NASA Ames Research Center

Archaeological Resources Study

Prepared for:

Prepared by:

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1. INTRODUCTION

1.1 Project Description

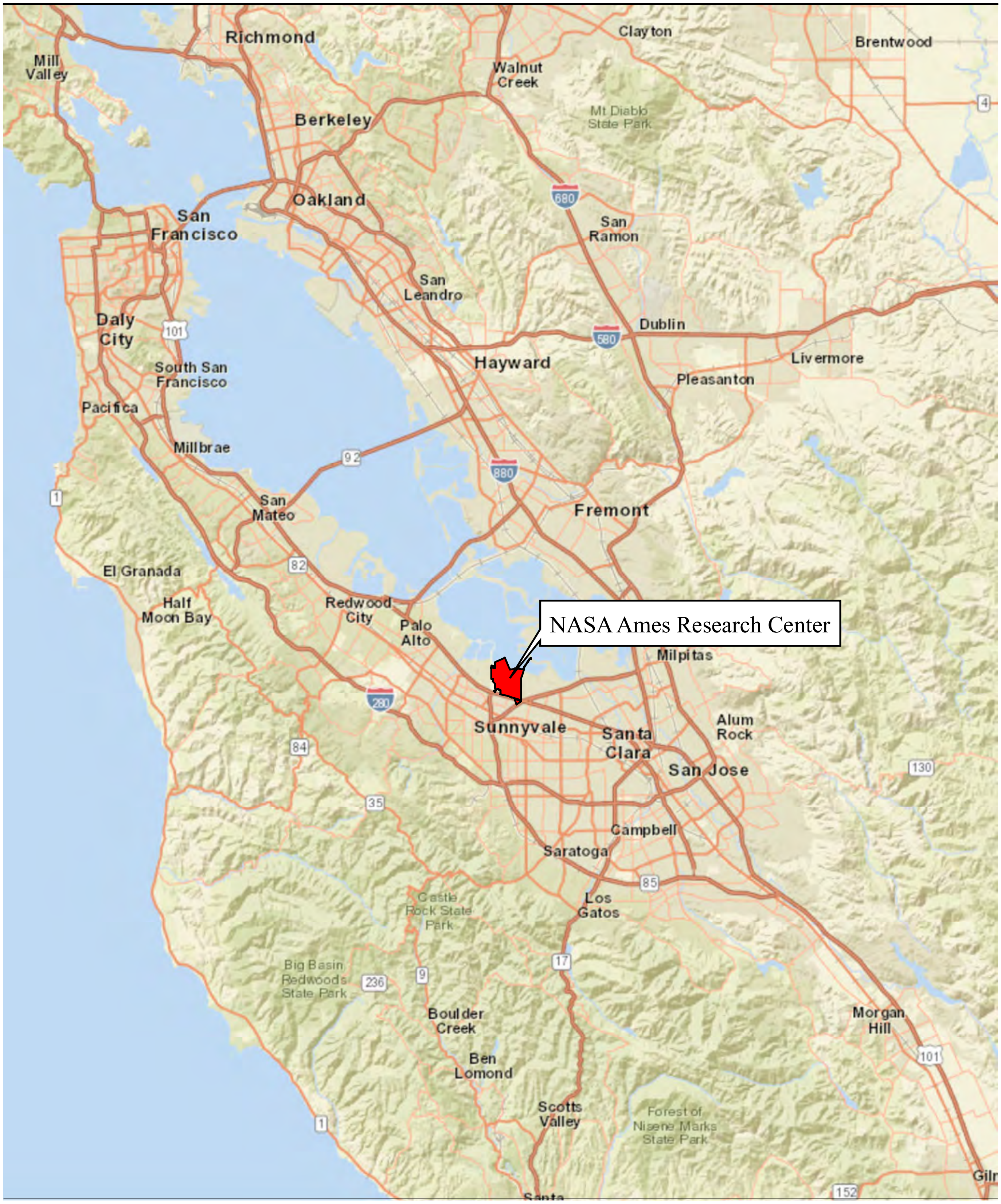
Ames Research Center (ARC) is one of 13 National Aeronautics and Space Administration (NASA) Centers and component facilities in the United States. It is located at Moffett Field, adjacent to Sunnyvale and Mountain View, California, at the south end of San Francisco Bay (Figure 1). ARC encompasses 1,864 acres owned and managed by NASA, and is currently divided into separate areas: Ames Campus; Bay View; California Air National Guard; Eastside Airfield; NASA Research Park; Runway Protection Zone; and Wetlands (Figure 2). The Ames Campus contains scientific facilities operated under NASA. The NASA Research Park and Eastside Airfield contain properties developed and formerly owned by the U.S. Navy that were part of Naval Air Station (NAS) Sunnyvale (later Moffett Field) and transferred to NASA in 1994. Eastside Airfield and the Bay View areas are NASA-owned and currently leased. Some areas of ARC are undeveloped, which are primarily wetlands or munitions buffer zones, and an extension of East Patrol Road, northeast of the ARC boundaries.

NASA assumes responsibility as the federal lead agency for all undertakings at ARC under the National Historic Preservation Act (NHPA) of 1966, as amended (54 United States Code [U.S.C.] 300101 et seq.), and its implementing regulations (36 Code of Federal Regulations [C.F.R.] Part 800). In support of NASA's obligations under NHPA, this Archaeological Resources Study was prepared to identify the potential for archaeological resources at ARC to inform and guide NASA's management of archaeological cultural resources. This study also supports ARC's Integrated Cultural Resources Management Plan (ICRMP), which contains guidance for the treatment of both archaeological and built environment cultural resources. The study area contains the entire ARC site (see Figure 2).

This Archaeological Resources Study consists of a desktop survey of archival resources and a geoarchaeological assessment. The study contains the results of archival research, including a records search at the Northwest Information Center (NWIC) for previous surveys and previously recorded resources, a Sacred Lands File search from the Native American Heritage Commission (NAHC), and a review of historic maps. It also contains background information describing the prehistoric and historic context for potential archaeological resources at ARC. A database of hundreds of previous geotechnical investigations conducted at ARC was reviewed as part of the geoarchaeological assessment. The study assesses the soils and potential patterns of settlement that indicate archaeological sensitivity and the potential for buried archaeological resources at ARC.

1.2 Preparers

The AECOM project team meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (36 C.F.R. Part 61). Stephanie Jow, M.A., RPA, prepared this study with contributions from Jay Rehor, M.A., RPA; Kathleen Kubal, M.A., RPA; Jennifer Redmond, M.A., RPA; and Trina Meiser, M.A. Resumes of key personnel are included in Appendix A. Jay Rehor, Justin Sorensen, Nick Janssen, and Brian Spelts prepared the graphics for this report. Daniel Cassedy, PhD, RPA, provided technical review.



Source: ESRI 2014

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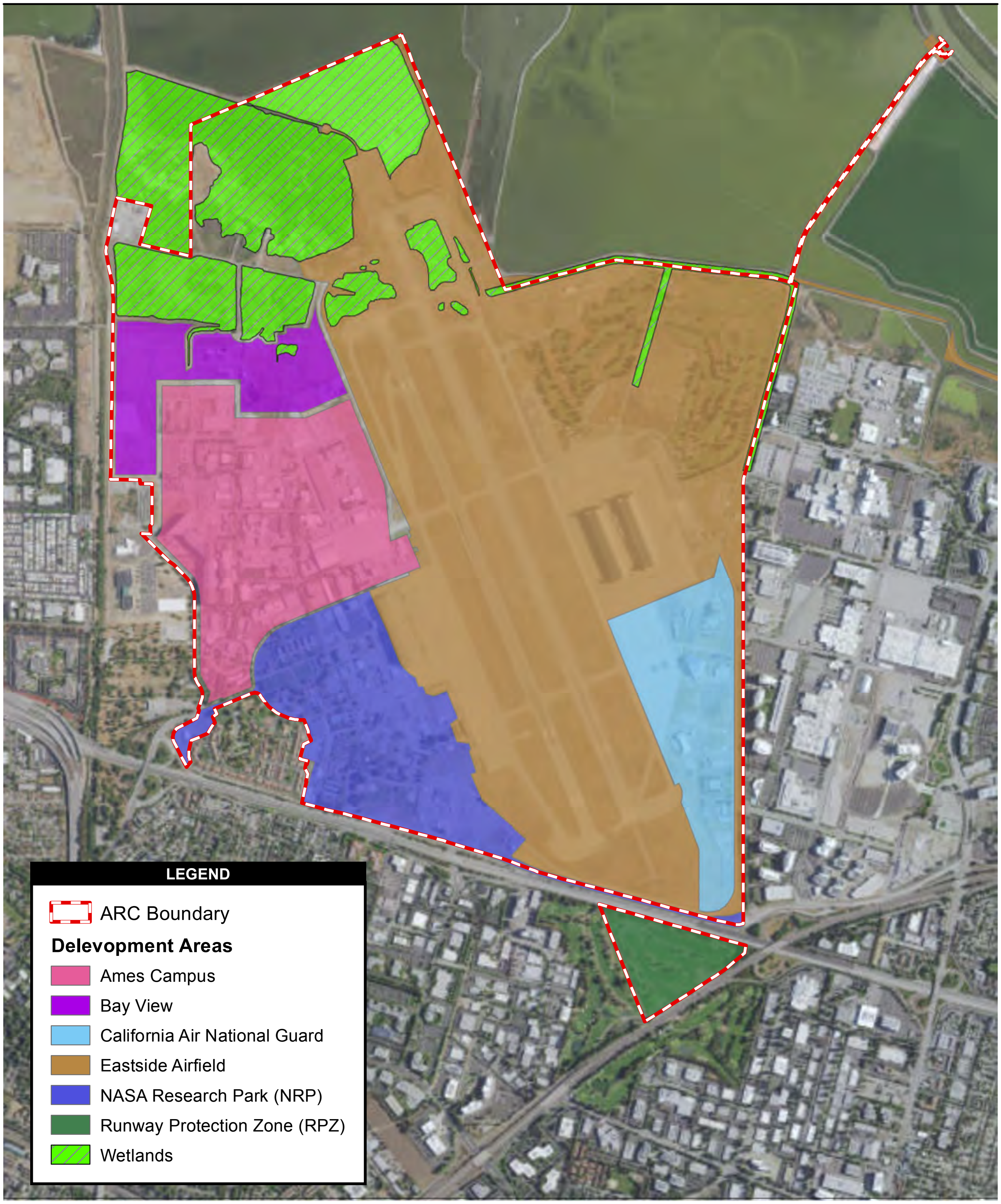
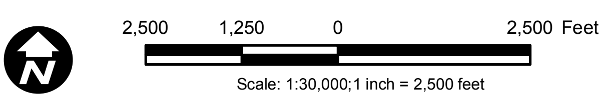
Location Map



Source: ESRI 2014; Bing 2014



ARC

Figure 2

2. CULTURAL SETTING

2.1 Prehistoric and Ethnohistoric Context

The earliest well-documented entry and spread of native peoples throughout California occurred at the beginning of the Paleo-Indian Period (12,000–8000 years Before Present [B.P.]), and social units are thought to have been small and highly mobile. Known sites have been identified in the contexts of ancient pluvial lakeshores and coastlines, as evidenced by such characteristic hunting implements as fluted projectile points and flaked stone crescent forms. Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers working in the Bay Area since the early 1900s, as summarized by Fredrickson (1974) and Moratto ([1984] 2004).

Few archaeological sites have been found in the Bay Area that date to the Paleo-Indian Period or the subsequent Lower Archaic (8000–5000 B.P.) time period, probably because of high sedimentation rates and sea level rise. However, archaeologists have recovered a great deal of information from sites occupied during the Middle Archaic Period (5000–2500 B.P.). By this time, broad regional subsistence patterns gave way to more intensive procurement practices. Economies were more diversified, possibly including the introduction of acorn-processing technology, and populations were growing and occupying more diverse settings. Permanent villages that were occupied throughout the year were established, primarily along major waterways. The onset of status distinctions and other indicators of growing sociopolitical complexity mark the Upper Archaic Period (2500–1300 B.P.). Exchange systems became more complex and formalized, and evidence of regular sustained trade between groups was more prevalent.

Several technological and social changes characterize the Emergent Period (1300–200 B.P.). Territorial boundaries between groups became well established, and it became increasingly common for distinctions in an individual's social status to be linked to acquired wealth. In the latter portion of this period (500–200 B.P.), exchange relations became highly regularized and sophisticated. The clamshell disk bead became a monetary unit, and specialists arose to govern various aspects of production and material exchange.

The Middle Archaic, Upper Archaic, and Emergent Periods can be broken down further, according to additional cultural manifestations that are well represented in archaeological assemblages in the Bay Area:

- Windmiller Pattern (5000–1500 B.P.) peoples placed an increased emphasis on acorn use and on a continuation of hunting and fishing activities. Ground and polished charmstones, twined basketry, baked clay artifacts, and worked shell and bone were hallmarks of Windmiller culture. Widely ranging trade patterns brought goods in from the Coast Ranges and trans-Sierran sources, as well as from closer trading partners.
- Berkeley Pattern (2200–1300 B.P.) peoples exhibited an increase in the use of acorns as a food source, compared to what was seen previously in the archaeological record. Distinctive stone and shell artifacts differentiated this period from earlier or later cultural expressions. Burials were most often placed in a tightly flexed position and frequently included red ochre.

- The Augustine Pattern (1300–200 B.P.) reflected increasing populations, resulting from more intensive food procurement strategies, as well as from a marked change in burial practices and increased trade activities. Intensive fishing, hunting and gathering, complex exchange systems, and a wider variety in mortuary patterns are all hallmarks of this period.

Ethnographic and archaeological research indicates that the study area falls within the traditional boundaries of the Ohlone, whose territory stretched from San Francisco Bay at the north to the southern tip of Monterey Bay, extending 60 miles inland (NASA 2002). The primary social organization of this group was centered around the patrilineal family unit, with a focus on patrilocality, and sovereign tribelets were often defined by territorial holdings (Bennyhoff 1977). ARC is located on Ramaytush and Tamyen (Tamien) lands of the Ohlone sphere of influence and has been specifically associated with the Posol-mi tribelet (a place name likely associated with the Rancho Posolmi, below) (Kroeber 1925; NASA 2009). The total number of individuals residing in this area has been estimated to be as high as 1,200 at the time of European contact; however, the combined effects of missionization and European-borne diseases had a heavy toll on these communities, nearly decimating the population and traditional practices (NASA 2009).

2.2 Historic Context

2.2.1 Spanish Period

The Spanish explored the Aliso-San Jose area as early as 1769, beginning with the expedition of Gaspar de Portola and Father Juan Crespi. In 1772, another expedition led by Juan Bautista de Anza and Father Pedro Font began exploring the inner coastal region of California, reaching the lower Guadalupe River in 1776. As part of their expansion into the area, the Spanish established a permanent presence with presidios, missions, and secular towns in California, including Mission Santa Clara de Asis and the Pueblo of San Jose de Guadalupe, both of which are in the vicinity of the study area.

The Spanish recognized the agricultural potential of the Santa Clara Valley, particularly the fertile soil, mild climate, and abundant surface water of northwest Santa Clara County. With the ability to support an agricultural population, the area was an ideal location for the establishment of a mission, and Mission Santa Clara de Asis was founded on the west bank of the Guadalupe River in 1777. The mission was destroyed and rebuilt on six successive occasions, all of which are several miles south of the study area; however, mission lands did extend into present-day Mountain View. Mission Santa Clara was essentially a self-sufficient economic (primarily agricultural) entity, which occupied extensive lands surrounding the church and other mission buildings. Between 1782 and 1832, the mission harvested approximately 118,000 bushels of grain and produce, and in 1832 it had the second largest livestock herd among northern missions, a total of 20,320 animals (10,000 cattle, 9,500 sheep, 55 swine, 730 horses, and 35 mules) (California Mission Resource Center 2016). Of the seven missions located within Costanoan territory, Mission Santa Clara probably had the greatest impact on the aboriginal population living in the vicinity of the study area.

Due to the agricultural potential of the Santa Clara Valley, the Spanish also established the Pueblo of San Jose de Guadalupe on the east bank of the Guadalupe River in 1777. The pueblo was moved from its original location to another location approximately 1 mile south due to flooding. Its final location was about 9 miles southeast of the study area (San Jose). The first of three civil settlements founded in Alta California, the pueblo's primary function was to supplement the crops grown by missions to support the garrisons at Monterey and San Francisco. The Spanish philosophy of government between 1797 and 1822 had involved ownership of the land by the Crown, and the founding of presidios, missions, and secular towns. Settlers were allotted house lots and cultivation plots but the Spanish Crown retained ownership of the land. Settlers could not sell their land or divide it; therefore, much of the property within the pueblo remained in possession of the descendants of the original colonizing settlers until the American Period. The common lands surrounding the pueblo were used primarily for grazing the livestock of the pueblo inhabitants.

The major transportation routes during this period were little more than trails. These included The Alameda that follows the old route between the Pueblo of San Jose de Guadalupe and Mission Santa Clara; Trimble Road that closely follows the trail between Mission Santa Clara and its corn fields, near present-day Milpitas; and the old Spanish trail between Mission Santa Clara and Mission Santa Cruz (Highway 17), all of which are south of the study area. Modern-day U.S. Highway 101 follows the general route of the original El Camino Real trail, a portion of which lies adjacent to the study area. El Camino Real was a primary north-south trail on the coast, connecting the missions, pueblos, and presidios in Alta California.

2.2.2 Mexican Period

In 1822, Mexico revolted against Spain and, in 1834, the missions became secularized. Mexican policies emphasized individual land ownership rights. Large tracts of land were granted to individuals during this time, including lands formerly in control of the missions, which had reverted to public domain. The lands farthest from the pueblos and missions were usually granted first. Valley and uplands acreage, as well as access to a water supply, were also usually included in the grants.

In 1844, the Rancho Posolmi was granted by Governor Micheltorena to Lopez Iñigo (also Inigo or Ynigo), a Native American documented as living in the vicinity of present-day Mountain View and farming what would become ARC lands (NASA 2009; Garaventa and Anastasio 1991). Iñigo and others occupied the area from as early as 1834, and by 1840 the group reportedly had about 100 cattle, 200 sheep, and 50 horses, as well as 300 to 400 acres under cultivation in wheat, corn, beans, and other crops (Salzman and Chavez 1984). Iñigo is thought to have lived on-site until his death in 1864, and his interment is believed to be located within the boundaries of the recorded archaeological resource CA-SCL-12/H (just outside the study area).

A small portion of the study area is also situated on Rancho Pastoria de las Borregas. Jose Mariano Estrada petitioned for this grant for himself and his son. Rancho Pastoria was finally granted to the son, Francisco M. Estrada, in 1842 by Governor Juan B. Alvarado. That same year, however, Jose Mariano Estrada sold the entire land grant to Mariano Castro, who in turn sold a portion of the rancho to Martin Murphy, Sr., in 1849.

2.2.3 American Period

The American Period began with the signing of the Treaty of Guadalupe Hidalgo in 1848, which was the basis for establishing the rights of Mexicans to land title within the conquered territories.

Under American law, the burden of proof was placed on the individuals seeking confirmation of private land claims. While this discouraged fraudulent claims from being filed, valid claims took an average of 17 years for the final patent to be issued; some took longer (Perez 1982). A claim for Rancho Poslomi was filed with the U.S. Public Land Commission in 1852 and the grant was patented in 1881.

Following the acquisition of California by the United States in 1848, the discovery of gold in the Sierra foothills resulted in a massive influx of people from the continental United States, Europe, Mexico, South America, and Asia. Those who failed to strike it rich mining for gold often stayed. The agricultural wealth of the Santa Clara Valley attracted settlers, and during the 1850s there was a significant influx of agriculturalists. Many ranchos were divided and sold. As shown on the 1859 Plat (Figure 3), Rancho Posolmi was divided into three parts: the upper left 448.02 acres were given to Iñigo's descendants; 847.98 acres, nearly half of the rancho, were given to Robert Walkinshaw; and the remaining 400 acres went to Thomas Campbell. Three buildings are observed on Campbell's property (Whisman's, Morse, and Mann) and four are present on Walkinshaw's land [Emmerson, and Ynigo's (Iñigo)], including three buildings associated with Ynigo's (Iñigo) community. In addition, the 1859 Plat depicts a north-south road to Wiseman's Landing that bisects the ARC boundary, and the road connecting Mountain View and Alviso (present-day Highway 237) and the Old San Francisco Road (El Camino Real) are nearby. No buildings associated with the Rancho Pastoria de las Borregas are depicted within the study area on its 1857 Plat; however, the present-day towns of Mountain View and Sunnyvale would later be established within its boundary.

Circa 1860, German immigrant John G. Jagels built a dock, warehouses, and other structures along the slough at the north end of the ARC study area, in order to ship the Santa Clara Valley's hay, grain, and produce. It is unclear how long the shipping operations continued at this location, but structures (as well as the name, Jagels' Landing) are shown on maps of this location well into the 20th century (Figure 5). In 1920, the South Shore Port Co. dredged a slough at the old Jagels' Landing out to the bay, hoping it would become a major deep water port. Ferry and freight service to San Francisco began in 1923, followed by subsequent development, including an amusement park and large saltwater swimming pool called Kingsport Plunge that opened in 1925. However, due to competition from other ferry service ports along the South Bay, and the increasing dominance of the automobile, the company declared bankruptcy soon after in 1927.

Until the drought of 1864, cattle ranching established during the Mexican Period continued to be the primary economic activity in the Santa Clara Valley. The primary agricultural crop of the era was grain crops, including barley and especially wheat. By 1854, Santa Clara County was producing 30 percent of California's total wheat crop and, by 1870, nearly all of rural Santa Clara County focused on barley and wheat. With the completion of the Transcontinental Railroad in 1869, San Jose, Santa Clara, and Milpitas were now connected to the national and world economies, which opened new agricultural and manufacturing markets for the Santa Clara Valley. In the 1870s and 1880s, farmers increased numbers of cows for milk and butter, sheep for wool, poultry for eggs, swine for meat, hay, grapes, and fruit trees in an attempt to protect themselves during bad crop years. Agricultural experimentation and the expansion of markets via the railroad supported the development of more labor-intensive and profitable farming on smaller parcels in the valley.

The following content was redacted from this public posting:

Figures 3-5

In 1876, Thompson and West published a land ownership map of Santa Clara County. As shown in Figure 4, this map demonstrates that ownership of land within the study area and surrounding region had become more diverse than it had been during the Mexican and early American Periods. The former Rancho Posolmi (labeled Ynigo Reservation) was divided into six parcels ranging in size from approximately 680 acres (Walkinshaw) to 155 acres (Jenkins). All parcels changed ownership, and it appears that only Whisman's building, first depicted on the 1858 Plat, was still standing, although several new buildings appear to have been built between 1858 and 1876. The public lands immediately west and northwest of Posolmi were divided into more than a dozen small parcels all under 200 acres and sold to different landowners. Several buildings from these parcels are located in the study area. Although general land use patterns had transitioned to farming on smaller parcels, a few large blocks of land owned by an individual or family did still exist in 1876. Over 4,000 acres of the former Rancho Pastoria de las Borregas, purchased by Martin Murphy in the 1850s, remained under his control as of 1876; however, by 1870, the U.S. agricultural census reports Murphy's farm contained only 1,000 acres of improved lands, suggesting that he too began to divide and sell portions of his vast land holdings. Data for the majority of these farms was found in the 1870 U.S. agricultural census. As shown in Table 1, these farms exemplify the dominance of wheat and raising meat on farms during the 1860s and 1870s.

Innovations in refrigeration and preservation after 1875 spurred broad agricultural development, particularly in fruit farming. The refrigerated car was in widespread use by the mid-1880s, which allowed for the transport of massive quantities of fresh fruit to large eastern markets (Anastasio and Garaventa 1987/88). As a result, grain fields were divided and replaced with orchards, and by 1900, Santa Clara County was the leading county in fruit production in the State of California. Bolstered by a burgeoning agricultural economy and other emerging industries, many communities in the valley were becoming more urbanized and sought to become established cities, including Mountain View, located a few miles south of the study area.

The town of Mountain View was established in 1850 as a stagecoach stop along El Camino Real. By 1854, two general stores, a blacksmith shop, hotel, saloon, and barn had been established and the community was quickly populating both sides of El Camino Real (Mountain View Historical Society 2002). With the arrival of the railroad in 1864, the town shifted its focus to building businesses along the tracks, which was nearly a mile from its original location at the intersection of El Camino Real and Grant Road. A "New" Mountain View was thus created as the "Old" Mountain View gradually declined in importance.

The New Mountain View continued to grow at the turn of the 20th century and had enough residents by 1902 to be incorporated. As reported on the 1904 Sanborn map, its population was estimated to be 1,000 and the town had established several hotels, a hardware store, bank, and Baptist church, as well as various agricultural-related facilities, including: the Mountain View Fruit Exchange, a slaughter house, winery (although not in operation), several lumber yards, a hay warehouse, and a vacant cannery and packing building (Sanborn Map Company 1904). By 1921, Mountain View had doubled its population and expanded its boundaries north of the railroad and southward to the Old Mountain View. As reflected on the 1921 Sanborn map, it also grew in complexity with the addition of several schools, churches, auto sheds and garages, a publishing company, public library, and City Hall, although it continued to function primarily as

Table 1. Livestock and Agricultural Production of 1870 Farms in the Study Area

	Walkinshaw Farm	Bailey Farm	Jenkins Farm	Frink Farm	Gallimore	Whelan	Crittenden	Snyder	Murphy
No. of Improved acres	600	300	165	75	200	80	160	150	1000
Total cash value of farm	$75k	$20k	$13k	$8k	$20k	$5k	$10k	$20k	$80k
Horses	14	8	9	18	7	4	10	4	30
Mules and asses	0	0	0	0	7	0	0	0	10
Milk cows	14	4	3	2	2	5	1	0	35
Other cattle	0	5	4	0	7	10	2	0	300
Sheep	15	0	0	0	0	4	5	0	0
Swine	0	0	0	0	28	0	0	0	15
Total value of livestock	$1,260	$1,200	$1,200	$2,000	$2,830	$750	$900	$400	$9,850
Total value of livestock slaughtered	$-	$-	$-	$-	$-	$60	$-	$1,000	$-
Wheat production (bushels)	6242	2000	600	150	1800	900	1200	1100	2200
Barley production (bushels)	3431	400	600	500	500	0	600	0	1200
Butter (lbs)	100	0	0	0	0	0	0	2000	0
Hay (tons)	60	100	100	55	10	30	15	200	2
Total value of orchard products	$-	$-	$-	$-	$-	$1,000	$-	$-	$-

Source: U.S. Census Bureau 1870 Manuscript Agricultural Census of the United States an agricultural service center, with the addition of several nurseries, the John McCarthy Cannery, California Supply Company Tomato and Pickle Products, Mountain View Water Works, Growler's Packing and Warehouse Plant, and S & L Trucking Company (Sanborn Map Company 1921). Despite this, the area surrounding Mountain View, including the study area, primarily consisted of farms and farmsteads until the mid-20th century. Agriculture remained the primary economy of the Santa Clara Valley, including the study area, up until the 1930s, with nearly 80 percent of Santa Clara County's land devoted to agricultural production (Jacobson 1984). The establishment of Moffett Field on the former Posolmi land grant in 1931 marked a new industrial era for this part of the Santa Clara Valley. The presence of a major military base attracted related industries to the area, including ARC (1940), Lockheed Missiles and Space Company (1956), and Westinghouse (1947). World War II and the ensuing Cold War era of high federal government military spending, fueled rapid growth and brought thousands of people to the area. By the 1960s, electronic and defense industries dominated Santa Clara County's economy and the increasing job market of the Santa Clara Valley sparked an incredible population boom between 1950 and 1975, increasing from 95,000 to over 500,000. The pre-war landscape of largely open fields, orchards, and scattered development was gone. Today, Santa Clara County is characterized by modern residential, commercial, and industrial complexes transected by the railroad and modern freeway corridors, with minimal open agricultural lands. Similarly, the majority of the study area is developed and/or has been altered in some way.

2.2.4 Moffett Field

In 1931, NAS Sunnyvale was established on primarily agricultural land purchased by San Francisco, Santa Clara, San Mateo, and Alameda Counties to host a West Coast naval airfield (Plate 1). Construction began on NAS Sunnyvale in October 1931. The airfield was originally built for the Navy's lighter-than-air dirigible operations. Hangar 1, the massive steel-frame structure built to house the dirigible *USS Macon*, the flagship for NAS Sunnyvale, was completed in April 1933. North and south of Hangar 1, two mooring circles were built to control and secure the dirigible. West of Hangar 1, the Navy built a campus of Spanish Colonial–style administrative and residential buildings (Shenandoah Plaza). East of Hangar 1, land was cleared and leveled for a single-runway airfield. Within a short time, the original runway was expanded and two small runways were added. The expansion of airfield operations included new Spanish Colonial-style quarters (Berry Court). NAS Sunnyvale was formally commissioned on April 12, 1933 (Plate 2). The *USS Macon* arrived at NAS Sunnyvale in October 1933 and was stationed there until February 1935, when it crashed into the Pacific Ocean. Soon after the crash, the Navy terminated its dirigible program at NAS Sunnyvale.

In September 1935, the Navy transferred NAS Sunnyvale to the U.S. Army Air Corps for use in pursuit and observation operations. When the airfield was occupied by the Army Air Corps, flight operations changed to accommodate fixed-wing aircraft used in pursuit and training operations. These aircraft, including the P-36 Hawk and BT-13 Valiant, required longer and wider runways. In 1938, the Army Air Corps removed the older runway system and built a 2,140-foot-long runway (Runway 14R-32L) using 3-inch-thick asphalt concrete. Historic photographs taken during this period show a wide runway bordered on the west side by an apron or taxiway marked by diagonal lines. Parking areas surrounding Hangar 1 were unpaved earth (Veronico 2006). In 1940, as part of the buildup preceding World War II, the Army Air Corps converted the airfield to become its West Coast training headquarters. In 1941, Runway 14R-32L was extended again.

Plate 1. Site of NAS Sunnyvale, 1930 (Source: Moffett Field Historical Society)

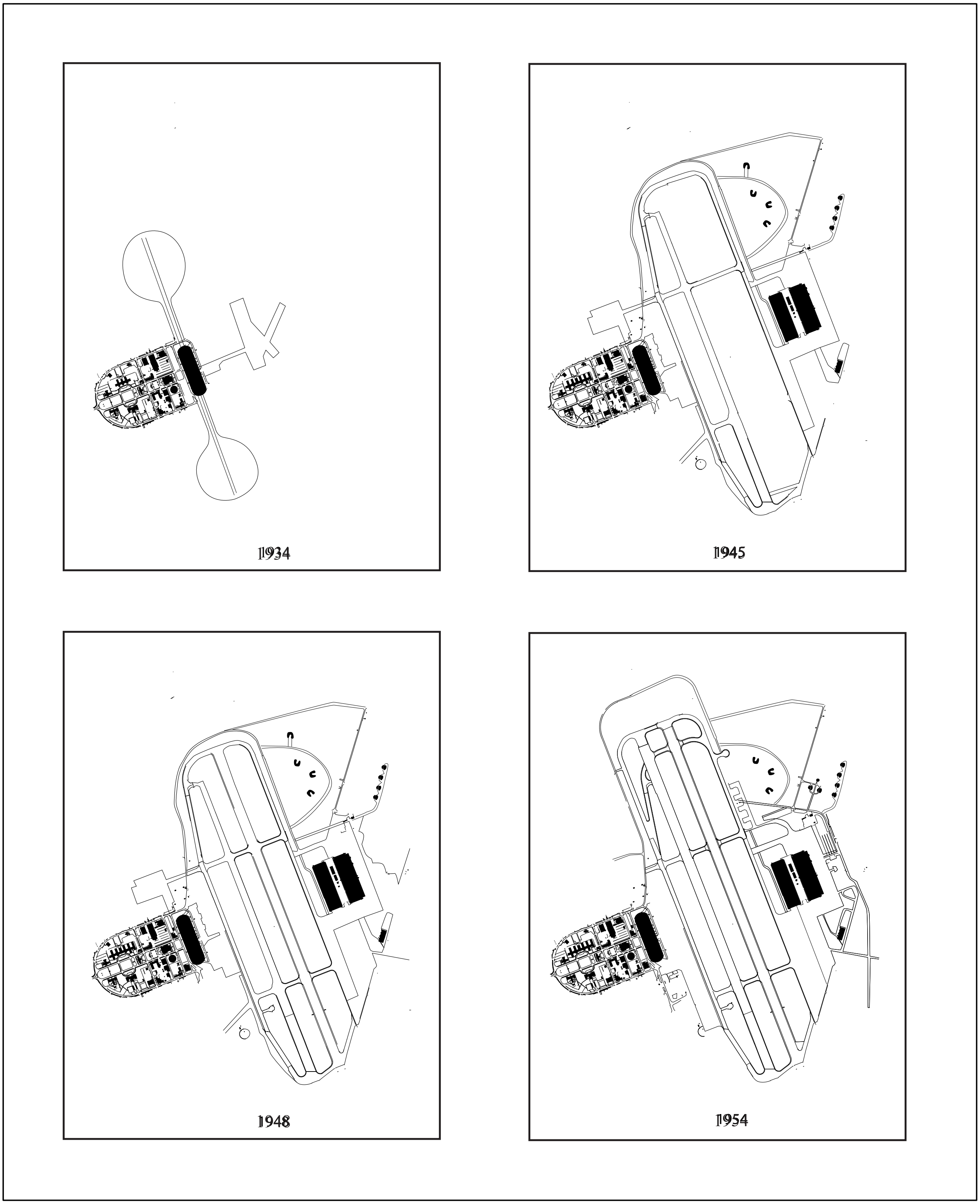
Plate 2. NAS Sunnyvale (Hangar One at center), 1934 (Source: Moffett Field Historical Society)

After the Pearl Harbor attack on December 7, 1941, the Navy reassumed control of the airfield and commissioned NAS Moffett Field (Moffett Field). Moffett Field was initially devoted to lighter-than-air aviation again, primarily K- and L-class nonrigid airships for reconnaissance and surveillance of the Pacific coast. Moffett Field was the headquarters for Fleet Airship Wing Three. Squadron ZP-32, Moffett Field's first squadron of blimps, launched its first patrol flight in February 1942 (Veronico 2006). Moffett Field was also used to train new airship pilots, using free balloons and blimps. Construction of Hangars 2 and 3, two enormous wood-frame hangars on the east side of the airfield used to maintain the blimps, occurred between 1942 and 1943.

By 1942, the Navy planned for additional fixed-wing aircraft operations at Moffett Field. In 1942, the Navy purchased 225 acres of agricultural land east of the airfield to develop additional facilities (Gleason 1958). In 1943, the Naval Bureau of Yards and Docks allotted $1.12 million for new construction at Moffett Field (Gleason 1958). The Navy added a large munitions storage and loading area to the northeast with direct access to the Guadalupe Channel (NASA 2013). The munitions area included five magazines (070 through 074), a small bunker, an inert ammunition storage building, and nine fortified combat ammunition loading circles. The runway was improved for larger aircraft, including the PV-1 Ventura and the Army's B-26 Marauder (Veronico 2006). In 1944, Runway 14R-32L was extended again with 11-inch Portland cement concrete, anticipating greater use by fixed-wing aircraft in the postwar period (NASA 2013). The blimp program was terminated in August 1947 (Gleason 1958).

Between 1945 and 1949, the airfield underwent major renovation and expansion as the Navy's aviation program at Moffett Field changed to support the Naval Air Transport Service, which operated the Navy's largest transport aircraft, including the R5D Skymaster (Gleason 1958). In 1946, the second runway 32R-14L was built of 8-inch-thick reinforced concrete to an original length of 7,425 feet. In the late 1940s, Moffett Field became the largest Naval Air Transport Service base on the West Coast with the first squadron in the Navy to have nuclear-weapon capabilities. At the time, the airfield supported the bomber aircraft P2V Neptune and AJ Savage (Gleason 1958). Eventually, Moffett Field's Naval Air Transport Service overhaul and repair operations terminated in October 1949 (Gleason 1958).

In the early 1950s, the Navy extensively developed the airfield again to accommodate new jet aircraft operations. After the Korean War started in June 1950, Moffett Field became the home training base for aircraft carrier jet fighter squadrons. Beginning in June 1951, the airfield's runways, taxiways, and parking aprons were extended and resurfaced, with Runway 32R-14L extended to 9,200 feet (U.S. Department of the Navy 1954). The expansion included new operations, supply, transportation, garage, and barracks buildings (Gleason 1958). The northeast area of the airfield between Hangars 2 and 3 and the channel was developed with three new high-explosive magazines (143, 147, and 528), an ordnance handling pad (442), and an extensive fuel transport and storage system. A new barge canal, dock, wharf, and underground pipeline system enabled direct fuel supply by barge to massive underground storage tanks. In 1953, the Navy designated Moffett Field as a master jet base in 1953, and operational units on-site reached an all-time high in 1955. Almost every new supersonic jet fighter aircraft in the Navy or U.S. Air Force inventories in the early 1950s was flight-tested at Moffett Field (NASA 2013). By the mid-1950s the airfield was fully expanded to its current footprint as depicted in Figure 6. Jet operations at Moffett Field ended in 1961.



Major Airfield Development at Moffett Field from 1934 to 1954

During the remainder of the Cold War, new development at Moffett Field was limited in connection with the Navy's aviation programs. In 1962, Moffett Field became a training center for the Navy's anti-submarine aircraft, the Lockheed P3 Orion. To accommodate the Orion's munitions capacity, including Mark 46 torpedoes, cluster bombs, and Bullpup or Harpoon missiles, a new magazine facility (561 and 484–492) was constructed in the safety buffer zone in 1965. In 1965, the Army also located its Aeromechanics Laboratory at Moffett Field, and the airfield became the primary site for research on helicopters during the latter years of the Vietnam War (Plate 3).

Plate 3. Moffett Field, 1972 (Source: Moffett Field Historical Society)

In 1991, the Base Realignment and Closure Commission recommended the closure of the naval air station. On July 1, 1994, Moffett Field was closed to military operations, renamed Moffett Federal Airfield, and transferred to NASA (with the exception of the military housing units at Berry Court, which were transferred to the U.S. Air Force and now are operated by the U.S. Army).

2.2.5 Ames Research Center

In December 1939, the National Advisory Committee for Aeronautics (NACA) began construction of the Ames Aeronautical Laboratory northwest of NAS Sunnyvale airfield. The NACA built the new laboratory adjacent to the airfield for defense-related military and industrial aeronautical research (Plate 4). The location was important because of access to the airfield, major aviation industry leaders, good weather, and a new high-powered electrical station in

Sunnyvale. The Army leased 62 acres of the installation to the NACA in December 1939, and the NACA purchased 40 acres of adjacent, undeveloped agricultural lands (Hartman 1970). Specific geographical issues including a high water table and high potential for seismic activity were taken into account in the design of the campus facilities.

Plate 4. Site of Ames Aeronautical Laboratory, view facing southeast (Hangar One at left), 1940 (Source: NASA Headquarters Archives)

Initial development of the campus focused on the construction of massive wind tunnel facilities to test models and full-scale airplanes. A flight research hangar, an electrical substation supplying 40,000 horsepower (approximately 30,000 kilowatts), two 7-by-10-foot wind tunnels, and a 16-foot wind tunnel were the first major facilities constructed in 1940-1941. In March 1942, construction began on the gigantic 40-by-80-foot structure (Building N-221), the world's largest low-speed wind tunnel for testing full-scale aircraft at the time (Muenger 1985). While construction continued during World War II, intensive development of the laboratory centered on aeronautical research facilities to support wartime aviation. Beside the core of wind tunnels and flight research hangar, Ames eventually developed Streamlined Moderne-style concrete administrative and office buildings around Bush Circle to the west of Shenandoah Plaza by 1943. A second aircraft hangar was added, and the ramps and taxiways connecting the airfield to the NACA area were extended.

During World War II, Ames operated around the clock, and researchers contributed important advances in aviation technology, including the development of airplane deicing equipment. Research and development continued steadily into the postwar period, with high-speed aviation at the forefront. At the end of World War II, there were five wind tunnels in operation at Ames, with several new supersonic speed wind tunnels under construction between February and September 1945. The postwar airfield improvements related to the Navy's flight programs, especially the extension of the main runway (32R-14L), allowed for more experimentation with high-speed aircraft. In 1946, R.T. Jones arrived to test his theory of sweptback wing design to avoid high drag of straight wings at transonic, supersonic, and high-subsonic speeds (Vincenti 2001). The NACA's research resulted in some of the most significant advancements in aeronautical engineering up to that time (Anderson n.d.).

In the 1950s, the Ames campus developed further with new facilities to support research on both fundamental theoretical aerodynamics and specific industry concerns, most notably in sweptback wing design. Research at Ames tested vehicles at supersonic speeds, again supporting theoretical progress with applied experimentation, and also laid the groundwork for developing flight simulators and computer-based modeling. One of the most significant research developments at Ames was Julian H. Allen's theory on blunt-nosed atmospheric reentry. The concept that blunt bodies dissipate heat more efficiently on reentry had far-reaching implications for all future space exploration vehicles (Vincenti et al. 2007). New facilities also were constructed to support the growing complexities of aerothermodynamics and hypervelocity ballistics research. Completed in 1956, the Unitary Plan Wind Tunnel complex (Hartman 1970) included an 11-by-11-foot transonic, a 9-by-7-foot supersonic, and an 8-by-7-foot supersonic wind tunnel, and was powered by a dedicated power plant that generated up to 240,000 horsepower (Butowsky 1984; Muenger 1985). The unique complex was used by industry, military, and university partners.

The launch of *Sputnik* in 1957 propelled the United States into the space age. NASA was established and began officially operating on October 1, 1958. NASA subsumed the NACA's former facilities. Ames, now ARC, turned toward the technological challenges of space travel. Its programs in applied research related to testing and improving aircraft in the early years of NASA, as NASA organized to address the unprecedented directive to achieve a lunar landing. Most research programs at ARC remained relatively unchanged until the early 1960s, when NASA Headquarters restructured the organization of its field centers to address space-related demands. ARC, which as an aeronautical laboratory traditionally focused on the physical science and engineering of aviation research, initially resisted the new space research programs. In 1963, Ames started the real shift from aeronautical laboratory to an interdisciplinary research center whose primary mission was basic and applied research on aerodynamics of reentry vehicles, flight control of space vehicles and aircraft, and space environment physics (Muenger 1985).

In the 1960s, ARC continued its applied research programs, and the airfield was the site of extensive research into vertical/short takeoff and landing (V/STOL) technologies and aircraft. Although aeronautics research with V/STOL studies and supersonic transport feasibility investigation continued, astronautics became the more visible research area at ARC. Aerothermodynamics and hypervelocity ballistics research related to astronautics led to expansion of the campus and the construction of new facilities, including the hypervelocity research laboratory and shock tunnel, a Mach 50 helium tunnel, a hypervelocity free-flight facility, a new impact range, and the gas thermodynamics and arc jet complex, which were designed to reproduce the extreme conditions that a space vehicle would be subjected to in space (Plate 5). Advancements in flight simulators also occurred during this time. In 1963, NASA approved ARC engineers' proposal for the construction of a complex of four flight simulation facilities. Other buildings constructed in 1965 and 1966 included a space environments research facility and structural dynamics laboratory that were built to simulate conditions and forces in space; a life sciences research laboratory; and a spaceflight guidance laboratory. These new facilities primarily focused on solving the major spaceflight problems of speed and the heat generated by it, and the control of space vehicles during flight. By 1969, ARC facilities included 18 wind tunnels, two sets of ballistic ranges, 10 flight simulators, 11 arc jet facilities, eight laboratories, and 56 major buildings (Muenger 1985).

Plate 5. ARC, 1964 (Source: NASA Headquarters Archives)

ARC contributed to the successful development of viable spacecraft for all of NASA's space programs, including Mercury, Gemini, Apollo, and the Space Shuttle programs. In 1971, ARC opened a Space Shuttle development office and eventually conducted half of all the wind-tunnel tests for the second phase of the Space Shuttle design in the National Full-Scale Aerodynamics Complex (NFAC), the Unitary Plan Wind Tunnel Complex, and the 3.5-foot hypervelocity tunnels (Bugos 2014; Muenger 1985). Started in 1978, the gigantic 80-by-120-foot Subsonic Wind Tunnel addition to the 40-by-80-foot wind tunnel was completed in 1982. Designated as the NFAC in 1987, it was the world's largest open-circuit tunnel able to accommodate a variety of large-scale aircraft including fighter jets, Space Shuttle models, and a Boeing 737. ARC also hosted a fleet of airborne science aircraft at Moffett Field that made major discoveries in infrared astronomy and high-altitude observation instruments. The airfield became the staging area for some of the most significant earth sciences missions of the 1970s and 1980s.

After Moffett Federal Airfield was transferred to NASA in 1994, ARC became a larger and more diverse research campus, hosting new tenants in the former military buildings at Shenandoah Plaza and the airfield. Into the 21st century, renovation and new development continue to further NASA's programs, including aviation and biosciences, as well as other tenants' operational, scientific, educational, and technological programs and industries.

3. ARCHIVAL RESEARCH

3.1 NWIC Records Search

A comprehensive records search for the study area was conducted on March 19, 2016, by the NWIC of the California Historical Resources Information System to obtain existing information on cultural resources within the study area. The NWIC records search reviewed prehistoric and historic archaeological site and isolate records; previous archaeological studies in the National Archeological Database; the California Office of Historic Preservation (OHP) Historic Properties Directory; the National Register of Historic Places (NRHP); the California Register of Historical Resources; California Historical Landmarks; California State Points of Historical Interest; OHP Archaeological Determinations of Eligibility; and historic maps. The record search results are included in Appendix B.

3.1.1 Previous Studies

The NWIC records search identified 27 previous archaeological investigations conducted between 1970 and 2015 that overlap with, or are immediately adjacent to, the study area. These studies cover approximately 944 of the 1845 acres within the ARC boundary, or 51.17 percent and include: 11 subsurface testing programs, 10 pedestrian surveys, one archival review, one archival review with a windshield survey, one management plan, one determination of effects investigation, one data recovery program, and one testing and monitoring program, Table 2 lists and briefly summarizes all 27 previous studies. The most pertinent archaeological investigations are discussed in greater detail below. The survey, testing, and data recovery investigations have been mapped to indicate portions of ARC that have been thoroughly assessed for archaeological resources (Figure 7 and 8). As demonstrated on Figure 7, approximately 49.19 percent (907.56 of 1845 acres) of the ARC study area has been surveyed for archaeological resources, and none of the investigations relocated previously recorded sites or identified any new sites. In addition, roughly 6.60 percent (121.88 of 1845 acres) has been included in subsurface testing or data recovery programs. [redacted]

[redacted]

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Table 2. Previous Archaeological Studies

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Figure 7

The following content was redacted from this public posting:

Figure 8: ARC Areas Included in Testing Programs

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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

S-015758: Archeological Survey Investigation for the Modification of the Outdoor [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

3.1.2 Previously Recorded Archaeological Resources

The records search results indicated that eleven archaeological resources have been previously recorded within or immediately adjacent to the study area. All of these sites were first inventoried during Nels Nelson's 1907–1908 survey of shellmounds in the San Francisco Bay area. It was not until 1912, however, that these sites were recorded and mapped in greater detail by archaeologist Llewellyn Loud. [redacted]

[redacted]

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AECOM

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Table 3. Previously Recorded Archaeological Resources

[redacted]

3.2 NAHC

In addition to the records search, the NAHC was contacted on April 21, 2016, requesting a search of their Sacred Lands File and a list of Native American tribes and representatives with a known interest in the area. A response from the NAHC was received April 27, 2016, indicating that the Sacred Lands File search was negative for cultural resources. Five Native American representatives were identified by the NAHC as having an interest in the area including:

- Valentin Lopez, Chairperson of the Amah Mutsun Tribal Band;
- Irenne Zwierlein, Chairperson for the Amah Mutsun Tribal Band of Mission San Juan Bautista;
- Ann Marie Sayers, Chairperson of the Indian Canyon Mutsun Band of Costanoan;
- Rosemary Cambria, Chairperson of Muwekma Ohlone Indian Tribe of the San Francisco Bay Area; and
- Andrew Galvan from the Ohlone Indian Tribe.

None of the tribes represented are federally recognized tribes as defined in the NHPA (54 U.S.C. § 300309) and as identified by the U.S. Department of the Interior's Bureau of Indian Affairs and listed in 81 Federal Register 5019, published January 29, 2016. Correspondence with the NAHC is included in Appendix C.

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Figure 9

4. ARCHAEOLOGICAL SENSITIVITY

The following section includes a discussion of, and maps depicting, the archaeological sensitivity of the study area. Because of the distinct taphonomic processes that led to the formation of historic-era and prehistoric archaeological resources, the sensitivity of ARC for these basic archaeological resource types is discussed separately. Furthermore, the sensitivity for near surface prehistoric archaeological resources (those which existed at the surface during the historic era, which may have been alternatively destroyed or obscured by recent development) and more deeply buried prehistoric archaeological resources (those which may have been buried through natural geomorphic processes, prior to the historic era) is discussed separately, due to the geomorphic evolution of the study area over the course of human history in the Santa Clara Valley (approximately the past 13,500 years).

4.1 Historic-Era Archaeological Sensitivity

As discussed in the historic context above, the historic period of ARC can be divided into two basic periods: the period prior to 1931, characterized by rural agricultural activities, and the period after 1931, when the Navy took ownership of the property, characterized by military and research development activities. Given the strict record keeping and waste management protocols of the post-1931 period—as well as the fact that many of the buildings associated with this period are still extant—the potential for encountering significant archaeological resources associated with the military period is generally considered low. In particular, areas where strictly industrial and military operations occurred (e.g., facilities maintenance shops, equipment storage, hangars, administration buildings, etc.) are considered particularly unlikely to yield any archaeological resources or indications of human activity not already well documented in equipment lists and military operations documents. A slightly higher potential for possibly significant archaeological resources exists in areas where “domestic” artifacts may be preserved, which may provide evidence of ways in which military personnel either utilized sanctioned goods (rations, personal effects, etc.) in unsanctioned ways, or supplemented military-provided resources with outside resources, in order to create lifeways and practices that either subverted or supported the dominant paradigm and officially accepted practices. Such domestic archaeological resources may exist in proximity to buildings such as the ca. 1933 recycling and storage facility (Bldg. 6), the commissary and commissary storage building (Bldgs. 12 and 13), the ca. 1941 enlisted men’s club (Bldg. 944), the ca. 1953 enlisted men’s barracks (Bldgs. 148 through 151), and the ca. 1970 enlisted barracks (Bldgs. 512A through 512C). Again, however, because of strict military waste management protocol, finding potentially significant historic-era archaeological resources in these areas is generally considered low.

Prior to development of ARC by the military, the area was dominated by small farms, as well as a small shipping and passenger ferry port at the north end of ARC along the bay shore. Although all above-ground evidence of these early American and Spanish period resources have been removed or obscured through grading and site development in the latter half of the 20th century, there is still the potential for buried archaeological resources associated with the pre-1931 historic-era occupation of the study area, in the form of artifact-filled depressions (e.g., wells, privies, cellars, etc.) and subsurface structural elements (i.e., foundations).

Historic mapping of the ARC area was reviewed, and indicated several areas of pre-1931 development, which are considered the most likely places that potentially significant historic-era archaeological resources would be encountered.

Several historic-era maps are available that are useful in establishing areas of historic-era farmsteads and occupation areas, which may be sensitive for subsurface archaeological resources. Unfortunately, because it is not possible to accurately reconstruct the site grading history for the entire study area since the early historic era, it is impossible to say (with few exceptions, discussed below) which areas may have been cut too deeply to reasonably contain historic-era resources, and which areas have been filled and, thus, may have a higher sensitivity. As such, all such areas must be considered to at least have some potential. Perhaps the most useful and accurate map, in establishing the location of possible pre-1931 historic-era resource locations, is the 1897 U.S. Coast and Geodetic Survey (USCGS) topographic survey (T-sheet) of Mountain View and Alviso (USCGS 1897). The portion of this map depicting the study area is shown in Figure 10. The extreme accuracy of the mapping depicted on T-sheets not only makes it much easier to georeference the maps to the current landscape, but also makes the placement of archaeologically sensitive areas inherently more precise. At least nine individual farmsteads with structures are depicted within or adjacent to ARC at the time. Many of these same locations are reflected in subsequent U.S. Geological Survey topographic quadrangles throughout the early part of the 20th century.

Lacking from the T-sheet mapping is any indication of the identity of the inhabitants or landowners of the farmsteads. For this purpose, one useful early map is the Thompson and West Historical Atlas of Santa Clara County (1876), discussed previously. In addition to depicting landownership at the time, the map depicts several additional farmsteads and structures within and adjacent to ARC (see Figure 4). However, the spatial accuracy is not nearly as great as the T-sheet and, thus, makes placement of potentially archaeologically sensitive locations inherently less reliable. Finally, the 1873 State Geological Survey of California (SGSC) Map of the Region Adjacent to the Bay of San Francisco provides additional insight into the early development of the study area (Figure 11). Of all the early historic-era maps, this is the grossest scale (1:125,000) and thus less reliable regarding precise potential resource locations. However, the map does show two interesting features not depicted on the other maps: (1) multiple drainage features terminating within and adjacent to the ARC boundary, which will be discussed below with regard to prehistoric archaeological resource potential; and (2) the name “Ynigo” (Iñigo) associated with a specific structure. As discussed above Section 3.2, Historic Context, Iñigo’s burial place is thought to be outside of the ARC boundary (CA-SCL-12/H); however, it appears that structures associated with the Iñigo occupation may have been within ARC. An unnamed structure nearby on the 1876 Thompson and West map may also represent the same structure.

Aside from the former farmstead locations, depicted on various historic-era maps throughout ARC, a unique development formerly located at the north end of ARC was Jagels’ Landing, as described above in Section 2.2.3

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Figure 10-11

There exists a potential for buried historic-era archaeological resources at this location, from the early American Period of Mountain View, up until the take-over of the property by the Navy. However, as-built drawings for the ca. 1953-1958 northern extension of the runways were reviewed and indicate sufficient over-excavation and ground disturbance that significant intact historic-era deposits associated with Jagel's Landing are unlikely to remain within the apron of the runways. As such, this area is no longer considered sensitive for historic-era resources.

Post-1931 aerial photographs and military design drawings were reviewed in an attempt to determine other areas that may have had sufficient topsoil removed during development episodes so as to effectively preclude the potential for near-surface archaeological resources; or, alternatively, those areas that may have had fill imported prior to development, which might better preserve some sites; and/or if everything was essentially built at grade, which could preserve some near-surface buried components. Although historic photos and design drawings are indicative of the amount of development that happened on the base since the 1930s, as is the current built-out nature of the site since the 1960s (Figure 12), few provide information on existing and final grade during these development episodes and, as such, do not provide sufficient evidence to determine the preservation potential of near-surface archaeological components.

All of the areas of pre-1931 historic-era development are shown in Figure 13 and are considered to have sensitivity for potentially significant historic-era archaeological resources (except for the Jagel's Landing area at the north end of the airfield, discussed above). Because of the variable accuracy of the historic-era maps, and the inherent inaccuracy of georeferencing such maps, a 250-foot buffer has been applied around each of the homestead/structure areas depicted on the maps. Unfortunately, given the long history of cutting and filling for military development across ARC, it is not possible to anticipate how deeply buried such resources may be, if they are present at all. On average, it must be assumed that there is a moderate potential for encountering buried historic-era archaeological resources within these areas.

4.2 Prehistoric Archaeological Sensitivity

As with the historic-era locations described above, prehistoric sites located at or near the surface during the historic period have the potential to have been alternatively removed or buried during 20th century grading and filling of the study area. In addition to historic-era landscape modifications, due to the long history—circa 13,500 years—of human occupation in California, consideration must also be given to the potential for more deeply buried prehistoric archaeological resources that may have been obscured by geomorphic processes over that span of time.

As described above in Section 3.1.2, for prehistoric sites CA-SCL-14 through SCL-20 and [redacted]

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Figures 12-13

[redacted]

[redacted]

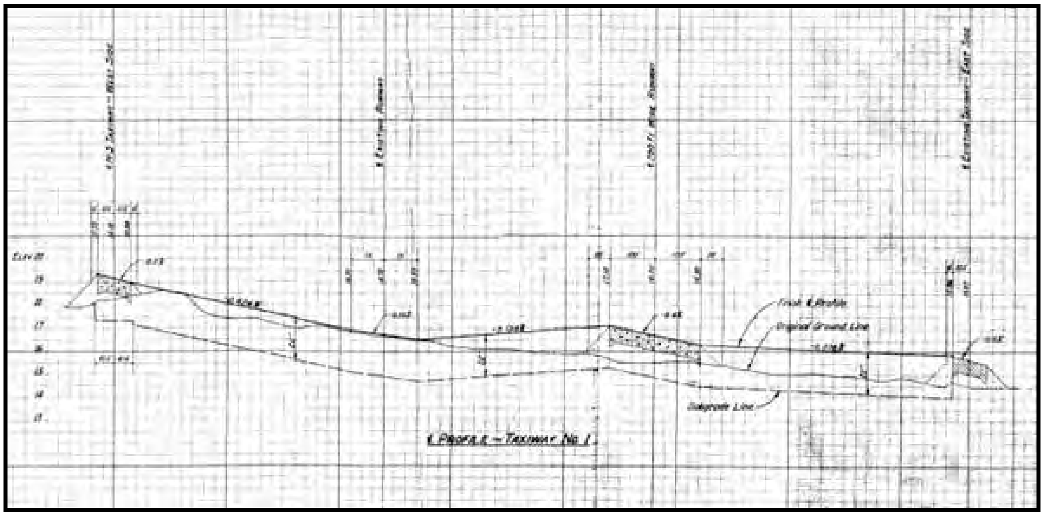

Plate 6. Excerpt from 1947 As-Built Drawing, Runway, Taxiway, and Parking Apron – Typical Cross Sections, NAS Moffett Field (Source: NASA ARC files, Sheet AM4—0047-C27)

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Figure 14

4.3 Geoarchaeological Potential

In addition to the areas of near-surface sensitivity for historic-era and prehistoric archaeological resources, consideration must be given to the potential for more deeply buried prehistoric archaeological resources, which may have been obscured even during the 19th century settlement and mapping of the study area. California, and the Bay Area in particular, has undergone dramatic geomorphic change over the past 13,500 years—roughly the period of human occupation. Perhaps the most dramatic of these changes has been the rise in sea level since the last glacial maximum, around 15,000 years B.P. At this time, global sea level was more than 300 feet (91 meters [m]) lower than today. As the ice sheets began to melt, sea levels began to rise substantially. Between 15,000 and 11,000 years B.P., sea levels rose at a rate of approximately 43 feet (13 m) every 1,000 years (Masters and Aiello 2007:44–47; Moratto 1984:31).

The earliest peoples migrating into California at this time would have been confronted with a vastly different landscape than the one seen today. The continental shelf would have extended up to 30 miles from the current shoreline, toward the Farallon Islands, presenting a large alluvial plain with diverse resources. This plain was created by the combined waters of the Sacramento and San Joaquin Rivers that flowed through the Golden Gate and across the continental shelf (Williams and Monroe 1970). The Franciscan Valley, now infilled by the San Francisco Bay, would also have been a unique, well-drained inland valley with diverse riparian and upland ecosystems. During this period, the study area would have been an upland environment, with vastly different topography (Masters and Aiello 2007:44–47).

Sea level rise decreased to about 26 feet (8 m) every 1,000 years between 11,000 and 8,000 years B.P. By 10,000 years B.P., the rising sea level began to enter the Franciscan Valley through the Golden Gate, and to dramatically alter hydrologic and ecological conditions within the valley (Sloan 2006:145–150). New tidal estuarine environments would have been created as riparian corridors and valley floors were lost. This newly formed estuary expanded rapidly, approaching current levels by approximately 6,000 years B.P., at which point sea level rise slowed considerably. Between 6,000 years B.P. and the present, sea level has risen at an average rate of about 4 feet (±1 m) every 1,000 years. It is during this period that the study area would have started to more closely resemble the geomorphic and ecological setting that is seen today.

Drainages responded to rising sea levels by retreating upslope and depositing alluvium over previously exposed land surfaces. This effect was heightened as sea level began to stabilize and alluvium accumulated. As a result, formerly stable Pleistocene and early Holocene land surfaces near San Francisco Bay are overlain by alluvium largely deposited over the last 6,000 years (Helley et al. 1979:18). These older buried land surfaces are often marked by well-developed paleosols that have the potential to harbor early prehistoric archaeological sites. The middle to late Holocene alluvium overlying these formerly stable land surfaces has accumulated up to 33 feet (10 m) thick in some locations around the Bay region (Meyer 2004). In addition, the younger Holocene alluvium often contains several paleosols, which mark periods of stability between episodic depositions.

In general, most Pleistocene-age landforms have little potential for containing buried archaeological deposits as they developed prior to human migration into North America.

However, Pleistocene surfaces buried below younger Holocene deposits do have a potential for containing archaeological deposits. As suggested above, Holocene alluvial deposits may contain paleosols that represent periods of landform stability prior to renewed deposition. Paleosols within Holocene-age landforms are of particular interest because they represent formerly stable surfaces that have a potential for preserving archaeological deposits.

Previous studies in the Santa Clara Valley and surrounding areas have demonstrated the presence of buried sites and the potential for others. These studies show a connection between geological processes and the distribution of prehistoric sites. Most known buried sites occur in association with buried land surfaces, identified by paleosols (Meyer and Rosenthal 2007:7). In some parts of the Santa Clara Valley associated with the floodplains of major rivers (e.g., Guadalupe River, Coyote Creek, etc.), over 60 percent of the recorded archaeological sites have been discovered in buried contexts (Meyer and Rosenthal 2007:8). Radiocarbon dates from 19 buried sites in the northern Santa Clara Valley range between approximately 5,000 and 700 years old (Rosenthal, Meyer, and Hildebrandt 2003:3). Farther south in Coyote Narrows, one of the oldest archaeological deposits in the Bay Area was discovered at the Blood Alley Site (CA-SCL-178) in a buried soil dated between 8,590 and 9,960 years old (Rosenthal, Meyer, and Hildebrandt 2003:3).

Analysis has revealed, however, that buried sites do not occur randomly across the landscape but are correlated with certain environmental and geomorphic factors, including proximity to water, landform slope (flatter being more sensitive), and the relative age of the landform (generally, younger being more sensitive).

Although the study area is characterized by a very gently sloping Holocene alluvial landform, no major freshwater sources cross through ARC. The closest mapped historic-era water source would have been Stevens Creek. However, as with many of the local creeks along the South Bay shoreline, Stevens Creek did not naturally continue across the lowlands, but was extended via artificial channels into the baylands during the mid-19th century in order to reduce flooding and increase arable lands (Grossinger and Askevold 2005). Prior to this channelization, Stevens Creek would have terminated into a large willow marsh, with numerous seeps and springs, south of ARC.

4.4 Soils

Soils are used as one indicator of the age of a surface landform and, therefore, the degree of soil development is directly relevant to the potential for containing buried archaeological resources. Soils that exhibit stronger development can be recognized as being older than those with weaker development, and deposits can be placed in a relative chronology. Landforms that exhibit poor surface soil formation are expected to have a heightened potential for containing buried archaeological resources because they were likely deposited during the Holocene. Deposits composed of sorted sand and gravel (associated with former stream channels) are expected to have little potential for containing intact archaeological resources but may contain redeposited material and may represent former stream channels that could be associated with prehistoric human use (Meyer 2000:10).

Surface soils in ARC are dominated (>70%) by Hangerone complex series soils. Hangerone series soils are organic-rich clay soils formed in poorly drained basin environments with high calcium carbonate accumulation (NRCS 2016). Other minor soils mapped within ARC are also dominated by hydric basin soils (e.g., Embarcadero series) or marsh soils (e.g., Novato series). All of these basin soils would have begun forming around the time that sea levels began to stabilize. In general, wet basins soils in the northern Santa Clara valley are not conducive to human occupation, as they were wet for large portions of the year. This geomorphic setting is indicated by the 1873 SGSC map (see Figure 11), which depicts numerous small drainages and seeps terminating within the ARC boundary, suggesting that the area was heavily saturated. However, buried sites in the Santa Clara Valley have been identified on slight topographic highs (e.g., natural levees) adjacent to basin soils.

The typical soil profile description for the Hangerone series includes a buried soil (paleosol) between 6 and 7.5 feet (1.8 to 2.3 m) below surface. Recent geoarchaeological investigations by URS (now) AECOM in the vicinity of ARC, which include subsurface trenching and continuous Geoprobe coring, identified paleosols within areas mapped as Hangerone and associated soil series (URS 2014, 2013). However, the age of this paleosol, and the age of the overlying surface alluvial unit, indicates that there is a reduced archaeological sensitivity for the Hangerone soil series in the vicinity of ARC.

In an earlier study conducted for the California Department of Transportation, six trenches and two Geoprobe cores were excavated in the US 101 right-of-way between Moffett Boulevard and the previously mapped southern boundary of CA-SCL-20/H, along the southern boundary of ARC (URS 2014, 2013). These areas are mapped by the National Resources Conservation Service (NRCS 2016) as Hangerone soils, with some areas of Bayshore soil series complex (very similar to Hangerone, but with no paleosol identified). A buried soil unit was identified in all of the areas investigated, but was identified variably between 4.25 feet (1.3 m) and 16.5 feet (5 m) below surface. The surface soil unit throughout this area was characterized by high organic content, an overthickened A horizon, high clay content, and large amounts of fresh water snail shell, which are indicative of a soil formed gradually over time as part of a freshwater marsh or pond environment. This finding is supported by a historical habitat reconstruction of west Santa Clara Valley, which identifies the area as wet meadow (Beller et al. 2010) and is consistent with the Hangerone soil series.

In the western portion of the study area, in the vicinity of Moffett Boulevard, this surface soil was underlain by a second basin soil that represents a period of relative landform stability. High organic content, an over-thickened AB horizon, and high clay content indicate that the buried unit was formed gradually over time, also as part of a basin environment. Radiocarbon assay from organic sediment at approximately 9.5 feet below surface, in the buried 2ABb horizon (near the intersection of Westcoat Court and Perimeter Road) yielded a date of cal B.P. 10,990 to 10,810. This date represents a minimum age for this buried surface, indicating that the landform was buried in the early Holocene and likely deposited before this time. The date is consistent with results from the 2ABb horizon at 4.5 feet below surface in the US 101/Moffett Boulevard interchange, which returned a date of cal B.P. 8010 to 7940. Again, this suggests that the buried landform was capped by sediment, and stopped receiving organic input, during the early Holocene. This buried surface was capped by fine-grained alluvial deposits, which may mark the transition from a freshwater marsh depositional environment to one more influenced by very low energy distal alluvial fan/floodplain deposition, perhaps as a result of increased floodplain aggradation from Stevens Creek in response to rapidly increasing sea levels in San Francisco Bay between ca. 10,000 and 8000 B.P. (Atwater, Hedel, and Helley 1977).

Farther to the east, in the vicinity of CA-SCL-20/H and east of Highway 237, a much older (circa cal B.P. 23,000) buried landform was identified much deeper, between 13 and 16 feet below surface. The lack of an intervening paleosol closer to the surface indicates that the buried landform present to the west, near Moffett Boulevard, may become exposed at the surface in the eastern portion of the area studied. Regardless, the findings have several implications for the geoarchaeological sensitivity of ARC. The first is that the Hangerone soil series appears associated with a surficial basin landform that began to form during the latest Pleistocene or early Holocene. The paleosol identified between 4.5 and 9.5 feet below surface therefore has a reduced sensitivity for containing archaeological sites. In comparison to a paleosol buried beneath a recent Holocene surface landform, this buried surface was not exposed for an appreciable amount of time during the course of human occupation in California and, furthermore, population density is assumed to have been very low during the late Pleistocene/early Holocene, further reducing the potential that an archaeological site would have been deposited within the study area prior to burial.

The variability in the identification of paleosols along the US 101 corridor, in the vicinity of ARC, may be the result of the heavy grading and disturbance along the South Bay shoreline during the historic-era but, more likely, is indicative of the natural variability in subsurface profiles compared to the type profiles documented by the NRCS. To address this variability, and attempt to establish a better understanding of subsurface conditions within ARC, a database of hundreds of previous geotechnical investigations conducted at ARC was reviewed for this report. Because the purposes of geotechnical investigations vary, so too does the information and veracity of information contained within them, with respect to soil profiles. None of the geotechnical reports reviewed contained sufficient information regarding soil profile development to be able to distinguish paleosols within the ARC subsurface profile. Most reports simply contained information on blow counts or had sampling intervals that were too long, and thus not useful for understanding geomorphic evolution or buried archaeological potential. Those core logs that do contain continuous sampling data lack analysis of pedogenic indicators and are only useful in documenting variability in sediment grain size with depth. While of limited utility to the current study, this grain size information is useful in establishing the possible location of former stream channels (as indicated by higher cobble, gravel, and sand content) as well as more generally showing the variability in depositional settings and preservation potential with depth and through time. High gravel content is indicative of a high energy depositional environment not conducive to archaeological preservation.

When mapped in a geographic information system (GIS) database, no distinct patterning is observed in the geotechnical data, with regard to possible former channel locations. Given the data from the US 101 geoarchaeological studies, discussed above, latest Pleistocene and Holocene sediments are assumed limited to the upper approximately 15 feet of ARC. Figure 15 depicts those geotechnical cores that had high gravel content from 0–10 feet and 10–20 feet.

The following content was redacted from this public posting:

Figure 15

As can be seen, the location and depth of these gravel concentrations is more or less random, suggesting that ARC may have been characterized by multiple aggrading and anastomosing channels during the late Pleistocene and early Holocene, prior to Bay inundation and formation of the basin landform. The variability in subsurface conditions, and the presence of numerous high-energy features, further reduces the potential for encountering preserved buried prehistoric archaeological resources.

5. SUMMARY AND CONCLUSION

This study consisted of a desktop analysis of archival resources to assess potential patterns of settlement that indicate archaeological sensitivity and the potential for buried archaeological resources at ARC. The archival research included a literature review, record search, NAHC Sacred Lands File check, and review of historic maps and aerials. The results of the literature review indicated that 51.16 percent (944 of 1845 acres) of ARC has been assessed for archaeological resources by previous investigations, with 49.19 percent of the ARC boundary surveyed (907.56 of 1845 acres) and 6.60 percent (121.88 of 1845 acres) included in subsurface testing programs. The record search indicated that eight archaeological resources have been previously recorded within the study area (CA-SCL-14, 15, -16, -17, -18, -19, -20/H, -23). These prehistoric surface sites were originally recorded in 1912, have been investigated numerous times, and have not been relocated since the mid-1900s. Furthermore, extensive subsurface testing (88 five-by-2 foot BTUs and 18 core samples) in the vicinity of CA-SCL-23 suggests that the area no longer contains any prehistoric archaeological component, having been removed through both agricultural and early military development. The NAHC Sacred Lands File Check was negative for sacred sites. Lastly, historic maps and post-1931 aerial photographs and military design drawings of ARC were also reviewed as part of the archival research. Several areas of pre-1931 development, which are considered the most likely places that potentially significant historic-era archaeological resources would be encountered, were identified. Although all above-ground evidence of these early historic-period resources have been removed or obscured through grading and site development during the latter half of the 20th century, there is the potential for near-surface buried archaeological resources associated with the pre-1931 historic-era occupation of the study area, with the exception of Jagel’s Landing at the north end of Moffett Field. Engineering drawings were available to conclude that this area was sufficiently over-excavated in the 1950s to preclude the reasonable potential for intact historic-era archaeological resources.

In addition to the literature review, the geoarchaeological desktop study included a review of existing soils data and recent geotechnical studies conducted within and in the vicinity of the study area to assess the potential for more deeply buried prehistoric archaeological resources. Review of previous studies conducted in the Santa Clara Valley and surrounding area documents the presence of buried sites and the potential for others, especially in areas with young (Holocene age) surface soils and proximity to water. Although the study area is characterized by a very gently sloping Holocene alluvial landform near water, surface soils in ARC are dominated by Hangarone series soils, which are wet basins soils not conducive to human occupation, that appear to be part of a landform that began forming during the late Pleistocene or early Holocene. As such, the entire study area is generally considered to have a low geoarchaeological potential (i.e., a low potential for prehistoric archaeological resources buried through natural processes). This conclusion is further supported by an analysis of geotechnical data from throughout ARC, which indicate significant variability in subsurface conditions and the presence of numerous high-energy geomorphic features, which further reduces the potential for encountering intact prehistoric archaeological resources buried through natural geomorphic processes.

Based on the multiple lines of evidence discussed above, the majority of ARC is assumed to have only a moderate to low potential to contain prehistoric archaeological sites buried through natural geomorphic processes, relative to other portions of the Santa Clara Valley and South Bay shoreline with younger surficial alluvial landforms in closer proximity to major riparian corridors. The potential for archaeological resources buried through natural geomorphic processes cannot be completely ruled out, but the relative potential suggests that extensive subsurface testing efforts to identify geoarchaeological resources may not be warranted within ARC. The greatest potential for geoarchaeological resources likely exists at the northern boundary of ARC, where recent Bay muds and associated wetland sediments may bury terrestrial landforms. These areas are depicted as purple stippling on Figure 16, and are based on the extent of historic tidal marshes (i.e., bay inundation) mapped by Sowers (2004). For the same reasons described above for Jagel's Landing, the northern extension of the airfield constructed in the 1950s is not considered sensitive for geoarchaeological resources and is excluded from the sensitivity mapping. In the areas of increased geoarchaeological sensitivity, if project impacts will be deep enough to reach the contact between the bay mud/estuary sediments and the underlying terrestrial alluvial landform, preconstruction field testing by a qualified geoarchaeologist, or construction monitoring, may be warranted, depending on how extensive the subsurface impacts will be (e.g., a single driven pile may not warrant investigation, whereas acres of deep excavation may). Without additional subsurface geoarchaeological testing information from this area, the absolute sensitivity for, and the nature of, prehistoric resources which may be located below the bay mud is unknown and should be a goal of future geoarchaeological research in this area.

With regard to near-surface prehistoric and historic-era archaeological resources, the degree of sensitivity is also hard to quantify, given the unknown variability in cutting and filling episodes during the 20th century related to pre-1931 agricultural practices and post-1931 military and research development that resulted in the current built-out nature of ARC. Given these considerations, areas identified in the archival research as previously containing surficial historic-era and prehistoric resources must be considered to still have a moderate potential for containing near-surface components; with the exception of the areas around Jagel's Landing at the north of the airfield and the Bay View Development Area (where CA-SCL-23 was previously mapped). Sufficient subsurface documentation exists to conclude that archaeological resources cannot be considered to reasonably exist in these areas.

[redacted]

[redacted]

The following content was redacted from this public posting:

Figure 16

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For undertakings located in blue areas with lower archaeological sensitivity, an intensive pedestrian survey conducted by a qualified archaeologist may be required to confirm no additional work is necessary, particularly in portions of ARC that have not been previously surveyed. In case of inadvertent discovery of archaeological deposits, standard operating procedures as outlined in the ICRMP will be implemented.

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APPENDIX A

PROJECT PERSONNEL RESUMES

Stephanie Jow
Senior Archaeologist

Professional History

08/2008 - Present, AECOM Senior Archaeologist
01/2006 - 07/2007, San Diego State University Education Outreach Coordinator

Education

MA, Anthropology, San Diego State University, 2009
BA, Physical Anthropology, University of California - Santa Barbara, 2004

Years of Experience

With AECOM: 7
With Other Firms: 0

Professional Affiliations

Society for California Archaeology
Society for Applied Anthropology

Training

Introduction to Section 106
Basic CEQA Training

Certifications

Register of Professional Archaeologists (RPA)

Stephanie is a senior archaeologist specializing in cultural resources management and Native American consultation. She has eight years of archaeological and ethnographic experience in southern California. Her experience includes archaeological testing, data recovery, survey, laboratory analyses, document research, and report production for private, city, county, state, and federal clients. Her key project experience includes CEQA/NEPA documents, technical reports, and large-scale environmental compliance programs. Over the past four years, Stephanie has served as an archaeologist, cultural lead, field director, and/or project manager on several renewable energy permitting and compliance projects in the Mojave and Colorado Deserts. She also works closely with Southern California Native American groups to assist in project compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, and she regularly works in coordination with project stakeholders; tribal representatives; and various agencies such as county governments, the California Energy Commission, California Public Utility Company, Bureau of Land Management, US Army Corps of Engineers, US Fish and Wildlife Services, and the State Historic Preservation Office

Experience

Los Angeles Department of Water & Power, Beacon Photovoltaic Project, Kern County, CA
Cultural Resources Specialist for environmental compliance services for the Beacon Photovoltaic Project. Responsibilities include the preparation and implementation of a Worker Environmental Awareness Program and Cultural Resources Monitoring and Mitigation Plan, management and oversight of archaeological and Native American monitors during construction activities for LADWP's joint facilities, and the preparation of a final monitoring report. The project also includes the evaluation and treatment of inadvertent discoveries when identified in the field. [09/2013 – Ongoing]

NAVFAC Southwest and MCB Camp Pendleton, Public Outreach Program, MCB Camp Pendleton, San Diego County, CA
Project Manager for the development of a public outreach plan as part of the cultural resources program on MCB Camp Pendleton. The project includes the production of cultural resources themed posters, brochures, and a web page, as well as consultation with public interest groups and local Native American groups. [09/2012 – Ongoing]

RE Barren Ridge 1 LLC, RE Cinco Project, Kern County, CA
Cultural Resource Specialist for the archaeological survey of the proposed RE Cinco solar facility and associated gen-tie transmission line. Duties included the recordation of historic and prehistoric archaeological sites, and the preparation of various cultural resources technical reports

including: Class I and Class III level reports, a Cultural Resources Inventory Report and Letter Report in support of the U.S. Fish and Wildlife Service EA. Responsibilities also included coordination with the USFWS, Bureau of Land Management, and local Native American Tribes; as well as client interaction and consultation. [11/2013 – 10/2015]

Abengoa Solar, Mojave Solar Power Plant Project, San Bernardino County, CA
Project Manager/Cultural Resource Specialist/Field Director for various project-related tasks. Field director for the archaeological survey of the Lockhart Substation Connection and Communication Facilities portion that included the recordation of historic and prehistoric archaeological sites, and contributions to the preparation of a cultural resources Class III report. Project Manager and Cultural Resource Specialist for the compliance phase during the construction of the 250 mega-watt solar facility. Responsibilities included overseeing Cultural Resources and Native American Monitors, coordination with the California Energy Commission, Bureau of Land Management Barstow Field Office, and local Native American Tribes; client interaction and consultation; and preparing various compliance reports. The project also included the identification, evaluation, and treatment of unanticipated discoveries encountered during construction monitoring. [08/2010 – 05/2013]

California High-Speed Rail Authority, Merced to Fresno High-Speed Train System Environmental Impact Report/ Environmental Impact Statement, Central Valley, CA
Assistant field director and crew chief for the archaeological survey of the Merced to Fresno section of the proposed high-speed train. Responsibilities included coordination of pre-field logistics, organization of field data, and assisting with the management of field efforts. Additional duties included architectural survey support, archival research, and report contributions. [01/2011 – 04/2013]

City of Escondido, Regional General Applications Project, Phase II, Escondido, CA.
Cultural Lead for the cultural resources investigations in support of a Programmatic Agreement to conduct routine maintenance activities for City channels, basins, inlets and outlets. The project included a record search, an archaeological survey of 27 channels/basins/inlets/outlets, and the completion of an Archaeological Survey Report. [08/2012 – 09/2012]

Solar Millennium, Blythe Solar Power Project,
Riverside County, CA
Archaeologist for the proposed 7,000-acre solar project under review by the BLM and CEC. The project included an archaeological survey of the project site and buffer zones, the recordation of historic and prehistoric archaeological sites, and the preparation of several cultural resources survey, evaluation, and data recovery reports. Duties included field surveys, site recordation, date recovery, and contributions to the various technical reports. [March 2010-December 2011]

Jay Rehor, RPA
Geoarchaeologist

Areas of Expertise

Geoarchaeology
Prehistoric Archaeology
Lithic Technology
GIS
CEQA/NEPA Compliance
Mitigation Development and Implementation

Education

BA/Anthropology & Earth Sciences/ 2000/University of California, Santa Cruz
MA/Cultural Resources Management/ 2008/ Sonoma State University

Licenses/Registrations

Registered Professional Archaeologist (RPA)

Years of Experience

With AECOM (formerly URS): 8
With Other Firms: 7

Professional Associations

Geological Society of America (GSA)
Society for American Archaeology (SAA)
Society for California Archaeology (SCA)
International Committee on Monuments and Sites (US/ICOMOS)

Training and Certifications

40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER)

Mr. Rehor has over 14 years of experience in archaeology and cultural resources management, participating in and directing projects throughout California and Hawaii. As a Senior Geoarchaeologist for AECOM, he has directed cultural resources programs in support of numerous major National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) projects. Mr. Rehor has extensive experience in addressing regulatory concerns regarding buried archaeological resources, with a particular focus on energy projects in Central and Southern California and the Mojave Desert. Mr. Rehor has developed a practical approach to combining existing geomorphic and geotechnical information, combined with field reconnaissance and archaeological data, to advise clients on areas of possible conflict with this resource area, and has worked with project engineers to design around these conflicts and/or develop feasible mitigation alternatives to resolve the concerns of permitting agencies and stakeholders.

Experience

Brightsource Energy, Rio Mesa Solar Project, Riverside County, CA. Geoarchaeological Task Lead. Developed and completed an archival review and geoarchaeological field testing program to assess the potential effects of a proposed solar power plant on buried cultural resources within a desert alluvial fan piedmont environment with unique geomorphic and ecological considerations due to proximity to the Colorado River. The investigations were designed to meet California Energy Commission (CEC) and Bureau of Land Management (BLM) requirements for impact assessment. The assessment successfully demonstrated that large portions of the project area were not sensitive for buried archaeological resources and developed recommendations for mitigations within the remaining project components.

California High-Speed Rail Authority, California High-Speed Rail Project, Fresno to Palmdale, CA. Principal Investigator/ Field Director. Prepared inventory plans and research designs for the proposed alignments (approximately 250 miles of track and ancillary features); directed field surveys for archaeological resources; prepared survey reports for both Fresno to Bakersfield and Bakersfield to Palmdale sections; prepared Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) sections; prepared evaluation plans for identified resources for eligibility to the National Register of Historic Places (NRHP); conducted evaluation testing of identified archaeological resources; developed and implemented a geoarchaeological sensitivity study to assist the Authority in developing appropriate mitigation strategies for this unprecedented project.

Hydrogen Energy California (HECA), Elk Hills, Kern County, CA. Task Manager/Geoarchaeological Specialist. Developed and completed a landscape reconstruction and sensitivity model for impacts of the

Hydrogen Energy facility on buried archaeological (geoarchaeological) resources, in response to California Energy Commission (CEC) cultural resources Data Requests. The sensitivity model was tested through field investigations, resulting in the identification and avoidance of buried archaeological resources, as well as a better understanding of the evolution of the project area through time.

SES, Calico (formerly Solar 1), Project, Barstow, CA. Task Manager/ Geoarchaeological Specialist. Developed and completed an archival and field-based geoarchaeological assessment of the 9,000 acre solar collection facility in conjunction with compulsory geotechnical investigations, for timely and cost-effective completion of CEC Data Requests.

SES, Imperial Valley Solar (IVS) (formerly Solar 2) Project, El Centro, CA. Geoarchaeological Specialist. The project consists of a 6,500 acre site and 8 mile transmission line corridor. Developed and completed an archival and field-based geoarchaeological assessment of solar collection facility project impacts on BLM lands (Plaster City Limited Use OHV area, El Centro).

Terra-Gen, Center Power Project, Pico Rivera, CA. Primary Investigator/Geoarchaeological Specialist. Oversaw archaeological investigations and developed an archival geoarchaeological assessment to meet CEC data requirements.

Canyon Power Plant, Santa Ana, CA. Geoarchaeological Specialist. Developed and completed an archival review and geoarchaeological testing program to assess the potential effects of a proposed natural gas power plant on buried cultural resources within a dynamic alluvial plain environment, and meet lead agency requirements for impact assessment.

Martifer Renewables, San Joaquin Solar 1 and 2, 106MW Solar/Bio-Fuel Power Plant CEQA Documentation, Coalinga, CA. Task Manager (Archaeology). Supervised the successful completion of cultural resources surveys and reporting for the combined 106 MW solar and biomass facilities within Fresno County. Additionally, completed an archival assessment of the impacts of the facilities on buried archaeological resources, for successful completion CEC Data Requests.

San Francisco Public Utilities Commission (SFPUC), Sunol Yard Improvement Program (SYIP), Sunol, CA. Principal Investigator and Geoarchaeological Specialist. Designed and implemented Extended Archaeological Survey program, in accordance with SFPUC guidelines, in order to address potential impacts to archaeological resources. Worked closely with SFPUC, Environmental Planning, and Native American tribes, to determine project effects to known archaeological resources and develop potential mitigation measures.

San Francisco Public Utilities Commission (SFPUC), Crystal Springs-San Andreas Transmission System Upgrades Project (CSSATSUP), CA. Cultural Resources Specialist, Assisted SFPUC in compliance with Section 106 and CEQA requirements for CSSATSUP, including assessment and documentation of late discoveries during preliminary studies and development of alternatives and monitoring protocol to reduce project-related impacts to a less than significant level.

Kathleen Kubal, RPA
Archaeologist

Areas of Expertise

Prehistoric Archaeology
Geoarchaeology
Geographic Information Systems

Education

MA/Cultural Resources Management/ 2011/Sonoma State University
BA/Anthropology and French/2002/West Virginia University

Licenses/Registrations

2011/Registered Professional Archaeologist (RPA)/989257

Years of Experience

With AECOM (formerly URS): 4
With Other Firms: 7

Professional Associations

Society for California Archaeology
Register of Professional Archaeologists

Training and Certifications

2014/Sedimentology and Stratigraphy, San Francisco State University
2014/Field Studies of Soils in California Ecosystems, UC Davis
2013/40-Hr. HAZWOPER
2013/Trench Safety Competent Person Training
2012/Geography of Soils, San Francisco State University
2012/Process Geomorphology, San Jose State University
2011/Section 106 Essentials from the Advisory Council on Historic Preservation
2010/Geoprocessing with ArcGIS Desktop
2004/Archaeological Field School, Stanford University

Ms. Kubal has over ten years of experience in archaeology and cultural resources management in California. She has conducted numerous state and federally permitted projects, and has authored or co-authored many types of reports, including: archaeological survey reports, archaeological and geoarchaeological testing plans, archaeological evaluation reports, geoarchaeological sensitivity reports, and cultural resources sections in both National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) documents. Ms. Kubal completed a Master's degree at Sonoma State University and has since taken numerous geoscience courses, giving her the necessary skillset to employ a multidisciplinary approach to the study of buried archaeological site potential.

Experience

City of San Mateo Public Works Department, U.S. 101/Hillsdale Boulevard Pedestrian & Bicycle Overcrossing Project, Geoarchaeologist/Cultural Resources Lead, San Mateo County, CA. Currently managing CEQA and Section 106 compliance for environmental clearance, including archaeological, historical, and geological research, and notification of local Native American tribal representatives. Conducted archaeological survey and subsurface geoarchaeological investigation and prepared survey and testing reports, which include documentation of soil taxonomy and geomorphological analysis.

Hyatt Hotels Corporation (sub to LSA Associates), Hyatt House and Hyatt Place Geoarchaeological Coring Survey, Geoarchaeologist, San Mateo County, CA, 2016. Conducted a geoarchaeological investigation to identify potential buried soils and/or archaeological resources. Documented results, including soil taxonomy and geomorphological analysis, in a testing report.

City of San Carlos, U.S. 101/Holly Street Pedestrian Overcrossing Project, Geoarchaeologist, San Mateo County, CA. Conducted a geoarchaeological investigation in support of a Caltrans-required Extended Phase I (XPI). Co-authored the XPI report, which includes documentation of soil taxonomy and geomorphological analysis.

California Pacific Medical Center (CPMC), Geoarchaeological Investigation for CPMC Medical Office Building, Geoarchaeologist, San Mateo County, CA. Conducted a geoarchaeological investigation to identify potential buried soils and/or archaeological resources.

City of Redwood City, U.S. 101/SR 84 (Woodside Road) Interchange Improvement Project, Cultural Resources Task Lead/ Geoarchaeologist, San Mateo County, CA. Oversaw CEQA and Section

106 compliance for environmental clearance. Conducted a geoarchaeological investigation in support of a Caltrans-required XPI. Co-authored the XPI report, which includes documentation of soil taxonomy and geomorphological analysis.

Santa Clara Valley Transportation Authority (VTA), U.S. 101 Express Lanes Project, Cultural Resources Lead/Geoarchaeologist, Santa Clara County, CA. Managed CEQA and Section 106 compliance for environmental clearance, including archaeological, historical, and geological research. Participated in the creation of a GIS-based subsurface sensitivity model. Conducted XPI geoarchaeological and archaeological testing. Co-authored survey and testing reports, which include documentation of soil taxonomy and geomorphological analysis.

Santa Clara Valley Transportation Authority (VTA), State Route 85 (SR 85) Express Lanes Project, Cultural Resources Lead/Geoarchaeologist, Santa Clara County, CA. Managed Section 106 compliance for environmental clearance, including archaeological, historical, and geological research and consultation with local Native American tribal representatives. Participated in the creation of a GIS-based subsurface sensitivity model. Conducted XPI geoarchaeological and archaeological testing. Co-authored survey and testing reports, which include documentation of soil taxonomy and geomorphological analysis.

APPENDIX B

RECORD SEARCH RESULT MAPS

CONFIDENTIAL

APPENDIX C

NAHC SACRED LANDS FILE SEARCH RESULTS LETTER

From:	Redmond, Jennifer
To:	"nahc@nahc.ca.gov"
Subject:	NASA Ames Research Center
Date:	Thursday, April 21, 2016 1:07:00 PM
Attachments:	NASA ARC Sacred-Lands-File-NA-Contact-Form.pdf ARC Boundary.pdf

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Dear Ms. Pilas-Treadway,

NASA is conducting a desktop survey to identify cultural resources within the boundary of the NASA Ames Research Center (ARC) at Moffett Field. NASA ARC is located on the bayshore in Mountain View, Santa Clara County, within Township 6S, Range 2W, Sections 10 and 15 and unsectioned portions of the *Rancho Posolmi* and *Rancho Pastoria de las Borregas* land grants as depicted on the U.S. Geological Survey (USGS) 7.5-minute *Mountain View, Calif* topographic quadrangle (please see attached map).

I am requesting the following information:

- Groups or individuals the NAHC identifies as having a known interest in the geographical boundaries of NASA ARC
- Identification by the NAHC of any sacred lands with the boundaries of NASA ARC that are listed in the Sacred Lands File

Please notify me if your organization has any information related to cultural resources that may exist on and in proximity to NASA ARC. To reach me, please contact me at the address and phone number below, or via email. I look forward to hearing from you.

Thank you,
Jenn

Jennifer Redmond, RPA
Archaeologist
D 510.874.3265
jennifer.redmond@aecom.com

AECOM
1333 Broadway, Suite 800, Oakland, CA 94612-1924
T 510.893.3600 F 510.874.3268
www.aecom.com

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: NASA Ames Research Center - ICRMP Update

County: Santa Clara

USGS Quadrangle Name: Mountain View

Township: 6S **Range:** 2W **Section(s):** 10, 15, and unsectioned portions of Rancho Posolmi and Rancho Pastoria de las Borregas

Company/Firm/Agency: AECOM

Street Address: 1333 Broadway, Suite 800

City: Oakland **Zip:** 94612

Phone: 510.874.3265

Fax: 510.871.3268

Email: jennifer.redmond@aecom.com

Project Description:

NASA is conducting a desktop survey to identify cultural resources within the boundary of the NASA Ames Research Center.

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

April 27, 2016

Jennifer Redmond
AECOM

Sent by Email: Jennifer.redmond@aecom.com
Number of Pages: 3

RE: NASA Ames Research Center, Mountain View, Santa Clara County

Dear Ms. Redmond:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

I suggest you contact all of those listed, if they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: Sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst

Native American Contacts
San Clara County
April 26, 2016

Amah MutsunTribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt , CA 95632
[redacted]

Ohlone/Costanoan
Northern Valley Yokuts

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road
Woodside , CA 94062
[redacted]

Ohlone/Costanoan

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister , CA 95024
[redacted]

Ohlone/Costanoan

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
P.O. Box 360791
Milpitas , CA 95036
[redacted]

Ohlone / Costanoan

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3152
Fremont , CA 94539
[redacted]

Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed NASA Ames Research Center, Mountain View, Santa Clara County.