produced elaborate material culture and diverse dietary and technological assemblages.

The next era in the region is identified as the Late Horizon by Beardsley (1948, 1954), the Hotchkiss Culture by Ragir (1972), and the Augustine Pattern by Fredrickson (1974). The culture was formed by populations during the later Upper Archaic and Emergent Periods, as defined by Rosenthal et al. (2007), and ranges in age from around 550 cal. BC to contact (dates vary between the different models of prehistory developed for the region). The Upper Archaic, as discussed above, corresponds with the late Holocene change in environmental conditions to a wetter and cooler climate. The Emergent Period and Late Horizon are markedly represented by the introduction of bow and arrow technology, as well as more pronounced cultural diversity as reflected in diversity of burial posturing, artifact styles, and material culture. Cultural patterns for this era are represented in the northern Sacramento Valley, namely within the Whiskeytown Pattern, at sites CA-SHA-47, CA-SHA-571/H, CA-SHA-890, CA-SHA-891, and CA-SHA-892 (Sundahl 1982, 1992).

This era primarily represents both local innovation and the blending of new cultural traits introduced into the Central Valley. The Emergent Occupation (as defined by Rosenthal et al. 2007) coincides with the Augustine Pattern (Fredrickson 1974) in the lower Sacramento Valley/Delta region, and with the Sweetwater and Shasta complexes in the northern Sacramento Valley (Fredrickson 1974; Kowta 1988; Sundahl 1982). The emergence of the Augustine Pattern appears to have been associated with the expansion of Wintun populations from the north, which appears to have led to an increase in settlements in the area after 550 BP (Bennyhoff 1994; Moratto 1984).

During this period in the Sierra Nevada, paleoenvironmental data suggests severe droughts occurred from around AD 892 to 1112 and AD 1210 to 1350 (Hull 2007; Lindstrom 1990; Stine 1994). These drier conditions surely affected the seasonal resource procurement rounds of the native populations during this time, and likely led to an influx of population movement and cultural blending into the foothills zone and Central Valley by Sierra Nevada groups.

Despite the varying designations, this emergent era is distinguished in the archaeological record by intensive fishing, extensive use of acorns, elaborate ceremonialism, social stratification, and cremation of the dead. Artifacts associated with the defined patterns (Augustine, Emergent, Hotchkiss) include bow-and-arrow technology (evidenced by small projectile points), mortars and pestles, and fish harpoons with unilaterally or bilaterally placed barbs in opposed or staggered positions (Bennyhoff

1950). Mortuary patterns include flexed burials and cremations, with elaborate material goods found in association with prestigious individuals. A local form of pottery, Cosumnes brownware, emerged in the lower Sacramento Valley (Rosenthal et al. 2007). Sites contain this ceramic type in their artifact assemblage near the Project Area include CA-SAC-6, CA-SAC-67, CA-SAC-107, CA-SAC-265, and CA-SAC-329. Human animal effigies are also a marker of this emergent era around the Project Area, and are present at sites CA-SAC-6, CA-SAC-16, CA-SAC-29, CA-SAC-267, and CA-SAC-267.

3.3 Ethnography

Prior to the arrival of Euro-Americans in the region, indigenous groups speaking more than 100 different languages and occupying a variety of ecological settings inhabited California. Kroeber (1925, 1936), and others (i.e., Murdock 1960; Driver 1961), recognized the uniqueness of California's indigenous groups and classified them as belonging to the California culture area. Kroeber (1925) further subdivided California into four subculture areas: Northwestern, Northeastern, Southern, and Central.

When the first European explorers entered the regions between 1772 and 1821, an estimated 100,000 people, about 1/3 of the state's native population, lived in the Central Valley (Moratto 1984:171). At least seven distinct languages of Penutian stock were spoken among these populations: Wintu, Nomlaki, Konkow, River Patwin, Nisenan, Miwok, and Yokuts. Common linguistic roots and similar cultural and technological characteristics indicate that these groups shared a long history of interaction (Rosenthal et al. 2007).

Ethnographically, the Project Area is in the central portion of the territory occupied by the Penutian-speaking Hill Patwin. The Patwin territory included both the River Patwin and Hill Patwin and extended from the southern portion of the Sacramento River Valley to the west of the river, from the town of Princeton south to San Pablo and Suisun bays. As a language, Patwin (meaning "people") is part of the Wintu linguistic family which has three main groups: Southern or Patwin; Central, of Glenn and Tehama counties; and the Northern, of the upper Sacramento, lower Pit, and the upper Trinity drainages (Johnson 1978). The Hill Patwin territory includes the lower hills of the eastern Coast Range mountain slope (Long, Indian, Bear, Capay, Cortina, and Napa Valley). Between there and the foothills, the grassy plains were largely unsettled, used mainly as a foraging ground by both valley and hill groups (Johnson 1978). Patwin pre-contact population numbers are not precise, but Kroeber (1932) estimates 12,500 for the Wintu, Nomlaki, and Patwin groups. These numbers reflect groups prior to the 1833 malaria epidemic.

Individual and extended families "owned" hunting and gathering grounds, and trespassing was discouraged without permission. Residence and marriage was generally matrilocal, but unrestricted. Politically, the Patwin were divided into "tribelets," made up of a primary village and a series of outlying hamlets, presided over by a more-or-less hereditary chief. Villages typically included family dwellings, acorn granaries, a sweathouse, and a dance house, owned by the chief. The chief had unrestricted power and presided over economic and ceremonial decisions (Johnson 1978).

Subsistence activities centered around fishing and hunting of deer, Tule elk, antelope, bear, ducks, geese, quail, turtles, fish, and other small animals. Hunting of deer often took the form of communal drives, with the actual killing of the deer performed by individuals or groups. Decoys were used for attracting such game as deer and ducks. Nets and holding pens were used for fishing, which was also

an important part of normal subsistence activities. Types of fish included sturgeon, salmon, perch, chub, sucker, hardhead, pike, trout, steelhead and mussels. Although acorns were the staple of the Patwin diet, they also harvested sunflower, alfilaria, clover, bunchgrass, wild oak, and yellow flower, which was parched or dried, then pounded into a meal. Buckeye, Pine nuts, Juniper berries, Manzanita berries, Blackberries, wild grapes, Brodiaea bulbs, and Tule roots were also collected. Each village had its own locations for these food sources, and the village chief was in charge of assigning particular families to each collecting area. Game was prepared by roasting, baking, or drying of the meat. Tobacco was collected along the river and inhaled, but not cultivated. Salt was scraped off rocks (in the Cortina region) or by burning a grass found in the plains (Johnson 1978).

Patwin houses were built in the form of a dome, using tree branches as for the framing, then covered with thatch and earth. House floors were typically dug out and the walls were built up as a mound, with the entrance to the building made through the roof (Powers 1976). As described by Kroeber (1925) and Johnson (1978) the closest village location was Moso, located on the north bank of Cache Creek around the town of Capay. No positive cultural material has been located or observed to support this claim.

One of the most distinctive aspects of the Patwin culture was the cult system, found throughout northern central California. The main feature of the cult was the occurrence of one or more secret societies whose membership was by strict initiation, each with its own series of dances and rituals (Johnson 1978). Patwin culture is most distinctive in that it possessed three secret societies: the ghost, Hesi, and Kuksu. These involved elaborate ceremonial activities consisting of singing and dancing (Foster 1995). Membership included mostly males, beginning around the ages of eight to 16, but on limited occasions, included high status women (Johnson 1978). Everyday Patwin life centered on the rituals performed within the secret societies. Details involving the ceremonies varied, but most had sacred dances requiring careful preparation, costume and music. These dances could last several days. Detailed summaries are provided by Kroeber (1932) and Loeb (1933).

The earliest historical accounts of the Project Area begin with Spanish mission registers of baptisms, marriages, and deaths of Indians. By 1800, Native Americans were taken from the Patwin settlement of Aguastos in the south-central area, and from other villages, by emissaries of Mission Dolores. In addition, missions San Jose and Sonoma actively proselytized the southern Patwin. Between the 1830s and 1840s, both Mexicans and Americans rapidly overtook the Patwin territory under the authority of the Mexican government (Johnson 1978).

The Spanish arrived on the central California coast in 1769, and by 1776 had been explored by José Canizares. In 1808, Gabriel Moraga crossed into the territory, and in 1813 a major battle was fought between the Miwok and the Spaniards near the mouth of the Cosumnes River. In 1833, an epidemic most likely to be malaria, raged through the Sacramento Valley, killing an estimated 75 percent of the native population. The discovery of gold in 1848 at Sutter's Mill, near the Nisenan village of Colluma (now Coloma) on the South Fork of the American River, drew thousands of miners into the area, and led to widespread killing and the virtual destruction of traditional Native American cultures.

3.4 Regional History

The first European to visit California was Spanish maritime explorer Juan Rodriguez Cabrillo in 1542. Cabrillo was sent north by the Viceroy of New Spain (Mexico) to look for the Northwest Passage.

Cabrillo visited San Diego Bay, Catalina Island, San Pedro Bay, and the northern Channel Islands. The English adventurer Francis Drake visited the Miwok Native American group at Drake's Bay or Bodega Bay in 1579. Sebastian Vizcaíno explored the coast as far north as Monterey in 1602. He reported that Monterey was an excellent location for a port (Castillo 1978).

Colonization of California began with the Spanish Portolá land expedition. The expedition, led by Captain Gaspar de Portolá of the Spanish army and Father Junipero Serra, a Franciscan missionary, explored the California coast from San Diego to the Monterey Bay Area in 1769. As a result of this expedition, Spanish missions to convert the native population, presidios (forts), and pueblos (towns) were established. The Franciscan missionary friars established 21 missions in Alta California (the area north of Baja California) beginning with Mission San Diego in 1769 and ending with the mission in Sonoma established in 1823. The purpose of the missions and presidios was to establish Spanish economic, military, political, and religious control over the Alta California territory. No missions were established in the Central Valley. The nearest missions were in the vicinity of San Francisco Bay and included Mission San Francisco de Asis (Dolores) established in 1776 on the San Francisco peninsula, Mission Santa Clara de Asis at the south end of San Francisco Bay in 1777, Mission San Jose in 1797, Mission San Rafael, established as an *asistencia* in 1817 and a full mission in 1823, and Mission San Francisco Solano in Sonoma in 1823 (Castillo 1978; California Spanish Missions 2011). Presidios were established at San Francisco and Monterey. The Spanish took little interest in the area and did not establish any missions or settlements in the Central Valley.

After Mexico became independent from Spain in 1821, what is now California became the Mexican province of Alta California with its capital at Monterey. In 1827, American trapper Jedediah Smith traveled along the Sacramento River and into the San Joaquin Valley to meet other trappers of his company who were camped there, but no permanent settlements were established by the fur trappers (Thompson and West 1880).

The Mexican government closed the missions in the 1830s and former mission lands, as well as previously unoccupied areas, were granted to retired soldiers and other Mexican citizens for use as cattle ranches. Much of the land along the coast and in the interior valleys became part of Mexican land grants or "ranchos" (Robinson 1948). During the Mexican period there were small towns at San Francisco (then known as Yerba Buena) and Monterey. The rancho owners lived in one of the towns or in an adobe house on the rancho. The Mexican Period includes the years 1821 to 1848.

John Sutter, a European immigrant, built a fort at the confluence of the Sacramento and American rivers in 1839 and petitioned the Mexican governor of Alta California for a land grant, which he received in 1841. Sutter built a flour mill and grew wheat near the fort (Bidwell 1971). Gold was discovered in the flume of Sutter's lumber mill at Coloma on the South Fork of the American River in January 1848 (Marshall 1971). The discovery of gold initiated the 1849 California Gold Rush, which brought thousands of miners and settlers to the Sierra foothills east and southeast of Sacramento.

The American period began when the Treaty of Guadalupe Hidalgo was signed between Mexico and the United States in 1848. As a result of the treaty, Alta California became part of the United States as the territory of California. Rapid population increase occasioned by the Gold Rush of 1849 allowed California to become a state in 1850. Most Mexican land grants were confirmed to the grantees by U.S. courts, but usually with more restricted boundaries, which were surveyed by the U.S. Surveyor

General's office. Land outside the land grants became federal public land which was surveyed into sections, quarter-sections, and quarter-quarter sections. The federal public land could be purchased at a low fixed price per acre or could be obtained through homesteading (after 1862) (Robinson 1948).

3.5 Project Area History

The Project Area is located just east of the Los Putos land grant (originally called Lihuaytos) which includes what is now Vacaville. The Lihuaytos land grant was issued by the Mexican governor of Alta California in 1843 to Juan Manuel Vaca and Juan Felipe Peña (Aviña 1976:98). Vaca and Peña came from New Mexico and settled along Putah Creek, north of what is now Vacaville. Their Lihuaytos land grant overlapped with the Rio de los Putos land grant along Putah Creek given to Francisco Guerrero y Palomares of Tepic, Mexico, in 1842. The Rio de los Putos land grant was purchased by William Wolfskill of Los Angeles the same year. Wolfskill's land grant had oak trees along Putah Creek while the Vaca and Peña grant was described as a "barren waste." Vaca and Peña grazed their cattle along Putah Creek and eventually took over use of the Rio de los Putos land grant forcing out the cattle of John Wolfskill, William Wolfskill's brother. The Wolfskills filed a suit to recover their land with the Mexican governor who ruled in favor of the Wolfskills (Bowen 2000a).

Vaca and Peña received a new grant in 1845, called Los Putos, from the Mexican governor, which roughly overlapped with the previous Lihuaytos grant. However, this grant was shifted slightly south so as not to overlap with the Rio de Los Putos grant. Instead, it overlapped the Tolenas grant to the southwest owned by Jose Francisco Armijo. Since there was no water on the Los Putos grant, Vaca and Peña began watering their cattle at Ulatis Creek on the Tolenas grant (Bowen 2000a). In 1850, Vaca sold nine square miles of the Los Putos grant to William McDaniel with the stipulation that one square mile (or one square English league in some documents) should be used for the village of Vacaville. Vaca later contended that he had only sold the one square mile or league for Vacaville to McDaniel (Bowen 2000b). The U.S. government issued a patent (federal deed) for the Los Putos land grant to Vaca and Peña in 1858 (Bureau of Land Management [BLM] 2017). The land grant confirmed by the U.S. government had better-defined and more restricted boundaries compared to the Mexican grant.

Lansing Mizner, McDaniel's business partner and a surveyor, laid out the town of Vacaville and surveyed it into lots. He filed the plat of the town with the County on December 13, 1851 (Bowen 2000b). Vaca received 105 blocks of 10 lots each and Peña received about 10 blocks. People wishing to settle in Vacaville could have purchased lots from McDaniel, Vaca, or Peña. The town plat showed two plazas, a block for schools, a block reserved for a church, and a block for a cemetery (Bowen 2000c).

Four years after the town was established, the Ulatis Academy opened in Vacaville in 1855. Vacaville was connected by a spur to the California Pacific/Southern Pacific Railroad main line from the Bay Area to Sacramento at Elmira in 1869 (Robertson 1998). The California College was begun at Vacaville in 1871. A telephone line was established in Vacaville in 1884 and a temperance union was formed in 1886.

While agriculture in the surrounding area had previously focused on wheat cultivation, by the 1880s Solano County's farmers had turned to fruit growing. Local conditions were favorable for this enterprise, as the area had an ample water supply, an earlier and more extensive growing season

than other regions, and an inexpensive labor force made up of Chinese immigrants. The Vacaville fruit district became quite successful, producing peaches, apricots, table grapes, and cherries (Limbaugh and Payne 1978; Wickson 1888). Fires destroyed most of downtown Vacaville and the Chinese district in 1887, but in that same year a large fruit drying enterprise began and Vacaville soon became the center of a major fruit and nut production area. Dried fruit from Vacaville was shipped as far away as England by 1903 (Martin 2007).

Only five years after fire destroyed much of the downtown area, an earthquake destroyed it again in 1892. That same year Vacaville received electricity and voted for incorporation; just three years later, another fire destroyed businesses and Chinese dwellings in Vacaville in 1895 (Martin 2007).

A spur to Vacaville from Suisun on the Sacramento Northern electric interurban railroad line from Oakland to Sacramento was completed in 1914 (Robertson 1998). Main Street was paved and a Carnegie Library opened in Vacaville in 1915.

Elmira started as a one-room depot in 1868 on the California Pacific Railroad (became part of the Southern Pacific Railroad in 1889) line from the Bay area to Sacramento (Robertson 1998). The depot was located near today's Elmira and was named Vaca Station. The Northern Railway linked Vacaville and Vaca Station in 1869. A town developed around Vaca Station. Due to confusion between Vaca Station and Vacaville, the town at Vaca Station decided to change its name to Elmira in 1871. It was named for Elmira, New York, after the birthplace of Jerome Banks, a prominent lawyer in town (Bowen 2001). The town was platted in 1868 on 40 acres of land. It was known as a fruit growing community, with a diverse variety of fruit orchards. By 1878, the town had a population of about 500 (Thompson and West 1880).

Irrigation and Water Conveyance

The following is a context of the theme of water conveyance to support agricultural development in the Project Area. The context is included to better understand the socio-cultural, technological, and economic factors associated with water conveyance systems supporting agricultural development similar to that found at site FAC-001, the Byrnes Canal, in the Project Area.

Certain components of a water conveyance system are common to all types of systems, while some components only pertain to particular systems. However, most water conveyance systems will consist of a diversion structure and conduit. Functions associated with diversion and conduits can pertain to agriculture, mining, domestic water supply, or other uses. The materials used for a water conveyance system can be influenced by a few factors, including the purpose, long term use of the system, geology and topographic elements, and builder's skill. Associated resources to the water conveyance system could include agricultural fields (JRP 2000).

Techniques used to build, design, and construct irrigation networks and canals have varied widely depending largely on the period they were constructed, investors, and location in California. As discussed above, the Project Area was used for grazing cattle through the Mexican Period, after which wheat, alfalfa, and fruit cultivation dominated the agriculture crops into the American Period. California has a unique history when it comes to water distribution; people tend to settle in areas with access to natural resources; however, during the Gold Rush in California, many urban centers were quickly established in areas near valuable mineral resources and the lack of a water sources did not deter this

rapid growth. Instead, innovative systems and businesses were established to transport water from areas of excess such as the storm-fed rivers of Northern California or the Sierra Nevada to areas of need such as deserts and drought-stricken valleys.

Low-lying areas subject to seasonal inundation, such as land in the vicinity of the Project Area, were drained and managed by cattlemen and farmers by construction of levee and canal systems, and multi-purpose dams were created on major rivers that not only prevented flooding but supplied water to municipalities and agricultural lands, lent to hydroelectric power, and were used for recreation (JRP 2000).

Although some irrigation for incipient agricultural endeavors were undertaken by a few Native American populations prior to and during initial European contact, Spanish and Mexican period irrigation for agriculture is the first well-documented, and led to the extensive irrigation systems of the American period.

Spanish missionaries constructed irrigation systems as early as 1769 in San Diego at the mission and associated pueblos. They brought irrigation system technology from traditions dating back to the Roman Empire: dry farming, runoff irrigation, tile-lined ditches, and masonry dams. The largest areas of cultivated crops at the missions established along the coast were dry-farmed wheat and barley, followed by orchards and vineyards (JRP 2000).

After Mexico gained independence from Spain in 1823, they continued settlement of present-day California but left the Central Valley alone until late in their rule, when the government began to grant ranchos. Cattle ranching was prime in the Central Valley for the next 20 years as the irrigated agriculture along the coast declined, supporting the large hide-and-tallow trade. Rancheros developed huge herds of cattle on large Mexican land grants, and trade of wheat, wine, and other agricultural goods was limited. Rancheros largely did not, however, invest time and labor in irrigation works, although some irrigated agriculture for the sparse citrus orchards and vineyards occurred intermittently. A typical rancho had a house garden but no irrigation system, because the focus was on highly profitable hide and tallow (JRP 2000).

By the end of the Mexican War in 1847, almost half of the non-Indian inhabitants of the Central Valley were already Americans who had begun to establish farms. In the following decades, as the Americans gained control of the Rancho lands, they developed more extensive irrigation systems for agriculture in addition to stock raising (JRP 2000).

The rainy season in California, November to March, conflicts with the prime growing season for most crops; this factor, coupled with the dry climate, made natural water unreliable for agriculture in most of California. The Sacramento Valley had sufficient rainfall for dry farming crops such as wheat and barley, so irrigation works were slower to develop in the area as opposed to most of Southern California (JRP 2000). The Sacramento Valley is watered primarily by tributaries flowing west down from the Sierra Nevada, as well as flood plains and alluvial fans created by the confluence of the Sacramento and San Joaquin rivers. This hydrology created an inland delta to the south of the Project Area with deep peat soils and drainage problems, while the Project Area had primarily rich earth that was easily plowed and irrigated (JRP 2000).

A widespread drought and flood cycle from 1863-1865, coupled with an unstable wheat market and soil exhaustion, awoke the wheat growers in the Central Valley to the benefits of irrigation and flood control. Irrigated acreage grew from 60,000 acres in 1860 to 400,000 by 1880 in California, with the Sacramento Valley having only 13,400 of these acres due to continued dry wheat farming. Wheat production declined in the 1890s, and as more farmers turned to irrigated crops, they saw more returns on the investment in irrigation, and the systems began to proliferate (JRP 2000). Communal arrangements for water distribution were developed, as opposed to individual landowners footing the bill on their land alone. Irrigation districts along with private and municipal water companies were initiated and became crucial to the large scale development and success of irrigated agriculture. The Wright Act of 1887 provided for the formation of irrigation districts throughout the Central Valley that fell under the democratic control of the water users themselves (JRP 2000).

By 1929, there were 15 irrigation districts in the Sacramento Valley as far north as Redding. Some were very large, such as the Glenn-Colusa district; others were smaller and served only suburban communities. Soon, the U.S. Reclamation Service (the predecessor to the U.S. Bureau of Reclamation) noticed the benefits of these systems and began establishing their own reclamation projects involving irrigation to help westerners improve their lands. With these federal involvements, improvements such as concrete lining and upkeep were made to many of the district canals (JRP 2000).

Open canals were most commonly used for irrigation to transport water for orchards and agricultural fields. The shape and size of the open canal can depend greatly on its function and construction material. Open canals are filled from the supply of a storage dam or diversion weir; the water is then diverted into a main canal through outlet gates or other types of control systems. Early canal systems in the Central Valley had rounded bottoms, long side slopes, and rounded berm mounds (JRP 2000). Modern irrigation channels are v-shaped, have steep slopes and flat, broad berms, since they are cut with modern machinery. Nineteenth century canals were sometimes lined with random-coursed stone paving. Twentieth century canals were constructed with concrete linings. Concrete-lined canals have a greater carrying capacity than stoned-lined canals (JRP 2000). Many central valley irrigation canals, like the FAC-001 in the Project Area, and concrete-lined.

The Byrnes Canal (FAC-001), is an offshoot of the Putah South Canal. These are administered by the Solano Irrigation District, established and functioning under the orbit of the Central Valley Project (built by the Bureau of Reclamation) and the State Water Project (built by the State of California), which encompasses 42 reservoirs, 14 major canals, and 31 pumps stations. It's transforming the Central Valley into the leading agriculture area for the nation, and saved water from being appropriated by the thirsty drylands of southern California. The Solano Irrigation District levies water use charges for municipal and industrial water provided in its service area, constructs and operates water drainage and generation facilities, and distributes hydroelectric power. It is controlled by a board of elected members, and every fiduciary action requires voter approval (Solano Irrigation District 1988).

The path to establishing the Solano Irrigation District stemmed from an increased awareness in the increased need for water in Solano County. John Wolfskill, one of Vacaville's first settlers, initiated a water pump at Putah Creek and dug ditches in the 1850s to carry the water to his fruit trees and vineyards. By the early 1900s, it became evident that a dam at the junction of Solano, Yolo, and Napa

counties would be inevitable, and people saw the value of impounding Putah Creek and tapping into Putah and Cache creeks (Solano Irrigation District 1988).

In 1907, several cities hired three prominent engineers, Arthur Powell Davis, George Washington Goethals (who built the Panama Canal), and William Mulholland, to investigate the feasibility. The men came up with a theoretical project that would create a water supply based on storage on the South Fork Eel River, a tunnel to Clear Lake on Cache Creek, and a tunnel to Putah Creek. Water would be stored in the Berryessa Valley behind a dam at Devil's Gate. In 1908, a nascent U.S. Bureau of Reclamation started investigating water storage at Putah Creek to deliver water to 50,000 acres around Dixon and Winters. William Pierce of Suisun Valley started talking about a dam at Devil's Gate as early as 1916 (Solano Irrigation District 1988).

Pierce's message was beginning to be heard by ears that could initiate change in the late 1930s. The Solano County Board of Supervisors appointed a Water Council in 1940 to promote water development and study local water needs, and they paid Peirce $750.00 to investigate sources of water and secure water data. Piece convinced local newspaper mogul and State Senator Luther Gibson to help persuade the board to fund the new Solano County Water Council and their efforts (Solano Irrigation District 1988).

Because the Shasta Dam had reduced natural water flow into the Delta, increased salinity in the sloughs, and allowed for salt water build up in the Sacramento River, Pierce pushed for a solution involving a dam at Devils Gate. The U.S. Bureau of Reclamation and USACE had put together specific plans to dam Putah Creek. The plan was called The Solano Project. Pierce and his colleague Frank Douglass of Vacaville completed their research and, despite heavy contention, managed to garner enough public support from around Yolo, Solano, Napa, and Lake Counties to back a big dam project at Monticello (Solano Irrigation District 1988).

Ed Uhl joined the Water Council because he saw first-hand the need for a public water supply. Uhl was a prominent rancher with widespread holdings in Solano and Yolo counties and remembered the effects of the lack of water "I was using groundwater where available, but it was only available in small amounts. I could irrigate 20 acres of property, whereas we had about 500 acres or more. Groundwater was a drop in the bucket, so I was dry farming like everybody else. In Elmira we had barley or oats." (Solano Irrigation District 1988:11). Landowners in Elmira were specifically against the Solano Plan, and distributed anti-dam propaganda to dissuade support (Solano Irrigation District 1988).

By the financial and engineering criteria of the U.S. Bureau of Reclamation, the Solano Project was authorized for construction by the Secretary of the Interior in November 1948, after a hiatus for WWII, petitioning the California Congressional Delegation, and a very thorough and effective public outreach, specifically in Solano County. Napa County opposed the project to the very end, contending it would be more of a detriment than a solution. The Solano Irrigation District was formed as a direct result of the tenacity of the men spearheading the idea for the Solano Project, and the district became a necessary component in bringing the project to fruition (Solano Irrigation District 1988).

Construction for the Putah Diversion dam began in 1958, six miles downstream from the main Monticello Dam. It created Lake Solano, which diverts water into the Putah South Canal, built for water distribution at the same time. It is 33.3 miles long and lined with concrete. Four contractors

built the canal over a three-year period, and piped a portion of it under Highway 40 at a location east of Vacaville and another north of Fairfield. A reservoir is located at the end of Putah South Canal to serve as a terminal reservoir and forebay from which water is delivered to Vallejo (Solano Irrigation District 1988).

The first water was released into the Putah South Canal in May of 1959 for immediate agricultural use, and construction was completed in 1962. The Putah South Canal served the Solano Irrigation District system at 58 diversion points, and consists of 165 miles of pipe and 120 miles of canal. Almost 80 percent of the water is delivered via gravity flow. The Byrnes canal is one of these diversion points. The canal doubled the value of land and led to new crops such as tomatoes, corn, asparagus, sunflower seeds, melons, kiwi fruit, walnuts, almonds, and bluegrass turf. It also pumped millions of dollars of investments in farm equipment into the economy. Agricultural production in Solano County grossed $12 million in 1955, $50 million in 1966, and by 1986 grossed $114 million (Solano Irrigation District 1988).

Railroads

The western terminus of the first transcontinental railroad, the Central Pacific Railroad, was in Sacramento. The line from Sacramento to Promontory Point, Utah, where it connected with the Union Pacific Railroad, was completed in 1869. Sacramento was connected to Oakland in 1869 by the construction of the Western Pacific Railroad. The Central Pacific and the Western Pacific had the same ownership. The Western Pacific name was soon dropped and the entire route from Oakland to Salt Lake City via Sacramento became known as the Central Pacific Railroad (Robertson 1998).

The Central Pacific Railroad was leased to the Southern Pacific Railroad (also under the same ownership) in 1885. After 1889, the Central Pacific name was no longer used and the entire railway was known as the Southern Pacific Railway Company. In 1996, the Union Pacific Railway acquired the Southern Pacific Railway (Robertson 1998).

The Northern Railway Company built a spur from Vaca Station (later Elmira) to Vacaville in 1869 which became known as the Vaca Valley Railroad. Vaca Station was on the California Pacific line from the Bay Area to Sacramento. The Northern Railway extended its line from Vacaville to Madison in 1877 and Rumsey in 1888 (Robertson 1998). The new alignment created several company towns along the route. No ballast rocks were laid on this route; the track was laid on hand-flattened, packed ground and the rails were attached to wooden ties laying on the bare ground (Crull 2014). The segment of grade within the current Project Area is simply a dirt trail along the shoulder of Elmira Road. The Northern Railway also built a line from Woodland to Tehama. The Northern Railway and the California Pacific Railroad were purchased by the Southern Pacific Railway in 1898 (Robertson 1998).

Architectural Context

The garage building (FAC-004) is primarily a standard construction vernacular building most closely associated with the “Ranch” style of architecture. Garages are standalone ancillary structures used for storage or mechanics. A Ranch garage is simply a garage following design form and elements of the Ranch architectural style.

The Ranch style of architecture was favored from the 1930s through 1970s including the period when the garage was likely built (1950s), particularly for residential houses. The Ranch style design and

form was largely a response to the high demand of post-WWII housing needs. This demand was caused by a natural population increase and the desire for larger homes suitable for larger families. Homes built during this era were quickly sold. Homes built after 1955 in the United States were commonly built with three or more bedrooms (Caltrans 2011). These new homes were about 50 percent larger than the average house constructed in the 1940s to 1950s (Caltrans 2011). A new standard amenity was a second bathroom or half bath, which was rarely seen in homes built prior to the 1940s (McAlester 2013).

Ranch style homes typically have an elongated form and are commonly single-story. Ranch homes are usually horizontal with low-pitch roofs with broad overhangs, unbroken eave lines, concrete slab floors, and grouped windows (McAlester 2013). Masonry detailing on the façade is also common such as brick wainscoting or stone entryways. Entry ways that are covered are usually quite small in size and too narrow to be used as a porch. While the rear private yard is larger, easily accessed from the main living room, and may have more than one rear patio. Two-car garages or carports are also typical for Ranch-style homes in California. Detached garages are not common in the Ranch style, yet some models have a separated garage from the house. The separation between the house and garage acts as an open breezeway but is still connected with the same roofline (Caltrans 2011).

The most prominent Ranch style architect in California was Cliff May. May designed and built homes largely in the areas surrounding San Diego and Los Angeles and is credited with creating the California Ranch architectural style, originating in the early 1930s. Through his career, May designed and built hundreds of these modernized houses built specifically to fit the lifestyle of the American family. May's designs became particularly popular in the post-war 1950s and his designs were sold throughout the United States. Through his career, May won dozens of awards in architecture and was a member of many home builders associations (van Balgooy 2004).

In Northern California, Joseph L. Eichler designed modern houses that were similar to the Ranch style of architecture. He built over 11,000 homes in nine communities in Northern California between 1949 and 1966. His style is most notably known as mid-century modern (Adamson 2002).

Archival research failed to identify any significant historical information pertaining ranch-style garages in the Project Area or the Central Valley.

4.0 METHODS

4.1 Personnel Qualifications

All phases of the cultural resources investigation were conducted or supervised by Registered Professional Archaeologist Theadora Fuerstenberg, who meets the Secretary of the Interior's Professional Qualifications Standards for prehistoric and historical archaeologist. Fieldwork was conducted by Associate Archaeologist Megan Webb and Archaeologist Paul Allgaier. The report was prepared by Ms. Fuerstenberg with assistance from Ms. Webb. Dr. Roger Mason, RPA provided technical report review and quality assurance.

Ms. Fuerstenberg, the Principal Investigator, is a senior archaeologist for ECORP with more than 13 years of experience in cultural resource management in California. She holds a Bachelor's degree in Anthropology and a Master's degree in Cultural Resources Management. She has participated in and

supervised numerous survey, testing, and data recovery excavations for both prehistoric and historical sites, and has cataloged, identified, and curated thousands of artifacts. She has conducted evaluations of cultural resources for eligibility for the NRHP and CRHR and performed impact assessment and development of mitigation measures for CEQA and Section 106 (NHPA) projects. Ms. Fuerstenberg meets the Secretary of Interior's Standards for Archaeology and History.

Dr. Mason has been professionally involved with cultural resources management in California since 1983. Dr. Mason is the author of more than 200 reports dealing with cultural resource surveys, evaluations, and mitigation programs in California. He has extensive project experience with the cultural resources requirements of CEQA and Section 106 of the NHPA.

Ms. Webb is an Associate Archaeologist for ECORP and has more than two years of experience in cultural resources management, primarily in California. She holds a BA degree in Anthropology and has participated in all aspects of archaeological fieldwork, including survey, test excavation, and data recovery, in addition to months of archaeological lab experience.

Mr. Allgaier is an on-call Archaeologist for ECORP and has more than four years of experience in cultural resource management in California as well as experience in Oregon and Nevada. He holds a Bachelor's degree in Anthropology and holds a GIS certificate. He has participated in all aspects of archaeological fieldwork, including survey, test and excavation on both prehistoric and historical sites. With more than three years of laboratory work, Mr. Allgaier has analyzed, identified, cataloged and curated countless artifacts.

4.2 Records Search Methods

A records search for the property was completed at the Northwest Information Center (NWIC) of the CHRIS at California State University-Sonoma on June 8, 2017 (NWIC search #16-1971; provided as Attachment A). The purpose of the records search was to determine the extent of previous surveys within a 0.5-mile (800-m) radius of the proposed Project location, and whether previously documented prehistoric or historic archaeological sites, architectural resources, or traditional cultural properties exist within this area.

In addition to the official records and maps for archaeological sites and surveys in Solano County, the following historic references were also reviewed: Historic Property Data File for Solano County (OHP 2012); The National Register Information System website (National Park Service [NPS] 2017); *Office of Historic Preservation, California Historical Landmarks* website (OHP 2017); *California Historical Landmarks* (OHP 1996 and updates); *California Points of Historical Interest* (OHP 1992 and updates); *Directory of Properties in the Historical Resources Inventory* (1999); *Caltrans Local Bridge Survey* (Caltrans 2016); *Caltrans State Bridge Survey* (Caltrans 2015); and *Historic Spots in California* (Kyle 2002).

Other references examined include a RealQuest Property Search and historic General Land Office (GLO) land patent records (BLM 2017). Historic maps reviewed include:

- 1859 BLM Plat map for Township 6 North, Range 1 West
- 1908 USGS Vacaville, (1:62,500)

- 1917 USGS Elmira, California (1:31,680)
- 1953 USGS Elmira, California (7.5-minute scale)
- 1953 photorevised 1968 USGS Elmira, California (7.5-minute scale)
- 1953 photorevised 1968 and 1973 USGS Elmira, California (7.5-minute scale)
- 1953 photorevised 1980 USGS Elmira, California (7.5-minute scale)

Historic aerial photos taken in 1968, 1993 and 2010 to present were also reviewed for any indications of property usage and built environment.

The nearest local historic register is in Vacaville, which does not contain information for the Project Area.

4.3 Sacred Lands File Coordination Methods

In addition to the record search, ECORP contacted the California Native American Heritage Commission (NAHC) on June 9, 2017 to request a search of the Sacred Lands File for the Project Area (Attachment B). This search will determine whether or not Sacred Lands have been recorded by California Native American tribes within the Project Area, because the Sacred Lands File is populated by members of the Native American community who have knowledge about the locations of tribal resources. In requesting a search of the Sacred Lands File, ECORP solicited information from the Native American community regarding tribal cultural resources, but the responsibility to formally consult with the Native American community lies exclusively with the federal and local agencies under applicable state and federal law. ECORP was not delegated authority by the lead agencies to conduct consultation.

4.4 Other Interested Party Consultation Methods

ECORP mailed letters to the Solano County Historical Society on June 9, 2017 to solicit comments or obtain historical information that the repository might have regarding events, people, or resources of historical significance in the area (Attachment A).

4.5 Archival Research Methods

In addition to the official records and maps for archaeological sites and surveys reviewed during the records search at the NWIC, ECORP conducted focused property- and site-specific archival research. Archival research was conducted online where primary sources such as historical newspaper articles, maps, and county recorders records were reviewed. These records were found at online repositories that include websites such as archive.org, the California Digital Newspaper Collection, U.S. census records from 1880 and beyond (familysearch.org), the BLM GLO survey plats at glorecords.blm.gov, and historical topographic maps at geonames.usgs.gov. The focused archival research resulted in sufficient information about the historic period remains in order to prepare appropriate evaluations of the resources within the Project Area. The results of the archival research are incorporated as historical context in Section 5 of this report.

4.6 Field Methods

On June 13, 14, and 15, and October 05, 2017, ECORP carried out an intensive pedestrian survey of the Project Area under the guidance of the *Secretary of the Interior's Standards for the Identification of Historic Properties* (NPS 1983) using 15-m transects, and spot checking where vegetation was too dense to maintain transects (Figures 2 and 3). ECORP expended five person-days in the field. At that time, the ground surface was examined for indications of surface or subsurface cultural resources. The general morphological characteristics of the ground surface were inspected for indications of subsurface deposits that may be manifested on the surface, such as circular depressions or ditches. Whenever possible, the locations of subsurface exposures caused by such factors as rodent activity, water or soil erosion, or vegetation disturbances were examined for artifacts or for indications of buried deposits. No subsurface investigations or artifact collections were undertaken during the pedestrian survey.

All cultural resources encountered during the survey were photographed, recorded using Department of Parks and Recreation (DPR) forms, and GPS coordinates were taken of their location. Any cultural resource that contained at least three artifacts in a ten-square-meter area or consisted of one or more features was considered a site. Any indications of cultural presence in the Project Area that failed to meet the definition of a site were identified as isolates and noted on a location map.

5.0 RESULTS

5.1 Records Search

The records search consisted of a review of previous research and literature, records on file with the NWIC for previously recorded resources, and historical aerial photographs and maps of the vicinity.

5.1.1 Previous Research

Ten previous cultural resources investigations have been conducted within 0.5 mile of the property, covering approximately 25 percent of the total area surrounding the property within the record search radius (Table 1). These studies revealed the presence of prehistoric sites, including lithic scatters and habitation sites, and historical sites, including agricultural drainage features, buildings, railroads, and railroad related features. The previous studies were conducted between 1981 and 2012 and vary in size from 32 acres to 180 acres or 100 linear miles.

Table 1. Previous Cultural Studies In or Within 0.5 Mile of the Project Area

Report Number	Author(s)	Report Title	Year	Includes Portion of the Project Area?
S-05164	Chaves, David	Vacaville Southeast Sector Environmental Impact Report	1981	No
S-20257	Wickstrom, Brian	Cultural Resource Survey for the Easterly Wastewater Treatment Plant Expansion, Solano County, California	1997	No

Table 1. Previous Cultural Studies In or Within 0.5 Mile of the Project Area

Report Number	Author(s)	Report Title	Year	Includes Portion of the Project Area?
S-22736	Jones and Stokes	Final Cultural Resources Inventory Report for the Williams Communications, Inc. Fiber Optic Cable system Installation Project, Point Area to Sacramento, California	2000	No
S-22817	Far Western Archaeological Research Group, Inc.	Cultural Resources Survey for the Level (3) Communications Long haul Fiber Optics Project Segment WS01: Sacramento to Oakland	2000	No
S-23471	Archeo-Tec	Cultural Resources Evaluation of the Hawkins Property, An approximately 32 acre parcel of land located within the City of Vacaville, Solano County, California	1998	No
S-33061	SWCA Environmental Consultants	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California	2006	No
S-34833	Peak & Associates, Inc.	Cultural Resources Assessment of the Brighton Landing Project Area, Solano County, California	2008	No
S-37992	Negroni, Sally	Field Office Report of Cultural Resources Ground Survey Findings	2010	No
S-39243	Peak & Associates, Inc.	Archaeological Survey Report, Vacaville-Dixon Bike Route Phase 5 Project, Hawkins Road, Solano County, California	2012	Yes
S-44980	LSA Associates, Inc.	Cultural Resources Study for the Brighton Landing Project, Vacaville, Solano County, California	2012	No

The results of the records search indicate that only a small portion of the Project Area (the right-of-way along Hawkins Road) has been previously surveyed for cultural resources. Therefore, a pedestrian survey of the Project Area was conducted for this Project following current (2014) USACE requirements.

The records search also determined that six previously recorded prehistoric and historic-period cultural resources are located within 0.5 mile of the Project Area (Table 2). Of these, one is believed to be associated with Native American occupation of the vicinity, and five are historic-period sites, associated with the railroad and one historic-period residence. One resource, the Vaca Valley Railroad Route, runs along and within the southern boundary of the Project Area.

Table 2. Previously Recorded Cultural Resources In or Within 0.5 Mile of the Project Area

Site Number CA-SOL-	Primary Number P-48-	Recorder and Year	Age/ Period	Site Description	Within Project Area?
n/a	419	B. Wickstrom 1997	Prehistoric	Obsidian flake isolate	No
n/a	546	J. Nelson 1999	Historic	Elmira Water Tower	No

Table 2. Previously Recorded Cultural Resources In or Within 0.5 Mile of the Project Area

Site Number CA-SOL-	Primary Number P-48-	Recorder and Year	Age/ Period	Site Description	Within Project Area?
n/a	549	J. Nelson 1999; P. Woltz 2013	Historic	Southern Pacific Railroad	No
n/a	745	M. Bowen 2002	Historic	Single family property located at 579 Leisure Town Road	No
n/a	1025	Dr. Scott Crull 2014	Historic	Vaca Valley Railroad Route	Yes
n/a	1026	Dr. Scott Crull 2014	Historic	Elmira Depot	No

5.1.2 Records

The *Office of Historic Preservation's Directory of Properties, Historic Property Data File* (dated April 5, 2012) did not include any resources within 0.5 mile of the Project Area (OHP 2012).

The National Register Information System (NPS 2017) failed to reveal any eligible or listed properties within the Project Area. The nearest National Register properties are located three miles northwest of the Project Area in Historic Downtown Vacaville.

Resources listed as *California Historical Landmarks* (OHP 1996) and by the OHP (OHP 2017) were reviewed on June 19, 2017. The nearest listed landmark is #534: the Vaca-Pena Adobe in Vacaville (plaque located 4.5 miles southwest of the Project Area).

A review of *Historic Spots in California* (Kyle 2002) mentions the Rancho Los Putos land grant and Vaca Valley. Juan Manuel Vaca and Juan Felipe Peña petitioned for a grant of land in 1842, which was approved by Governor Micheltorena. This land grant included land that was already a part of John Reed Wolfskill's grant. After that heated controversy was resolved by Micheltorena in Wolfskill's favor, the first settlers of Vaca Valley built adobe homes two miles southwest of the present City of Vacaville near Lagoon Valley. The Peña Adobe is still standing and is listed as Landmark #534. Kyle (2002) also mentions that Don Manuel Vaca deeded nine square miles of Rancho Los Putos to William McDaniel. McDaniel paid $3,000 for the Rancho and agreed to lay out a town and name it Vacaville.

Historic GLO land patent records from the BLM's patent information database (BLM 2017) show that James Clark received a patent (federal deed) for the northwest quarter of Section 24 in the Project Area on August 1, 1866. U.S. Census data from 1910 revealed that James Clark was born in Canada in 1858 and was a farmer. He lived in Silveyville in Solano County in 1910 and was a widower by that time. He had two daughters, Mary and Janet, who were also born in Canada, and a son, Earl, born in California. James died in 1924 and is buried in the Silveyville district of the Dixon Cemetery (www.familysearch.org).

Table 3. GLO Land Patent Records

Patentee	Patent Date	Serial Number	Patent Type/Authority	Location
James Clark	8/1/1866	CACAAA 000097	Captain Porters Company California Volunteers March 3, 1855: Scrip Warrant Act of 1855 (10 Stat. 701)	NW ¼ of Section 24, T 6 North, R 1 West

A RealQuest online property profile for APNs 0138-010-010 and 0138-010-020 revealed that the southwest portion of the Project Area is owned by the Papin family and contains a single-family residence built in 1990. APNs 0138-010-030, 0138-010-040, and 0138-010-050 cover the majority of the Project Area and consist of agricultural or vacant land. APN 0138-010-080 consists of vacant industrial land where the railroad was historically located. The offsite vegetation removal area is in APN 0142-050-020 which consists of agricultural property; the offsite culvert area in APN 0142-092-030 is vacant single family residence land. No other property history information was on record with RealQuest.

The Caltrans Bridge Local and State Inventories (Caltrans 2015, Caltrans 2016) did not list any historic bridges in or within 0.5 mile of the Project Area.

The *Handbook of North American Indians* (Wilson and Towne 1978) lists the nearest Native American villages as *Uluato* within the Patwin territory. This village is located on the southern bank of Ulatis Creek, approximately 1.5 mile west of the Project Area.

A review of the Vacaville local historical registry did not reveal any resources in the vicinity of the Project Area.

5.1.3 Map Review and Aerial Photographs

The review of historical aerial photographs and maps of the Project Area provide information on the past land uses of the property. Based on this information, the property was initially used for ranching and/or farming. Following is a summary of the review of historical maps and photographs.

- The 1859 GLO Plat map for Township 6 North, Range 1 West indicates the Rancho Los Putos as west of the Project Area. Alamo Creek, noted as Arroyo Alamo on the 1859 map, is depicted as within the southwestern corner of Section 24.
- The 1908 USGS Vacaville, California (1:62,500) and 1917 USGS Elmira, California (1:31,680) maps show the Clear Lake Branch of the Southern Pacific Railroad (previously recorded as P-48-1025; Vaca Valley Railroad) running along the north side of Elmira Road, which forms the southern boundary of the Project Area. A structure is shown within the Project Area in the center of the property north of Alamo Creek, which meanders through the Project Area. The Los Putos Land Grant is located east of the Project Area. The town of Elmira is located east of the Project Area.
- The 1953 USGS Elmira, CA (7.5-minute) map shows Elmira Road/Water Street and California Pacific Road and a structure within the southwest corner of the Project Area. Also shown on the map is the Southern Pacific Railroad (previously recorded as P-48-1025), previously labeled Clear Lake Branch, as north of Elmira Road. Alamo Creek remains meandering through the Project Area

and a section of the creek has been rerouted. The structure mapped in the center of the Project Area is no longer present.

- The 1953 photorevised 1968 USGS Elmira, CA (7.5-minute) map reveals that Alamo Creek has been redirected from a meandering creek to an east/west channel within the southern portion of the Project Area. Two structures are depicted within the southwestern corner of the Project Area. The land grant boundary creates the western boundary of the Project Area and the Southern Pacific Railroad (previously recorded as P-48-1025) is located north of Elmira Road. An irrigation canal that spans the northern and western boundary of the Project Area appears on the 1968 additions and has been recorded as FAC-001, Byrnes Canal. The canal is an auxiliary canal of the Putah South Canal, located 1.5 miles west of the Project Area.
- The 1953 photorevised 1973 USGS Elmira, CA (7.5-minute) map depicts Alamo Creek as traveling east/west through the Project Area.
- A review of aerial photographs from 1968 reveal that the majority of the Project Area was cultivated. The northern and western canals are visible on the aerial photographs. Alamo Creek runs east/west through the southern portion of the Project Area. There appear to be two structures in the southwestern corner of the Project Area, but they are mostly obscured by dense tree canopy. The Vaca Valley railroad tracks (previously recorded as P-48-1025), which were historically located within the southern portion of the parcel, are not clearly visible on the aerial photographs and may have been removed, but the right-of-way is visible.
- All other aerials photographs from 1993, 2005, and 2008 to present show the property in its current state.

In summary, the Project Area has been undeveloped and appears to have been used for grazing lands or agriculture though its history. One structure that appeared north of Alamo Creek in 1917 was no longer present by 1955. Structures in the southwestern portion of the Project Area are shown on maps beginning in 1953.

5.2 Sacred Lands File Results

A search of the Sacred Lands File by the NAHC failed to indicate the presence of Native American cultural resources in the Project Area. A record of all correspondence is provided in Attachment B.

5.3 Other Interested Party Consultation Results

No responses to the letters sent to the Solano County Historical Society have been received as the preparation of this document.

5.4 Field Survey Results

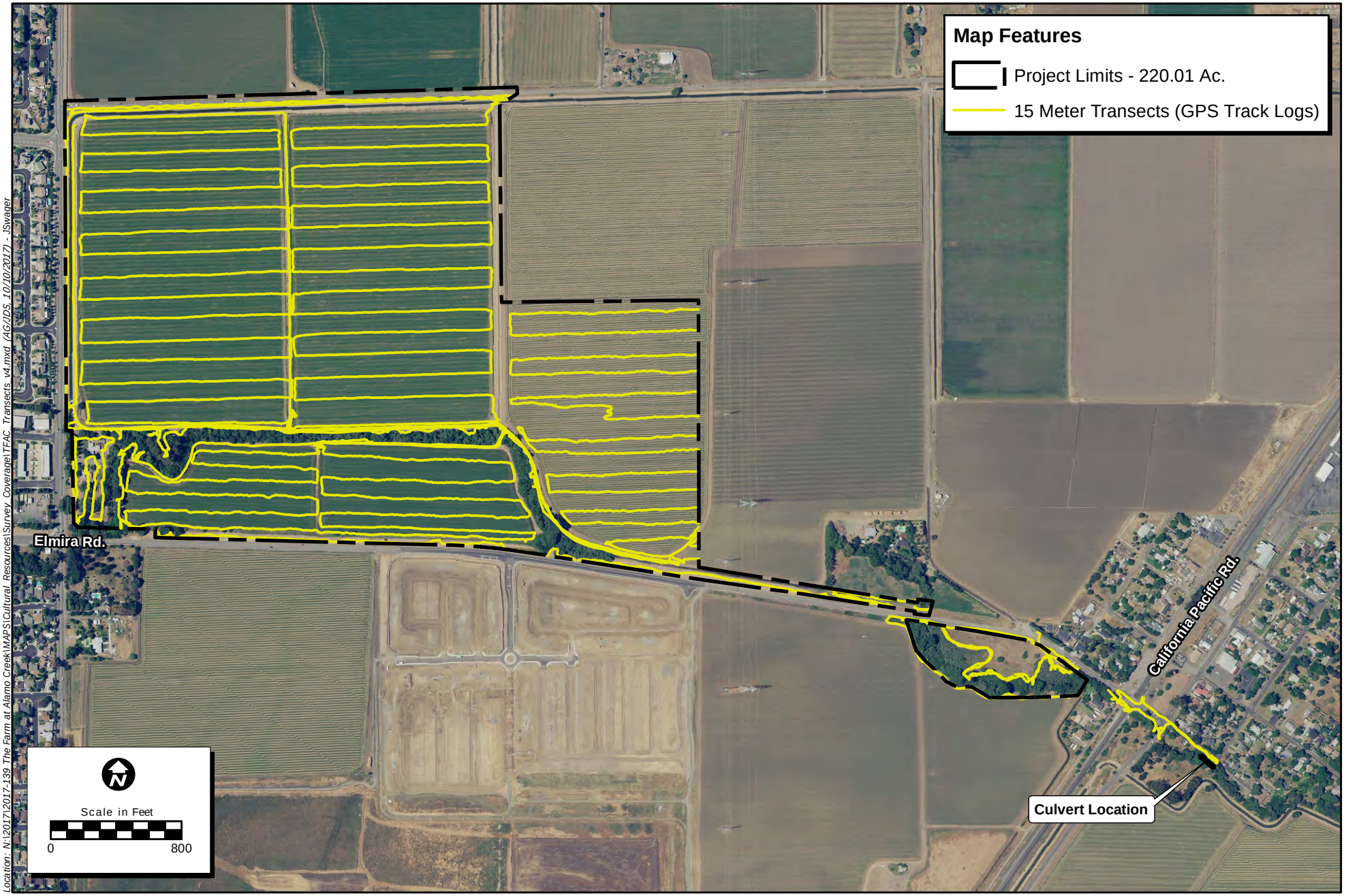
An intensive pedestrian survey, designed to identify historic and prehistoric sites and artifacts within the ±220-acre Farm at Alamo Creek Project Area, including the off-site improvements areas, was conducted by ECORP archaeologists Megan Webb and Paul Allegaier on June 13, 14, and 15, and October 5, 2017.

The Project Area was surveyed using parallel transects oriented in an east-west direction and spaced 15 to 20 meters apart (Figure 4). The majority of the property consisted of alfalfa or bare agricultural fields with 50 to 90 percent surface visibility (Figures 3 through 5). It was apparent that the surface has been modified as a result of years of agricultural production. The Project Area contained dirt access roads, segments of Byrnes Canal, old Alamo Creek, and agricultural fields. The Project Area was easily accessible and completely surveyed using parallel transects, with the exception of the off-site blackberry removal area with overgrown vegetation located along and within Alamo Creek. All areas that were accessible along the creek banks were walked. However, large thick groves of blackberry bushes and densely overgrown vegetation were avoided.

According to historic aerial photographs and maps, Alamo creek was rerouted south to its current alignment sometime after 1955. Several photographs were taken identifying the creek and inaccessible areas (Figures 6 through 8). The southwestern corner of the Project Area contained a residential parcel with a 1990s residence (Figure 9) and the area was surveyed using north-south transects. Also, the land located directly north of Elmira Road consists of an 18- to 25-meter-wide former railroad grade (the route of the Vaca Valley Railroad [P-48-1025]). The off-site culvert improvement area is adjacent to Water Street in Elmira.

As a result of the survey, two previously unidentified historic-period resources were discovered within the Project Area: FAC-001, a segment of the historic-period Byrnes Canal; and FAC-004, an historic-period garage and foundation. No prehistoric sites were discovered during the survey.

Figure 3. Alfalfa fields overview (view south) June 13, 2017.



Map Date: 8/23/2017
Photo Source: 2016, NAIP

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 4. Survey Transect

2017-139 The Farm at Alamo Creek

Figure 5. Agricultural fields overview (view west) June 14, 2017.

Figure 6. Vegetation along Alamo Creek overview (view west) June 14, 2017.

Figure 7. Alamo Creek overview (view south) June 14, 2017.

Figure 8. Vegetation in blackberry removal area south of Elmira Road. View east. October 5, 2017.

Figure 9. Residential parcel overview (view south) June 15, 2017.

5.4.1 Previously Recorded Resources

As a result of previous investigations by other firms, one railroad grade segment was recorded within the Project Area and it was relocated. Site descriptions follow, and confidential DPR 523 records are provided in Attachment D.

P-48-1025: Vaca Valley Railroad Grade

The Vaca Valley Railroad grade is located along the north side of Elmira Road and enters the southwestern portion of the Project Area. The track ran from Elmira to Vacaville from 1869 to 1877, after which the route was renamed the Vaca Valley & Clear Lake Railroad and which reached Rumsey by 1888. The railroad was operated until 1992 by the Southern Pacific Railroad and the tracks were removed in 1995. A railroad grade without tracks or ties is visible on the north side of Elmira Road (Figure 10). According to the site record, the rails were laid on wooden ties lying on the bare ground and no ballast rocks were used.

Figure 10. Railroad grade (P-48-001025) overview (view west) June 14, 2017.

5.4.2 Newly Identified Resources

Two previously unidentified resources were recorded in the Project Area during the field survey: FAC-001, historic-period Byrnes Canal; and FAC-004, historic-period garage and foundation. Site descriptions are provided below. DPR site records and a map showing resource locations are available in Attachment D.

FAC-001: Historic-aged Byrnes Canal

Byrnes Canal runs along the western and northern Project boundary; an off-shoot runs north/south through the Project (Figure 11). The canal is visible on the 1968 aerials. The canal connects to the Putah South Canal to the west of the Project Area. The Project proposes to use underground pipes to carry the water currently in the canals.

The canal is a typically constructed open irrigation canal, filled from a diversion weir with outlet gates at the southwest and northwest corners that have the appearance of more modern construction. The canal is fed by underground pipes connected to the Putah South Canal to the west. The canal is concrete-lined, 20 feet across at the top, and appears to be v-shaped with steep slopes and a flat, broad berm that was likely cut with modern machinery. The canal surrounds the west, north, and eastern boundaries of the Project and is 6,294 feet (1.19 miles) in total length, with a weir at both the southwest end and northwest corner, a culvert and overcrossing at the northeast corner, and a control gate at the southeast end.

Figure 11. Byrnes Canal (FAC-001) overview from southwest corner (view north) June 15, 2017.

FC-004: Historic-Period Garage

This Ranch-style garage is located within the residential lot within the southwestern corner of the Project Area (Figure 12). No building information was found as a result of the APN search, and exhaustive archival research revealed no previously unknown additional property or owner information. The 1968 aerials may reveal a structure at the location of the garage, but the tree canopy obscures the area.

A concrete foundation pad (Figure 13) is located west of the garage and could have been the location of the original residence on the property (no longer extant), which may have been the same age as the garage. The current residence was built in the 1990s and is located to the north of the garage. The concrete is set, rather than poured, and does not contain temper or aggregate. This may indicate that it is more recent than the garage.

Figure 12. Garage (FAC-004) overview (view northeast) June 15, 2017.

Figure 13. Concrete foundation next to garage (view east). June 15, 2017.

6.0 EVALUATION OF ELIGIBILITY

The segment of previously recorded resource P-48-001025, the Vaca Valley Railroad grade, and the newly identified resources, FAC-001 (Byrnes Canal segment), and FAC-004 were evaluated for eligibility for the CRHR and NRHP.

6.1 Federal Evaluation Criteria

Under federal regulations implementing Section 106 of the NHPA (36 CFR 800), cultural resources identified in the Project Area must be evaluated using NRHP eligibility criteria. The eligibility criteria for the NRHP are as follows (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 aspects of integrity of location, design, setting, materials, workmanship, feeling, association, and

(a) is associated with events that have made a significant contribution to the broad patterns of our history;
(b) is associated with the lives of a person or persons significance in our past;
(c) embodies the distinctive characteristics of a type, period or method of construction, or represents the work of a master, or possesses high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction; or
(d) has yielded or may be likely to yield information important in prehistory or history.

In addition, the resource must be at least 50 years old, except in exceptional circumstances (36 CFR 60.4).

Historical buildings, structures, and objects are usually eligible under Criteria A, B, and C based on historical research and architectural or engineering characteristics. Archaeological sites are usually eligible under Criterion D, the potential to yield information important in prehistory or history. An archaeological test program may be necessary to determine whether the site has the potential to yield important data. The lead federal agency, in this case, USACE, makes the determination of eligibility based on the results of the test program and seeks concurrence from the State Historic Preservation Officer (SHPO).

Effects to NRHP-eligible resources (historic properties) are adverse if the project may alter, directly or indirectly, any of the characteristics of an historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

6.2 State Evaluation Criteria

Under state law (CEQA) cultural resources are evaluated using CRHR eligibility criteria in order to determine whether any of the sites are Historical Resources, as defined by CEQA. CEQA requires that impacts to Historical Resources be identified and, if the impacts would be significant, that mitigation measures to reduce the impacts be applied.

An Historical Resource is a resource that meets the following criteria:

1) is listed in or has been determined eligible for listing in the CRHR by the State Historical Resources Commission;
2) is included in a local register of historical resources, as defined in Pub. Res. Code 5020.1(k);
3) has been identified as significant in an historical resources survey, as defined in Pub. Res. Code 5024.1(g); or
4) is determined to be historically significant by the CEQA lead agency [CCR Title 14, Section 15064.5(a)]. In making this determination, the CEQA lead agency usually applies the CRHR eligibility criteria.

For this Project, only the fourth definition of an Historical Resource is applicable because there are no resources previously determined eligible or listed on the CRHR, there are no resources included in a local register of historical resources, and no resources identified as significant in a qualified historical resources survey.

The eligibility criteria for the CRHR are as follows [CCR Title 14, Section 4852(b)]:

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the U.S.;
(2) It is associated with the lives of persons important to local, California, or national history.
(3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or
(4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition, the resource must retain integrity. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association [CCR Title 14, § 4852(c)].

Historical buildings, structures, and objects are usually eligible under Criteria 1, 2, and 3 based on historical research and architectural or engineering characteristics. Archaeological sites are usually eligible under Criterion 4, the potential to yield information important in prehistory or history. Cultural resources determined eligible for the NRHP by a federal agency are automatically eligible for the CRHR.

Impacts to an Historical Resource (as defined by CEQA) are significant if the resource is demolished or destroyed or if the characteristics that made the resource eligible are materially impaired [CCR Title 14, § 15064.5(a)].

P-48-001025 (Vaca Valley Railroad segment). This historic-period railroad segment has its original association with the early development of towns (specifically of Vacaville and Elmira), passenger commuting, and transportation of agricultural commodities in Solano County. It served both as a passenger and freight railroad and transported the fruit and nuts produced in the area. The railroad was important in the economic development of Vacaville because it connected Vacaville with the rest of California and stimulated the production of wheat, fruits, and nuts around Vacaville by providing transportation to markets. Therefore, P-48-001025 is associated with a significant event (early economic development of the Vacaville area) and is eligible under NRHP Criterion A and CRHR Criterion 1.

The Vaca Valley Railroad was built by the Northern Railway Company, of which Charles Crocker was president (Robertson 1998). Crocker was one of the Big Four (Leland Stanford, Collis Huntington, Mark Hopkins, and Charles Crocker) who were owners and investors in the transcontinental railroad

and many other railroads in California that eventually were merged into the Southern Pacific Railroad. Thus, the Vaca Valley Railroad has some association with an important historical person, Charles Crocker. However, this railroad was only a small segment in the network of railways developed by Crocker and the Big Four, and its association with Crocker is not significant. Therefore, this railroad segment does not demonstrate association with the lives of persons significant in history and is not eligible under NRHP Criterion B or CRHR Criterion 2.

The features of the railroad that would make it significant and eligible under NRHP Criterion C/CRHR Criterion 3 would be those related to the original construction of the line or its major periods of use that exhibit important characteristics such as construction techniques and engineering features of those periods. This railroad segment does not represent the work of a master, nor does this segment have any significant engineering characteristics. However, this segment exhibits unusual, atypical features and type or method of construction. The absence of ballast rock, with the wooden ties laying on bare ground, is somewhat unusual, but does not appear to represent a significant engineering achievement. Rather, it was likely a cost-saving measure. Therefore, this segment of P-34-001029 does not have elements that would make it eligible under NRHP Criterion C or CRHR Criterion 3.

The information potential in railroads lies in their alignment and route. The alignment and route of the vast majority of railroads in the U.S., including P-48-001025, were recorded relatively accurately in historical maps and records; thus the information regarding its historical alignment is provided in the archival record. Furthermore, P-48-001025 does not possess the potential for subsurface archaeological deposits, and, accordingly, was not tested. This railroad does not possess the potential to yield any additional information regarding the relationship or functionality of railroads, nor does it provide any information that is not already represented in the archival record. Therefore, the abandoned segment of the Vaca Valley Railroad segment is not eligible under NRHP Criterion D or CRHR Criterion 4.

The Vaca Valley Railroad segment lacks integrity. The railroad grade berm is present, but in a state of significant deterioration. Impacts from erosion, vegetation overgrowth, and bioturbation have left the grade appearing as a small trail (Figure 10). Further, the other elements of the railroad, the ties and rails, are no longer present. Therefore, this resource does not retain its integrity of workmanship. Although the railroad retains its integrity of location because it remains in the place it was originally constructed, the combination of elements that created the original form, space, and structure of the railway, along with the physical elements that were placed in a particular pattern and configuration are no longer represented. Therefore, much of its integrity of design and materials have been compromised by the removal of the materials that were central to its function (rails and ties). The physical environment in which the historic property was used is no longer present due to modern traffic and continued modern agricultural activities. It does not express the aesthetic or historic sense of the time period of significance. Therefore, it does not retain integrity of setting or feeling. It no longer conveys any direct link to an important event such as the early economic development of the area, and thus does not retain integrity of association.

Although the Vaca Valley Railroad (P-48-001025) appears to be associated with a significant historical event (early economic development of the area), the remaining railroad grade does not retain sufficient integrity to convey this association. Thus, the Vaca Valley Railroad is evaluated as not eligible for inclusion in the National Register of Historic Places because of lack of integrity.

FAC-001 (Byrnes Canal). The Byrnes Canal is a water conveyance facility for agricultural irrigation which draws water from the larger Putah South Canal (outside the Project Area to the west). Water conveyance canals provide infrastructure essential for community development and are thus important to the communities they serve. Water supply was pivotal to the development of agriculture in California, and irrigation canals helped provide an essential water supply for the development of farming communities. For a water conveyance system such as FAC-001 to be eligible under Criterion A, it must be demonstrated that it is associated with an important event or a pattern of events, such as the development of irrigated farming in the Vacaville/Elmira area of the valley. Additionally, the association must be demonstrated as important as opposed to merely coexistent.

The Byrnes Canal was built sometime after 1962 when the Putah South Canal was completed. It was likely privately constructed, (exhaustive historical research did not reveal a specific date of construction or company contractor), and became part of the irrigation conveyance system established by the Solano Project, which distributed water from the dam at Monticello, which created Lake Berryessa on Putah Creek. The Byrnes Canal and the Putah South Canal is administered and maintained by the Solano Irrigation District. Thus, the Byrnes Canal is only a minor component of the greater Solano Project, constructed in the 1950s. The Solano Project was constructed too late to have been associated with the original development of irrigation districts to provide water for agriculture in the Sacramento Valley organized following passage of the Wright Act of 1887. Therefore, the Byrnes Canal is not associated with significant historical events and is not eligible under NRHP Criterion A or CRHR Criterion 1.

The persons associated with the original construction of the Byrnes Canal are unknown and not mentioned in historical documents. It may have been constructed by one of many farmers who also built or purchased irrigation ditches and water from the Solano Irrigation District supplied by the Putah South Canal. The conceptual pioneers, builders, and engineers of the Putah South Canal and the dam at Monticello were not associated with the offshoot canals that were established in later years from their initial irrigation engineering endeavors. There are no other indications that the Byrnes Canal is associated with any other specific persons significant in the history of the region, county, or state. Therefore, the Byrnes Canal does not appear to be eligible under NRHP Criterion B/CRHR Criterion 2.

The Byrnes Canal is of typical construction for the time period (1962-1968) and there is nothing in the construction or engineering that required a unique or revolutionary engineering technique that might make the canal eligible under this criterion. It is one of numerous small irrigation canals of similar age and construction connected to and fed by a larger system. Therefore, the Byrnes Canal is not eligible under NRHP Criterion C or CRHR Criterion 3.

As historic engineering structures, canals can occasionally be recognized for the important information they may yield regarding historic construction material or technologies. The Byrnes Canal, like many in the Central Valley, is well documented and is not a principal source of information in this regard. There are no associated artifacts that could provide important information. Therefore, the Byrnes Canal is not eligible under NRHP Criterion D or CRHR Criterion 4.

The Byrnes Canal largely retains all aspects of integrity. It remains in the original location where it was constructed, within the same type of agricultural environment, and largely still expresses the aesthetic sense of the mid to late twentieth century due to the lack of modern development in the

immediate vicinity. Therefore, the Byrnes Canal retains its integrity of location, setting, and feeling. Although it has been regularly maintained, and portions of the features have been recently painted, the combination of elements that create the form, plan and space still remain intact, as do the elements that were combined to create the specific configuration of the canal. It still expresses the physical evidence of the typical methods of 1960s irrigation canal construction. It therefore largely retains integrity of design, materials, and workmanship, and association.

Regardless of integrity, the Byrnes Canal (FAC-001) is evaluated as not eligible for the NRHP or CRHR under any criteria.

FAC-004 (Historic-Period Garage). No information was found in the archival record to suggest that the garage is associated with an important historical event or contributed to the broad patterns of history. The garage clearly was built in association with a house (no longer extant). The house may have stood on an associated concrete foundation pad. The garage (and likely the house) was built in the Ranch style and first appeared on maps in 1953. Thus, the house and garage are not associated with the early development of agriculture in the Vacaville area, which took place in the late nineteenth and early twentieth centuries. In addition, the garage is not associated with any existing historic district. Therefore, the garage and associated foundation are not associated with any significant historical events and are not eligible under NRHP Criterion A or CRHR Criterion 1.

The archival research for the property that contains the garage and associated foundation revealed that the original residence on the property is not significantly associated with any important person who contributed to local, state, or national history. Ultimately, the archival record failed to identify any significant individual or important person associated with the property. Therefore, the garage is not associated with the lives of persons significant in the past and is not eligible under NRHP Criterion B or CRHR Criterion 2.

The garage is a simple building with some minor influence from the Ranch style of architecture. The Ranch style characteristics in this building are the side gable roof, simple rectangular footprint, and wood-framed exterior with exposed rafters. Though the garage contains some elements of Ranch style, it is designed as a supporting structure to the primary residence (no longer extant) and does not contain any design features that are distinctive of high-style Ranch architecture and lacks context without the original residential building that no longer exists. The construction techniques are standard and the simplicity of design of the garage suggests the builder is not considered a master in Ranch style or any other architecture or building practice. The techniques employed for construction and maintenance of the garage were not unique and were in existence prior to construction of the building, and therefore are not historically significant. The garage does not embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master, or possess high artistic values, or possess any significant distinguishable components. Therefore, the garage and foundation are not eligible under NRHP Criterion C/CRHR Criterion 3.

There are no associated artifacts with the foundation and garage. Further, the garage and foundation do not have the potential to yield information important in prehistory or history and archival research potential has been exhausted with no demonstrated potential to yield additional information. Therefore, the garage and foundation are not eligible under NRHP Criterion D or CRHR Criterion 4.

The site visit and review of available historical information for the garage and foundation indicate that the garage retains integrity of location, setting, and some materials. The building appears to have never moved and remains within its relatively rural setting on the outskirts of Vacaville. The garage remains structurally intact and has received only minor maintenance over the years, thus retaining many of its original materials and workmanship. However, the original design, association, and feeling is diminished significantly without the original associated residence. Overall, the garage appears to retain integrity of location, materials, workmanship, and setting, but fails to retain integrity of design, feeling, or association.

Regardless of integrity, the building is evaluated as not eligible under any criteria for the NRHP and CRHR.

7.0 MANAGEMENT CONSIDERATIONS

7.1 Conclusions

Newly recorded resources FAC-001, a segment of the Byrnes Canal; and FAC-004, an historic-period garage and concrete foundation; and previously recorded resource, a segment of the Vaca Valley Railroad (P-48-001025), were evaluated using the NRHP and CRHR criteria and were found not eligible for the NRHP or CRHR.

If a 404 permit is necessary for the project and the USACE determines that the sites within the Project Area are ineligible for the NRHP and are not historic properties, and the SHPO concurs, no mitigation measures for identified cultural resources in the Project Area will be necessary under Section 106. If the CEQA lead agency determines that the resources in the Project Area are ineligible for the CRHR and, therefore, are not Historical Resources for the purpose of CEQA, no mitigation measures for identified cultural resources will be necessary under CEQA. Until the lead agencies concur with the identification and evaluation of eligibility of cultural resources, including archaeological sites and standing structures, no ground-disturbing activity or demolition should occur.

7.2 Likelihood for Subsurface Cultural Resources

Due to the presence of alluvium along Alamo Creek, and given the likelihood of prehistoric archaeological sites located along perennial waterways, there exists the potential for undiscovered buried prehistoric archaeological sites in the Project Area.

7.3 Post-Review Discoveries

There always remains the potential for ground-disturbing activities to expose previously unrecorded cultural resources. Both CEQA and Section 106 of the NHPA require the lead agency to address any unanticipated cultural resource discoveries during Project construction. Therefore, ECORP recommends the following mitigation measures be adopted and implemented by the lead agency to reduce potential adverse impacts to less than significant:

- If subsurface deposits believed to be cultural or human in origin are discovered during construction, all work must halt within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for

prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgment. The following notifications shall apply, depending on the nature of the find:

- If the professional archaeologist determines that the find does not represent a cultural resource, work may resume immediately and no agency notifications are required.
- If the professional archaeologist determines that the find does represent a cultural resource from any time period or cultural affiliation, he or she shall immediately notify USACE, the lead CEQA agency, and applicable landowner. The agencies shall consult on a finding of eligibility and implement appropriate treatment measures, if the find is determined to be eligible for inclusion in the NRHP or CRHR. Work may not resume within the no-work radius until the lead agencies, through consultation as appropriate, determine that the site either: 1) is not eligible for the NRHP or CRHR; or 2) that the treatment measures have been completed to their satisfaction.
- If the find includes human remains, or remains that are potentially human, he or she shall ensure reasonable protection measures are taken to protect the discovery from disturbance (Assembly Bill [AB] 2641). The archaeologist shall notify the Solano County Coroner (per § 7050.5 of the Health and Safety Code). The provisions of § 7050.5 of the California Health and Safety Code, § 5097.98 of the California Public Resources Code, and AB 2641 will be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, the Coroner will notify the NAHC, which then will designate a Native American Most Likely Descendant (MLD) for the project (§ 5097.98 of the Public Resources Code). The designated MLD will have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (§ 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (§ 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a reinternment document with the county in which the property is located (AB 2641). Work may not resume within the no-work radius until the lead agencies, through consultation as appropriate, determine that the treatment measures have been completed to their satisfaction.

The lead agency is responsible for ensuring compliance with these mitigation measures because damage to significant cultural resources is in violation of CEQA and Section 106. Section 15097 of Title 14, Chapter 3, Article 7 of CEQA, *Mitigation Monitoring or Reporting*, "the public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects. A public agency may delegate reporting or monitoring responsibilities to another public agency or to a private entity which accepts the delegation; however, until mitigation measures have been completed the lead agency remains responsible for ensuring that implementation of the mitigation measures occurs in accordance with the program."