Final
Preliminary Assessment and Site Inspection Work Plan

Parks Air Force Base
Formerly Used Defense Site
Alameda County, Dublin, California

FUDS Property No. J09CA0083
FUDS Project No. J09CA0083-01 and J09CA0083-02

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Environmental Design Section
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EXECUTIVE SUMMARY

This document presents the Preliminary Assessment and Site Inspection Work Plan completed by the United States Army Corps of Engineers (USACE) in support of the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS) at the former Parks Air Force Base (hereinafter referred to as "former Camp Parks" or "former Parks AFB"). Former Camp Parks is located in the City of Dublin, approximately 30 miles southeast of San Francisco in Alameda County, California. In an Inventory Project Report written by Dynamac Corporation in 1994, the Site, designated Number J09CA0083, was determined to be formerly used by the Department of Defense (DoD) and eligible for the DERP for FUDS. The USACE is the lead agency charged with execution of the FUDS program. The Department of Toxic Substances Control (DTSC) with support from the Regional Water Quality Control Board are the regulatory agencies providing oversight.

On 19 January 1943, Camp Parks, Camp Shoemaker, and the U.S. Naval Hospital Shoemaker were established under the U.S. Navy in Dublin, California. After World War II, nearly all buildings constructed in the early 1940s were demolished. The U.S. Air Force began constructing buildings in 1951; however, it was not until 1953 that Camp Parks, Camp Shoemaker, and the U.S. Naval Hospital Shoemaker were officially transferred to the Department of the Air Force from the Navy. At that time, the sub-installations were combined to former Parks Air Force Base (AFB) for use as a U.S. Air Force training and staging area. Since 1946, Alameda County leased the area formerly known as the U.S. Naval Disciplinary Barracks (in the southern portion of the Site) for use as a prison farm. In 1959, Parks AFB was transferred to the US Army and renamed Camp Parks. Between 1964 and 1972 various portions of the former Camp Parks were quitclaimed or transferred to Alameda County including the Sewage Lagoon Buffer Zone, the former Camp Shoemaker, the US Naval Hospital and two well fields. On 11 December 1980, remaining parts of Camp Parks were officially designated as a semi-active installation and renamed Parks Reserve Forces Training Area to be used as a mobilization and training center.

The Site is defined as the FUDS eligible properties including former Camp Shoemaker and the former U.S. Naval Hospital Shoemaker, the former Sewage Lagoon Buffer Zone, the northern area of former Well Field Number 1, and former Well Field Number 2. Parks Reserve Forces Training Area remains an active installation and therefore is not included in the FUDS eligible Site.

Twenty-eight Hazardous, Toxic, or Radiological Wastes (HTRW) or Containerized HRTW (CON/HTRW) Areas of Interest (AOIs) were identified at former Camp Parks. Of the 28 AOIs identified, five are recommended for a Site Inspection and included in the attached Quality Assurance Project Plan (QAPP). These five are AOI 16 – Building 1395 Oil Storage tank, AOI 22 – Underground Fuel Oil storage Depot, AOI 23 – Camp Shoemaker Burn Pit, AOI 24 –Naval Small Bore Rifle Range, and AOI 28 – Sanitary Landfill. AOI 25 – Building 299 Laundry and Boiler Room is recommended for a Remedial Investigation (RI) as sufficient data has already been collected during previous investigations. AOI 8, Buildings 468A and 468B Gas Stations, is currently under discussion between the USACE and Alameda County to determine the appropriate actions, and AOI 6 – Hickman Road Firing Range is considered a potential Responsible Party (PRP) project.. The remaining 20 AOIs are recommended for No Department of Defense Action Indicated (NDAI). A discussion of all AOIs is contained in Chapter 4 and the QAPP, which is the primary work plan for the Site Inspection, is contained in Chapter 5.

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
ACM	asbestos-containing materials
AEC	Atomic Energy Commission
AOI	Area(s) of Interest
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATF	Alcohol, Tobacco, and Firearms
BD/DR	building demolition/debris removal
bgs	below ground surface
BIA	Bureau of Indian Affairs
Bldg	Building
°C	degrees centigrade
CA	Corrective Action
CCC	Continuing Calibration Check
CCV	Continuing Calibration Verification
COC	Chain of Custody
COD	Coefficient of Determination
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CON/HTRW	containerized hazardous, toxic, and radiological wastes
CRHR	California Register of Historical Resources
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DL	Detection Limit
DoD	Department of Defense
DoE	Department of Energy
DQA	Data Quality Assessment
DQI	Data Quality Indicator
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
EDD	Electronic Data Deliverable
DWR	California Department of Water Resources
EDR	Environmental Data Resources
EPA	Environmental Protection Agency
°F	degrees Fahrenheit
FD	Field duplicate
FEMA	Federal Emergency Management Agency
FTL	Field Team Leader
FUDS	Formerly Used Defense Site
FUDSMIS	Formerly Used Defense Site Management Information System
GC	Gas Chromatograph
GEIMS	Geographic Environmental Information Management System
GIS	Geographic Information System
GOCO	government-owned, contractor-operated
GPS	Global Positioning System
GSA	General Services Administration

HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	hazardous, toxic, and radiological wastes
ICAL	Initial Calibration
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
IDW	investigation-derived waste
INPR	Inventory Project Report
ITA	Indian Trust Asset
LCS	Laboratory Control Sample
LOD	Limit of Detection
LOQ	Limit of Quantitation
LTO/LTM	Long-Term Operation/Long-Term Monitoring
LUFT	Leaking Underground Fuel Tank
MB	Method Blank
MMRP	Military Munitions Response Program
µg/Kg	microgram per Kilogram
µg/L	microgram per Liter
mg/Kg	milligram per Kilogram
MS	mass spectrometer
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	mean sea level
NA	Not Applicable
NARA	National Archives Record Administration
NDAI	no DoD action is indicated
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRC	Nuclear Regulatory Commission
NRDL	Naval Radiological Defense Laboratory
NRHP	National Register of Historic Places
NWIS	National Well Inventory System
OSHA	Occupational Safety and Health Administration
PA	preliminary assessment
PBS	Public Building Service
PCB	polychlorinated biphenyl
PM	Project Manager
ppb	parts per billion / µg/L
ppm	parts per million / mg/L
PQOs	Project Quality Objectives
PRP	potentially responsible party
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QG	Quartermaster General
QSM	Quality Systems Manual
RD/RA	remedial design/remedial action
RF	Response Factor
RFTA	Reserve Forces Training Area
RI/FS	remedial investigation/feasibility study
RG	Record Group

RPD	Relative Percent Difference
RRT	Relative Retention Time
RSD	Relative Standard Deviation
RSL	Regional Screening Level
RT	Retention Time
SAP	Sampling and Analysis Plan
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SI	site inspection
SOP	Standard Operating Procedure
SRI	Stanford Research Institute
SWRCB	State Water Resources Control Board
Tetra Tech	Tetra Tech, Inc.
TBD	To Be Determined
TPH	Total Petroleum Hydrocarbons
TPHd	Total Petroleum Hydrocarbons – diesel range
TPHg	Total Petroleum Hydrocarbons – gasoline range
TPHmo	Total Petroleum Hydrocarbons – motor oil range
TTL	Technical Team Leader
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
USACE-SPK	United States Army Corps of Engineers, Sacramento District
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VOC	Volatile Organic Compounds
WP	work plan
WS	worksheet

1.0 INTRODUCTION

This Preliminary Assessment/Site Inspection (PA/SI) Work Plan outlines activities that will be conducted at Areas of Interests (AOIs) identified at the Parks Air Force Base (AFB) also known as the former Camp Parks Formerly Used Defense Site (FUDS), FUDS Property No. J09CA0083. The PA/SI will be performed by the United States Army Corps of Engineers (USACE), Sacramento District (SPK).

The former Camp Parks FUDS is located in Dublin, approximately 30 miles southeast of San Francisco in Alameda County, California (Figure 1-1). It consists of approximately 1,100 acres (USACE, 1994; 1999). The former Camp Parks various aliases include: Camp Parks, Naval Camp Parks, Fleet City, Camp Shoemaker, U.S. Naval Hospital Shoemaker, and Parks AFB. For the purposes of this Work Plan the Parks AFB FUDS will be referred to as "former Camp Parks" or the "Parks AFB."

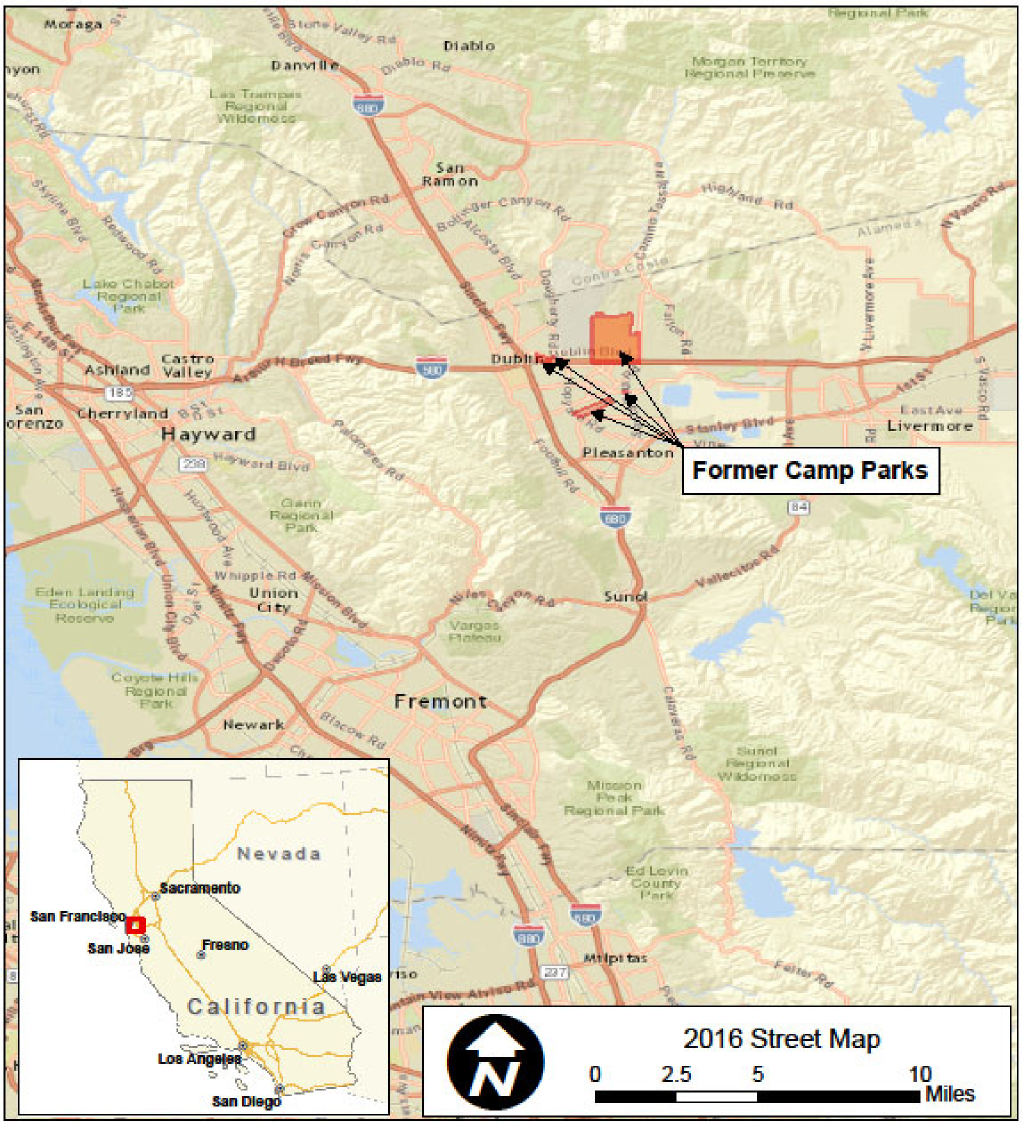


Figure 1-1 Site Location Map

1.1 AUTHORITY

The activities described in this PA/SI Work Plan will be performed by the USACE-SPK under the authority of the Defense Environmental Restoration Program for FUDS. In 1986, Congress established the DERP at 10 United States Code (U.S.C.) 2701 *et seq*.

The program directs the Secretary of Defense to "carry out a program of environmental restoration at facilities under the jurisdiction of the Secretary." The DoD role in DERP is to ensure that policy and management of the overall program are consistent with the provisions of the DERP statute, and where appropriate, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (as amended by Superfund Amendments and Reauthorization Act) and the National Oil and Hazardous Substance Pollution Contingency Plan. At a FUDS, execution of the program has been delegated by the DoD to the USACE.

The method of evaluating a FUDS property/project follows a process similar to the CERCLA process: (1) INPR (property eligibility document), (2) preliminary assessment (PA), (3) site inspection (SI), (4) remedial investigation/feasibility study (RI/FS), (5) decision document, (6) remedial design/remedial action (RD/RA), and (7) long-term operation/long-term monitoring (LTO/LTM). At any point within this process, a time critical removal action can be initiated, if warranted, or a determination that no DoD action is indicated (NDAI) can be made. If an NDAI determination is made, a project close-out document is generated.

Under the FUDS program, one of the parameters to be considered during the initiation of a project is whether the property (or specific item/site) has been beneficially used by any owner, operator, or other party that may be considered a potentially responsible party (PRP). If USACE determines the contamination was caused solely by DoD, it will be mitigated by USACE through the FUDS program. If an investigation is initiated (by any party) and DoD is determined to be only partially responsible, USACE will investigate to the extent necessary to determine DoD liability.

Consideration must also be given to the ability to differentiate DoD-generated contaminants from contaminants introduced by other PRPs, on or off the FUDS property. If identification of separate contaminant streams cannot be achieved, or if separate remediation of DoD-generated contaminants cannot be realized, the project may be ineligible for remediation under the FUDS program. If commingled contamination exists, a PRP project must be initiated, and the Department of Justice will negotiate a contribution settlement with the current landowner/responsible party based on a liability analysis.

Further, the DERP-FUDS policy does not allow the USACE to provide cost recovery to property owners nor does it allow USACE to recover costs from property owners for remedial work. However, the property owner may initiate an investigation and/or clean-up action and subsequently seek cost reimbursement from the Department of Justice by filing a tort claim.

This Preliminary Assessment is intended to provide the historic information needed to determine if any AOIs should be included in the SI to determine if a release occurred from former DoD activities. The accompanying Quality Assurance Project Plan (QAPP), which is the primary work plan for the SI, proposes what data will be collected from the identified AOIs.

1.2 PURPOSE AND SCOPE

The purpose of this PA/SI is to research and evaluate operations and activities that occurred at Former Camp Parks AOIs to determine if any environmental impact(s) had occurred due to former DoD use. Additionally, uses of the property after the DoD's tenure have been evaluated to determine if individual areas of interest are eligible for follow-on action using Defense Environmental Restoration Account (DERA) funds for DERP-FUDS.

The scope of the PA/SI includes but is not limited to:

- Research and review of pertinent, readily available historical literature, newspapers, museum and historical society files, and geologic and hydrogeologic literature, as well as available historical aerial photographs and topographic maps of former Camp Parks and surrounding area;
- Reconnaissance of the Site and interviews with persons familiar with former Camp Parks ;
- Review of historical chain of title records concerning Site ownership;
- Evaluation of on-Site hazardous substances use, storage, and/or disposal;
- Interaction with appropriate federal, state, and municipal agencies to review available records and permits;
- Acquisition and review of a regulatory agency database report;
- Collection of soil and groundwater data at AOI's potentially impacted by former DoD releases, and
- Preparation and submittal of a PA/SI report summarizing the results and presenting interpretations and conclusions.

1.3 FUDS PROPERTY AND PROJECT ELIGIBILITY

The former Camp Parks was determined to be eligible for the FUDS program in 1994 (USACE 1994, 1999). To be eligible for the FUDS program a real property must have been under the jurisdiction of the Secretary of the Defense and owned by, leased to or otherwise possessed by the United States and transferred from DoD control prior to 17 October 1986 and known or potential contamination or hazards on the eligible property attributable to DoD activities occurred prior to 17 October 1986 (USACE, 2004).

Under the FUDS program a project of the FUDS property may be classified under the following project categories.

- *HTRW Projects*: HTRW projects include environmental response actions at an area of an eligible FUDS property as the result of DoD activities related to hazardous substances, pollutants, and contaminants as defined in CERCLA; petroleum, oil, or lubricants; DoD-unique materials; hazardous wastes or hazardous waste constituents; low-level radioactive materials or low-level radioactive wastes; and explosive compounds released to soil, surface water, sediments, or groundwater as a result of ammunition or explosives production or manufacturing at ammunition plants.

- *Containerized HTRW (CON/HTRW) Project*: CON/HTRW project includes response actions at an area of an eligible FUDS property to address underground storage tanks (USTs), aboveground storage tanks (ASTs), transformers, hydraulic systems, investigation derived waste (IDW), abandoned inactive monitoring wells, etc.; incidental removal of contaminated soils resulting from a leaking UST or other container; or long-term corrective actions required by Resource Conservation Recovery Act Subtitle I involving significant soil and groundwater response actions following UST closure/removal actions.

- *MMRP Projects*: Military Munitions Response Program (MMRP) projects include response actions at an area of an eligible FUDS property related to military munitions and explosives of concern and their constituents as the result of DoD activities at FUDS. MMRP projects can include response actions for the removal of foreign military munitions if it is incidental to the response addressing DoD military munitions at a FUDS property.

- *PRP Projects*: Potential Responsible Party (PRP) projects involve activities at an area of an eligible FUDS property where DoD may bear potential CERCLA liability for hazards or hazardous substance releases along with other parties.

- *BD/DR Projects*: Building Demolition/Debris Removal (BD/DR) projects are response actions at an area of an eligible FUDS property to address the demolition and removal of unsafe buildings and structures and the removal of unsafe debris. The conditions must have been hazardous due to DOD use, and present at time of transfer.

1.4 FORMER CAMP PARKS FUDS AREAS OF INTEREST

Twenty eight AOIs have been identified as potential eligible FUD projects for the PA/SI. The AOIs include twelve HTRW and sixteen CON/HTRW areas of interest and are presented in Table l-1 and Table 1-2 respectively. No MMRP or BD/DR projects were identified. The AOIs are further described in Section 4.0. AOI numbers used in previous documentation with DTSC have been preserved, with additional AOI numbers added and some AOI names changed to more accurately represent the presented AOIs. Figures 1-2 and 1-3 show the location of the HTRW and CON-HTRW AOIs mapped in relation to the Former Camp Parks.

Table 1-1 HTRW AOIs

AOI #	AOI Name
1	Bldg. 1788 Motor Pool
2	Bldg. 627 Incinerator
3	Bldg. 1715 Garbage Incinerator
4	Bldg. 1501 Wash Rack and Grease Pit
5	Burn Area
6	Hickman Road Firing Range
7	Naval Radiological Defense Laboratory
9	Bldgs. 297B and 297D Paint Shop and Store Room
23	Camp Shoemaker Burn Pit
24	Naval Small Bore Rifle Range
25	Bldg. 299 Laundry and Boiler Room
28	Hickman Road Sanitary Fill Area

Table 1-2 CON/HTRW AOIs

AOI #	AOI Name
8	Bldgs. 468A and 468B Gas Stations
10	Bldg1210 UST
11	Bldgs. 1391 and 1393 Oil Storage Tanks
12	Bldg. 1746 Oil Storage Tank
13	Bldg. 1778 Gasoline Generator
14	4th street & Offutt Ave/4th street & Nellis USTs
15	Various Transformers
16	Bldg. 1395 Oil Storage Tank
17	Old Greystone USTs
18	Hospital Boiler USTs
19	4th and Madigan USTs
20	Former Prison Farm Tanks
21	Engineer Hill Oil Storage Tanks
22	Former Underground Fuel Oil Storage Depot
26	Bldg. 1396 UST
27	Tyndall Avenue ASTs

Figure 1-2 Former Camp Parks Overall HTRW Map

Figure 1-3 Former Camp Parks Overall CON/HTRW Map

A FUDS project is ineligible for funding under the FUDS program if any of the following conditions or situations exists (USACE 2004).

- The current land owner refuses right-of-entry.
- Project response actions would mitigate hazards that resulted from civil works activities rather than military activities.
- Funding in the ER-FUDS appropriation is not authorized for reimbursement of current landowners or other PRPs for any response actions initiated or completed with regard to DoD contamination.
- Project response actions would abate asbestos-containing materials (ACM) or lead-based paints, unless the ACM or lead-based paint is incidental to the completion of response actions at an approved project, or the ACM were not incorporated as an integral component of a facility but were released into the environment by DoD disposal actions resulting in an on-site CERCLA hazardous substance release for which DoD is responsible.
- The project involves a UST or other structure that has been beneficially used by any owner subsequent to DoD control. For a CERCLA release from a beneficially used UST or transformer subsequent to DoD control, a PRP project may only be proposed if there is evidence of a CERCLA release resulting from DoD use.

1.5 METHODS OF INVESTIGATION

Literature Review. Includes review of available published and unpublished historical, geologic, hydrogeologic, and environmental reports.

Agency Contacts. Includes contacting agencies and organizations via telephone, personal interviews, and record searches for information relating to the Site area. Records from these contacts are in Appendices A, C, D, E, F, and G.

- National Archives and Records Administration (NARA);
- Public Building Service, GSA;
- USACE, Sacramento District;
- San Francisco Bay Regional Water Quality Control Board (SFBRWQCB);
- Bureau of Indian Affairs (BIA);
- Alameda County Department of Environmental Health;
- Contra Costa County Hazardous Materials Division;
- Zone 7 Water Agency;
- Alameda County Sheriff's Department;
- Alameda County Assessor's Office; and
- City of Dublin Public Works.

Aerial Photograph Survey. Includes interpretation of historical aerial photographs of the Site for evidence of structures and/or activities that may be indicative of potential environmental concerns.

Topographic Map Review. Includes evaluating historical topographic maps obtained through Environmental Data Resources, Inc. (EDR), NARA, and any other available sources to evaluate past land use and Site development.

Historical/Cultural Resources. Includes review of published literature on the prehistory, ethnography, and history of the vicinity, including review of the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), California Historical Landmarks, California Points of Historical Interest, and the California Office of Historical Preservation's Historic Resource Inventory listings for Alameda County, as well as historical maps and secondary historical sources.

Interviews. Conduct interviews with county and municipal agency representatives and other persons familiar with Parks AFB who might have information about the history of the Site and the land surrounding it.

Regulatory Agency Database/Sanborn Map Search. EDR maintains comprehensive environmental information databases and historical information, including Sanborn Maps and City Directories, and specializes in providing such data for use in real estate and environmental documents. EDR performed a database search of specific government records within a prescribed radius of the Site in accordance with American Society for Testing and Materials (ASTM) method E 1527-00 (ASTM 2000) and reviewed their Sanborn Map collection for coverage in the Site area.

Site Reconnaissance. Conduct Site visits. The objectives of the Site reconnaissance was to verify any evidence of former DoD activity, document any environmental areas of interest, and document the current status of the Site.

2.0 FUDS PROPERTY DESCRIPTION

2.1 LOCATION AND DESCRIPTION

The FUDS-eligible portion of former Camp Parks comprises a total of approximately 1,100 acres (ac) in Alameda County, California, and is located in the Cities of Dublin and Pleasanton near their respective boundaries. The FUDS property includes the following five areas described as:

- Former Camp Shoemaker - is bounded on the west by Arnold Avenue, on the south by Highway 580, and on the east by Tassajara Road in Dublin, California (approx. 954.74 ac).
- Former Sewage Lagoon Buffer Zone - is located between Dublin Avenue and Highway 580 and is currently a recreational park and a portion of the Civic Plaza in Dublin, California (approx. 24.98 ac).
- Former Bus Station Annex was used for loading and unloading passengers and is currently owned by the City of Dublin and leased to several different businesses (approx. 2.00 ac).
- Former Well Field Number 1- The northern portion of has been used for flood control and is situated on the southern bank of the Arroyo Mocho Canal; it is currently owned by the Alameda County Flood Control in Pleasanton, California (approx. 0.68 ac).
- Former Well Field Number 2 - used to supply former Parks AFB with drinking water and is currently a City of Pleasanton recreational park in Pleasanton, California (approx. 104.89 ac).

Figure 2-1 illustrates the boundaries of the five areas that compose Former Camp Parks. Appendix B contains further documentation describing the real estate of the Former Camp Parks.

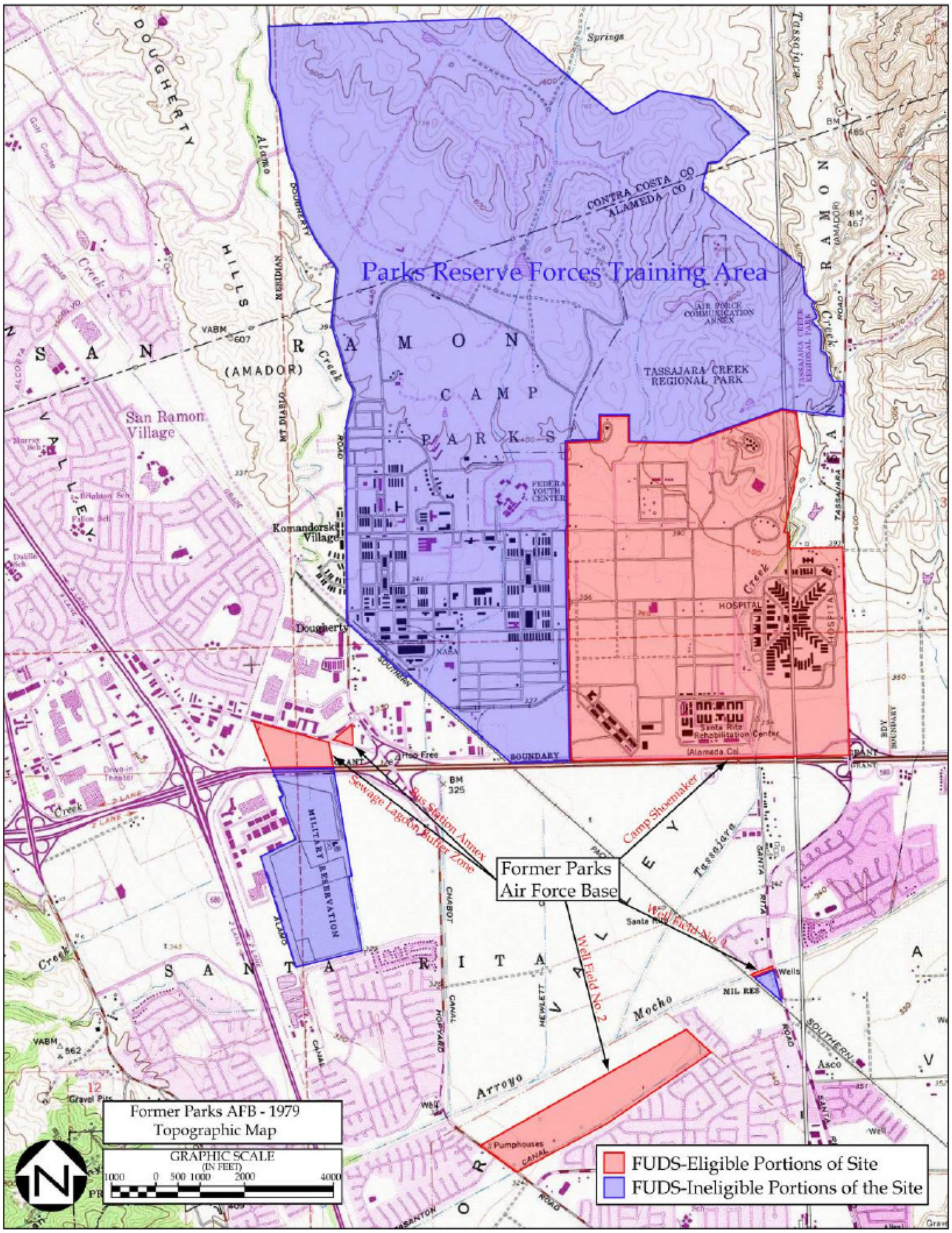


Figure 2-1 FUDS Eligibility Map

2.2 DoD REAL PROPERTY TRANSFERS

2.2.1 Acquisition

Camp Shoemaker was acquired by the United States of America from Ada Clement, *et al.* on 24 May 1943 and consisted of 954.742 FUDS-eligible acres. Former Well Field Number 1 was acquired by the United States of America from the Spring Valley Water Company on 3 February 1943 and consisted of 4.105 acres of which 0.681 acre is FUDS-eligible. Former Well Field Number 2 was acquired from the Spring Valley Company and the County of Alameda on 14 October 1943 through a condemnation action and consisted of 104.89 FUDS-eligible acres. The former Sewage Lagoon Buffer Zone (portion of the Sewage Plant) was acquired by the United States of America from Charles A. Gale and William H. Donahue on 4 December 1943 and consisted of 164.896 acres, of which 24.98 acres are FUDS-eligible. The former Bus Station Annex was acquired by the United States of America from Charles A. Gale and William H. Donahue on 8 December 1943 and consisted of 2.00 FUDS-eligible acres.

2.2.2 Leases, Easements, Permits, and Licenses Issued by the DoD

The 2-acre parcel, known as the Bus Station Annex, was leased to R. N. Jensen Construction Company on 1 October 1954 for a term of 5 years. The lease was subsequently assigned to the Western Sierra Lumber Company. This property was sold prior to the expiration of the lease.

2.2.3 Disposition

The United States of America quitclaimed the 2-acre parcel known as the former Bus Station Annex on 1 October 1957 to Robert and Fannie S. Rothman. On 1 November 1969, the FUDS-eligible northern portion of former Well Field Number 1 was sold to Alameda County Flood Control and Water Conservation District. On 15 June 1969, the former Camp Shoemaker portion was quitclaimed to the Surplus Property Authority of Alameda County. On 29 June 1971, the GSA quitclaimed a portion of former Well Field Number 2 (totaling 104.079) acres to the City of Pleasanton for recreational use. On 25 May 1972, the United States of America quitclaimed 22 acres of the former Sewage Lagoon Buffer Zone to Valley Community Services District. Several acres of the former Sewage Lagoon Buffer Zone were removed from the property during DoD disposal of the Site for expansion of Highway 580 on the southern boundary. On 12 December 1972 and 15 October 1984, property that held former buildings and wells on former Well Field Number 2 were sold to the Alameda County Flood Control and Water Conservation District totaling 1.675 acres.

2.2.4 Chain of Title

The chain of title for former Parks AFB is included below as Table 2-1 followed by Figures 2-2 to 2-4 are real estate maps of former Parks AFB.

Table 2-1 Chain of Title through Time for Former Parks AFB

Date	Grantor/Grantee	Portion of Site	Acreage Transferred	FUDS-Eligible Acreage	Total DoD FUDS-Eligible Site Acreage		Document Type/Record
					Owned	Leased	
3 February 1943	Spring Valley Water Company/ United States of America	Well Field Number 1	4.105	0.69	0.69	0.00	Final Judgment of Record/Number 22466-G, recorded 8 December 1949 in Book 5957, pages 204–206, Official Records of Alameda County
24 May 1943	Ada Clement, *et al.*/United States of America	Camp Shoemaker	3,396.00	954.74	955.43	0.00	Final Judgment of Record/Number 22352-R, recorded 1 August 1947 in Book 5132, pages 1–32, Official Records of Alameda County
14 October 1943	Spring Valley Company and County of Alameda/United States of America	Well Field Number 2	104.89	104.89	1,060.32	0.00	Final Judgment of Record/Number 22803-G, recorded 7 November 1949 in Book 5930, pages 41–45, Official Records of Alameda County
8 December 1943	Charles A. Gale and William H. Donahue/United States of America	Bus Station Annex	2.00	2.00	1,087.30	0.00	Declaration of Taking/Document Number 22985-S, recorded 22 May 1945
25 September 1944	Southern Pacific Railroad and Spring Valley Water Company/ United States of America	Sewage Lagoon Buffer Zone	164.90	24.98	1,085.30	0.00	Final Judgment/Number 22460-G, recorded 4 April 1945 in Book 4681, page 234, Official Records of Alameda County
1 October 1957	United States of America/Robert and Fannie S. Rothman	Bus Station Annex	2.00	2.00	1,085.30	0.00	Quitclaim Deed/Recorded 18 October 1957 in Book 8498, pages 529–530, Official Records of Alameda County
3 July 1961	Robert and Fannie S. Rothman/ Robert and Fannie S. Rothman	Bus Station Annex	2.00	2.00	1,085.30	0.00	Grant Deed/Recorded 7 July 1961 in Reel 361, Image 479, Official Records of Alameda County
15 June 1969–Present	United States of America/ Surplus Property Authority Alameda County	Camp Shoemaker	954.74	954.74	129.88	0.00	Quitclaim Deed/Recorded 11 July 1969 in Document Number 69-078117, Official Records of Alameda County
1 November 1969–Present	United States of America/ Alameda County Flood Control and Water Conservation District	Well Field Number 1	0.68	0.68	1,084.62	0.00	Quitclaim Deed/Recorded 12 November 1969 in Document Number 69-127713, Official Records of Alameda County
29 June 1971–Present	United States of America/City of Pleasanton	Well Field Number 2	103.22	103.22	26.66	0.00	Quitclaim Deed/Recorded 20 July 1971 in Document Number 71-91279, Official Records of Alameda County
1 May 1972	United States of America/ County of Alameda	Sewage Lagoon Buffer Zone	0.60	0.60	26.06	0.00	Quitclaim Deed/Recorded 12 May 1972 in Document Number 72-64126, Official Records of Alameda County
25 May 1972	United States of America/Valley Community Services District	Sewage Lagoon Buffer Zone	22.00	22.00	4.06	0.00	Quitclaim Deed/Recorded 27 June 1972 in Document Number 72-85689, Official Records of Alameda County
12 December 1972	United States of America/ Alameda County Flood Control and Water Conservation District	Well Field Number 2	0.81	0.81	3.25	0.00	Quitclaim Deed/Recorded 5 February 1973 in Document Number 73-15125, Official Records of Alameda County
15 October 1984	United States of America/ Alameda County Flood Control and Water Conservation District	Well Field Number 2	0.86	0.86	2.39*	0.00	Deed/Recorded 31 October 1984 in Document Number 219622, Official Records of Alameda County
12 August 1986–Present	Alameda County Flood Control and Water Conservation District/ City of Pleasanton	Well Field Number 2	1.89	1.89	0.00	0.00	Quitclaim Deed/Document Number 86223562. Recorded in Official Records of Alameda County on 17 September 1986

Date	**Grantor/Grantee**	**Portion of Site**	**Acreage Transferred**	**FUDS-Eligible Acreage**	**Total DoD FUDS-Eligible Site Acreage**		**Document Type/Record**
					Owned	**Leased**	
1 July 1988–Present	Dublin San Ramon Services District/City of Dublin	Sewage Lagoon Buffer Zone	21.39	21.39	0.00	0.00	Quitclaim Deed/Document Number 88158847. Recorded in Official Records of Alameda County on 1 July 1988
12 April 1999–Present	Dublin Information, Inc./City of Dublin	Sewage Lagoon Buffer Zone	105.19	22.00	0.00	0.00	Quitclaim Deed/Document Number 99149007. Recorded on 12 April 1999 in the Official Records of Alameda County
10 January 2000	Dublin Investors/SCS Development Company	Bus Station Annex	1.26	1.26	0.00	0.00	Grant Deed/Document Number 2000019431. Recorded on 24 January 2000 in the Official Records of Alameda County
7 March 2000–Present	SCS Development Company/J & E Esperanca Investments, LLC	Bus Station Annex	1.26	1.26	0.00	0.00	Grant Deed/Document Number 2000076438. Recorded on 15 March 2000 in the Official Records of Alameda County
7 February 2006	Green Bear, Ltd. Partnership, *et al.*/City of Dublin	Bus Station Annex	0.22	0.22	0.00	0.00	Grant Deed/ Document Number 2006061221. Recorded on 16 February 2006 in the Official Records of Alameda County

Note: * Property was acquired to expand Highway 580, and no records exist of this transaction

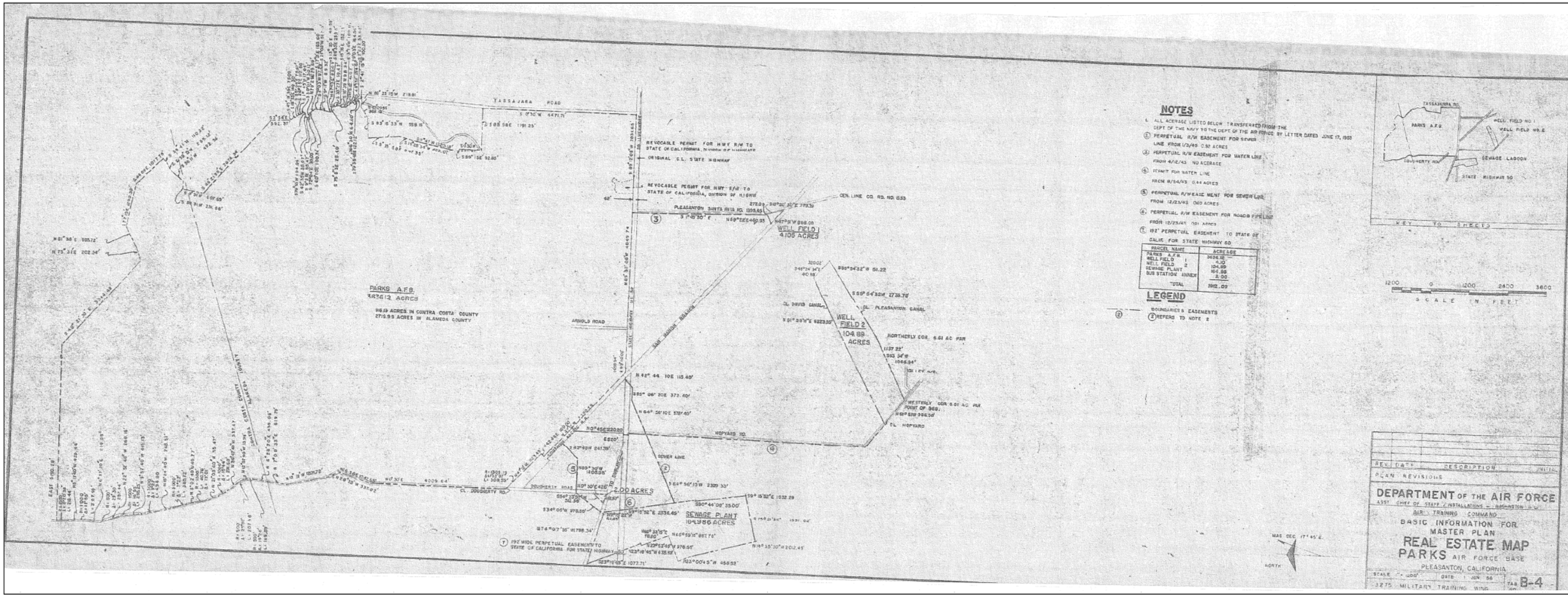


Figure 2-2 1956 Department of the Air Force Real Estate Map for Parks AFB.

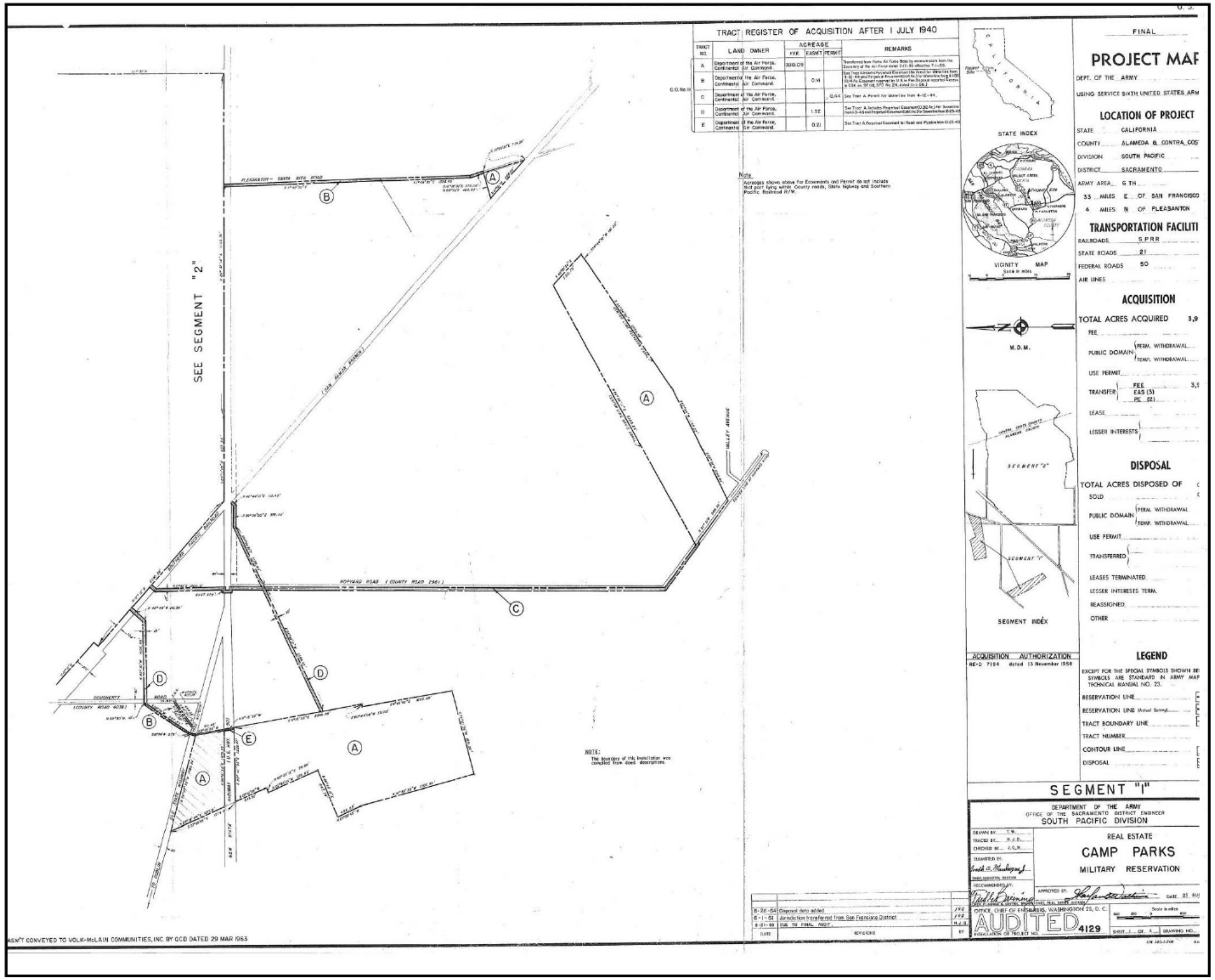


Figure 2-3 1964 USACE Real Estate Map of Camp Parks

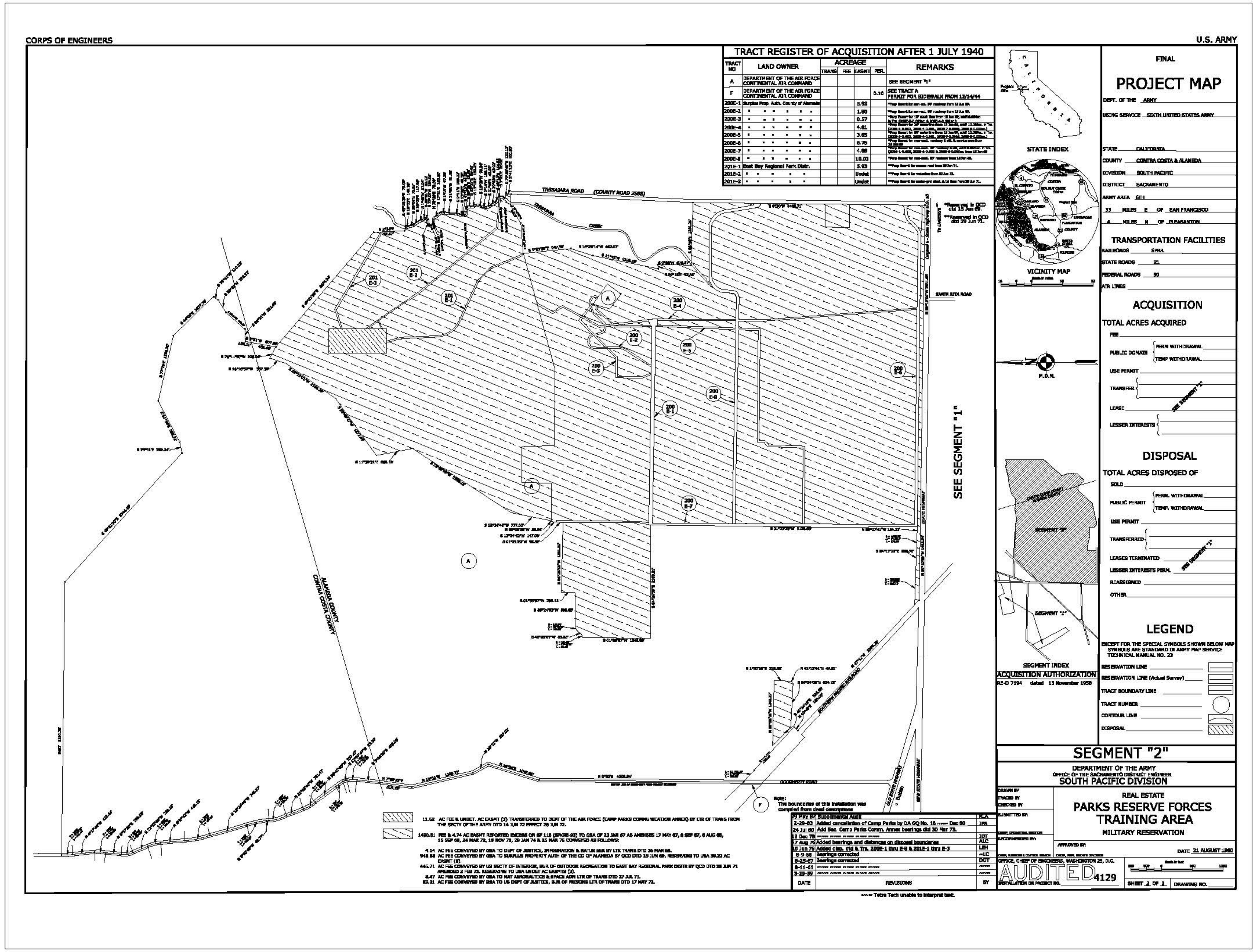


Figure 2-4 Redrawn 1960 USACE Real Estate Map of Parks Reserve Forces Training Area

2.3 CURRENT USES OF THE SITE

Current uses of the Former Camp Parks are:

- Former Camp Shoemaker and the former U.S. Naval Hospital Shoemaker contains the Alameda County Sheriff's Training Center, the Santa Rita Jail, and a multitude of residences, businesses, and parks;
- Former Sewage Lagoon Buffer Zone contains a recreational park and a portion of the City of Dublin Civic Center;
- Former Bus Station Annex is occupied by several retail stores, but is primarily a parking lot;
- Former Well Field Number 1 is currently used as a flood control ditch known as the Arroyo Mocho Canal;
- Former Well Field Number 2 is currently a recreational sports park owned by the City of Pleasanton.

2.4 SURROUNDING PROPERTY CHARACTERISTICS

The areas around the separate portions of the Site are currently residential, commercial, recreational, or still in DoD use. Parks Reserve Forces Training Area (RFTA) is immediately to the west of former Camp Shoemaker and is still an active military base.

2.5 NATURAL SETTING

2.5.1 Topography

The Site is located on an alluvial plain in the Livermore Valley, which has moderately steep hills with rounded summits that rise to the north. The elevation at the Site ranges from 337 feet above mean sea level (msl) to 765 feet above msl; however, elevation of some areas within the Site may have been altered due to cutting and filling from land development. Former Camp Shoemaker and U.S. Naval Hospital Shoemaker are relatively flat except for the northeastern portion of the area, which is hilly. The former Sewage Lagoon Buffer Zone, former Bus Station Annex, former Well Field Number 1, and former Well Field Number 2 are relatively flat to slightly undulating areas. Regional topography is shown in the United States Geological Survey (USGS) 7.5-minute quadrangle maps provided in Section 3.4.

2.5.2 Soils

The following summary of soil types at former Parks AFB was obtained from EDR's GeoPlus Report (Appendix B) and the United States Department of Agriculture (USDA), Natural Resource Conservation Service Soil Data Mart (2007). The four separate components of the Site have different soil types and are discussed below.

Former Camp Shoemaker and the U.S. Naval Hospital Shoemaker - The dominant soil component is listed as the Clear Lake Clay, and the surface texture of the soil is described as clay. The parent material consists of alluvium derived from sedimentary rock. The soil water-holding capacity ranges between 0.12 and 0.16 inch of water per inch of soil from 0 to 65 inches below ground surface (bgs). The pH of the soil ranges from 6.5 to 8.4 increasing with depth. The risk of corrosion of uncoated steel and concrete is high

and moderate, respectively. The soil is moderately well drained and has medium surface runoff. The soil meets the requirements for a hydric soil because it is poorly or very poorly drained and has a water table at a depth of 1.0 foot or less during the growing season when permeability is less than 6.0 inches per hour in any layer within a depth of 20 inches.

Former Sewage Lagoon Buffer Zone and the former Bus Station Annex - The dominant soil component is listed as the Pescadero Clay, and the surface texture of the soil is described as clay. The parent material consists of alluvium derived from sandstone and shale. The soil water-holding capacity ranges between 0.10 and 0.15 inch of water per inch of soil from 0 to 72 inches bgs. The pH of the soil ranges from 6.1 to 6.5 at the surface and from 7.9 to 8.4 at depths from 2 to 72 inches bgs. The risk of corrosion of uncoated steel and concrete is high and low, respectively. The soil is moderately well drained and has medium surface runoff. The soil meets the requirements for a hydric soil because it is poorly or very poorly drained and has a water table at a depth of 1.0 foot or less during the growing season when permeability is less than 6.0 inches per hour in any layer within a depth of 20 inches.

Former Well Field Number 1 - The dominant soil component is listed as the Sycamore Silt Loam, and the surface texture of the soil is described as silt loam. The parent material consists of alluvium derived from calcareous sandstone and/or calcareous shale. The soil water-holding capacity ranges between 0.13 and 0.18 inch of water per inch of soil from 0 to 60 inches bgs. The pH of the soil ranges from 7.9 to 8.4. The risk of corrosion of uncoated steel and concrete is high and moderate, respectively. The soil is moderately well drained and has low surface runoff. The soil does not meet the requirements for a hydric soil.

Former Well Field Number 2 - The dominant soil component is listed as Sunnyvale Clay Loam over clay, and the surface texture of the soil is described as clay loam. The parent material consists of alluvium derived from sandstone and shale. The soil water-holding capacity ranges between 0.12 and 0.18 inch of water per inch of soil from 0 to 66 inches bgs and decreases with depth. The pH of the soil ranges from 7.9 to 8.4. The risk of corrosion of uncoated steel and concrete is high and low, respectively. The soil is moderately well drained and has low surface runoff. The soil meets the requirements for a hydric soil because it is poorly or very poorly drained and has a water table at a depth of 1.0 foot or less during the growing season when permeability is less than 6.0 inches per hour in any layer within a depth of 20 inches.

2.5.3 Geology

Former Camp Parks is located in the California Coast Ranges Geomorphic Province, characterized by a well-developed northwest-southeast oriented geomorphic features produced by structural features of the same trend (Norris and Webb 1990). In the vicinity of the Site, rock types are dominantly sedimentary underlain by Franciscan basement. The main geologic unit mapped at the Site is the Plio-Pleistocene Tassajara Formation. It is obscured in some areas by Holocene surficial valley-fill (Barlock 1988). The Plio-Pleistocene Livermore Formation is not exposed at the Site, but overlies the Tassajara Formation and plays a significant role in the Livermore Valley hydrogeology.

Former Camp Parks is located in the intermontane region of the Northern Diablo Range. The Diablo Range is part of the northwest-trending Coast Ranges and parallels three major fault systems in the area: the San Andreas, the Sur-Nacimiento, and the Coast Range Thrust. These faults can generally be considered to define three different lithologic blocks. The westernmost block is the Salinian Block, which lies east of the Sur-Nacimiento Fault and west of the San Andreas Fault. This block consists primarily of metamorphic and granitic rock. To the east of the Salinian Block is the Franciscan Assemblage, lying between the San Andreas and the Coast Range Thrust Fault zones. It is composed of marine sedimentary and volcanic rocks. The next block positioned above the Coast Range Thrust Fault zone consists of late Mesozoic through late

Tertiary marine sedimentary rocks overlying complex ancient oceanic and continental crust rocks. This block lies primarily along the eastern margin of the Coast Range Province. Structural relationships along the Coast Range thrust are complex due to later reactivation of the thrust by high-angle normal and strike slip faults (Department of Energy [DoE] 1992).

The Hayward fault, which is part of the San Andreas Fault system, forms the western boundary of the East Bay Hills and is located about 12 miles west of the Site. Another branch of the San Andreas Fault system, the Calaveras Fault zone, trends northwest through the San Ramon Valley, which borders the Livermore Valley to the west. Geologic hazards likely to affect the Site in the event of a large magnitude earthquake along surrounding faults are ground shaking, liquefaction, and surface rupture.

2.5.4 Hydrogeology

Hydrogeological data were obtained from the California Department of Water Resources (DWR) *Groundwater Bulletin 118* (DWR 2003), a statewide inventory of groundwater basins that includes individual hydrogeologic descriptions for each delineated groundwater basin in California.

The Site is located in the Livermore Valley Groundwater Basin. This basin extends from the Pleasanton Ridge east to the Altamont Hills and from the Livermore Upland north to the Orinda Upland. Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is to the west, then south towards Arroyo de la Laguna.

The entire floor of Livermore Valley and portions of the upland areas on all sides of the valley comprise groundwater-bearing materials. The materials are continental deposits from alluvial fans, outwash plains, and lakes. They include valley-fill materials, the Livermore Formation, and the Tassajara Formation. Under most conditions, the valley-fill and Livermore sediments yield adequate to large quantities of groundwater to all types of wells.

Within the Livermore Valley Groundwater Basin, faults are the major structural features known to have marked effect on the movement of groundwater. Faults in this region tend to act as barriers to the lateral movement of groundwater. The resulting groundwater levels stand higher on the up-gradient side. The Livermore, Pleasanton, and Parks faults act as such barriers, dividing the Quaternary Alluvium into five groundwater subbasins.

2.5.5 Surface Water

The Tassajara Creek runs through the eastern portion of former Camp Shoemaker. There are several canals in the vicinity of the Site, including Alamo Canal running north to south, near Highway 680; Chabot Canal running north to south, in the central area between the southern portions of the Site; Pleasanton Canal running east to west, south of former Well Field Number 2; and Arroyo Mocho Canal running east to west, north of former Well Field Number 1. Arroyo Mocho Canal converges with Arroyo de la Laguna, which flows south and joins Alameda Creek in the Sunol Valley (DWR 2003). Runoff to the alluvial plain is rapid, but the alluvial plain in the northern half of Livermore Valley drains slowly. All but the larger streams are dry through most of the summer. There are no natural lakes in the area, but there are a few reservoirs (USDA 1997). Portions of the FUDS-eligible areas of the Site are within the 500-year floodplain, as mapped on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Appendix B).

2.5.6 Climate

The climate of the region is typical of the San Francisco Bay Area, characterized by moderately cool, wet winters and dry summers. July and August are the warmest months with average high temperatures of 88ºF and 89ºF, respectively. December and January are the coolest months with average low temperatures of 39ºF. The annual average precipitation is 15 inches, with January and February typically being the wettest months with about 3 inches of precipitation each. Humidity ranges from 92 percent to 28 percent and averages 84 percent in the morning to 49 percent in the afternoon.

2.5.7 Biological Resources

Former Camp Parks is located within the Central California Coast Ranges Province (Bailey 1983). The montane vegetation of this region consists of species with thick, hard evergreen leaves. One climax association, dominated by trees, is called sclerophyll forest. The other, called chaparral, is a shrub climax. These two associations appear in alternating patches in almost every part of the region, but chaparral occupies the greater area. The forest consistently appears on north-facing slopes and on wetter sites; chaparral occupies south-facing slopes and drier sites. Mule deer are the most prevalent large mammals in the province. Other large mammals include the coyote, mountain lion, California bobcat, gray fox, wood rat, and spotted and striped skunks. Small mammals peculiar to chaparral include the Merriam chipmunk, California mouse, and five-toed kangaroo rat. The most common birds seen in the dry summer season are wrentit, common bushtit, and rufous-sided towhee. In October, white-and-golden-crowned sparrows, several races of fox sparrows, hermit thrushes, ruby-crowned kinglets, and Audubon's warblers are present. Reptiles, including the coast horned lizard and gopher snake, are numerous in all vegetation types. Amphibians appear to be scarce, except for the Pacific treefrog.

According to the California Wildlife Habitat Relationships System, 32 wildlife habitats occur in Alameda County. Of these habitats, the following probably occur on or near the Site: annual grassland, closed-cone pine-cypress, coastal scrub, deciduous orchard, eucalyptus, evergreen orchard, Jeffrey pine, mixed chaparral, and perennial grassland (California Department of Fish and Game 2005; Mayer and Laudenslayer 1988).

The following species are listed on the United States Fish and Wildlife Service (USFWS) Endangered Species Act list for Alameda County: plants—large-flowered fiddleneck, Santa Clara Valley Dudleya, Presidio Clarkia, pallid manzanita, few-flowered Navarretia, many-flowered Navarretia, Contra Costa goldfields, Lake County stonecrop, and palmate-bracted bird's beak; reptile—Alameda whipsnake; mammals—salt marsh harvest mouse and San Joaquin kit fox; insects—Callippe silverspot butterfly and bay checkerspot butterfly; fish—Chinook (Sacramento River winter run) salmon, California (Central valley population) steelhead, Sacramento splittail, and tidewater goby; crustaceans—vernal pool fairy shrimp and longhorn fairy shrimp; birds—mountain plover, California least tern, California clapper rail, western snowy plover, and brown pelican. One special-status species habitat was observed during the 2007 site visit—burrowing owl. One special-status species occurrence was reported within 1 mile of the Site from the California Natural Diversity Database—Congdon's tarplant (*Cetromadia parryi* subspecies. *Congdonii*) reported at Camp parks Reserve Forces Training Area. Wetlands were mapped within 1 mile of the Site, according to the USFWS National Wetlands Inventory, but none near any of the AOIs discussed in this document.

2.6 HISTORICAL/CULTURAL RESOURCES

The region was the tribal territory of the peoples of the Costanoan linguistic family; Costanos is translated from Spanish as "Coast People," but more properly, these indigenous people are called Ohonean and Mutsun (Heizer 1978). The ancestors of the Costanos settled around 500 A.D., from the San Joaquiacramento River Delta area (Heizer 1978). Costanos were organized by camps, then villages, then tribelets, numbering approximately 50 tribelets in the central coast/bay area; the Site was occupied by East Bay Costanoan (or Chochenyo) language speakers, numbering about 2000 (Heizer 1978). Seven Spanish Catholic missions were established in Costanoan territory between 1770 and 1797; by 1810, Costanoan aboriginal existence had disappeared. This population decline is attributed in part to introduced diseases and declining birth rates. Ranchers and Indians battled periodically, primarily over territorial and livestock ownership disputes. Costanoan languages became extinct by 1935. In 1971, descendants of Costanoans united into a corporate identity, the Ohlone Indian Tribe (Heizer 1978).

The Pueblo of San Jose was established in 1777, and the Mission San Jose was founded in 1797 by Spanish King Charles IV. Early settlers included Don Luis Maria Peralta, who in 1776, founded a rancho at San Leandro Creek, covering much of what is now Alameda County. With Peraltta's death in 1842 came the subdivision of the rancho among his sons (Wood 1883). The gold rush in 1848 brought a wave of settlers into what is now Alameda County. In 1853, Alameda County was created from portions of Contra Costa and Santa Clara Counties (Wood 1883). The Murray Township was named after Michael Murray, an early settler and businessman who sponsored the bid for Alameda to become a county (Wood 1883). In 1869, the Pacific Railroad was completed in Oakland, linking the West and East Coasts. In the area called the Murray Township (what is now Dublin), Don Jose Maria Amador created San Ramon Rancho and Adobe in 1826 (Hulaniski 1917); the rancho was transferred to J. W. Dougherty in 1860 (Wood 1883). John Green established the first store in Dublin in 1856, and in the same year, the first school was built. In 1859, a Roman Catholic Church was built. Another early settler was Robert Livermore, who purchased the Canada de Los Vaqueros from Miranda Hiquera and Francisco Alvarez. Agricultural production then became (and still remains) the dominant industry (Wood 1883). The origin of the name "Dublin" was probably derived from Irish settlers (Wood 1883).

Queries by EDR of all available databases (including the NRHP and the California Historic Landmarks list) revealed no historical or cultural resources within 1 mile of the Site.

3.0 SITE HISTORY

3.1 SITE HISTORY SUMMARY

Former Camp Parks was used as a training center for the U.S. Navy, U.S Army, U.S Air Force, and the National Guard from 1943 to 1984. Table 3-1 summarizes the Site history from pre-DoD use (1943) to the present.

Table 3-1 General Timeline of Site History

Year	Event
19 January 1943	Camp Parks was established in Dublin, California, for use as a U.S. Naval training base.
3 February 1943	The DoD acquired Well Field Number 1 from the Spring Valley Water Company (4.105 acres, of which 0.69 acres are FUDS-eligible).
24 May 1943	The DoD acquired the land for Camp Shoemaker and U.S. Naval Hospital Shoemaker from Ada Clements, *et al.* (3,396.00 acres, of which 954.74 acres are FUDS-eligible).
14 October 1943	Well Field Number 2 was purchased from the Spring Valley Water Company by the U.S. Navy (104.89 acres).
4 December 1943	The Sewage Lagoon Buffer Zone was acquired by the DoD from Charles A. Gale and William H. Donahue (164.90 acres, of which 24.98 are FUDS-eligible).
8 December 1943	The land for the Bus Station Annex was purchased from Charles A. Gale and William H. Donahue (2.00 acres).
April 1944	Camp Parks. Shoemaker Naval Hospital, the Naval Receiving Barracks and the Naval Disciplinary Barracks were administratively combined into the U.S. Naval Training and Distribution Center (TADCEN), Shoemaker, California.
1946	After World War II, the U.S. Navy disestablished the Site. This included Camp Parks, Shoemaker Naval Hospital, the Naval Receiving Barracks and the Naval Disciplinary Barracks.
21 December 1946	Alameda County Sheriff's Office moves inmates into former U.S. Naval Disciplinary Barracks on Camp Shoemaker
1951	The Navy reacquired the land. The U.S. Air Force began constructing buildings at Camp Parks.
1953	The Site was officially transferred from the U.S. Navy to the U.S. Air Force and designated Parks AFB. The Site operated as a basic training center, overseas replacement depot, and air base defense training area during the Korean War.
1 October 1957	The GSA quitclaimed the 2-acre parcel known as the former Bus Station Annex to Robert and Fannie S. Rothman.
July 1959	The Site (known as Parks AFB at that time) was transferred to the U.S. Army, renamed Camp Parks, and operated in a standby status under the Sixth U.S. Army, Presidio San Francisco until 1973.
13 October 1964	The former Sewage Lagoon Buffer Zone was declared excess to the needs of the U.S. Army.

Year	Event
1964	The Site was declared excess to the needs of the Army, but it was directed to retain 1,600 acres for National Guard and U.S. Navy use.
15 June 1969	Former Camp Shoemaker and U.S. Naval Hospital Shoemaker were sold to the Alameda County Surplus Property Authority (954.74 acres).
1 November 1969	The northern portion former Well Field Number 1 was sold to Alameda County Flood Control and Water Conservation District (0.69 acres).
29 June 1971	The GSA quitclaimed former Well Field Number 2 to the City of Pleasanton for recreational use (103.22 acres).
1 May 1972	The DoD transferred 0.60 acre of the former Sewage Lagoon Buffer Zone to Alameda County.
25 May 1972	The DoD transferred the remaining 22.00 acres of the former Sewage Lagoon Buffer Zone to the Valley Community Services District (later renamed the Dublin San Ramon Services District).
12 December 1972	Several of the retained buildings and wells at former Well Field Number 2 were sold to the Alameda County Flood Control and Water Conservation District (0.81 acre).
1973	The U.S. Army determined that the remainder of the original Camp Parks was needed as a mobilization and training center for reserve components.
11 December 1980	The remaining portion of Camp Parks was designated as semi-active and became Parks Reserve Forces Training Area, which remains the active part of the original base today.
15 October 1984	The remaining buildings and wells at former Well Field Number 2 were sold to the Alameda County Flood Control and Water Conservation District (0.86 acre).

Sources: Parks RFTA on-line history (www.globalsecurity.org/military/facility/camp-parks htm)
Alameda County Sheriff's Office on-line history (https://www.alamedacountysheriff.org/history.php)
Military Museum on-line:
(http://www militarymuseum.org/FleetCity html and http://www militarymuseum.org/CpParks html)
Official Records of Alameda County: Final Judgment of Record/Number 22466-G, Final Judgment of Record/Number 22803-G, Declaration of Taking/Number 22460-G, Final Judgment of Record/Number 22985-S, Quitclaim Deed/Document Number 69-078117, Quitclaim Deed/Document Number 71-91279, Quitclaim Deed/Document Number 72-64126, Quitclaim Deed/Document Number 72-85689, Quitclaim Deed/Document Number 73-15125, Deed/Document Number 219622
Official Document of the General Services Administration: Quitclaim Deed/Document Number D-Cal-574

3.1.1 Pre-DoD Use

Prior to DoD use, the Site was unincorporated grassland owned by Ada Smith and others.

3.1.2 DoD Use: Former Camp Parks

On 19 January 1943, Camp Parks, Camp Shoemaker, and the U.S. Naval Hospital Shoemaker were established under the U.S. Navy in Dublin, California. During the war these three major facilities were called "Fleet City." Camp Parks and Shoemaker Naval Hospital were designed to support the U.S. Naval Construction Battalions (Seabees). In 1946, the U.S. Navy disestablished the three components until it reacquired the land in 1951. After World War II, nearly all buildings constructed in the early 1940s were

demolished. Figure 3-1 is a map showing conditions of the site when the Navy occupied it in 1945. Other maps of the site from 1951 and 1959, as well as building lists, are in Appendix D.

The U.S. Air Force began constructing buildings in 1951; however, it was not until 1953 that Camp Parks, Camp Shoemaker, and the U.S. Naval Hospital Shoemaker were officially transferred to the Department of the Air Force and designated as Parks AFB for use as a U.S. Air Force training and staging area. Figure 3-2 is a map showing the 1951 Preliminary Master Plan for Parks AFB.

In November 1958, the U.S. Air Force determined that it had no further requirement for the use of Parks AFB. It was determined that the training of civilian components, as well as U.S. Army mobilization training and staging area requirements assigned to Camp Stoneman, could be met at Parks AFB. In 1959, the U.S. Army acquired Parks AFB, and the installation was re-designated Camp Parks. From 1959 through 1973, the Camp Parks was operated in a standby status under the jurisdiction of the Sixth U.S. Army, Presidio of San Francisco. On 11 December 1980, the portion of former Camp Parks that is FUDS-ineligible was officially designated as a semi-active installation. It was renamed Parks RFTA and was to be used as a mobilization and training center for Reserve Components in the event of a war or natural disaster. Parks RFTA remains a training facility for the San Francisco Bay Area Army Reserve, California National Guard Soldiers from 180 units and Naval Reserve Seabees. The FUDS eligible properties are discussed below.

Since 1946, Alameda County leased the area formerly known as the U.S. Naval Disciplinary Barracks (in the southern portion of the former Camp Parks) for use as a prison farm. However, no lease documentation was found during research. Other buildings were present at various locations around the property; however, no documentation was found regarding their dates of use, destruction, or associated appurtenances.

The GSA quitclaimed the 2-acre parcel known as the former Bus Station Annex on 1 October 1957 to Robert and Fannie S. Rothman (Figure 3-3). In 1964, the entire Site was declared excess to the needs of the U.S. Army, but the military retained acreage for U.S. Navy and National Guard use. The former Sewage Lagoon Buffer Zone was declared excess to the needs of the U.S. Army on 13 October 1964. On 15 June 1969, the GSA sold the entire portion of former Camp Shoemaker and U.S. Naval Hospital Shoemaker to the Alameda County Surplus Authority. On 1 November 1969, the northern portion of former Well Field Number 1 was sold to Alameda County Flood Control and Water Conservation District. On 29 June 1971, the GSA quitclaimed 104.89 acres of former Well Field Number 2 to the City of Pleasanton for recreational use. Furthermore, on 12 December 1972 and 15 October 1984, the former buildings and wells were sold to the Alameda County Flood Control and Water Conservation District.

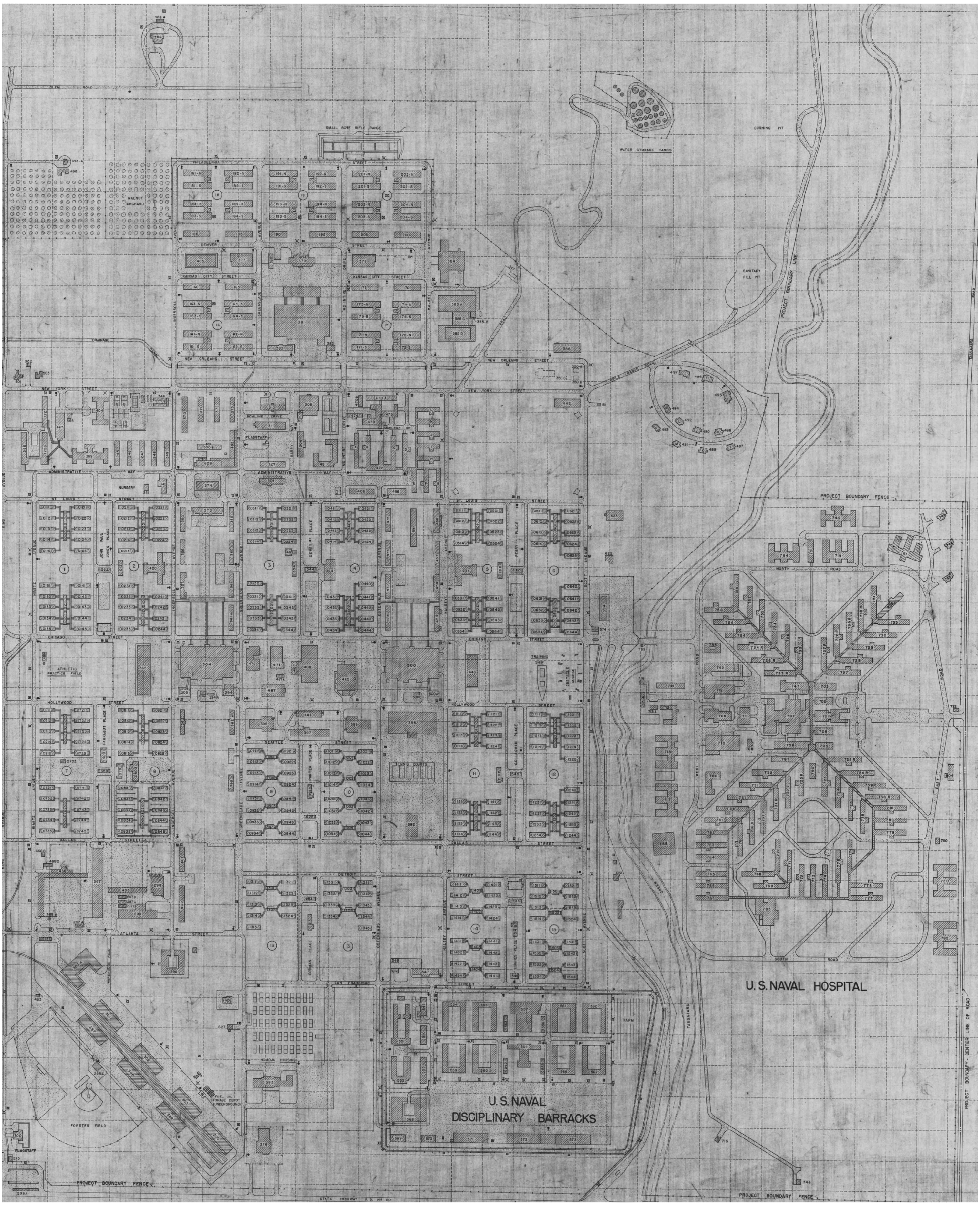


Figure 3-1 Map showing conditions of Camp Shoemaker and U.S. Naval Hospital Shoemaker on June 30, 1945

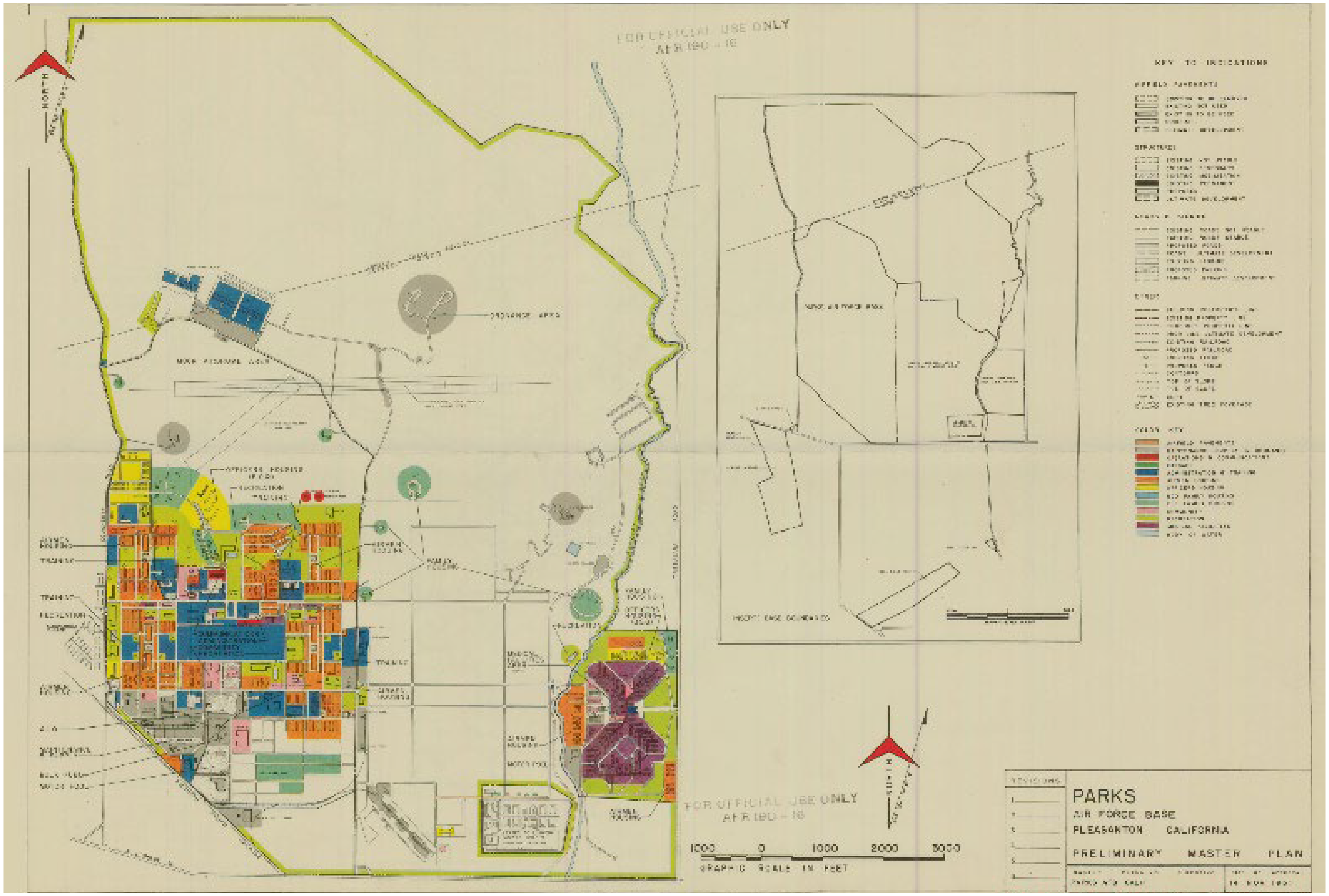


Figure 3-2 Parks AFB 1951 Preliminary Master Plan

3.1.3 Post-DoD Use

3.1.3.1 Camp Shoemaker and U.S. Naval Hospital Shoemaker

On 15 June 1969, the DoD transferred former Camp Shoemaker to Alameda County, who continued to run the prison farm (also known as Greystone) in the southern portion of the Site. The Alameda County Sheriff's Department began to use the entire area by building firing ranges in the northern portion of the Site beginning in approximately 1972. Many of the houses that were transferred along with the property were used by the Sheriff's Department for housing. Construction began on the Santa Rita Jail in 1983, and it was opened on 1 October 1989; all inmates housed in Greystone were transferred to the new prison. The Alameda County Sheriff's Training Center was developed to the north and east of the Santa Rita Jail. In the central portion of former Camp Shoemaker and U.S. Naval Hospital Shoemaker, abundant residential development and retail development began around 1998 and continues today.

3.1.3.2 Sewage Lagoon Buffer Zone

After the City of Dublin purchased the former Sewage Lagoon Buffer Zone, it was converted into a recreational park on the eastern half and the City of Dublin Civic Center and Public Offices on the western portion. It is currently owned by the City of Dublin. Per DTSC, there has been hexavalent chromium found in groundwater downgradient of this area, however there are no historical DoD uses of the site we have found which would have resulted in such impacts. There is no evidence that this was a maintenance base or that the DoD practiced wood treatment, metal plating, production of dyes, paints, inks or plastics, stainless steel production, leather tanning, anti-corrosion activities or any others that would be of concern in hexavalent chromium contamination.

3.1.3.3 Bus Station Annex

The area formerly known as the Bus Station Annex was sold to Robert and Fannie S. Rothman on 1 October 1957. The area has transitioned through multiple owners and no longer retains its original parcel shape. It is currently owned by the City of Dublin and is used as a parking lot for surrounding retail stores.

3.1.3.4 Well Field Number 1

The northern portion of Former Well Field Number 1 was transferred to Alameda County Flood Control Agency for use as a drainage canal called the Arroyo Mocho Canal. This area had no structures built on it during or after DoD use of the property.

3.1.3.5 Well Field Number 2

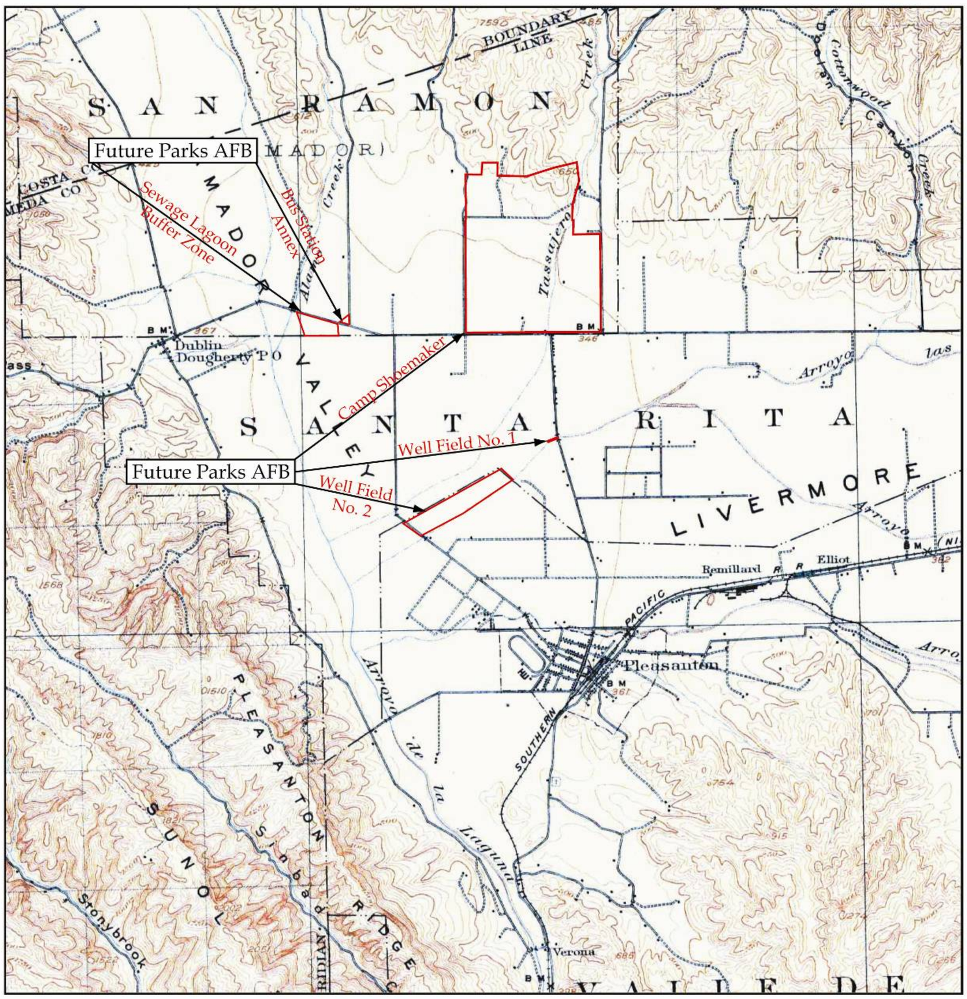
Former Well Field Number 2 was transferred to the City of Pleasanton for use as a recreational park on 29 June 1971. The buildings and wells were retained until they were sold to the Alameda County Flood Control and Water Conservation District on two separate dates, 12 December 1972 and 15 October 1984. The buildings have been razed, but it is unclear whether they were removed before or after the property transfer. The Pleasanton Sports Park currently has numerous baseball and softball fields, football fields, playgrounds, and a skate park. No DoD structures remain on the property and all DoD wells within this area have been destroyed.

3.2 HISTORICAL TOPOGRAPHIC MAPS

The following USGS topographic maps were obtained: 30-minute and 15-minute USGS topographic map of the Site and vicinity dated 1906 and 1947, respectively; additionally, 7.5-minute USGS topographic for the following years: 1961, 1961 photorevised 1968, 1961 photorevised 1973, and 1961 photorevised 1980. The 7.5-minute maps are discussed in separate subsections due to their size and distribution. A discussion of map features follows.

Historical Topographic Map Dated 1906

The historical topographic map dated 1906 (Figure 3-3) shows the cities of Dublin and Pleasanton. The map shows little development, and no military installations are noted. Tassajara Creek is apparent running through the eastern portion of what would become Camp Shoemaker. The Pleasanton Ridgeline can be seen trending northwest to southeast in the southwest portion of the map. The Southern Pacific Railroad line can be seen entering the City of Pleasanton from the south and turning to the east. The Contra Costa and Alameda County boundary lines are seen in the northwest portion of the map. Several creeks are noted running through this area, including Arroyo de la Laguna, Alamo Creek, Cottonwood Creek, and Tassajara Creek.

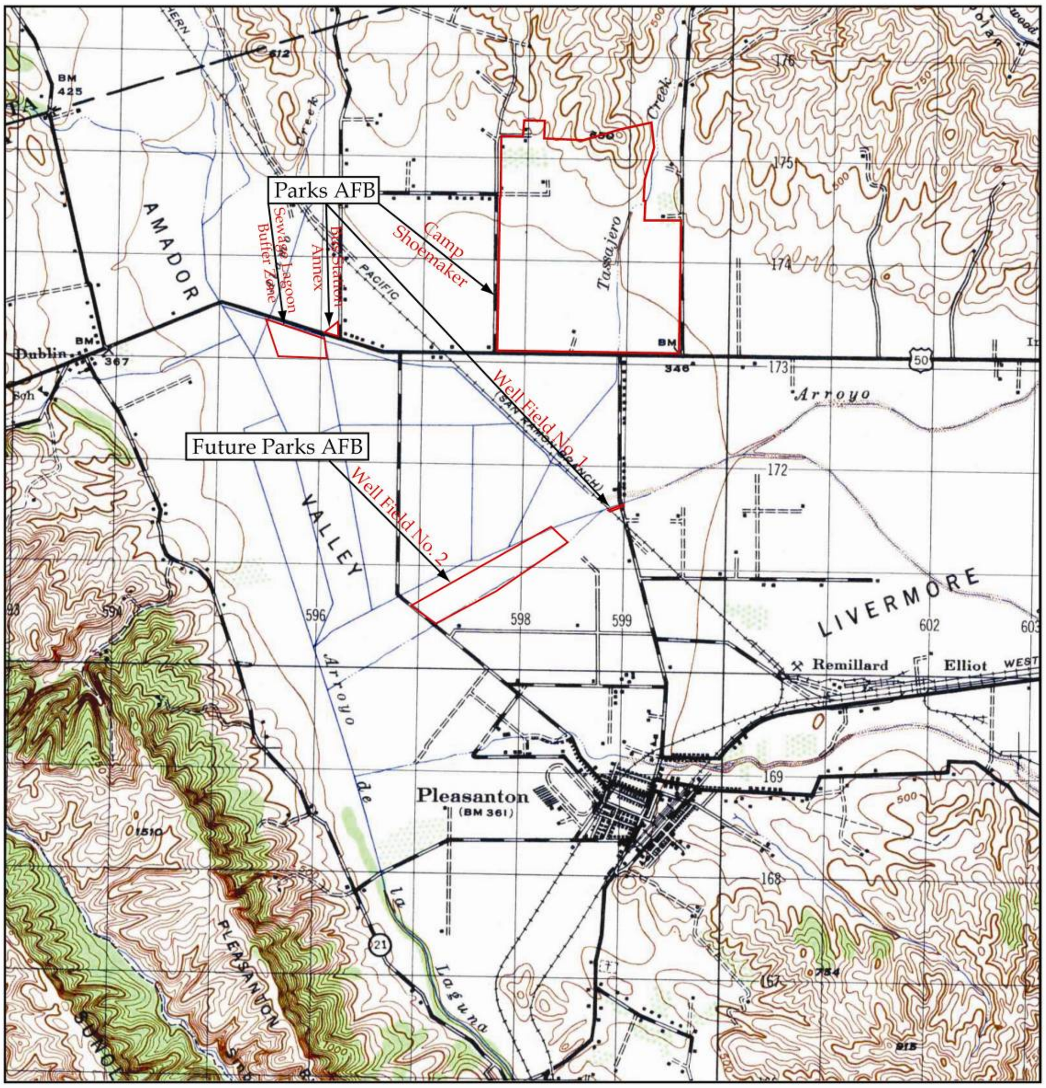


N ↑	TARGET QUAD NAME: PLEASANTON MAP YEAR: 1906 SERIES: 15 SCALE: 1:62500	SITE NAME: Former Parks AFB ADDRESS: Anastacia Court/Parkside Drive Pleasanton, CA 94588 LAT/LONG: 37.6831 / 121.8903	CLIENT: Tetra Tech Inc. CONTACT: Chris Drabandt INQUIRY#: 1944218.4 RESEARCH DATE: 06/04/2007

Figure 3-3 Historical Topographic Map of the Site Dated 1906

Historical Topographic Map Dated 1947

The historical topographic map dated 1947 (Figure 3-4) shows little change from the previous map. More development is apparent in the City of Pleasanton and the City of Dublin. Highway 50 courses in an east-west direction, next to portions of the Site. The San Ramon Branch of the Southern Pacific Railroad runs to the northwest from Livermore. Former Highway 21 courses north to south in the western portion of the map. A building has been constructed within the northern area of Camp Shoemaker.



N ↑	TARGET QUAD NAME: PLEASANTON MAP YEAR: 1947 SERIES: 15 SCALE: 1:50000	SITE NAME: Former Parks AFB ADDRESS: Anastacia Court/Parkside Drive Pleasanton, CA 94588 LAT/LONG: 37.6831 / 121.8903	CLIENT: Tetra Tech Inc. CONTACT: Chris Drabandt INQUIRY#: 1944218.4 RESEARCH DATE: 06/04/2007

Figure 3-4 Historical Topographic Map of the Site Dated 1947

3.2.2 Former Camp Shoemaker and U.S. Naval Hospital Shoemaker

Historical Topographic Map Dated 1961

The historical topographic map dated 1961 (Figure 3-5) shows Camp Shoemaker in use by the DoD. The areas to the north and west of Camp Shoemaker are shown as Camp Parks (currently Parks RFTA). The Santa Rita Rehabilitation Center (also known as the Alameda County Prison Farm) is shown in the southern portion of the Site. The U.S. Naval Hospital Shoemaker is apparent in the eastern portion of the Site. A few buildings are shown on the Site, including water reservoir holding tanks and a large square reservoir in the northeast portion of the Site.

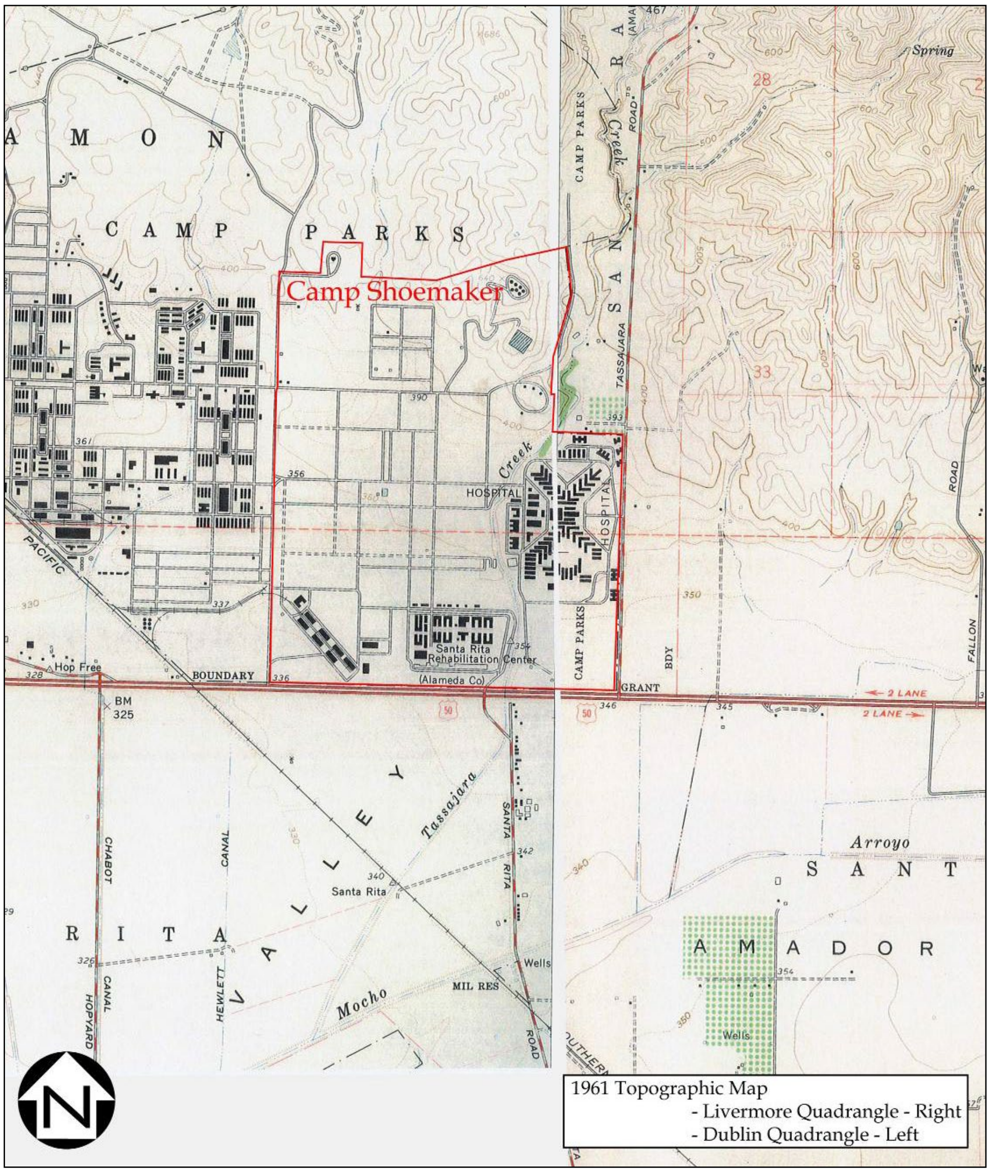


Figure 3-5 Historical Topographic Map of the Camp Shoemaker Portion of Former Camp Parks Dated 1961

Historical Topographic Map Dated 1961 Photorevised 1968

The historical topographic map dated 1961 photorevised 1968 (Figure 3-6) shows more development to the south and southwest of former Camp Shoemaker.

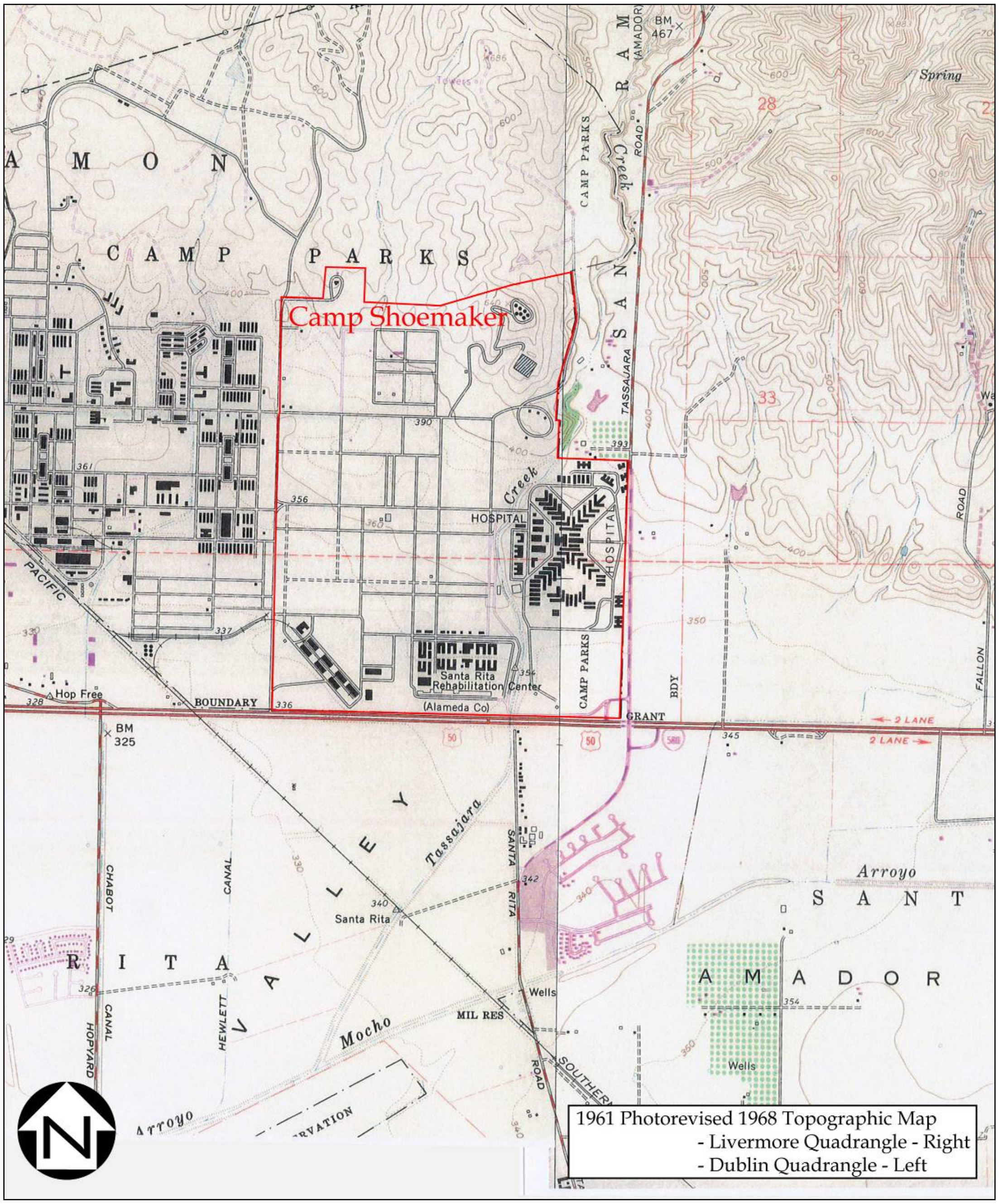


Figure 3-6 Historical Topographic Map of the Camp Shoemaker Portion of Former Camp Parks Dated 1961 Photorevised 1968

Historical Topographic Map Dated 1961 Photorevised 1973

The historical topographic map dated 1961 photorevised 1973 shows more development south and west of the Site. No changes are evident within the former Camp Shoemaker Boundaries.

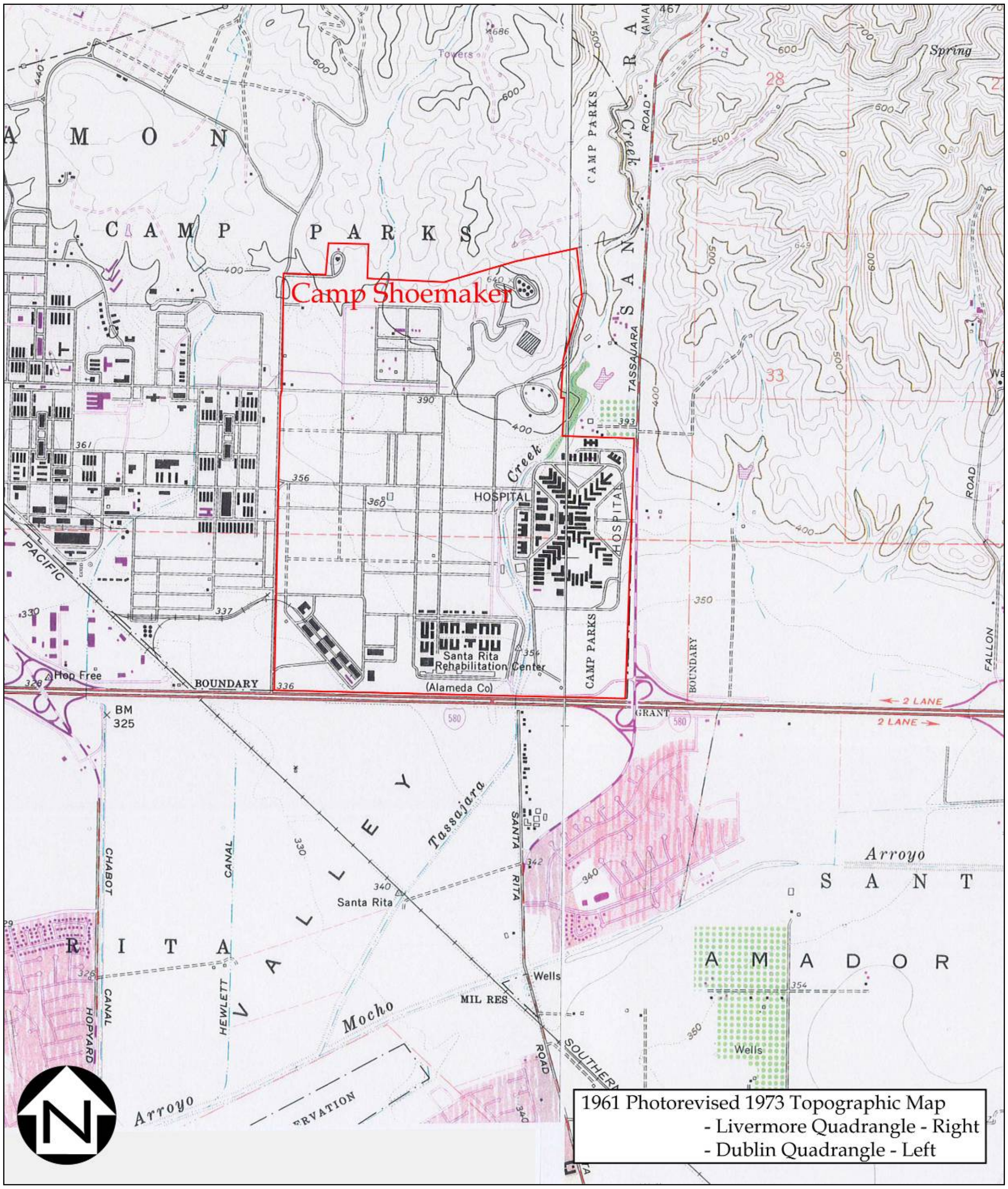


Figure 3-7 Historical Topographic Map of the Camp Shoemaker Portion of Former Camp Parks Dated 1961 Photorevised 1973

Historical Topographic Map Dated 1961 Photorevised 1980

The historical topographic map dated 1961 photorevised 1980 (Figure 3-8) shows more buildings constructed in the north to south-central portion of the Site. More buildings have been constructed at the "Santa Rita Rehabilitation Center" (also known as the Alameda County Prison Farm).

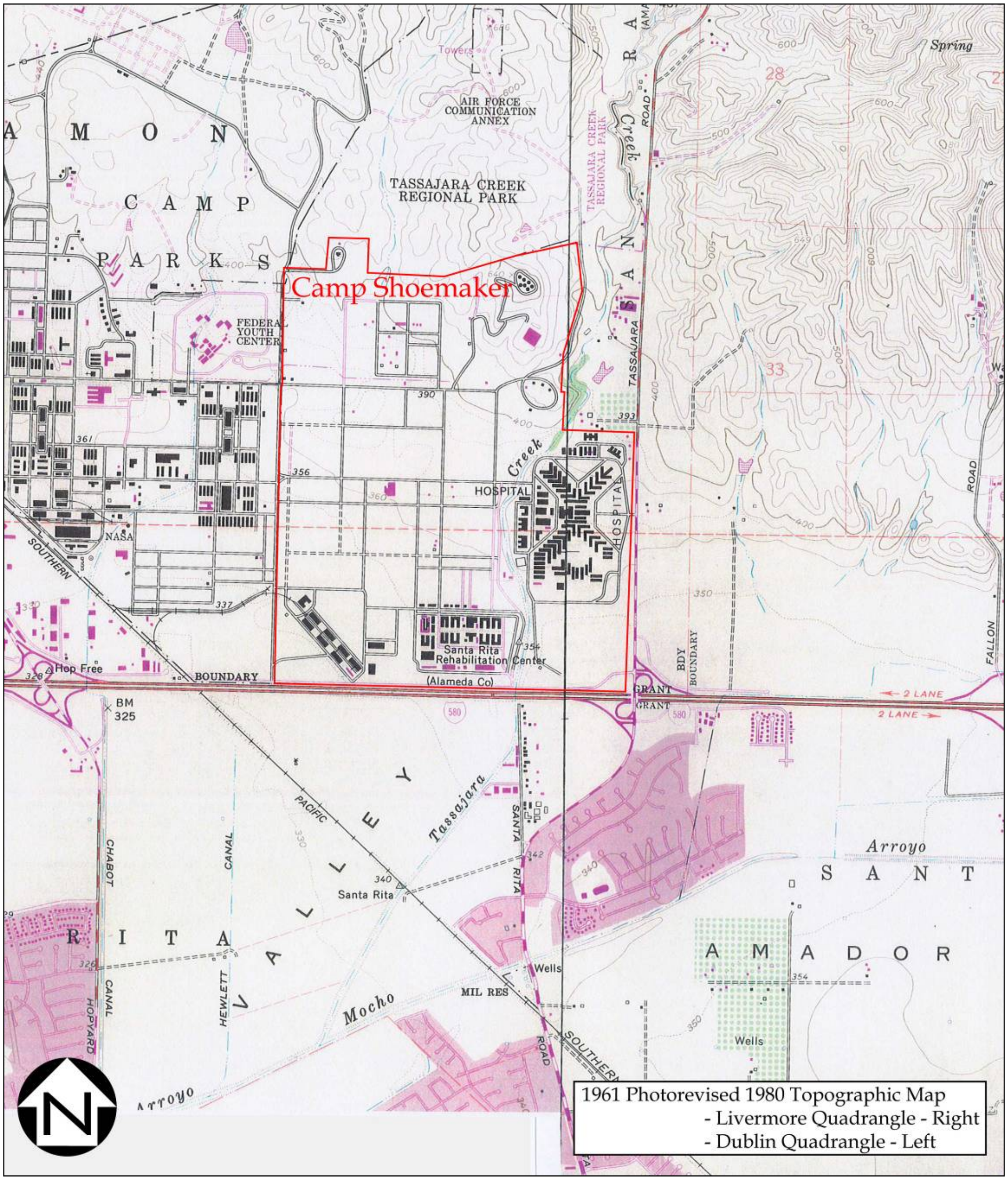
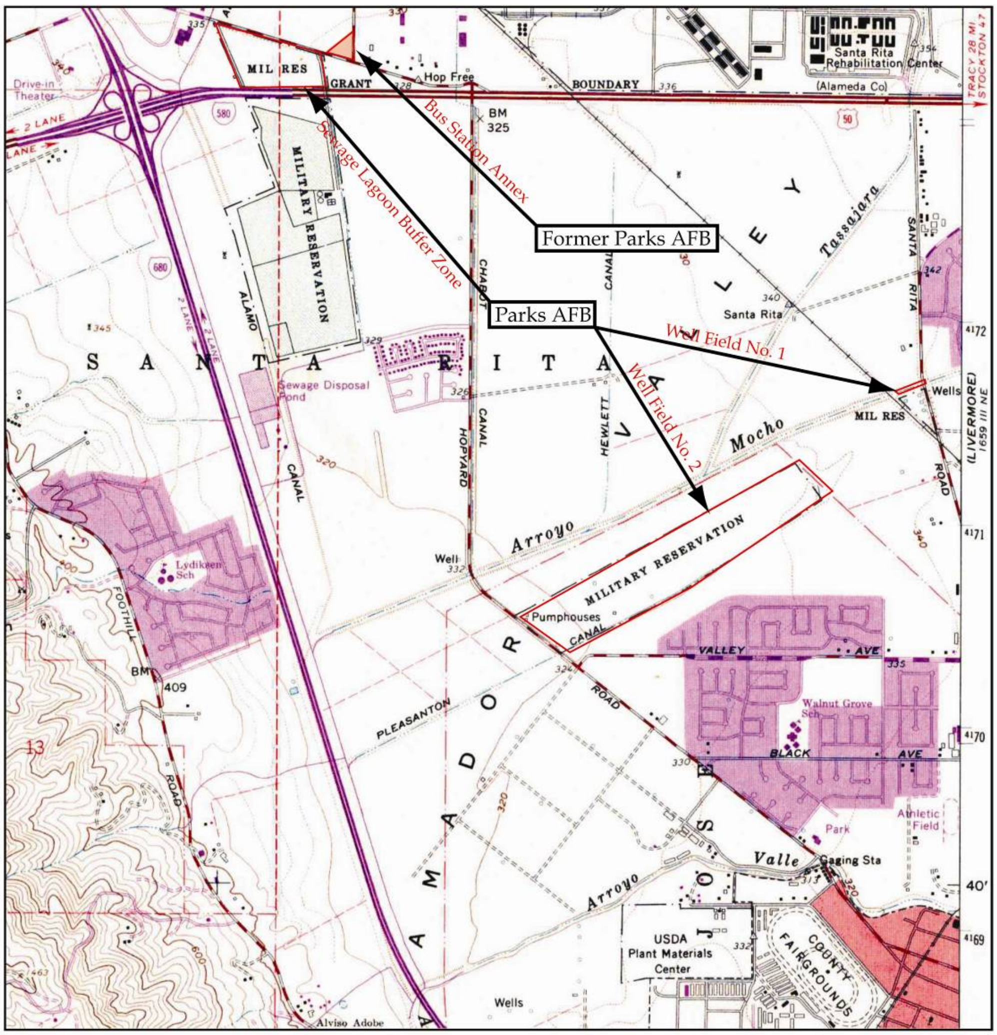


Figure 3-8 Historical Topographic Map of the Camp Shoemaker Portion of Former Camp Parks Dated 1961 Photorevised 1980

3.2.3 Southern Portion of Former Parks AFB

Historical Topographic Map Dated 1961 Photorevised 1968

The historical topographic map dated 1961 photorevised 1968 (Figure 3-9) shows portions of former Parks AFB. The former Bus Station Annex is no longer owned by the DoD and is shaded in red. Significant development is apparent around the Site. Highway 50 has been re-designated highway 580, and highway 680 now appears west of the Site. Pump houses are noted within the boundaries of Well Field Number 2 near Hopyard Road.

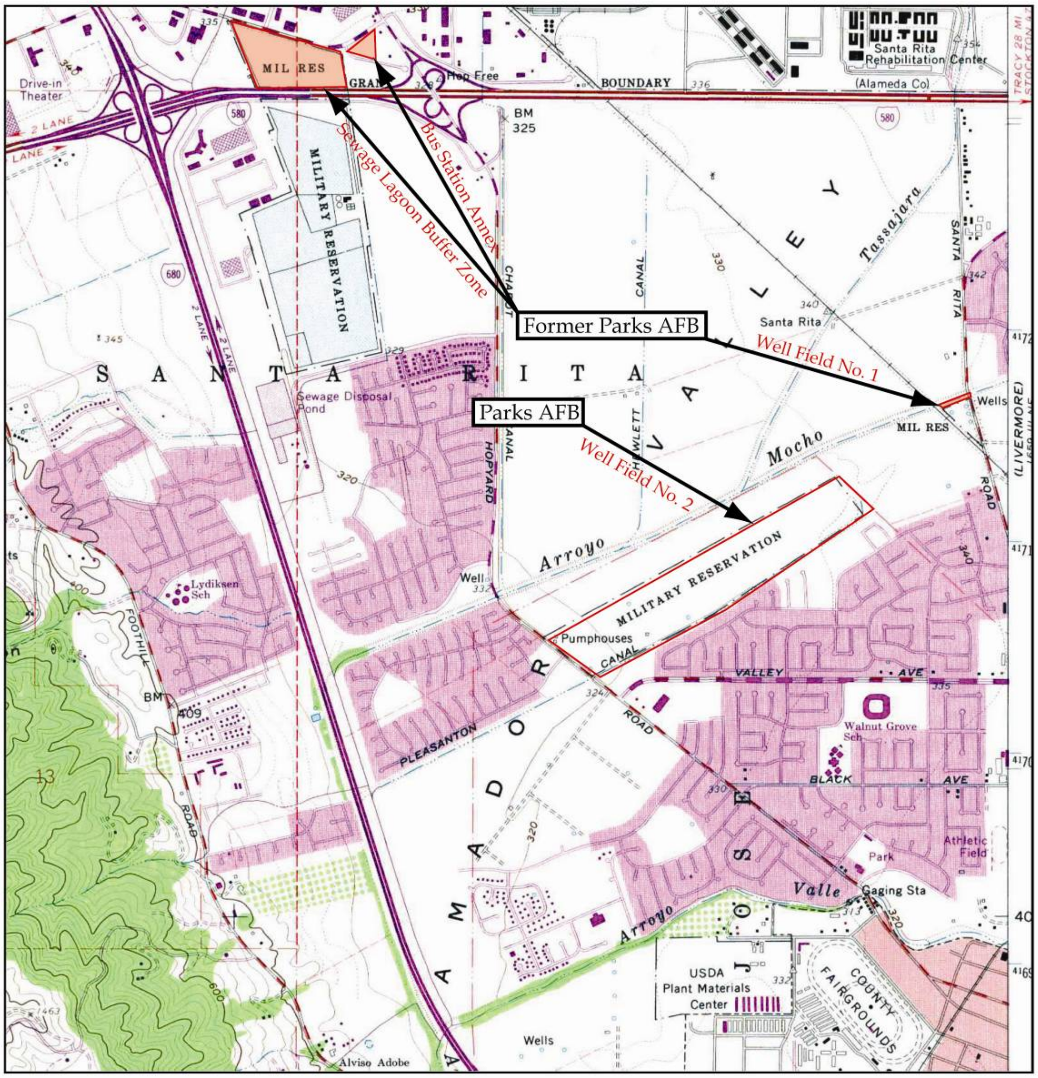


N ↑	TARGET QUAD NAME: DUBLIN MAP YEAR: 1968 PHOTOREVISED FROM:1961 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Former Parks AFB ADDRESS: Anastacia Court/Parkside Drive Pleasanton, CA 94588 LAT/LONG: 37.6831 / 121.8903	CLIENT: Tetra Tech Inc. CONTACT: Chris Drabandt INQUIRY#: 1944218.4 RESEARCH DATE: 06/04/2007

Figure 3-9 Historical Topographic Map of the Southern Portions of the Site Dated 1961 Photorevised 1968

Historical Topographic Map Dated 1961 Photorevised 1973

The historical topographic map dated 1961 photorevised 1973 (Figure 3-10) shows more development than the previous topographic map. A new interchange has been constructed east of the sold portion of the former Sewage Lagoon Buffer Zone (shaded in red) on highway 580. Forested areas appear southwest of the Site on Pleasanton Ridge. The only remaining DoD property shown on this topographic map is former Well Field Number 2.

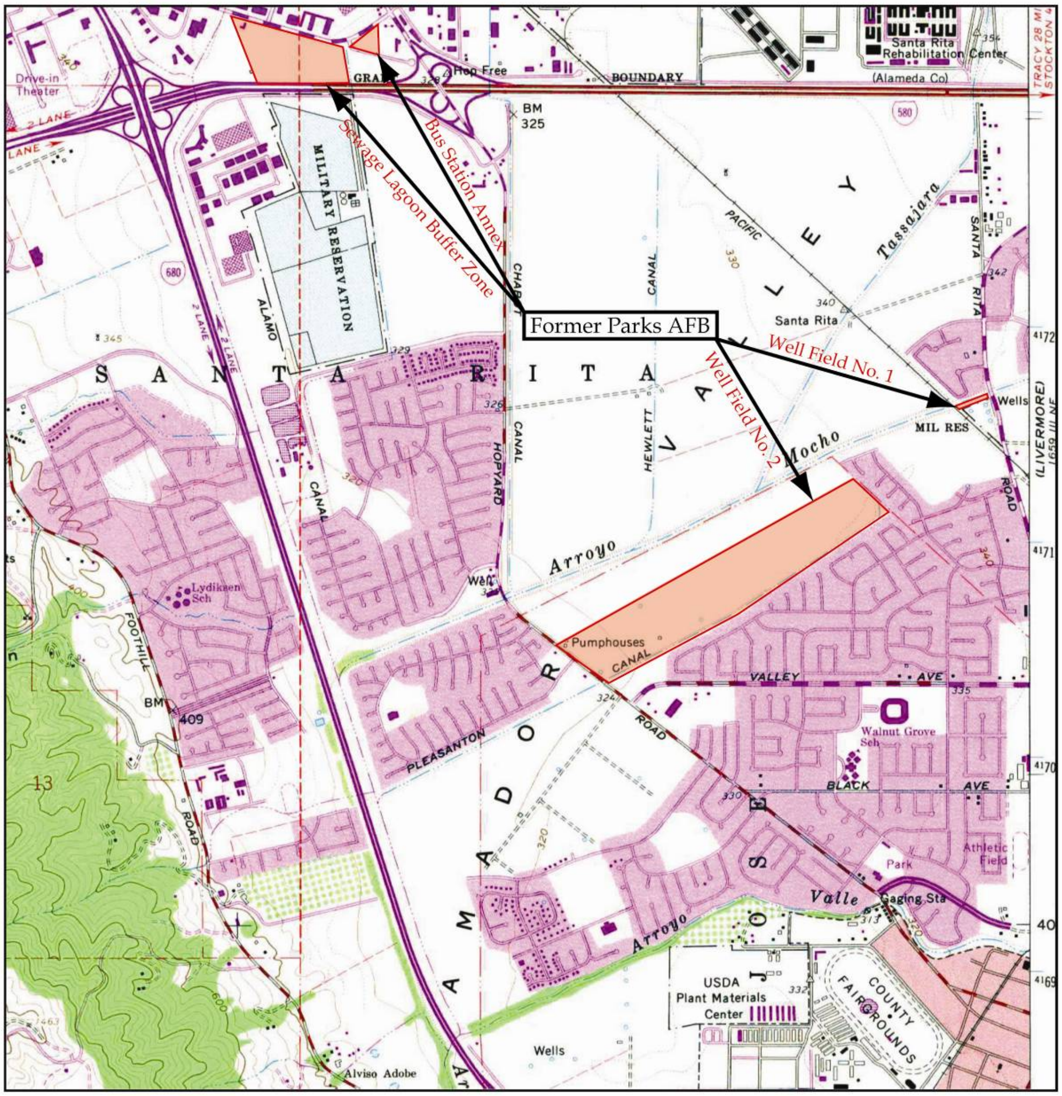


N ↑	TARGET QUAD NAME: DUBLIN MAP YEAR: 1973 PHOTOREVISED FROM:1961 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Former Parks AFB ADDRESS: Anastacia Court/Parkside Drive Pleasanton, CA 94588 LAT/LONG: 37.6831 / 121.8903	CLIENT: Tetra Tech Inc. CONTACT: Chris Drabandt INQUIRY#: 1944218.4 RESEARCH DATE: 06/04/2007

Figure 3-10 Historical Topographic Map of the Southern Portions of the Site Dated 1961 Photorevised 1973

Historical Topographic Map Dated 1961 Photorevised 1980

The historical topographic map dated 1961 photorevised 1980 (Figure 3-11) shows little change from the previous topographic map. Some residential development north and west of former Well Field Number 1 is apparent. Former Well Field Number 2 is no longer owned by the DoD, excluding a few buildings and wells.



N ↑	TARGET QUAD NAME: DUBLIN MAP YEAR: 1980 PHOTOREVISED FROM:1961 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Former Parks AFB ADDRESS: Anastacia Court/Parkside Drive Pleasanton, CA 94588 LAT/LONG: 37.6831 / 121.8903	CLIENT: Tetra Tech Inc. CONTACT: Chris Drabandt INQUIRY#: 1944218.4 RESEARCH DATE: 06/04/2007

Figure 3-11 Historical Topographic Map of the Southern Portions of the Site Dated 1961 Photorevised 1980

3.3 HISTORICAL AERIAL PHOTOGRAPHS

Historical aerial photographs of the Site and vicinity were obtained for the following years: 1939, 1949, 1957, 1958, 1965, 1966, 1971, 1973, 1978, 1982, 1986, 1992, 1996, and 2004. Presented below are aerial photographs from the years 1939 (pre-DoD use), 1949, 1958, 1965, and 1966 (during DoD use), and 1978, 1982, 1996, 2004 and 2016 (post-DoD use), accompanied by a general discussion of the Site and surrounding area. Due to the size and distribution of the different portions of the Site, former Camp Shoemaker and the southern portions are discussed separately, and aerial photographs from different years are included. Electronic copies of these images are available in Appendix A.

3.3.1 Former Camp Shoemaker Portion of Former Parks AFB

Historical Aerial Photograph Dated 1949

The historical aerial photograph dated 1949 (Figure 3-12) shows Camp Shoemaker and the U.S. Naval Hospital when the area was under the command of the U.S. Navy. The Alameda County Prison Farm is located in the south central portion of the map; however, it is unknown if the U.S. Naval Disciplinary Barracks had been leased to Alameda County at this time. Many areas appear to have impressions of construction; however, no documentation of construction or removal was located during research. Conversely, several buildings in the central portion of the site appear to have been razed or are in disrepair. All the buildings for U.S. Naval Hospital Shoemaker are still in good condition. Nineteen water storage tanks are present on top of the hill in the northeast portion of the site. The rail yard and other buildings in the southwest portion of the site still remain and appear to be in fairly good condition. An orchard is apparent on the south side of Building 1395. The three boiler plants, two in the middle of the site and one in the northern portion, appear to have been razed prior to 1949.

Historical Aerial Photograph Dated 1958

The historical aerial photograph dated 1958 (Figure 3-13) shows former Camp Shoemaker and the U.S. Naval Hospital Shoemaker that are a portion of Parks AFB. The naval hospital is located in the eastern portion of the Site and comprises the majority of the buildings there. In the southern portion of the Site, the Alameda County Prison Farm is seen. Foundations of many of the buildings are still present around the site.

Historical Aerial Photograph Dated 1966

The historical aerial photograph dated 1966 (Figure 3-14) shows the Site with few changes. Several foundations of demolished buildings in the central and northern portions of former Camp Shoemaker appear to have been removed.

Historical Aerial Photograph Dated 1978

The historical aerial photograph dated 1978 (Figure 3-15) shows that many of the buildings at the Site have been demolished. Most of the structures at the U.S. Naval Hospital Shoemaker remain, and the Officer Houses and water reservoirs in the northeast portion of former Camp Shoemaker are intact. The Alameda County firing range is apparent near the northern boundary of the Site. An Alameda County Sheriff's Department ordnance disposal area has been constructed in the northern portion of the Site.

Historical Aerial Photograph Dated 1982

The historical aerial photograph dated 1982 (Figure 3-16) shows a few buildings in the northern portion of the former U.S. Naval Hospital have been removed.

Historical Aerial Photograph Dated 1996

The historical aerial photograph dated 1996 (Figure 3-17) shows several new east-west roads have been constructed through the Site. The buildings at the former U.S. Naval Hospital have been demolished, along with buildings at the rail yard in the southwest corner and the former Alameda County Prison Farm along the southern boundary of the Site. Berms have been added at the former firing range in the northeast portion of the Site. A new jail facility has been constructed in the northern portion of the Site. The Alameda County Sheriff's Department has constructed a new training facility for northern California. The water tanks atop the hill in the northeast portion of the Site have been removed.

Historical Aerial Photograph Dated 2004

The historical aerial photograph dated 2004 (Figure 3-18) shows new development all over the Site. In the central portion of the Site, many residential homes have been constructed and along the southern and western boundaries, several businesses are apparent. In the northern portion of the Site, the new training firing range has been constructed north of the jail facility. The former rail yard has been graded and prepared for construction.

Historical Aerial Photograph Dated 2016

The historical aerial photograph dated 2016 (Figure 3-19) shows new development in several areas of the Site. More commercial areas have been developed south of Dublin Blvd and the Emerald Glen Community Park area has been developed further.

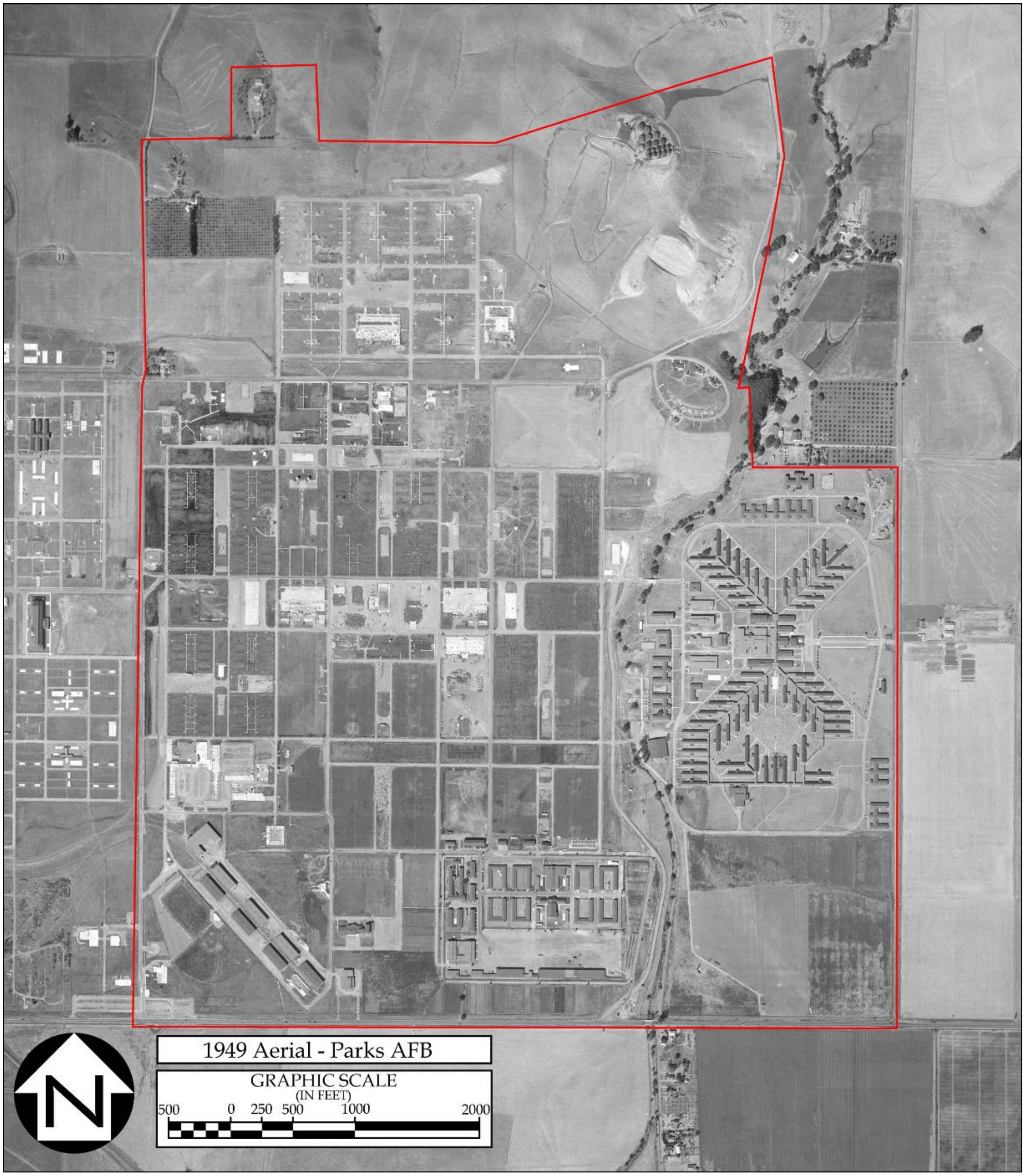


Figure 3-12 Historical Aerial Photograph of Former Camp Shoemaker Dated 1949

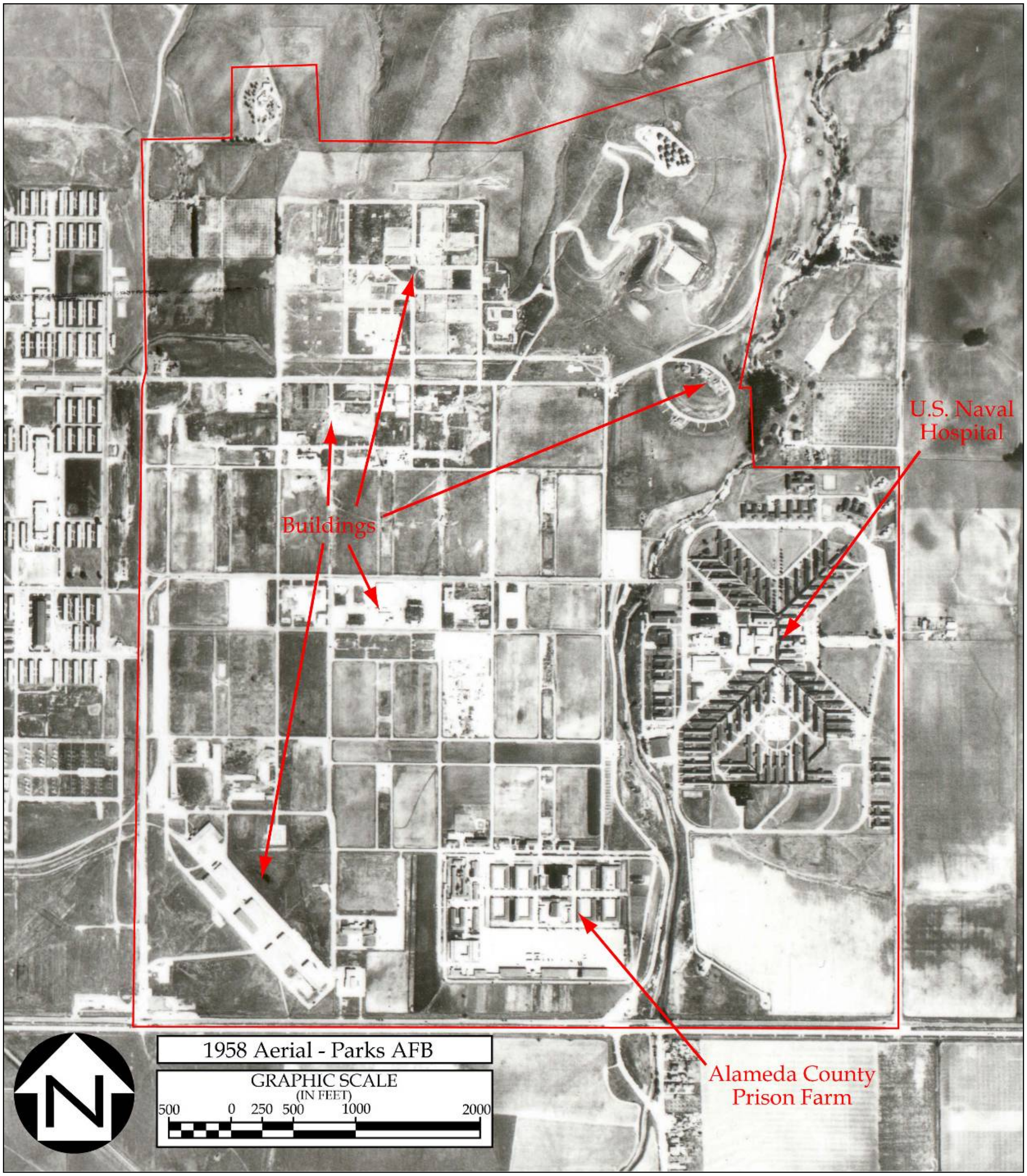


Figure 3-13 Historical Aerial Photograph of Former Camp Shoemaker Dated 1958

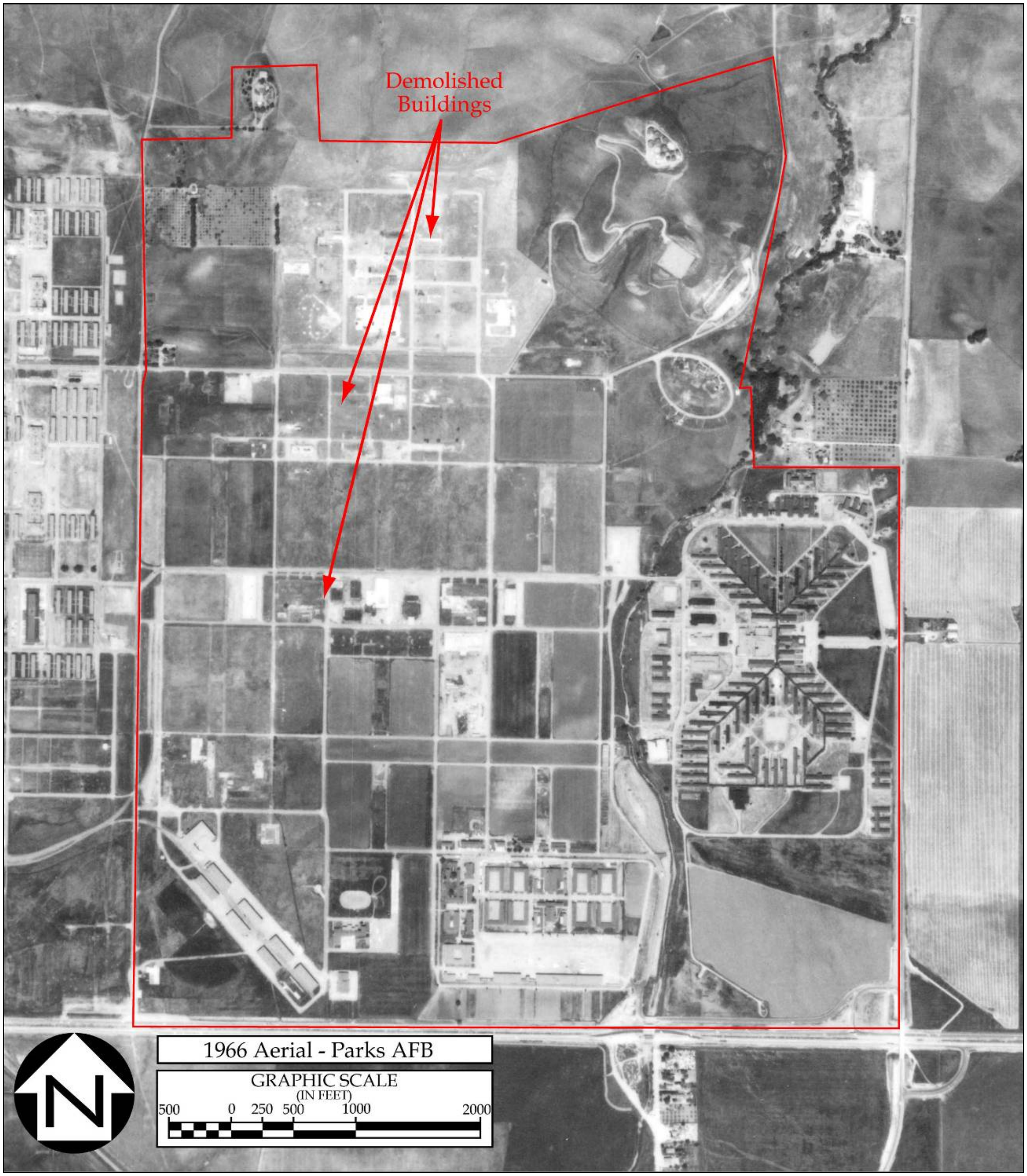


Figure 3-14 Historical Aerial Photograph of Former Camp Shoemaker Dated 1966

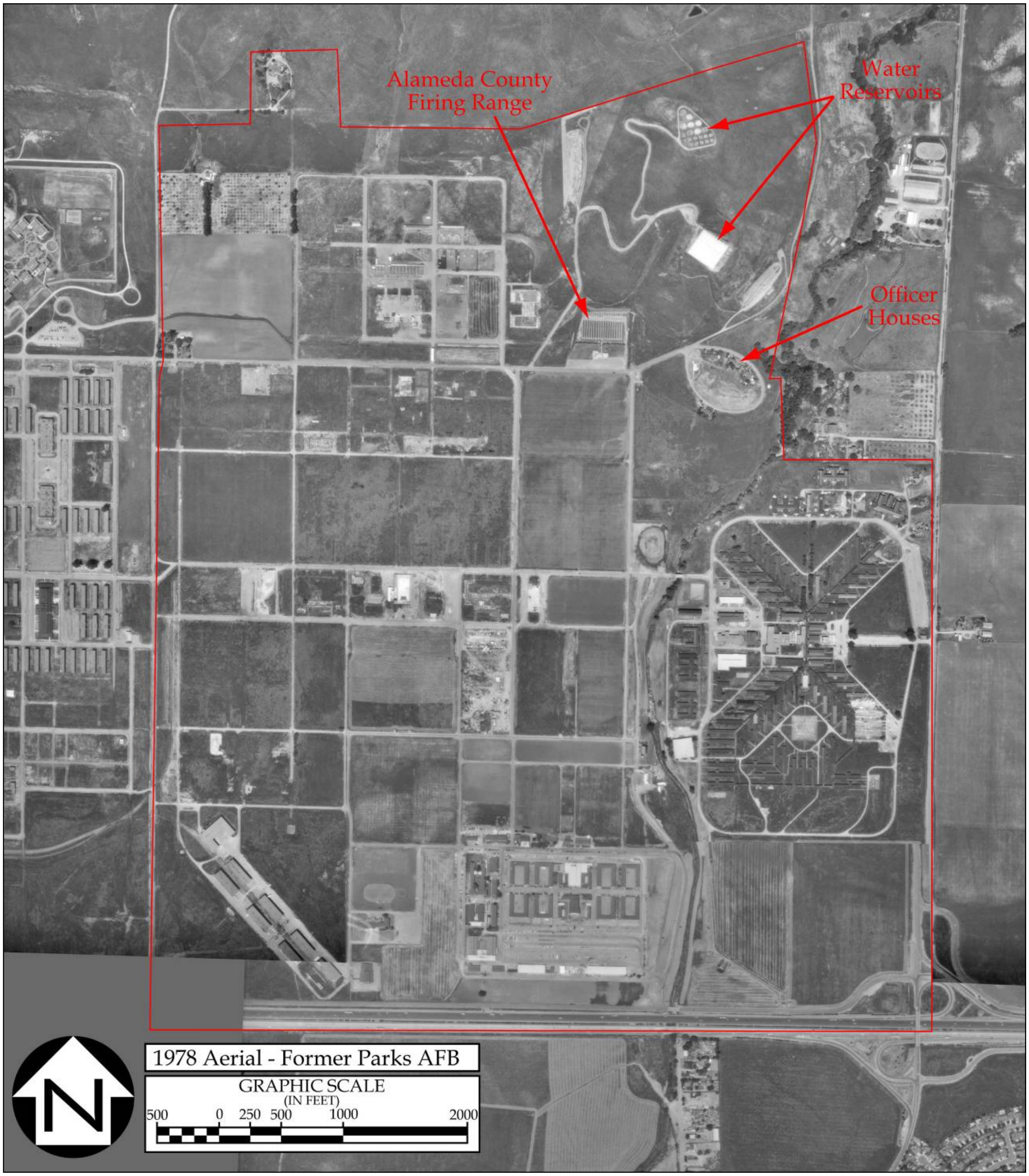


Figure 3-15 Historical Aerial Photograph of Former Camp Shoemaker Dated 1978

Figure 3-16 Historical Aerial Photograph of Former Camp Shoemaker Dated 1982

Figure 3-17 Historical Aerial Photograph of Former Camp Shoemaker Dated 1996

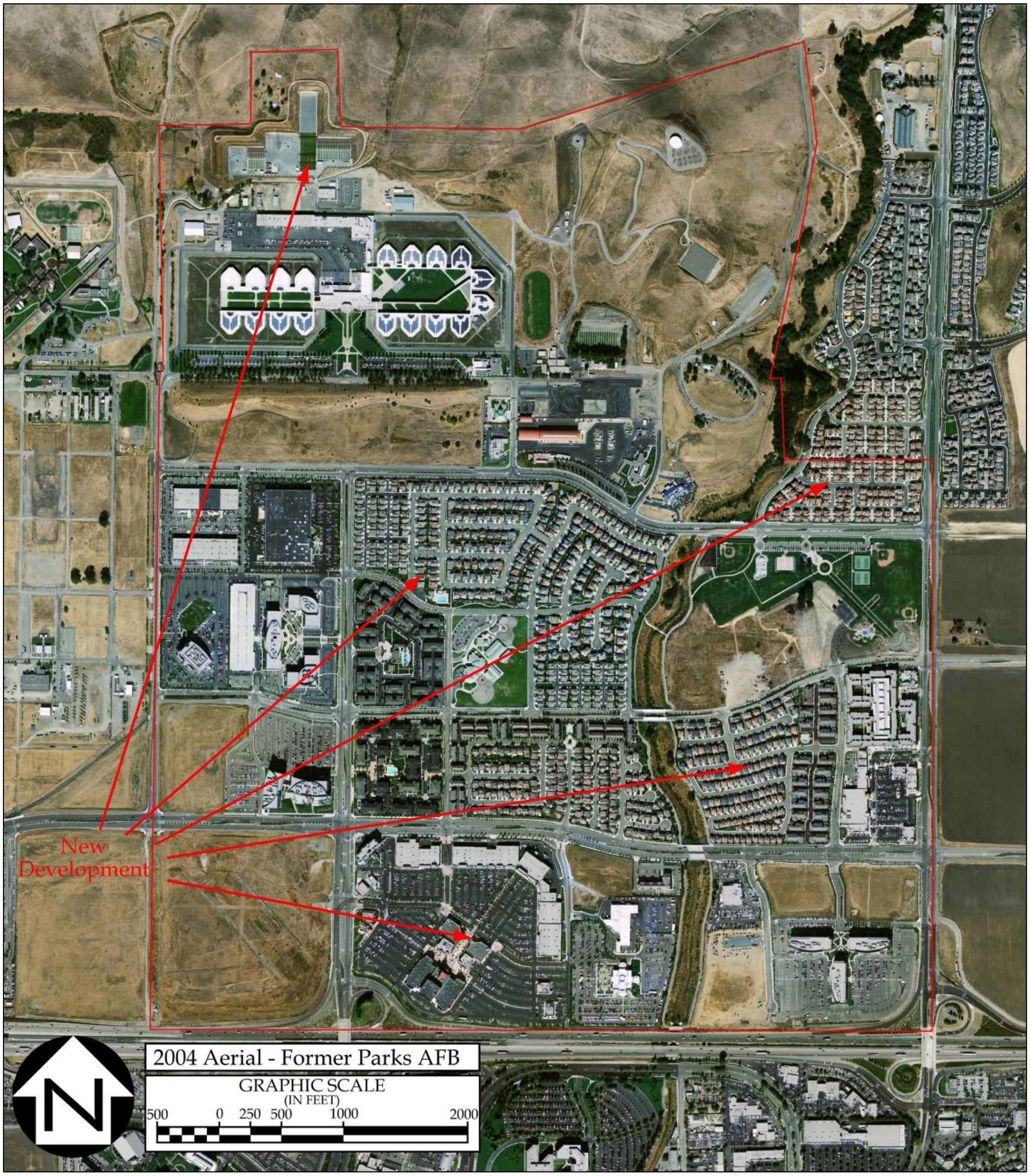


Figure 3-18 Historical Aerial Photograph of Former Camp Shoemaker Dated 2004

Figure 3-19 Aerial Photograph of Former Camp Shoemaker Dated 2016

3.3.3 Southern Portion of Former Camp Parks

Historical Aerial Photograph Dated 1930

The historical aerial photograph dated 1930 (Figure 3-20) shows Well Fields Number 1 and 2 are undeveloped farmland. No aerial photography was available for the former Sewage Lagoon Buffer Zone and Bus Station Annex for the 1930s.

Historical Aerial Photograph Dated 1949

The historical aerial photograph dated 1949 (Figure 3-21) shows Well Fields Number 1 and 2 with DoD buildings and wells constructed. Roads can also be seen connecting the different areas of the Site. A new bridge has been constructed on Santa Rita Road over the Arroyo Mocho canal.

Historical Aerial Photograph Dated 1958

The historical aerial photograph dated 1958 (Figure 3-22) shows the Site during DoD use. The Bus Station Annex, however, was sold before this aerial photograph was taken. In Well Field Number 2, five wells can be seen dispersed throughout the Site. Development is apparent on Well Field Number 1 and northeast of the former Bus Station Annex. The sewage lagoons can be seen south of the buffer zone.

Historical Aerial Photograph Dated 1965 and 1966

The historical photographs dated 1965 and 1966 (Figure 3-23) show the Site after several parcels have been sold. Residential areas can be seen in the northwest portion of the photograph. Tracks of land are apparent and beginning to be developed for business immediately east of the former Bus Station Annex. Roads at Well Field Number 2 are more apparent.

Historical Aerial Photograph Dated 1978

The historical aerial photograph dated 1978 (Figure 3-24) shows much more development around the Site. A new interchange has been constructed where Hopyard Road crosses Highway 580. Roads for businesses have been constructed to the north, south, and west of the former Sewage Lagoon Buffer Zone.

Historical Aerial Photograph Dated 1982

The historical aerial photographs dated 1982 (Figure 3-25) show softball and baseball fields at former Well Field Number 2 and the former Sewage Lagoon Buffer Zone. A chain of retail stores is located on the southern boundary of the former Bus Station Annex. Around former Well Fields Number 1 and 2, many residences have been constructed.

Historical Aerial Photograph Dated 1996 and 1998

The historical aerial photographs dated 1996 and 1998 (Figure 3-26) show a new Civic Center in the northeast portion of the former Sewage Lagoon Buffer Zone and oxidation ponds to the south. More businesses have been constructed north of former Well Field Number 2 and the Arroyo Mocho Canal.

Historical Aerial Photograph Dated 2004

The historical aerial photographs dated 2004 (Figure 3-27) shows no significant changes from the previous aerial photograph.

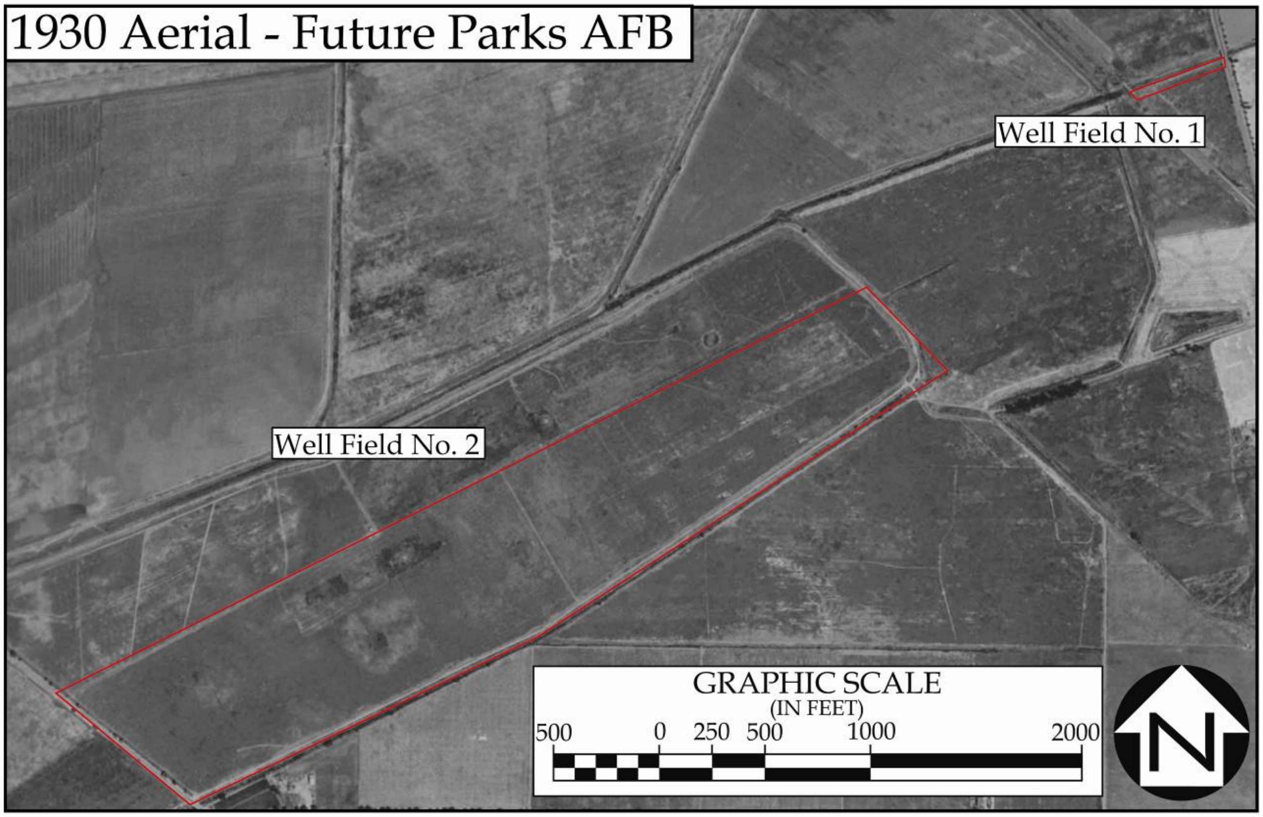


Figure 3-20 Historical Aerial Photograph of the Southern Portion of Former Camp Parks Dated 1930

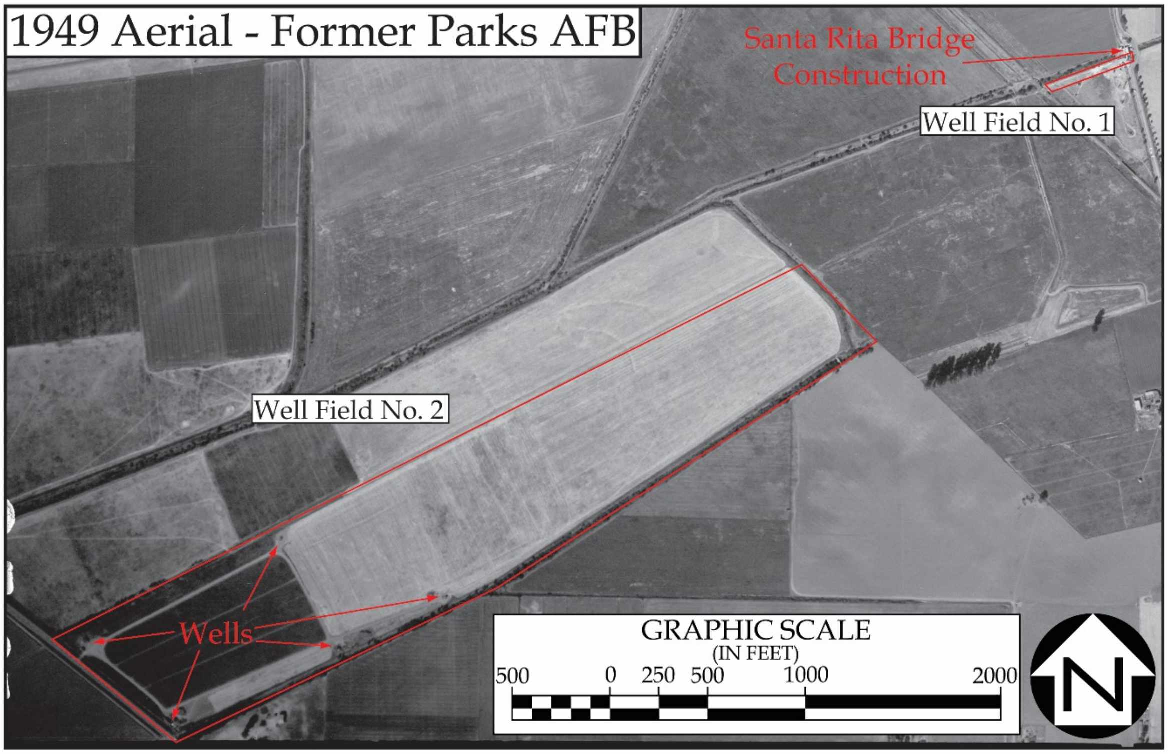


Figure 3-21 Historical Aerial Photograph of the Southern Portion of Former Camp Parks Dated 1949

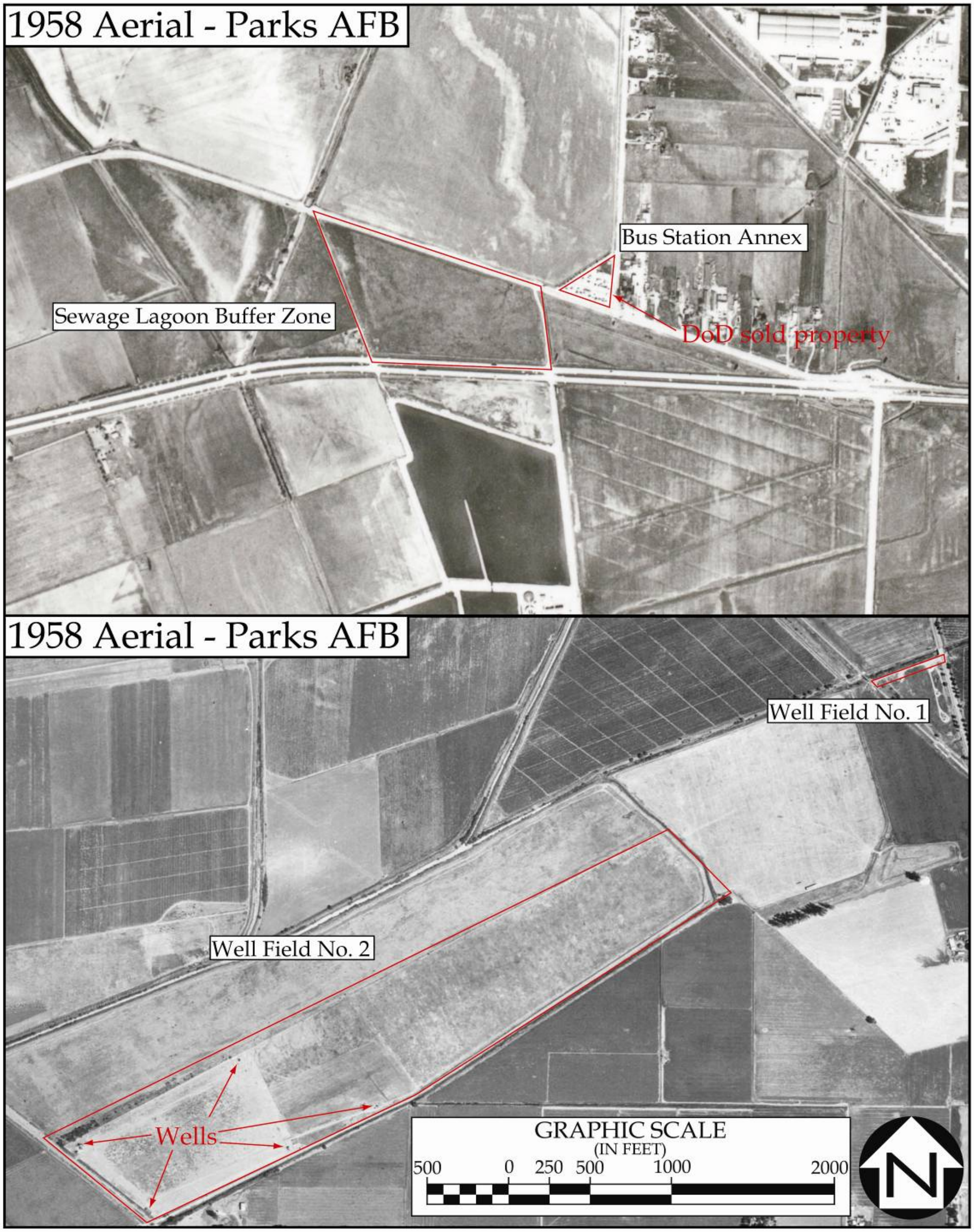


Figure 3-22 Historical Aerial Photograph of the Southern Portion of Former Camp Parks Dated 1958

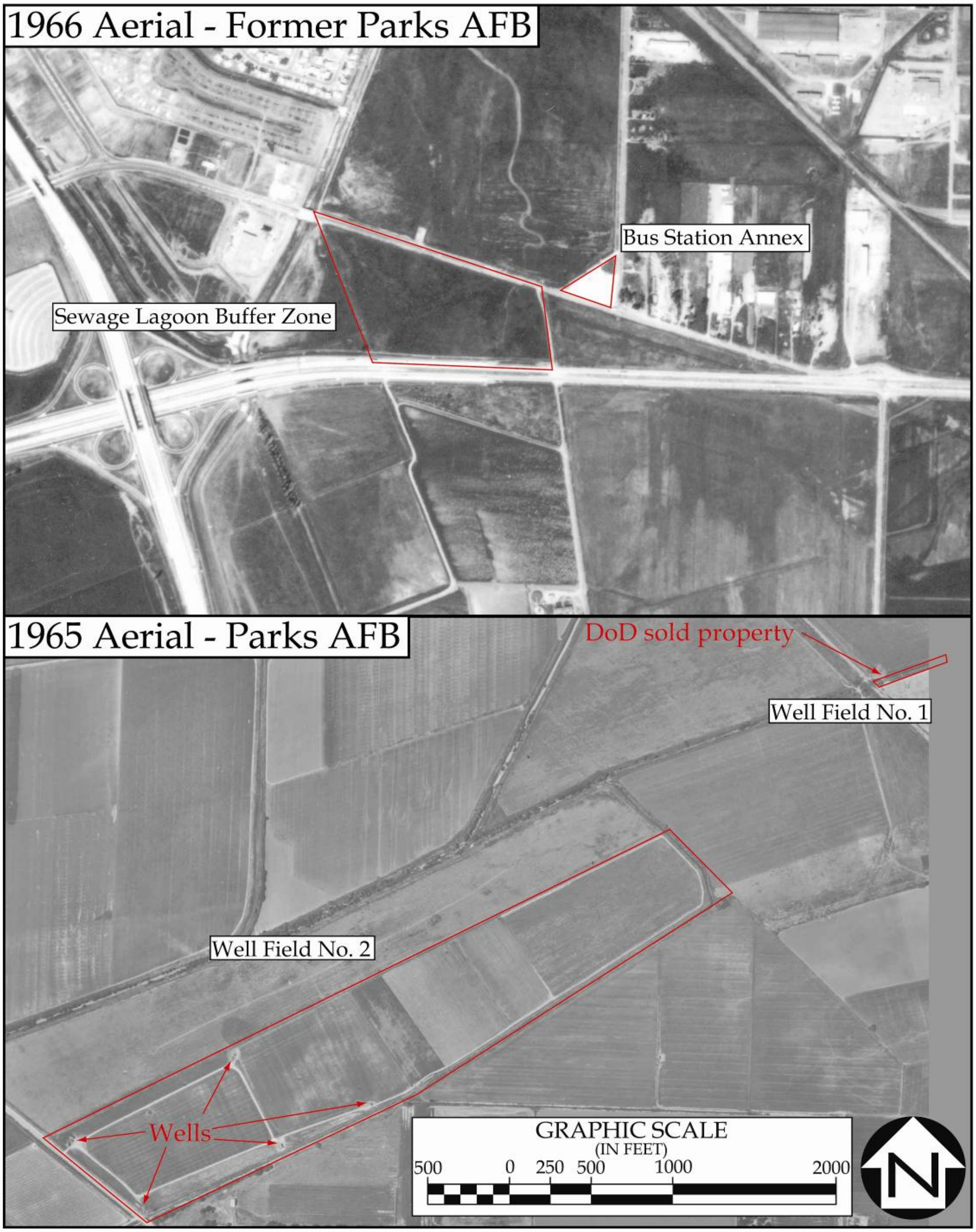


Figure 3-23 Historical Aerial Photographs of the Southern Portion of Former Camp Parks Dated 1965/1966

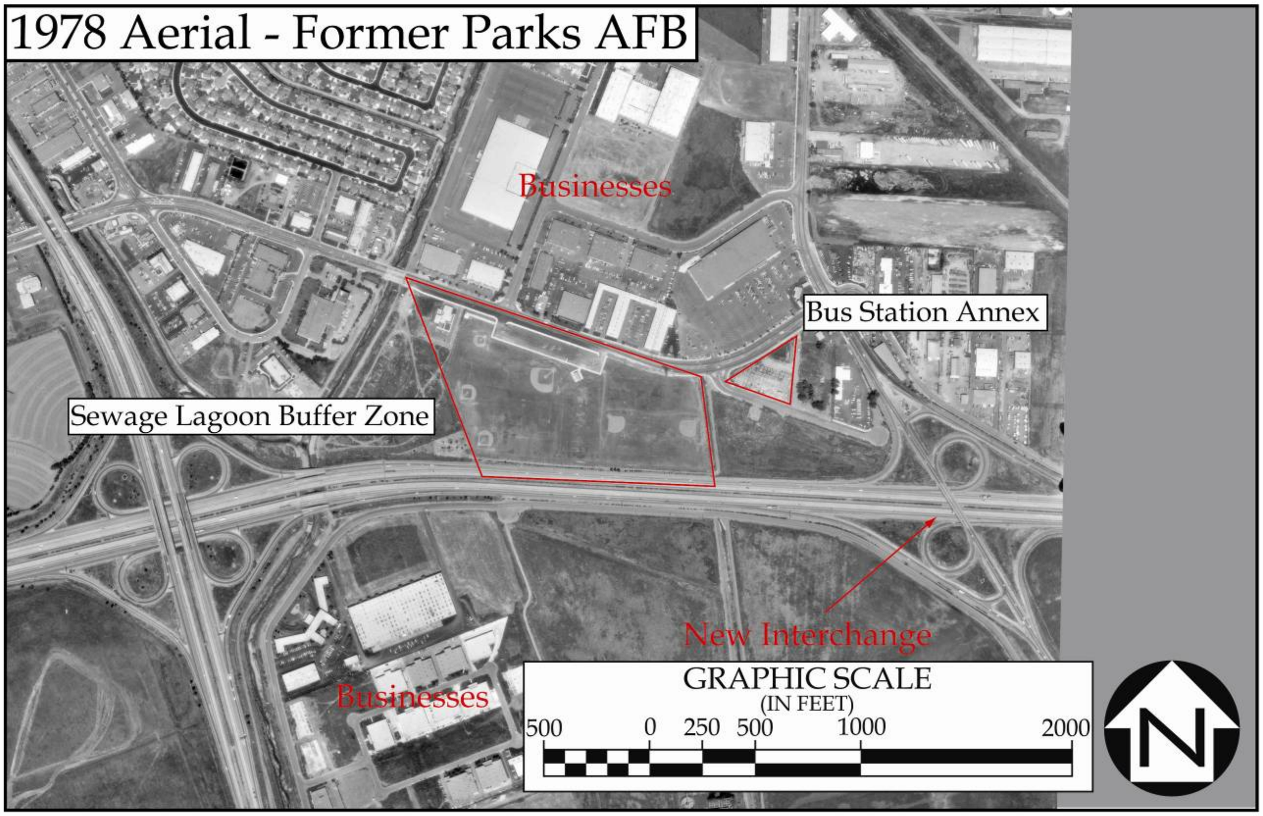


Figure 3-24 Historical Aerial Photograph of the Southern Portion of Former Parks AFB Dated 1978

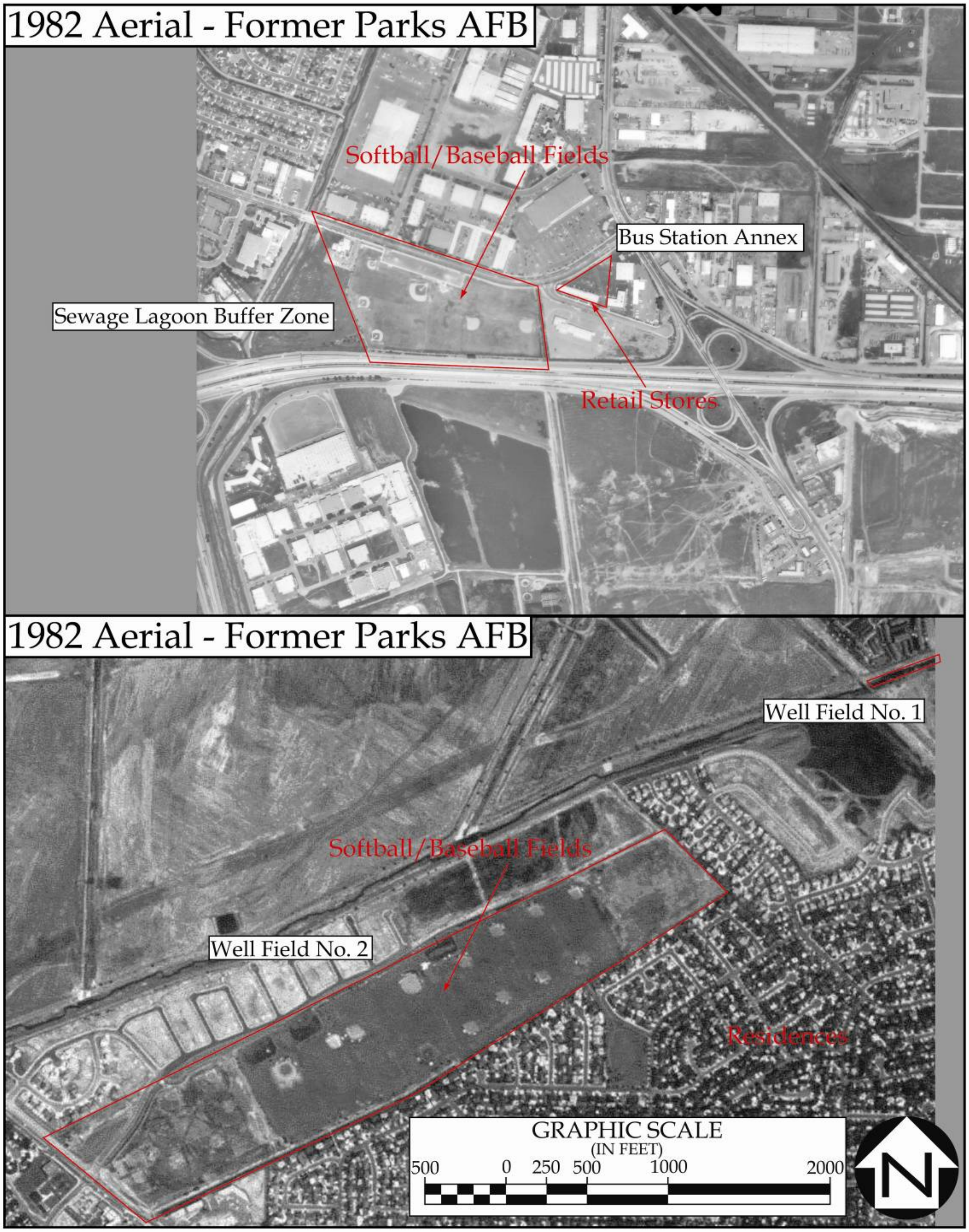


Figure 3-25 Historical Aerial Photograph of the Southern Portion of Former Parks AFB Dated 1982

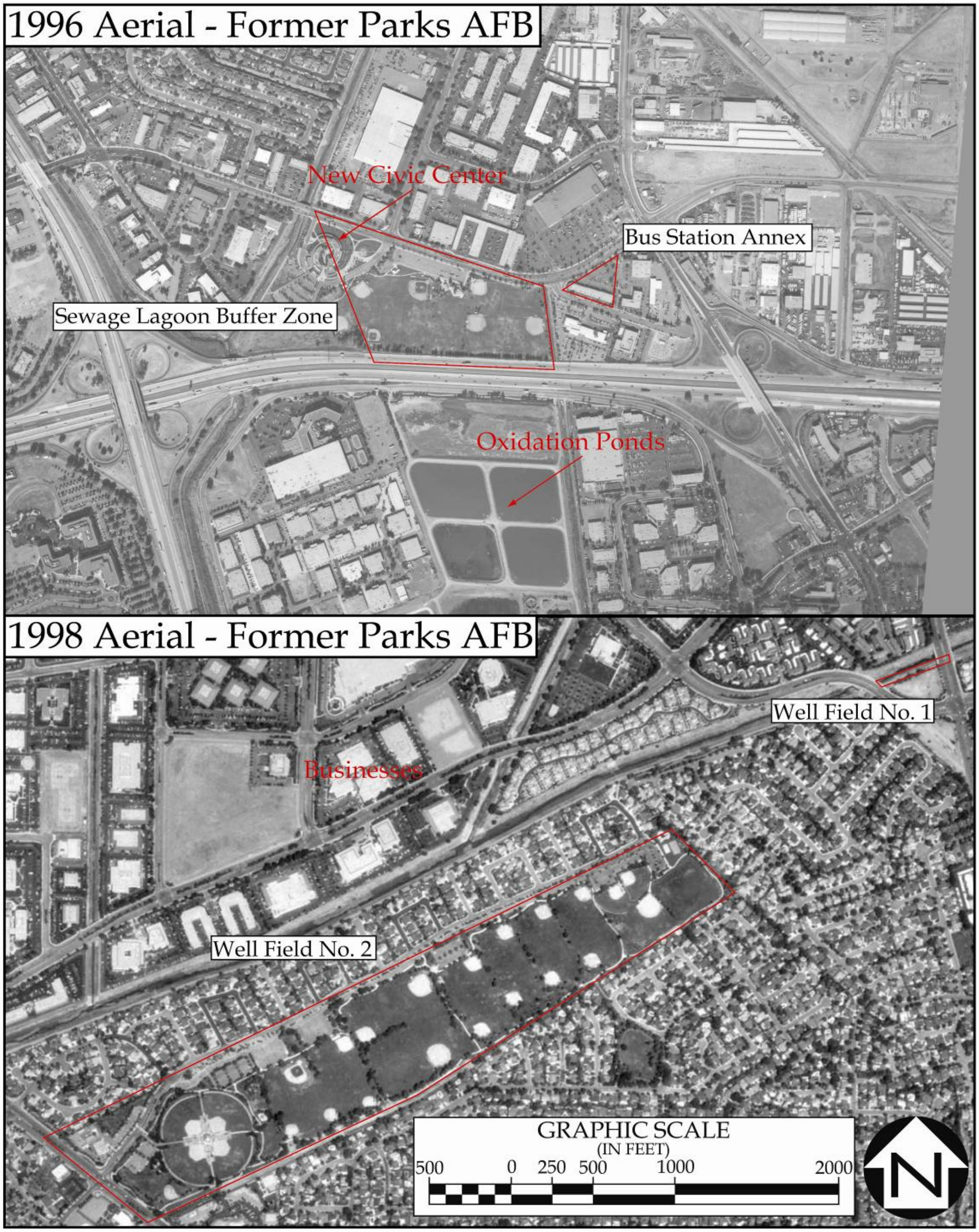


Figure 3-26 Historical Aerial Photographs of the Southern Portion of Former Camp Parks Dated 1996/1998

Figure 3-27 Historical Aerial Photograph of the Southern Portion of Former Camp Parks Dated 2004

3.4 ALAMEDA COUNTY RECORDS REVIEW

Aaron Woods of Parks RFTA Fire Department was interviewed on 17 July 2004, and he stated that since his hire in 1972, there were no major hazardous materials releases. No records of hazardous material spills were found in the logbooks at the fire station, which date back to 1965.

The Alameda County Fire Department was contacted on 20 January 2005, who referred the team to the Department of Environmental Health for hazardous materials releases.

Mike Williar of Contra Costa County Environmental Health Department Hazardous Materials Division was contacted on 20 January 2005. He reported that they have no records for hazardous material releases on the FUDS-ineligible portion of the Site that lies within Contra Costa County.

Mr. James Yoo of Alameda County Department of Public Works was contacted on 23 July 2007. The Alameda County Department of Public Works reported that they do not have any files regarding the Site.

The Alameda County Planning Department was contacted on 23 July 2007. The Planning Department reported that information pertaining to the FUDS-eligible portions of the Site is handled by the respective cities.

The City of Dublin Planning Department was contacted on 17 May 2007. The City of Dublin Planning Department reported that they had no pertinent information regarding the FUDS-eligible portions of the Site.

Mr. Matt Katen at the Zone 7 Water Agency was contacted on 24 July 2007. The Zone 7 Water Agency reported that information is available regarding wells around the Site. Information was reviewed and obtained on 26 July 2007. Information regarding wells around the Site is located in Appendix A.

During the 2016 PA effort, USACE-SPK was in contact with Rod Freitag, the Environmental Program manager with the Alameda County GSA. Mr. Freitag set aside several documents that pertained to various AOIs on the FUDS-eligible portion of former Camp Parks. Pertinent documents are contained in Appendices E and F, have been labeled according to the AOI they pertain to, and discussed in detail in Section 4.0.

4.0 AREAS OF INTEREST

Twenty eight HTRW or CON/HTRW Areas of Interest (AOIs) were identified at former Camp Parks. A discussion of each AOI follows. No MMRP or BD/DR AOIs were identified at former Camp Parks.

4.1 HTRW AOIs

4.1.1 AOI 1: Building 1788 Motor Pool

In the 1945 Camp Shoemaker Map, building 788 [old building designation] was labeled for use as 'Transportation and Storage.' According to the 1951 Preliminary Master Plan Map, this building was identified as a Motor Pool (Figure 4-1). The 1956 Building Inventory (see Appendix D, page 12 of 14) listed this building as a warehouse. It is unclear if the building was actually used for motor pool activities during this time frame. Per Rod Freitag of the GSA of Alameda County, this was a former wooden structure with a concrete floor, and during the late 1980s to the early 1990s four County environmental consultants inspected the building and none indicated the presence of hazardous materials of concern other than asbestos and lead paint (ineligible under FUDS) associated with the structure and equipment being stored therein. No hazardous chemical storage USTs, ASTs, containers or evidence of chemical contamination were noted. Gregg & Associates inspected the entire Santa Rita property in 1988 for USTs and ASTs; none were noted in this building (Gregg, 1988, Appendix D). Per Rod Freitag, the building was demolished by an environmental contractor (CEC) under observation of the County's environmental consultant (Professional Services Industries). Currently, this area is adjacent to a canal and the majority of it has been graded and developed into residences. In 2018, USACE performed a geophysical investigation of the portion of the area not developed into residences. The magnetic and ground penetrating radar found no indication of any UST at the site. The workplan and report for this geophysical investigation can be found in Appendix J. This AOI is FUDS eligible; however, no potential releases as a result of former DoD motor pool activities is suspected and therefore it is recommended that an NDAI determination be made.

Figure 4-1 AOI 1: Building 1788

4.1.2 AOI 2: Building 627 Incinerator

According to the 1945 map of Camp Shoemaker, an Incinerator (Building 627 [old number designation]) was located east of the rail yard along the west side of what is currently Hacienda Drive (Figure 4-2). The Incinerator Building was removed between 1966 and 1971, according to aerial photography. No documentation was found regarding the materials incinerated, incinerator removal, or beneficial use. The area has undergone restoration and is currently under Hacienda Drive, an 11 lane roadway, near Dublin Blvd.

In 2000, Lowney Associates conducted a site investigation of this parcel and found a visually identifiable ash-like substance, burned debris, molten glass fragments, and broken glass in the location of the former incinerator (Lowney Associates, 2000) (see Appendix F). Analytical soil samples testing included volatile fuel hydrocarbons (Gas/BTEX), poly-aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPHs), metals, organochlorine pesticides, and dioxins. Elevated lead levels and detectable amounts of dioxins and TPH were found. No Gas/BTEX, organochlorine pesticides or PAHs were detected.

In 2001, Subsurface Consultants, Inc (Subsurface) was contracted by Alameda County General Services to determine the extent of the incinerator waste, remove and dispose impacted soil, and collect confirmation soil samples (Subsurface, 2002a) (see Appendix F). Approximately 3,400 cubic yards (4,462 tons) of burn waste material, including what appeared to be remnants of the old incinerator structure and impacted fill, was removed from the site and transported to the Kettleman Hill facility for final disposal. Final excavation depths ranged from 2.5 to 6.5 below ground surface (bgs) and measured approximately 110 feet (ft) by 265 ft in area. Soil removed from the site contained lead concentrations ranging from 11 to 610 mg/kg.

In 2005 Treadwell & Rollo performed soil sampling at the former incinerator area during the construction of Martinelli Way (former Digital Drive) while grading work was being performed. A total of four near surface soil samples were collected and submitted for total lead analysis from two discolored soil areas exposed during grading. Four samples were collected from the soil stockpile and submitted for lead analysis. Lead concentrations ranged from 7.3 to 23 mg/kg. On December 5, 2005, DTSC issued a closure letter finding that no hazardous substances exist on the property that could pose a threat to public health or the environment and that no further action was necessary (Alameda County Health Care Services Agency, 2006) (see Appendix E). This AOI is FUDS-eligible but due to the closure certification, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

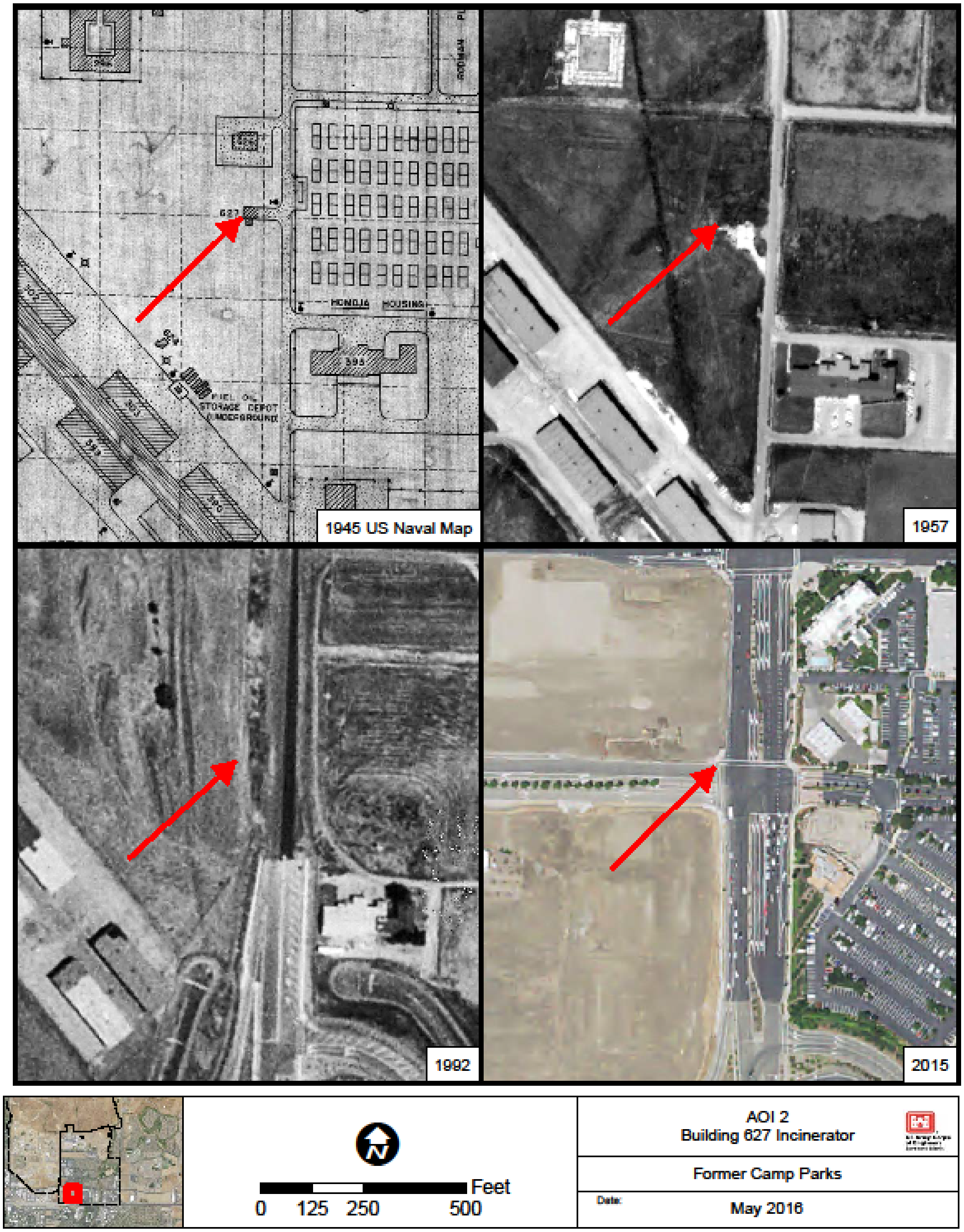


Figure 4-2 AOI 2: Building 627

4.1.3 AOI 3: Building 1715 Garbage Incinerator

According to the building inventory, Building 1715 was designated as a Garbage Incinerator (Figure 4-3). No further documentation was found regarding the materials incinerated or when the incinerator was removed. Also no documentation was found regarding beneficial use, however historical aerial photography indicates the incinerator was present until at least 1982, which is 13 years after the DoD transferred the Site. The area has since been redeveloped into a car dealership.

In 1999, during the installation of a storm drain inlet prior to construction of the car dealership, miscellaneous debris was found by Terrasearch, Inc. The debris included items such as wood, steel, car parts, assorted medical materials, and glass bottles (Terrasearch, 1999a). Debris was found in an area approximately 80 ft. by 80 ft. and 0 to 15 ft. deep. Composite samples were collected from the area and analyzed for CAM 17 metals, TPHs, PCBs, oil and grease, reactivity corrosivity and ignitability. Field radioactivity screenings were also performed. The contaminant of concern was found to be lead, with concentrations up to 1500 mg/kg (Terrasearch, 1999b) (Appendix F).

In 2000, EnecoTech excavated the area. Ash, debris and soil were stockpiled and composite sampled, and piles with contamination levels above clean up criteria were transported and disposed of offsite. To obtain "clean closure" for the property with no post closure actions or property use restrictions, the excavation project aimed to leave no remaining burn waste and no metal concentrations above those naturally occurring in the soil (determined to have upper limits of 31.0 mg/Kg for Lead and 6 mg/Kg for Arsenic). Approximately 7,843 tons of contaminated soil, including waste material, ash, and debris were disposed of (EnecoTech, 2000, pg. 1-1) (Appendix F). Waste approved for disposal at a Class I facility was transported to Kettleman Hills Facility in Kettleman City, CA, and waste approved for disposal at a Class III facility was transported to Altamont Landfill in Livermore, CA. The final excavation dimensions were approximately 165 ft. by 170 ft. and the maximum depth was about 18 ft. below original grade. Soil removed from the site contained lead concentrations ranging from 6.46 mg/kg to 214 mg/kg. Only one stockpile removed from the site contained an unacceptable concentration of arsenic, at 62.6 mg/kg (pg. 4-3 and 4-4). Following excavation in 2000, EnecoTech performed soil sampling to confirm that the excavation had met the remediation goals. Samples were collected and sent to Test America, Inc. in Nashville, TN, for total lead and total arsenic analysis. Lead concentrations of confirmation samples averaged 5.24 mg/kg and the maximum concentration was 7.37 mg/kg. Arsenic concentrations averaged 3.88 mg/kg and the maximum concentration was 6.37 mg/kg (EnecoTech, 2000, pg. 1-2).

On April 25, 2002, Ms. Karen Moroz from Alameda County Health Care Services sent a letter to GM Environmental Project Manager, Ms. Rowena Adamowski, indicating that DTSC and CIWMB concurred that No Further Action was warranted (Alameda County Health Care Services Agency, 2002) (Appendix E). This AOI is FUDS-eligible, but due to the removal of contamination and approval of No Further Action by DTSC, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

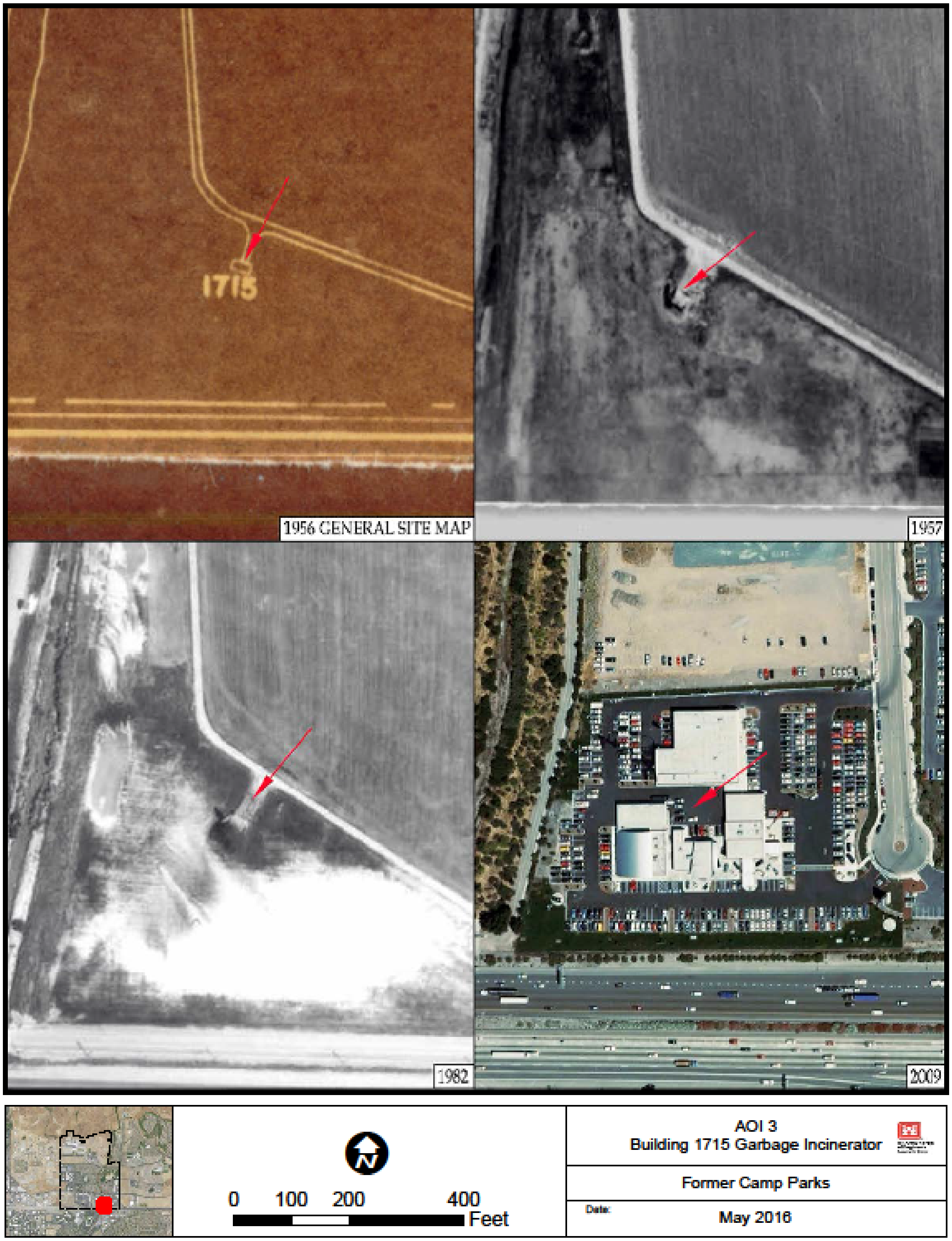


Figure 4-3 AOI 3: Building 1715

4.1.4 AOI 4: Building 1501 Wash Rack and Grease Pit

According to the Site's building inventory and the 1956 General Site Map, a Wash Rack and Grease Pit (Building 1501) was located on the southern boundary of the former Alameda County Prison Farm. Due to the fact that the Wash Rack and Grease Pit do not appear on the June 30, 1945 map, it appears that they were not installed until Alameda County acquired the property through a lease with the DoD (see Figure 4-4 for a comparison of these maps). This portion of the base was deactivated after WWII and leased to Alameda County in 1946. The building does appear to be on the 1951 Master Plan (See Appendix D), in the area labeled "Leased to Alameda County Sheriff - Alameda County Prison Farm." This area was not removed until after 1989, when the Prison Farm was shut down and all inmates were moved to the new Santa Rita Jail in the northern portion of the Site. Currently, this area is located under or near a Black Angus Restaurant. This AOI is FUDS-ineligible because it was installed by Alameda County during its lease of the property. This AOI is further recommended for NDAI based on subsequent actions taken by non-DoD parties.

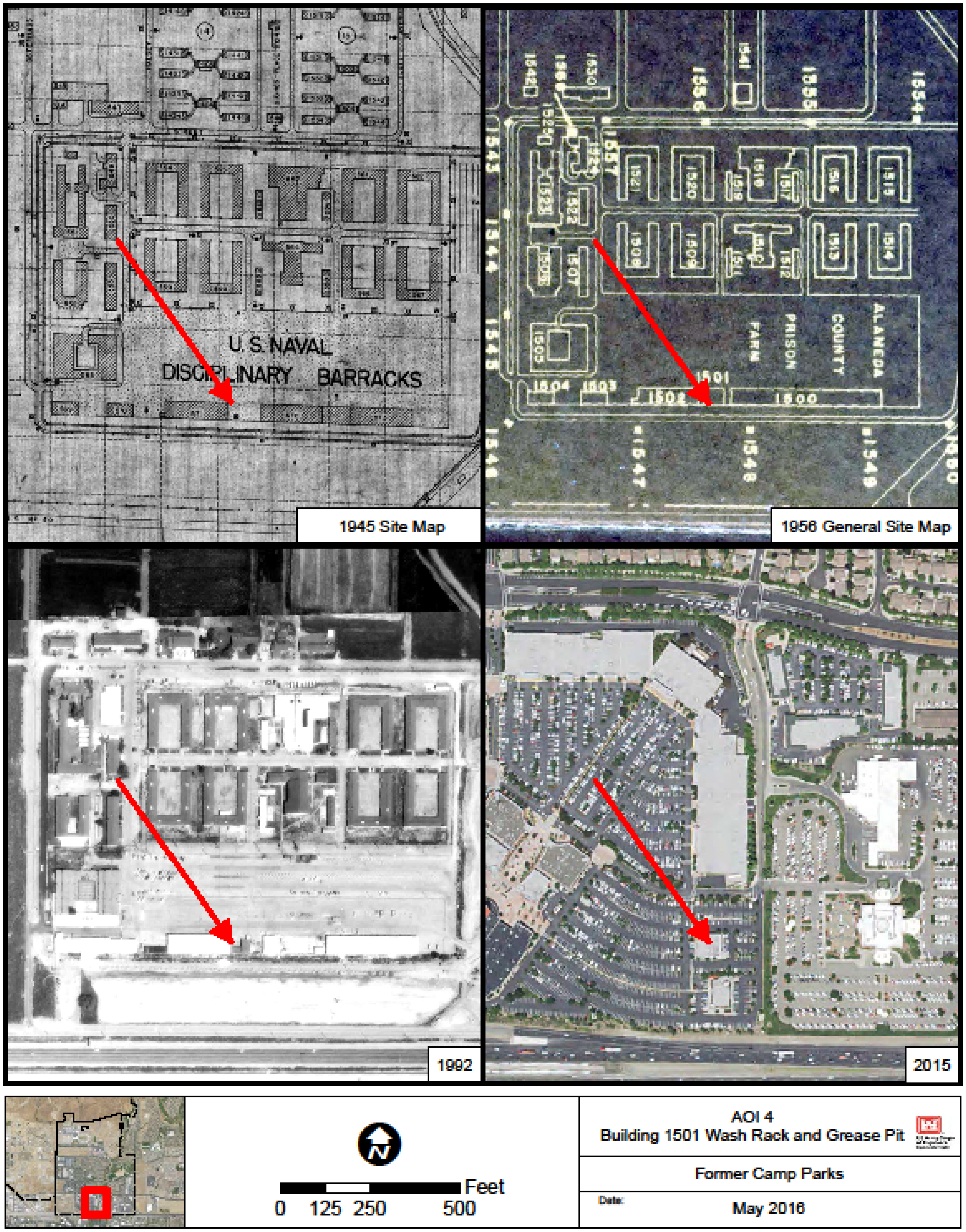


Figure 4-4 AOI 4: Building 1501 Wash Rack and Grease Pit

4.1.5 AOI 5: Burning Pit

On the 1958 General Site Map of Camp Parks (see Appendix D) there is a Burning Pit located north of the Water Storage Tanks, near Building 1899 and the adjacent Pistol Range. As is illustrated on Figure 4-5, this Burning Pit is still on the currently active base, and is therefore not FUDs eligible.

Figure 4-5 AOI 5: Burning Pit

4.1.6 AOI 6: Hickman Road Firing Range

According to the 1951 Preliminary Master Plan Map and the 1945 Shoemaker Map, a sanitary fill area was located in the northeast portion of former Camp Shoemaker. The possible sanitary landfill is addressed in AOI 28. Nearby this location was also documented as a 25-meter firing range in the 1958 General Site Map (Figure 4-6).

The Hickman Road Firing Range was located along Hickman Road in the northeast portion of former Camp Shoemaker. This range was a 40 point, 25-meter rifle range. No other documentation was found regarding the use of this area. The range is apparent on historical aerial photographs from present day through 1966. The range was constructed sometime between 1957 and 1966; it was used to sight rifles. According to Sergeant McElroy, the Alameda County Sheriff's Office beneficially used this area for shotgun training during the 1990's. Currently, this area is used for motorcycle training by the Alameda County Sheriff's Office. Recent site visits confirm the presence of historic and modern-era expended bullets, casings, and debris associated with both the DoD and Sherriff's Office.

The Hickman Road Firing Range is considered a potential PRP site because the onsite physical evidence and history of the site indicate that both the DoD and local Sheriff's Department used this site as a firing range. It is recommended that the Hickman Road Firing Range not be included in the SI and instead be evaluated through the FUDS PRP Program.

Figure 4-6 AOI 6: Hickman Road Firing Range

4.1.7 AOI 7: Naval Radiological Defense Laboratory

The following summary was prepared with information in files collected from the Naval Radiological Defense Laboratory (NRDL), Stanford Research Institute (SRI), and the Atomic Energy Commission (AEC); this information can be found in Appendix G. From 1959 to 1973, the facility was under the jurisdiction of the Army and operated on a standby basis. In 1959, the NRDL began using several buildings and land areas at Camp Parks as a remote site for radiological experimentation. NRDL was the foremost research laboratory in the country on the effects of radiation and methods for identification and decontamination. NRDL was based at Hunters Point Naval Shipyard and began as the Radiological Safety Section of the San Francisco Naval Shipyard Industrial Laboratory in 1946. In 1970, NRDL was shut down and its mission concluded. The mission of NRDL was to conduct basic and applied research on the physical and biological effects of fission products resulting from a nuclear explosion or from controlled nuclear processes; develop and evaluate radioactive detection devices and shielding equipment or materials for the protection of personnel; engage in reclamation or decontamination procedures for shipboard, aircraft, and land areas; prepare data for training information required by the military services, including assistance to other federal agencies and government contractors in the fields of nuclear and radiological warfare; and develop the use of radioisotopes and other tracer techniques in the above technical fields. The experiments and tests carried out at Parks AFB were in support of this mission.

Historical information and the radioactive material license information suggest the use of radioactive materials at Parks AFB occurred between 1959 and 1970. The radiological materials were controlled and used under AEC Byproduct Radioactive Material Licenses. Two licenses were issued directly to NRDL. One license was a general license issued to NRDL and managed by the NRDL Radioisotope Committee. This license authorized the use of radioactive materials in Buildings 131, 305, 310, 311, 312, 331, and areas known as the Camp Parks Pond, the Camp Parks Nucleonics Range (later known as the Stanford Research Institute Compound), and the Surface Roughness Area. AEC Byproduct Material License 04-00478-03 was terminated in 1970. Licensed radioactive material was removed from Building 131 except for the radioactive material transferred to SRI. The radioactive material and the building were transferred to SRI under AEC Byproduct Material License 04-01043-10 in 1969. The Nuclear Regulatory Commission (NRC) terminated AEC Byproduct Material License 04-01043-10 in October 1983. Licensed radioactive material stored in Building 305 and control of the building was transferred to University of California, Berkley under AEC Byproduct Material License 04-650-07 in 1969. At the remaining buildings and areas, the licensed radioactive material was removed, release surveys were performed, and the release status was confirmed by a representative from the U.S. AEC, Region 5 Division of Compliance. The location of these buildings is shown on Figure 4-7. The other license, AEC Byproduct Material License Number 04-00487-08 issued in 1963 and terminated in 1970, authorized the use of five 3,000-curie cobalt-60 sources (a total of 15,000 curies) for experiments involving high gamma radiation exposure to large animals (*e.g.* horses, burros, hogs and sheep) in the Camp Parks Nucleonics Range (Figure 4-7). As a condition of license termination, the cobalt-60 sources were transferred to AEC Byproduct Material License 04-01043-11, held by SRI. In 1971, AEC Byproduct Material License 04-01043-11 was amended to allow the use of four 2,000-curie cobalt-60 sources (a total of 8,000 curies). The sources were consequently offered for transfer and disposal from the SRI compound in November 1973 and picked up by Nuclear Engineering of Nevada. The AEC terminated AEC Byproduct Material License 04-01043-11 in February 1974.

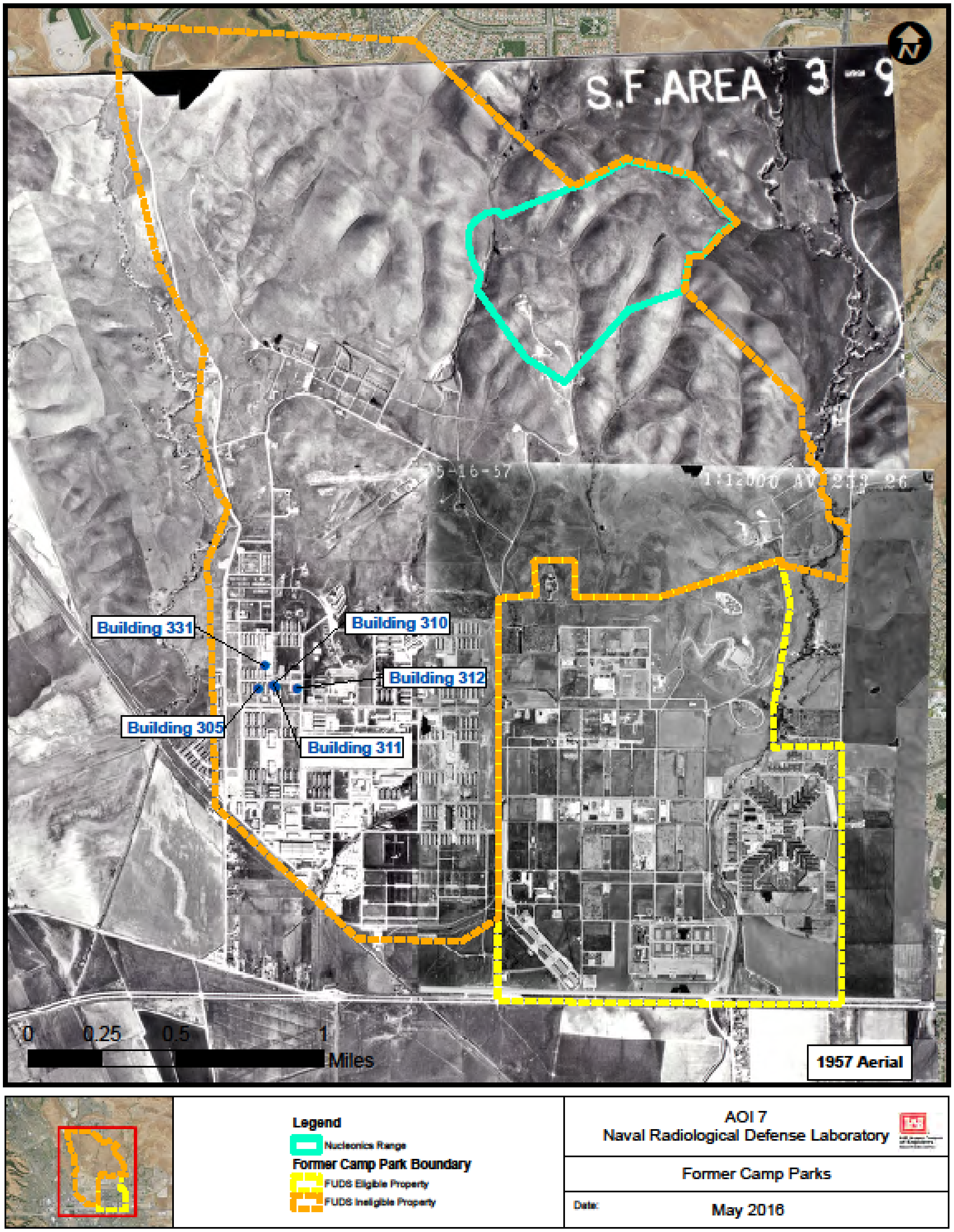


Figure 4-7 AOI 7: Locations of SRI Parks AFB Nucleonics Range

Historical documents state SRI used sections of Parks AFB for simulated fallout studies. The documents do not describe the areas used for these studies. Lanthanum-140 was the radiological tracer used in these studies and has a half-life of just over 40 hours; therefore, any trace of the radionuclide would have long since decayed away.

During the Site visit on 28 August 2007 with Sergeant McElroy, he stated irradiated animals were buried in the northern portion of Former Camp Shoemaker's boundaries. No documentation was found confirming this statement.

In April 1986, EG&G Energy Measurements of Las Vegas, Nevada, conducted an aerial radiological survey over the Dublin area, which included former Camp Parks. Survey results showed only naturally occurring radiation over the former Camp Parks area. There is no documentation stating that any radiological materials were stored, used or, buried on FUDS-eligible property. This AOI is FUDS-ineligible because the areas are currently owned by the DoD or on ineligible FUDS property.

4.1.8 AOI 9: Building 297 B/D Paint Shop and Store Room

According to the 1945 Naval map of Camp Shoemaker, a paint shop and a paint storeroom (Buildings 297B and 297D [old number designations]) were located north of the former rail yard (Figure 4-8). The aerial photographic interpretation shows Buildings 297B and 297D were removed between 1958 and 1966. The area is now a parking lot for office buildings. The area around these buildings have been investigated previously, with the contamination found only seeming to be associated with the other AOIs, AOI 8 Building 468A and 468B Gas Stations and AOI 25 Bldg. 299 Laundry and Boiler Room. In 1998 Ehler and Kalinowski took groundwater sample BH-8 in the area where the paint shop used to be. PCE was detected at 25 µg/L in BH-8. Several groundwater samples taken in the vicinity by Versar, Erler and Kalinowski and Lowney and Associates only have shown TPHs, PCE, Carbon Tetrachloride and Chloroform (the TPHs being most likely from nearby AOI 8-Gas Stations and PCE, Carbon Tetrachloride and Chloroform being most likely from nearby AOI 25-Laundry), with other VOCs being non-detect (Versar, and Lowney, Appendix F). In addition to the contaminants matching the other nearby uses, higher results of these VOCs have been found in locations closer to the fueling and laundry facilities, not the paint shop area. Additional near surface investigations are not feasible since the area has been capped with asphalt and developed into a large parking lot for the adjacent buildings. This AOI is FUDS-eligible; however, historical investigations do not imply that there were releases from buildings 297 B and D, and therefore it is recommended that an NDAI determination be made for this AOI. The VOC contamination found near AOI 9 will be addressed under AOI 8 and AOI 25.

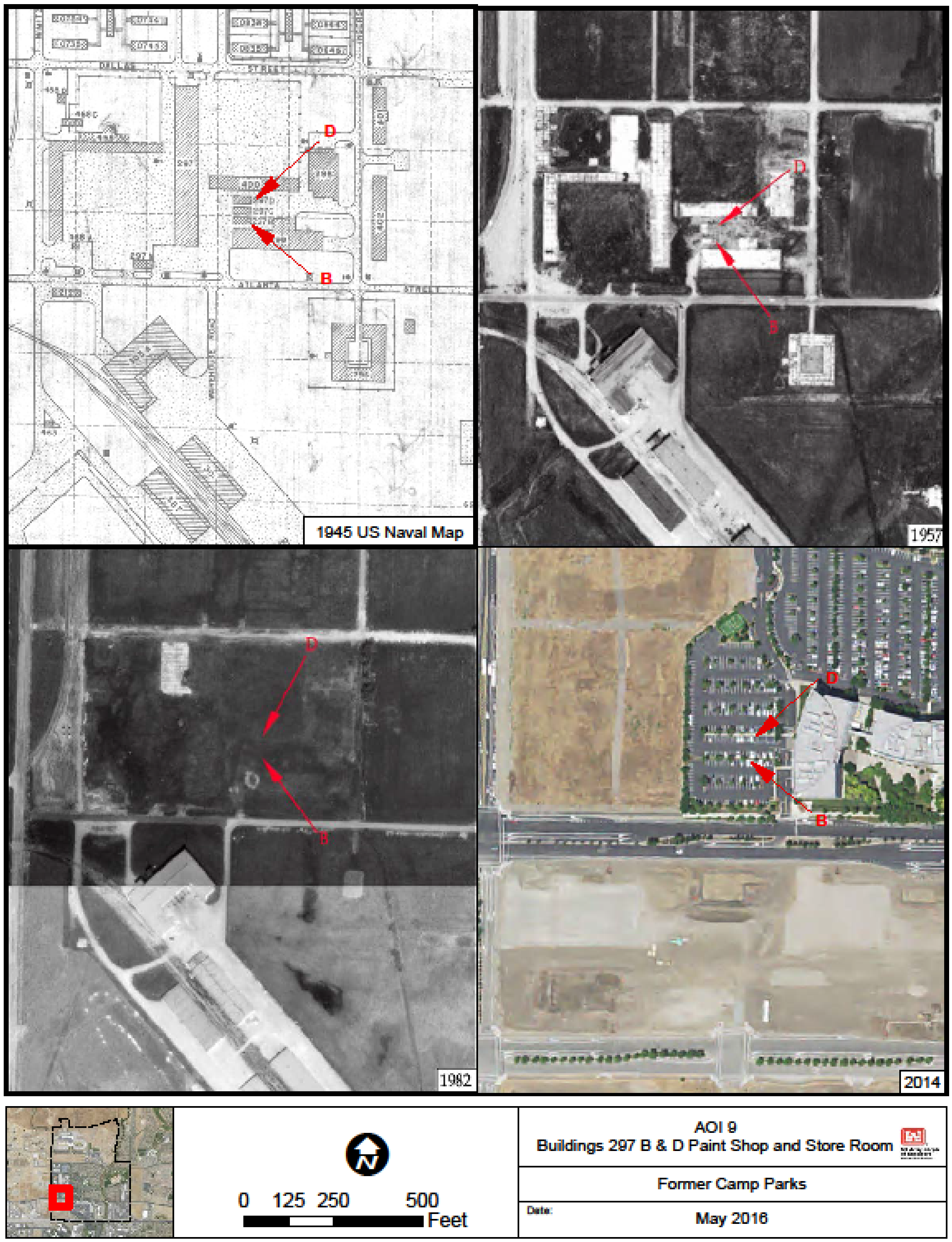


Figure 4-8 AOI 9: Buildings 297 B and 297 D

4.1.9 AOI 23: Camp Shoemaker Burn Pit

A map of U.S. Naval facilities on Camp Shoemaker, "showing conditions on 30 June, 1945" depicts a 'burning pit' east of the Water Storage tanks, north of the hospital (Figure 4-9). During a 2006 effort to rehabilitate a drainage ditch along Barnet Blvd, a contractor of Alameda County, Fugro West, Inc. found evidence of this former DOD burn pit near part of the drainage ditch. Thirteen samples were collected from 13 exploratory trenches in the area of the drainage ditch, and 13 samples from underlying clay, at approximately 4 to 5 feet bgs. Samples from the trenches closest in location to the historic burn pit had near surface lead levels from 28 to 840 mg/kg, while deeper samples and those further from the pit had lead levels of 4.2 to 11 mg/kg. No polynuclear aromatic hydrocarbons were found in any samples. (Fugro West, 2006).

A 23 February 2016 site visit by USACE staff with Alameda County Sheriff's Office personnel found evidence of a landfill and previous burning of debris. Debris dug up by burrowing animals was present, including what appeared to be bed springs, broken glass and ceramics, a spark plug, and melted glass (see Appendix B for site visit photos). Alameda County Sheriff's Office personnel also recounted finding silverware at the location. Alameda County has also in the past done surface sweeps of the area to pick up debris that had surfaced. This AOI is FUDS-eligible and is recommended to be included in the Site Inspection Work Plan.

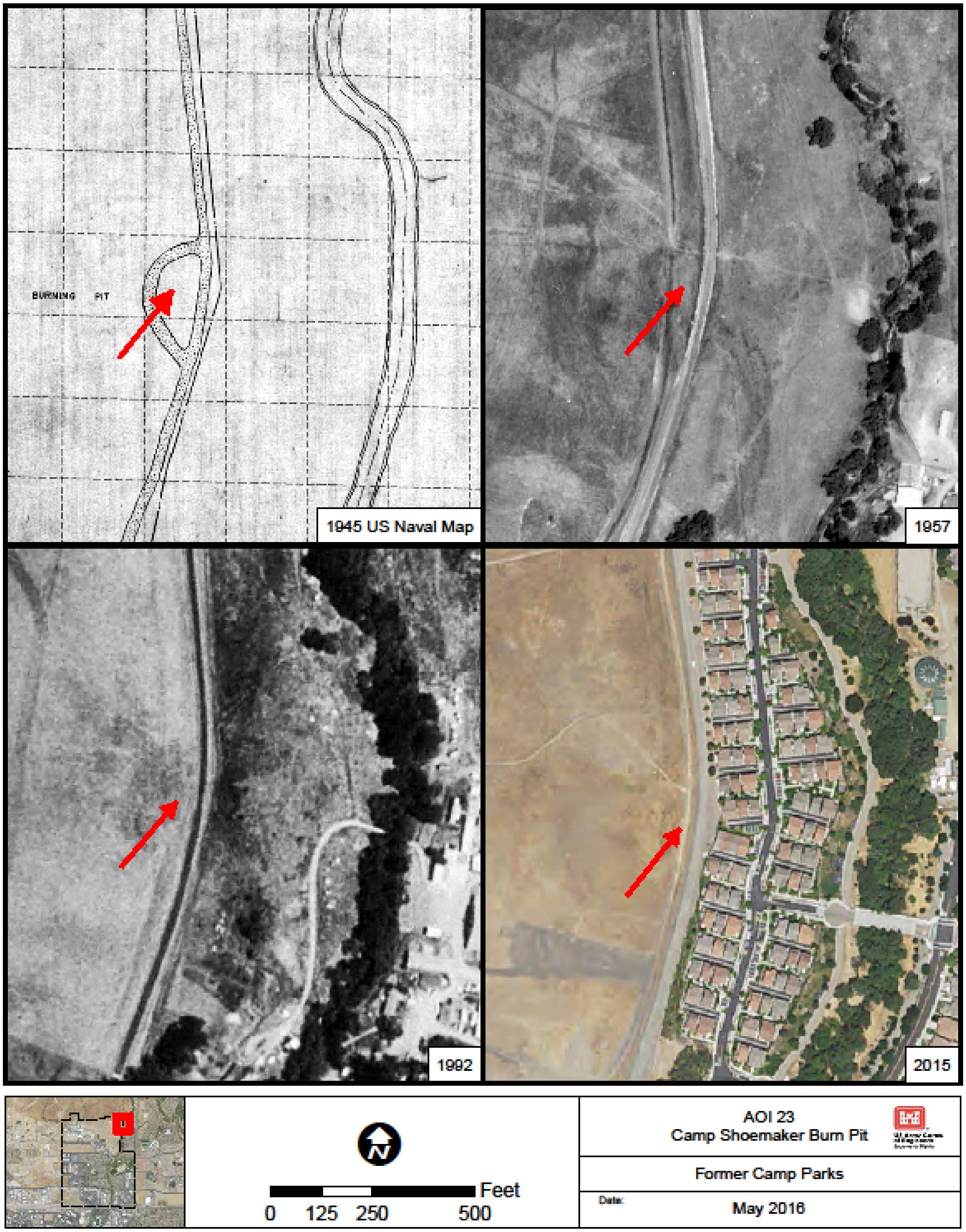


Figure 4-9 AOI 23: Camp Shoemaker Burn Pit

4.1.10 AOI 24: Naval Small Bore Rifle Range

A map of U.S. Naval facilities on Camp Shoemaker, "showing conditions on 30 June, 1945" depicts a 'small bore rifle range' west of the Water Storage tanks, north of Philadelphia Street (12th St on later Army maps) (Figure 4-10). Berms in this location consistent with a rifle range are visible on aerial photos from 1949 – 1982 (Appendix A). A May 2016 site visit by USACE staff with Alameda County Sheriff's Office personnel found no evidence of a range, such as bullets or casings. During the site visit, Sherriff Frank Matteo stated that the Sherriff's Office was unaware of any evidence of a range. It is possible that earth movement occurred during construction of the dirt road and solar panel array on the top of the hillside, immediately north of the AOI. This AOI is FUDS-eligible and is included in the Site Inspection Work Plan.

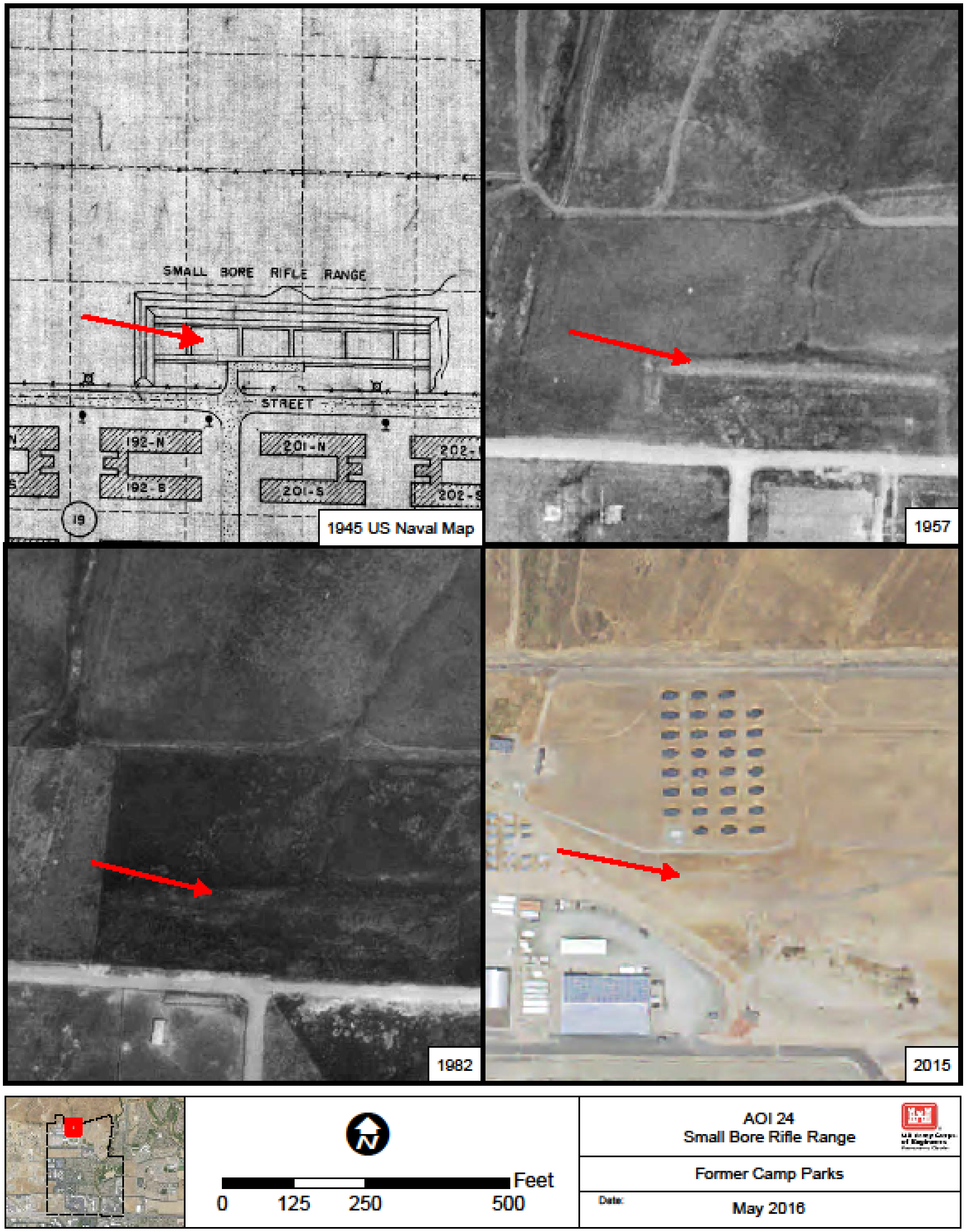


Figure 4-10 AOI 24: Naval Small Bore Rifle Range

4.1.11 AOI 25: Bldg. 299 Laundry and Boiler Room

A map of U.S. Naval facilities on Camp Shoemaker, "showing conditions on 30 June, 1945" depicts Building 299, which is listed in the building inventory on that same map as a "Laundry and Boiler Room." This area is currently under the parking lot west of an office Building on Sybase Drive (Figure 4-11).

Previous sampling has been done in this area by Erler and Kalinowski in 1998 and Versar in 1998 and 1999 (Erler & Kalinowski, 1998). During those sampling events, thirteen groundwater samples around Building 299 and to the west contained tetrachloroethylene (PCE) at concentrations ranging from 24 to 440 micrograms per liter (µg/l). In May of 2017 Langan Engineering and Environental Services, Inc performed a Phase II Environmental Site Characterization of nearby AOI 8 (Appendix F), during which they analyzed 5 groundwater samples from 5 borings. Very low levels of the VOCs PCE (0.8 µg/L) and chloroform were detected below the San Francisco Bay Regional Water Quality Control Board's 2016 Tier I and groundwater to soil vapor Environmental Screening Levels (ESLs). The PCE was detected in the approximate location of the former service station at building 468A, where PCE was detected at 120 µg/L by Versar in 1999. The remaining groundwater samples were non-detect for VOCs. The nearest water supply well (as identified on the Groundwater Ambient Monitoring and Assessment online mapping tool [GAMA]) is approximately 0.9 miles southeast of the Site. Two fuel oil USTs, one 10,000 gallon and one 1,000 gallon, were removed in this vicinity in March 2000. These tanks were not in the 1988 Alameda County Tank Management Plan (Gregg &Associates, 1988) (Appendix D). Both tanks were full of water and had holes present in them. Based on sampling, some excavated soil was taken to Vasco Road landfill in Livermore, and the rest was used to backfill the excavations. The tanks were considered closed in compliance with Title 23 CCR, with no further action necessary, by Alameda County Health Care Services (Alameda County) in June 2000 (Alameda County, 2000) (Appendix E). This AOI is FUDS-eligible, but due to the closure certification for the USTs, it is recommended that an NDAI determination be made for the USTs. Alameda County worked with the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) regarding contamination at Parcel 15, which encompasses this AOI, as well as AOIs 8 and 9. The Water Board has determined that groundwater at the site has been impacted by chlorinated solvents, including PCE, TCE, chloroform and carbon tetrachloride, and that non detectable to trace concentrations of fuel hydrocarbons and chlorinated solvents have been found in soil vapor. However, they have determined that all contaminants at the site are below health based screening levels, and that the site meets the criteria for case closure under the Waterboards Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites. On December 3, 2018 the SFBRWQCB issued case closure with a no further action ruling for this parcel (see Appendix E AOIs 8, 9, and 25 closure document). This AOI is FUDS-eligible, but due to the case closure by the Waterboard, it is recommended that an NDAI determination be made for this AOI.

Figure 4-11 AOI 25: Building 299

4.1.12 AOI 28: Hickman Road Sanitary Fill Area

According to the 1945 Naval Shoemaker Map and the 1951 Parks AFB Preliminary Master Plan, a sanitary fill area was located in the northeast portion of former Camp Shoemaker (Appendix D and Figure 4-12). No further documentation was found regarding this area. The nearby hillside currently has evidence of past use as a firing range by both the military and the local parties (see AOI 6). If it exists, the sanitary fill portion of this area would be considered FUDS-eligible and is included in the Site Inspection Work Plan.

Figure 4-12 AOI 28: Sanitary Landfill Area

4.2 CON/HTRW AOIs

4.2.1 AOI 8: Building 468A and 468B Gas Stations

According to the 1945 map of Camp Shoemaker, two former gasoline service stations (Buildings 468A and 468B [old number designations]) were located north of the former rail yard near the current Arnold Road, between Dublin Blvd and Central Pkwy (Figure 4-13). The former Gasoline Service Stations were removed between 1966 and 1971, according to historical aerial photographs (Appendix A). No documentation was found regarding the type, size, location, or quantity of fuel tanks that would have been associated with this area. No development in the area of the Gasoline Service Stations has been initiated.

A Geophysical investigation in 1999 by JR Associates found no tanks in this vicinity (JRAssociates, Appendix F). In 2000, Lowney and Associates took several soil and groundwater samples in the vicinity of these service stations, and found total petroleum hydrocarbons in the diesel range (TPHd) in groundwater up to a concentration of 3,300 µg/l, with the majority of the concentrations at approximately 150 to 400 µg/l. One groundwater sample near Building 468B contained 15,000 µg/l total petroleum hydrocarbons in the gasoline range (TPHg). Two soil samples near Building 468B also contained TPHd up to a maximum concentration of 300 mg/kg, and total petroleum hydrocarbons in the motor oil range (TPHmo) up to maximum concentration of 5,600 mg/kg (Lowney, 2000). Lowney and Associates also took surface soil samples in this area in 2000 (Lowney, Appendix F), analyzed for Arsenic, Cadmium, Lead, DDT, DDE, Gamma Chlordane and Asbestos, and found no results of concern. In 2001 Pacific States Environmental, Inc excavated a trench between the two test pits where high concentrations of TPH had been found in the soil, and screened the excavated soil using a field organic vapor meter. No viscous material was visually observed and no elevated organic vapor meter measurements were recorded (Subsurface, 2002b, Appendix F). In May of 2017 Langan Engineering and Environmental Services, Inc performed a Phase II Environmental Site Characterization of this site (Appendix F), during which they analyzed 63 soil samples from 32 borings and 5 groundwater samples from 5 borings. TPHg was not detected in any of the samples analyzed. TPHd was detected in 16 of the 63 soil samples analyzed at concentrations ranging from 1.1 milligrams per kilogram (mg/kg) to 59 mg/kg. TPHmo was detected in 21 of the 63 soil samples analyzed at concentrations ranging from 10 mg/kg to 510 mg/kg. Total petroleum hydrocarbons as gasoline were not detected at the Site in groundwater. Diesel was detected in two samples at 99 and 110 µg/L and motor oil was detected in two samples at 300 and 740 µg/L. The nearest water supply well (as identified on the Groundwater Ambient Monitoring and Assessment online mapping tool [GAMA]) is approximately 0.9 miles southeast of the Site. The County of Alameda is the current land owner and worked with the San Francisco Regional Water Quality Control Board to address contamination concerns at Parcel 15, which encompasses this AOI, as well as AOI 9 and AOI 25. The Water Board has determined that groundwater at Parcel 15 has been impacted by chlorinated solvents, including PCE, TCE, chloroform and carbon tetrachloride, and that non detectable to trace concentrations of fuel hydrocarbons and chlorinated solvents have been found in soil vapor. However, they have determined that all contaminants at the site are below health based screening levels, and that the site meets the criteria for case closure under the Waterboards Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites. On December 3, 2018 the SFBRWQCB issued case closure with a no further action ruling for this parcel (see Appendix E AOIs 8, 9, and 25 closure document). This AOI is FUDS-eligible, but due to the case closure by the Waterboard, it is recommended that an NDAI determination be made for this AOI.

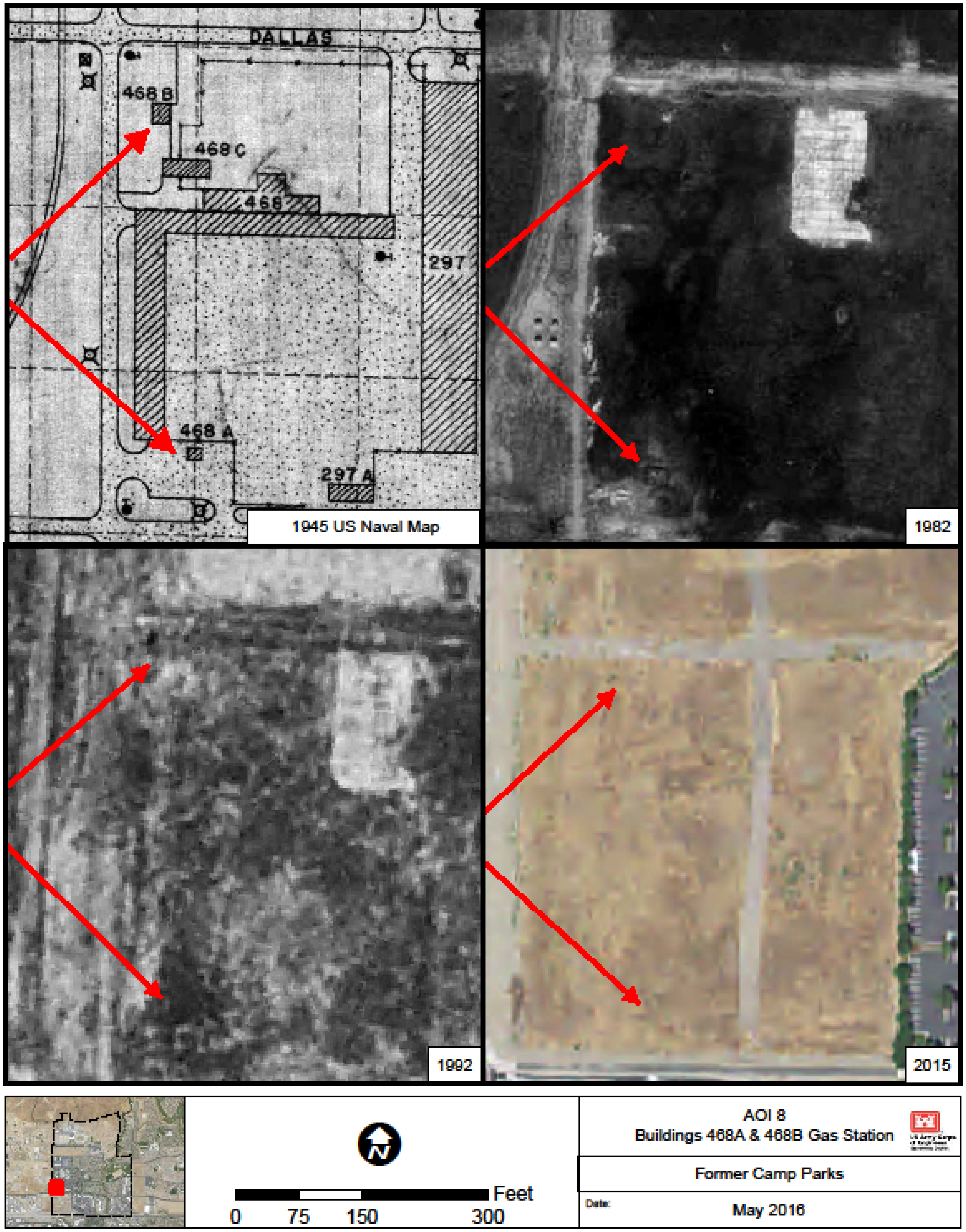


Figure 4-13 AOI 8: Buildings 468A and 468B

4.2.2 AOI 10: Building 1210 UST

As shown on the 1956 Heating Plan Map (Tab G-6, Sheet 4 of 5, Appendix D) for the Non-Commissioned Officer's Club (Building 1210), a 1,000-gallon fuel oil UST was located on the north side of the building beside the eastern wing (Figure 4-14). The map states that the UST was abandoned.

According to Sergeant McElroy of the Alameda County Sheriff's Department, at least one gasoline UST was located at former Building 1210 (also known as the Madigan Building). The 1988 Alameda County Tank Management Plan identified this tank as being installed in 1950 and not currently in use (Gregg, 1988) (Appendix D).

The tank was removed by Environmental Science and Engineering, May 18, 1992, who was contracted by Alameda County GSA. At that time the tank was empty and showed no visible holes. The report states that no noteworthy release of petroleum hydrocarbons has occurred. Closure was accepted by the county January 25, 1995 (Alameda County, 1995a). Two restaurants and their parking lots have been constructed at its former location. This AOI is FUDS-eligible, however, due to the closure certification, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

Figure 4-14 AOI 10 Building 1210

4.2.3 AOI 11: Buildings 1391 and 1393 Oil Storage Tanks

The Master Plan Central Heating System listing for Parks AFB (Tab G-6, Sheet 2 of 5, Appendix D) identified Officer's Family Housing Buildings (Buildings 1391 and 1393) as having oil-heating systems (Figure 4-15). These tanks were not on the 1988 Alameda County Tank Management Plan. No information pertaining to the location or size of the oil tanks was found during research. It is unknown whether these tanks were USTs or ASTs, however similar officer family housing were equipped with ASTs. Currently, the Santa Rita Jail property is situated in the former location of the two tanks, and no evidence of the former tanks is currently present.

No information regarding demolition of these buildings or removal of any tanks that may have been present has been located. Alameda County Environmental Program Manager Rod Freitag was the County's project manager for construction of a waste screening plant located at the northwest corner of the Arnold/Broder intersection, the approximate location of building 1393 based on historical maps (see Figure 4-15, lower right quadrant). Per Mr. Freitag, excavations for the plant and associated sewer lines extended more than 10 feet bgs. Construction involved excavation of the northwest quadrant of the intersection and trenching across Arnold, and no fuel tanks or evidence of fuel contamination was observed. Considering this and other development in the immediate area, it's unlikely that any tanks remain or that significant soil contamination exists. Given that the location of these tanks relative to the buildings is unknown, and that the buildings have been completely removed, there would be a high amount of uncertainty in performing any sampling, as the location of the tanks is unknown. Also, past excavations and construction in the area have shown no sign of contamination. This AOI is FUDS-eligible, however, due to no evidence of remaining tanks or contamination and the uncertainty of sampling, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

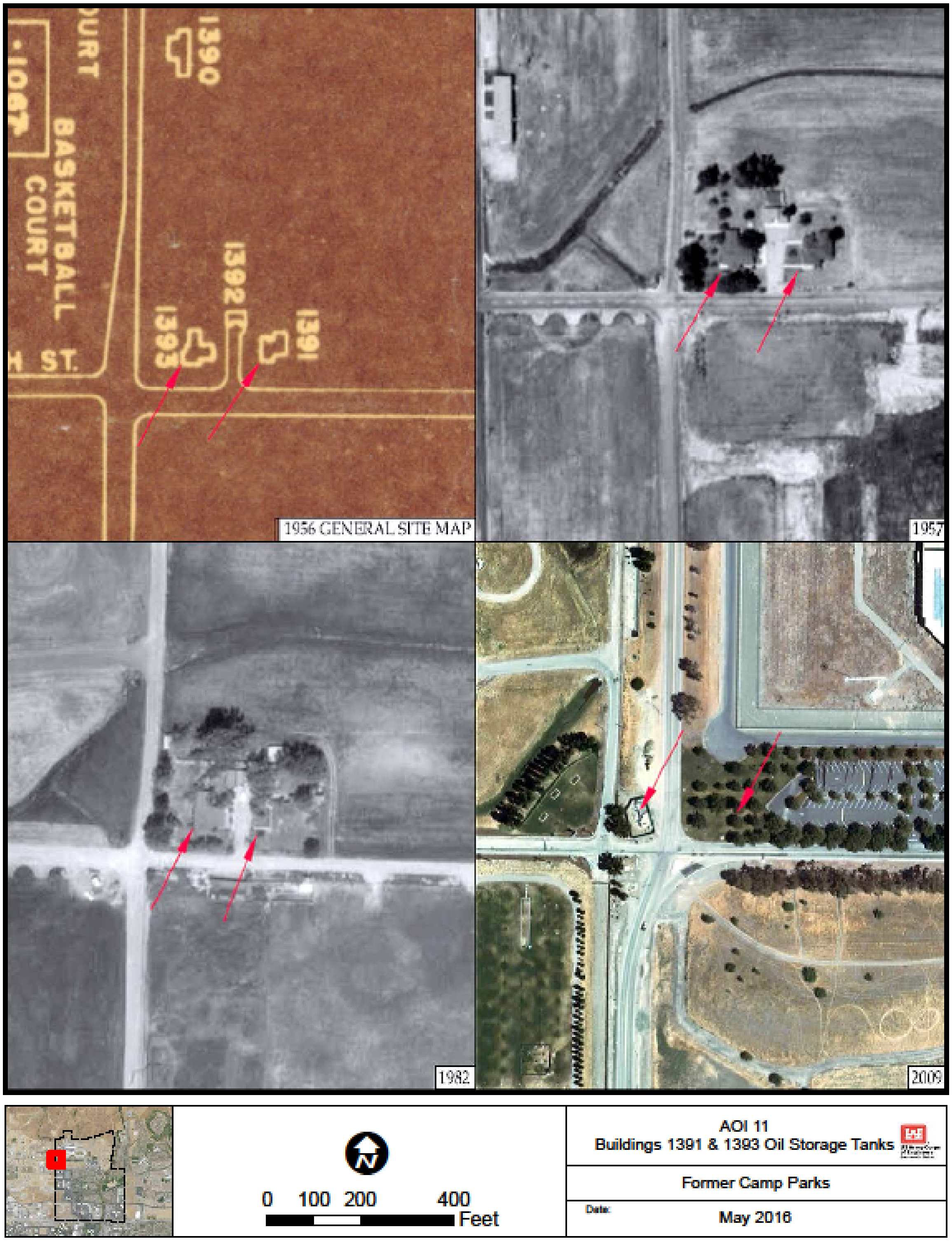


Figure 4-15 AOI 11: Buildings 1391 and 1393 Oil Storage Tanks

4.2.4 AOI 12: Building 1746 Oil Storage Tank

The Master Plan Central Heating System listing for Parks AFB (Tab G-6, Sheet 2 of 5, Appendix D) identified the Sanitary Sewer Pump Station (Building 1746) as having an oil heating system. This tank was not on the 1988 Alameda County Tank Management Plan. No information pertaining to the location or size of the oil tank was found during research. Currently, an office building parking lot is situated next to a cement utility pad at what is the possible former location of the tank, and no evidence of the tank is currently present. The location of this tank relative to the building is unknown, the building has been completely removed, and therefore the location of the former tank is unknown and there would be a high amount of uncertainty in performing any sampling. In 2018, USACE performed a geophysical investigation of this area of interest, and found no indication of any UST at the site. The workplan and report for this geophysical investigation can be found in Appendix J. This AOI is FUDS-eligible, however, due to no evidence of any tank being present, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

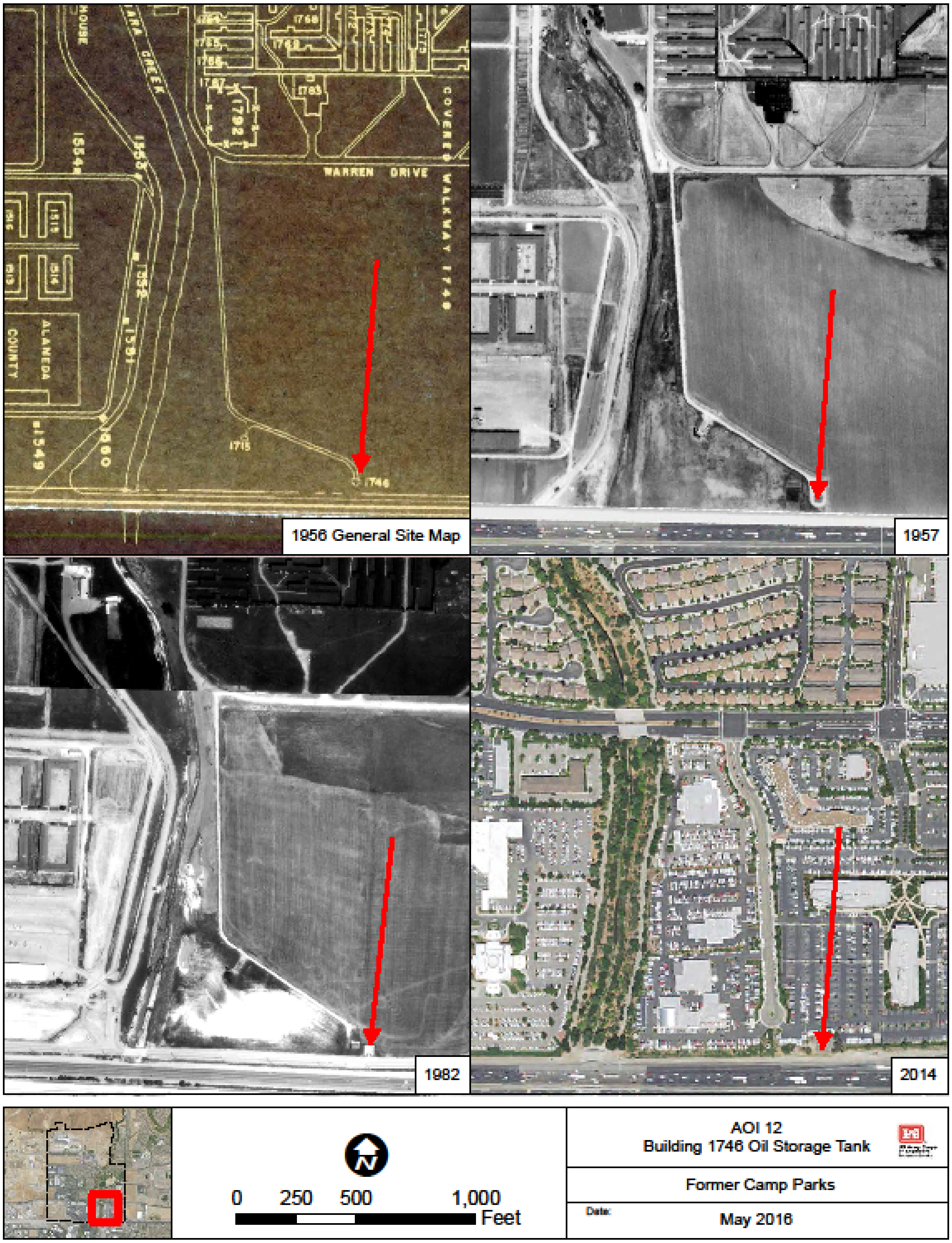


Figure 4-16 AOI 12: Building 1746 Oil Storage Tank

4.2.5 AOI 13: Building 1778 Gasoline Generator

According to the 1956 Electrical Power and Lighting Facilities Map (Tab G-8, Sheet 3 of 3, Appendix D), the Obstetrical Ward (Building 1778) was located on the eastern portion of the U.S. Naval Hospital Shoemaker and contained a gasoline driven generator. No further documentation was found regarding the location, use or removal of a tank that might have been associated with the generator. Per Rod Freitag of Alameda County, this generator was not in place when Alameda County became involved in the property. A Phase 1 Environmental Site Assessment of the property was done by RGA Environmental, Inc in 1999 (Appendix F). During the inspection, no evidence was found of any tanks, drums, spills, wells or discharges. Currently, retail stores including a Safeway and Petco, their parking lots, and a nearby roadway are in the former location of Building 1778. This AOI is FUDS-eligible, however, due to no evidence of a release, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

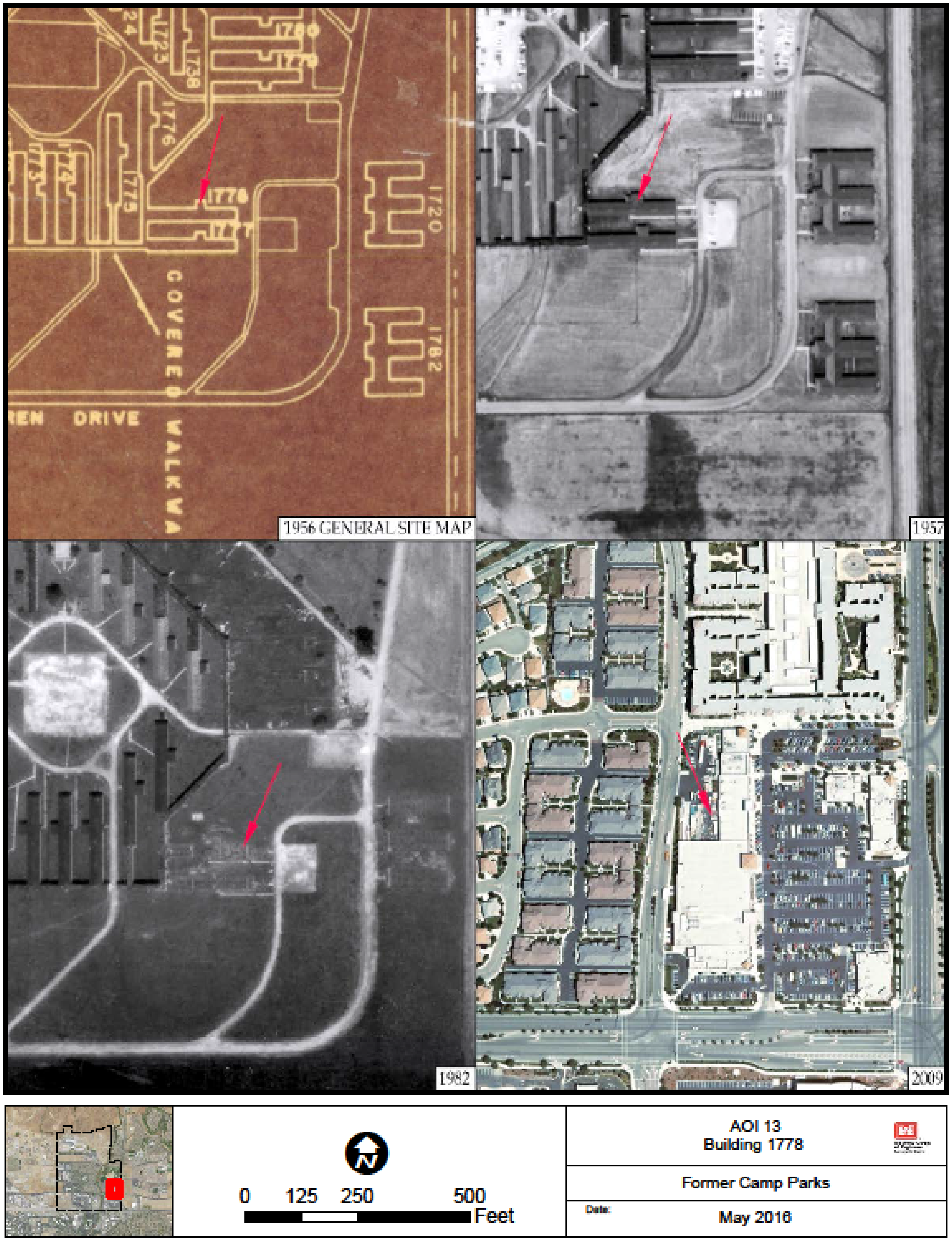


Figure 4-17 AOI 13: Building 1778

4.2.6 AOI 14: 4th Street & Offutt Ave/4th St. and Nellis USTs

Three tanks were labeled tanks # 1, 2, and 3 by Alameda County and were associated with Boiler House No 4 (Building 305 on the 1945 Naval Map, Appendix D). The USTs were removed in March 1988, with soil contamination with Bunker-C oil noted at time of excavation (from overfilling and associated piping), as tanks were reported to be in good condition. An April 5, 1996 letter from the Alameda County Department of Environmental Health certifies Remedial Action Completion (Alameda County, 1996) (Appendix E). The Remedial Action Completion Certification states that the UST site was over-excavated and the material stockpiled nearby. Based on sampling results, some material was shipped to BFI landfill in Livermore, CA, and the rest of the material was spread on site. This AOI is FUDS-eligible, however an NDAI decision is requested based on past site closure.

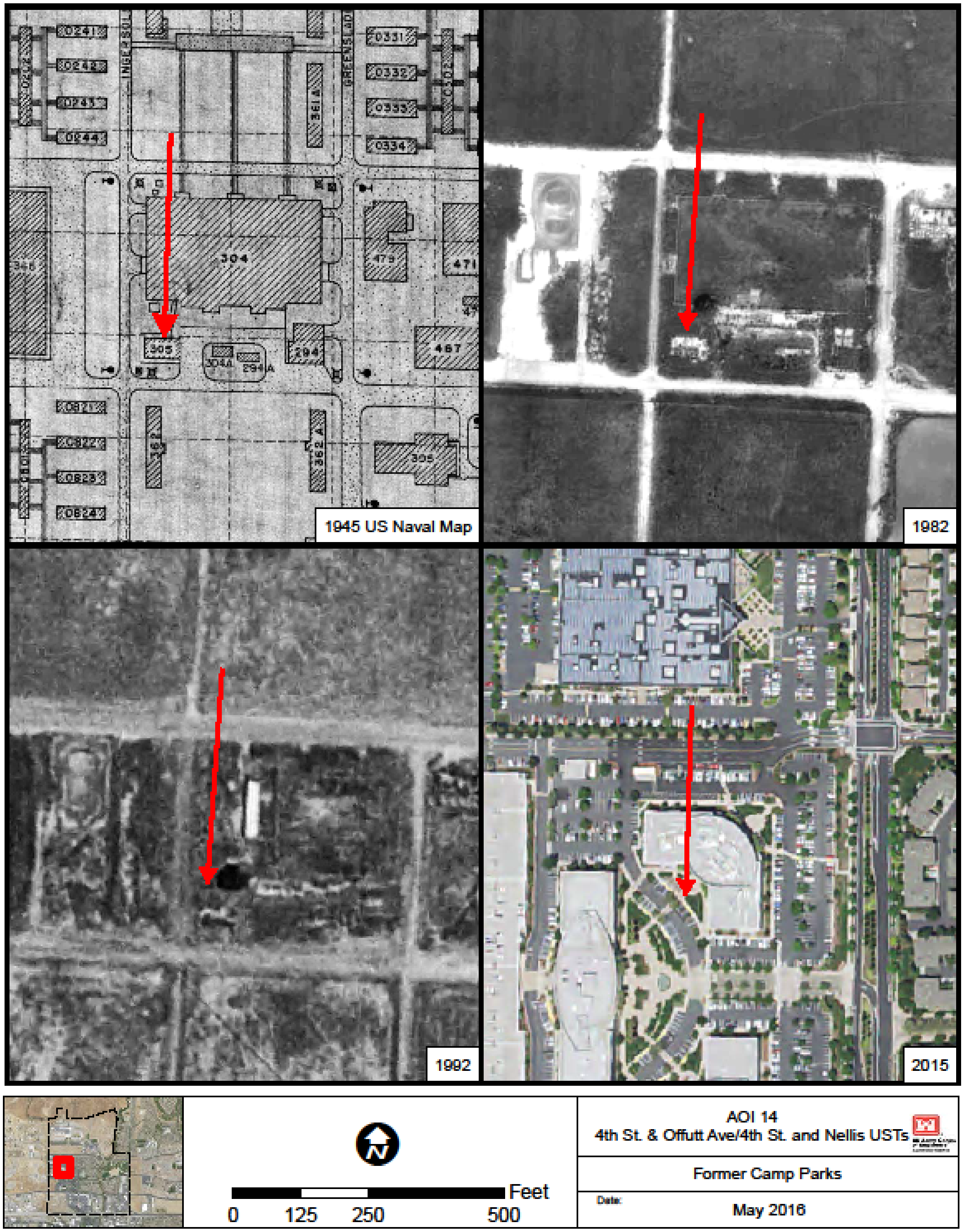


Figure 4-18 AOI 14: 4th St and Offutt Ave USTs

4.2.7 AOI 15: Various Transformers

According to the 1956 Electrical Power and Lighting Facilities Map (Tab G-8, Sheets 1, 2, and 3 of 3, Appendix D), 106 various sized transformers were located within former Camp Shoemaker and the U.S. Naval Hospital Shoemaker (Figure 4-19 and Figure 4-20). According to Mr. Paul Kot, Environmental Manager at Parks RFTA, all polychlorinated biphenyl (PCB) containing transformers have been removed from the Site. This AOI is FUDS-eligible, however, no further inspection is warranted because all PCB containing transformers have been removed and no documentation or indications of spills were found during research. Due to the uncertainty of sampling and low risk, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

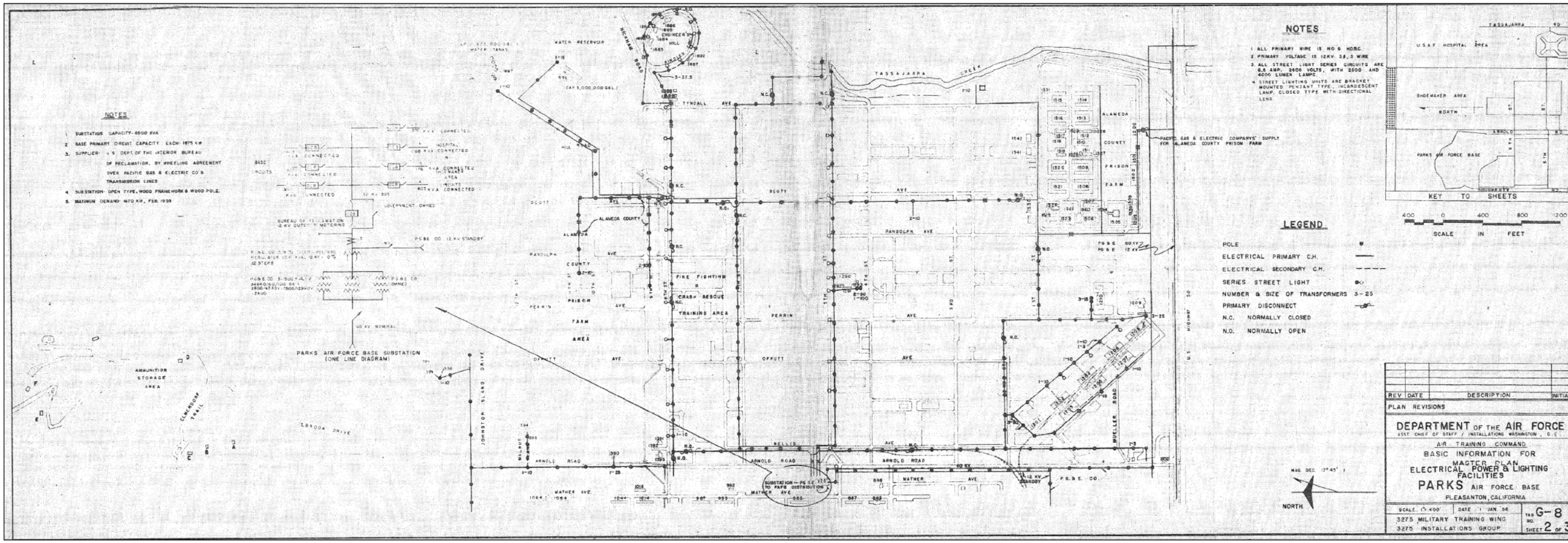


Figure 4-19 AOI 15: 1956 Master Plan for Electrical Power and Lighting Facilities of Former Camp Shoemaker

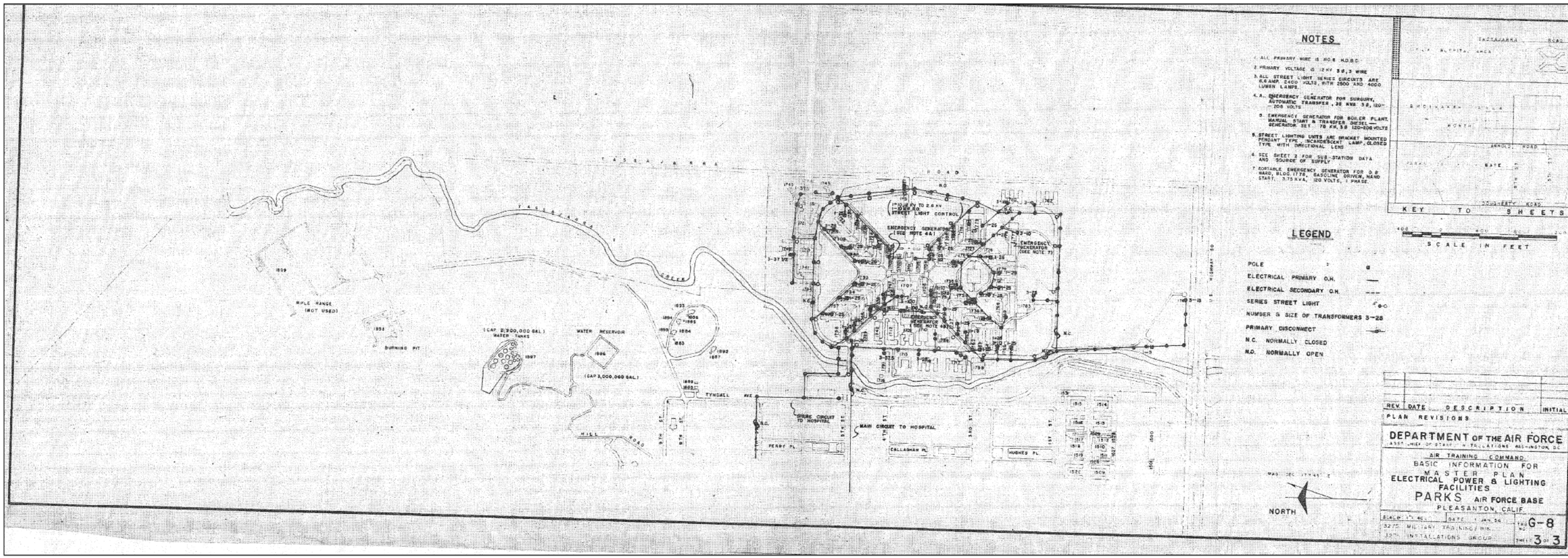


Figure 4-20 AOI 15: 1956 Master Plan for Electrical Power and Lighting Facilities of Former U.S. Naval Hospital Shoemaker

4.2.8 AOI 16: Building 1395 Oil Storage Tank

The Master Plan Central Heating System listing for Parks AFB (Tab G-6, Sheet 2 of 5, Appendix D) identified the Officer's Family Housing Building (Building 1395) as having an oil heating system (Figure 4-21). No information pertaining to the location or size of an oil storage tank was found during research; however, according to Sergeant McElroy, this tank was an AST and removed in the 1990s. During the May 2016 visit, Sergeant Frank Matteo stated that the house was never used by the Alameda County Sheriff's Office. Currently, only the foundation and rubble of the building remains. There is one possible AST footing that is identifiable on the south side of the building (see Appendix B for Site Visit photos). This AOI is FUDS-eligible and is included in the site inspection work plan.

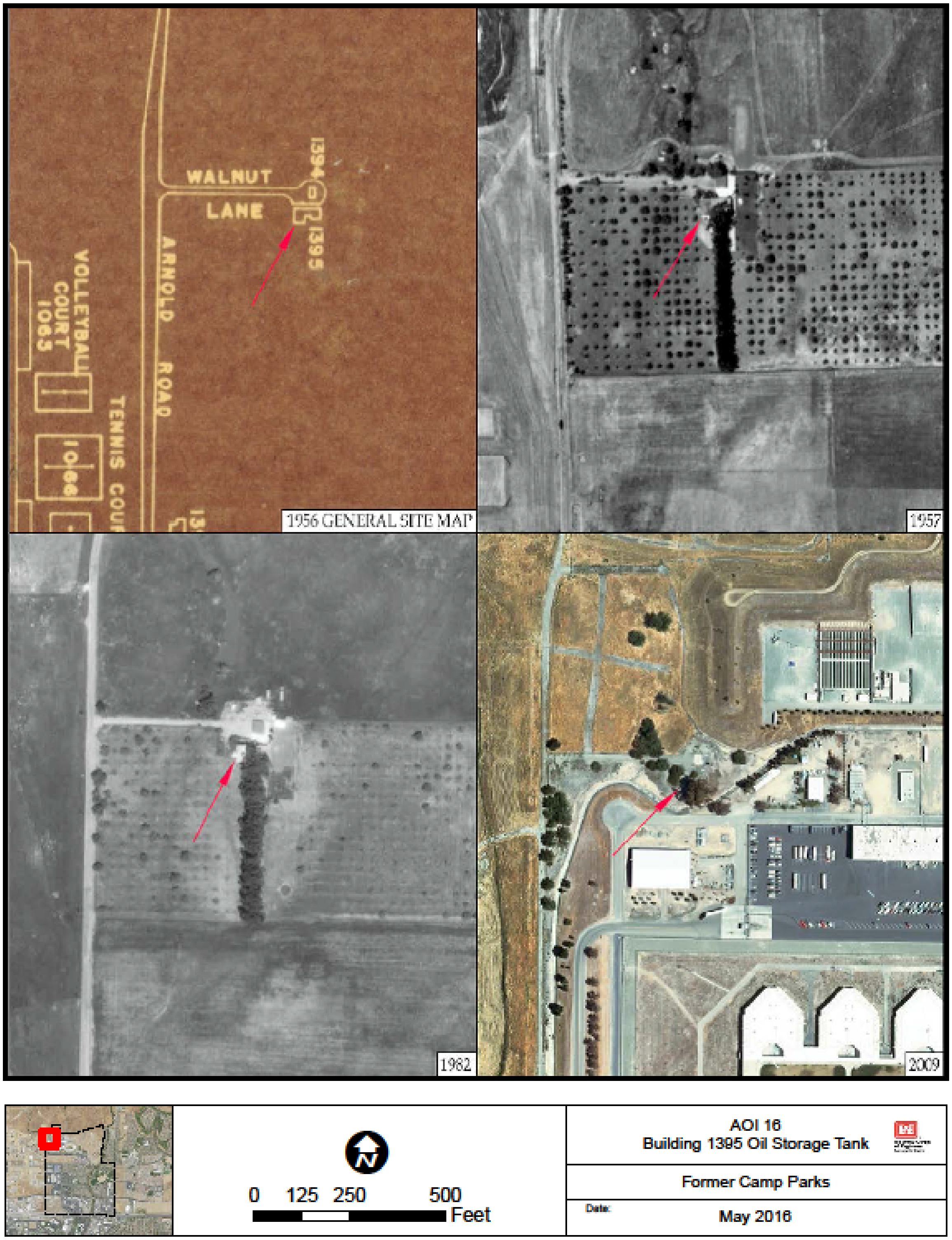


Figure 4-21 AOI 16: Building 1395 Oil Storage Tank

4.2.9 AOI 17: Old Greystone USTs

Three USTs were removed from the fueling facility at the former Alameda County Prison Farm between 18 and 20 May 1992. The USTs are described as: one 10,000-gallon unleaded gasoline tank (Tank 11); one 11,000-gallon regular leaded gasoline tank (Tank 12); and one 500-gallon waste oil tank (Tank 12A). In the 1988 Alameda County Tank Management Plan, tanks 11 and 12 were listed as installed in 1950, and in use (Gregg, 1988). All three tanks were located in the Prison Farm, which was leased to and operated by the Alameda County Sheriff's Department since 1946. During 1992-1993, the site was investigated and contaminated soil treated, and on 10 January 1995, Alameda County closed the UST removal case pursuant to Title 23 CCR Div. 3 Ch. 16 Section 2721(e) (Alameda County, 1995b). This AOI is FUDS-ineligible because Alameda County operated these tanks. This AOI is further recommended for NDAI based on subsequent actions taken by non-DoD parties.

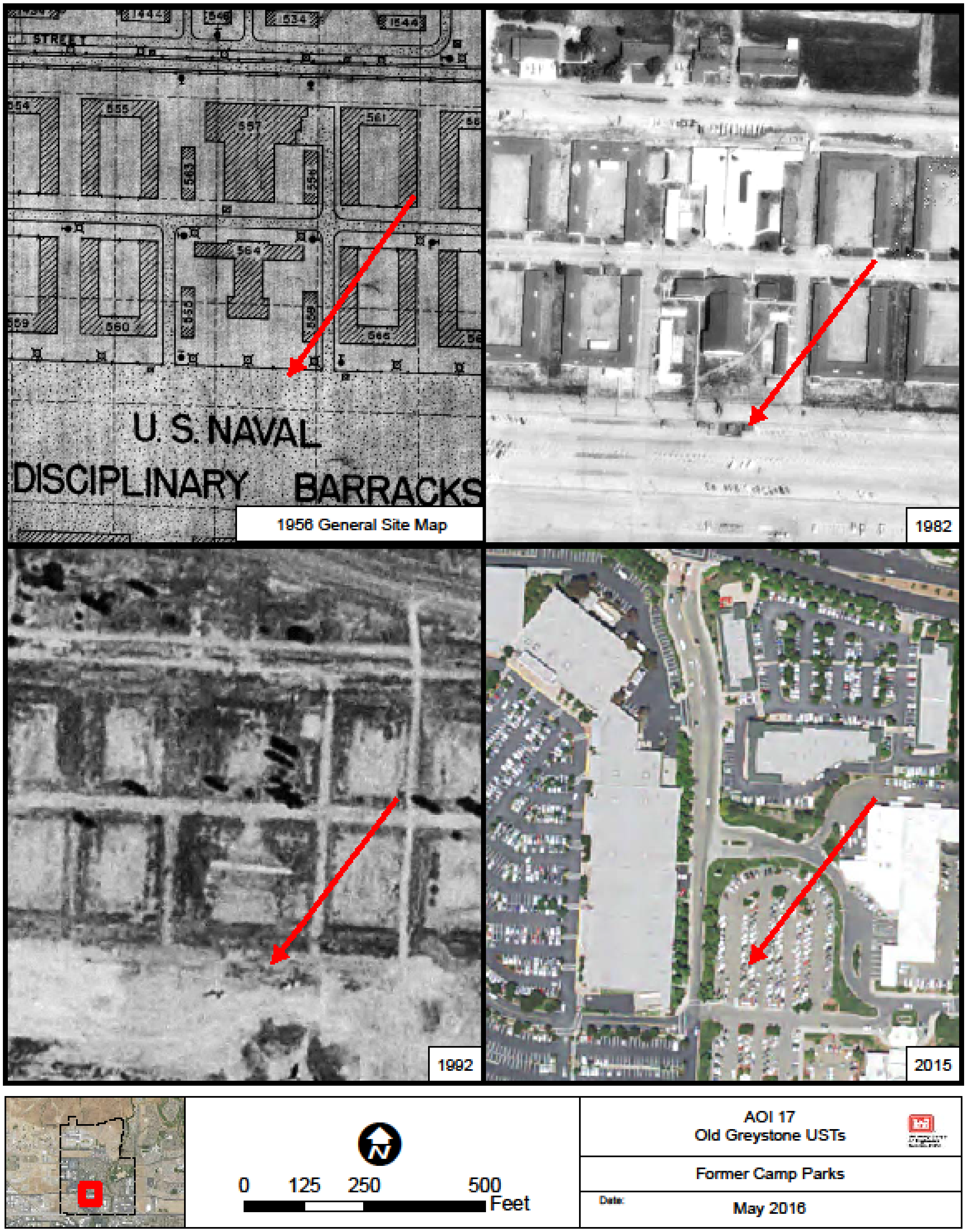


Figure 4-22 AOI 17: Old Greystone USTs

4.2.10 AOI 18: Hospital Boiler USTs

Two 14,000-gallon Bunker C fuel oil USTs (Tanks 18 and 19) were located at the former U.S. Naval Hospital Shoemaker's Boiler Plant (Figure 4-23). The tanks were noted as being installed in 1950 and not in use in the 1988 Alameda County Tank Management Plan (Gregg, 1988). These tanks were removed on 18 May 1992. On 25 September 1995, the Alameda County Department of Environmental Health found that these tanks were closed in full compliance with Title 23 of the California Code of Regulations, and no further investigations were necessary (Alameda County, 1995c)(Appendix E). This AOI is FUDS-eligible, however, due to the closure certification, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

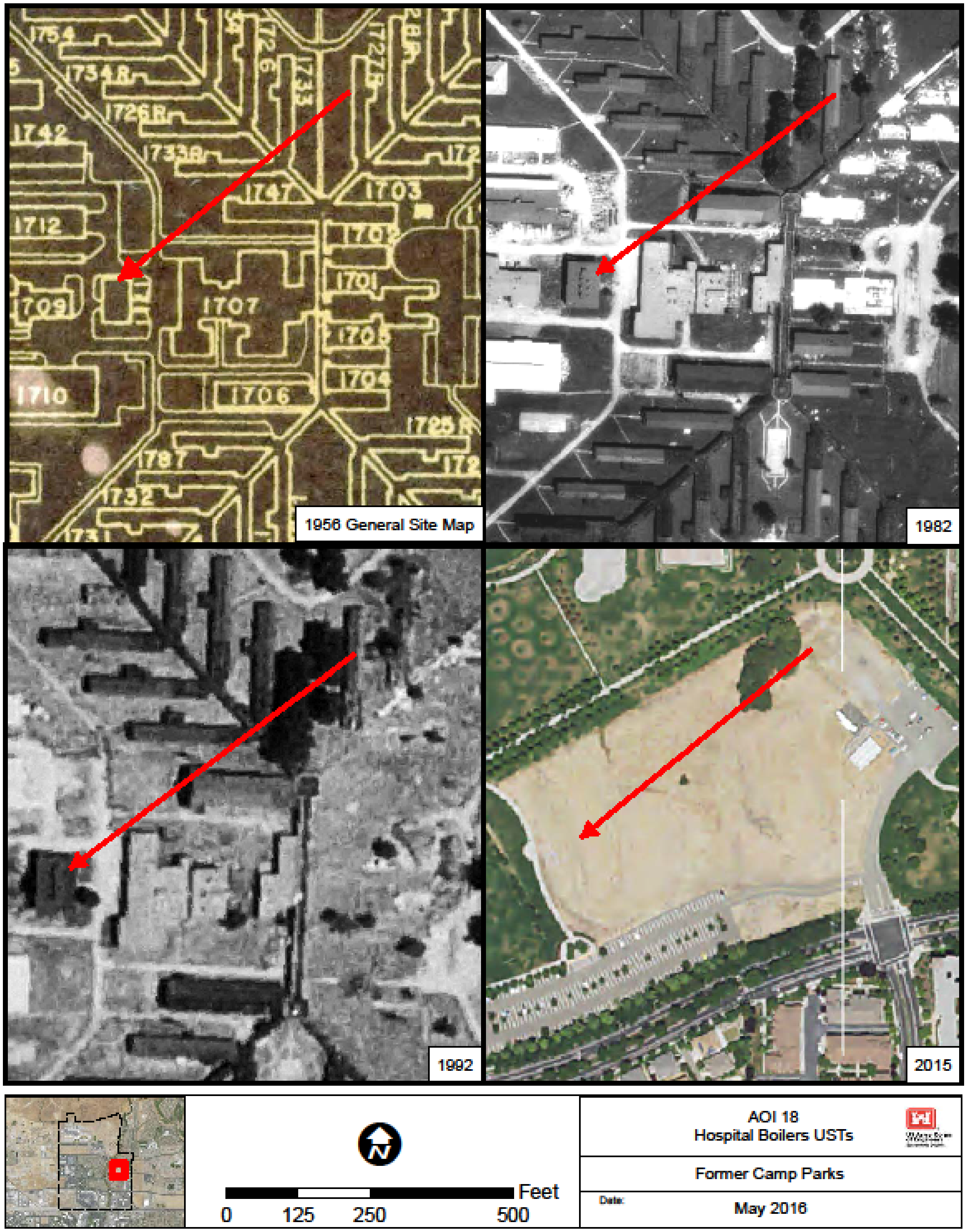


Figure 4-23 AOI 18: Hospital Boiler USTs

4.2.11 AOI 19: 4th and Madigan USTs

Three tanks were associated with Building 500-A, identified as a boiler house on the 1945 Naval Map (Figure 4-24). These tanks are identified as Tanks 4, 4A and 4B, and were 10,000-gallon, approximately 8,000-gallon, and approximately 3,000-gallon fuel oil USTs. Only the 3,000 gallon tank is listed in the 1988 Tank Management plan, and it is described as installed in 1955, containing Bunker C oil, and abandoned (Gregg, 1988). The tanks were removed by Alameda County on 18 May 1992. The case was closed by Alameda County in March 1996 (Alameda County, 1996) (Appendix E). This AOI is FUDS-eligible, however, due to the closure certification, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

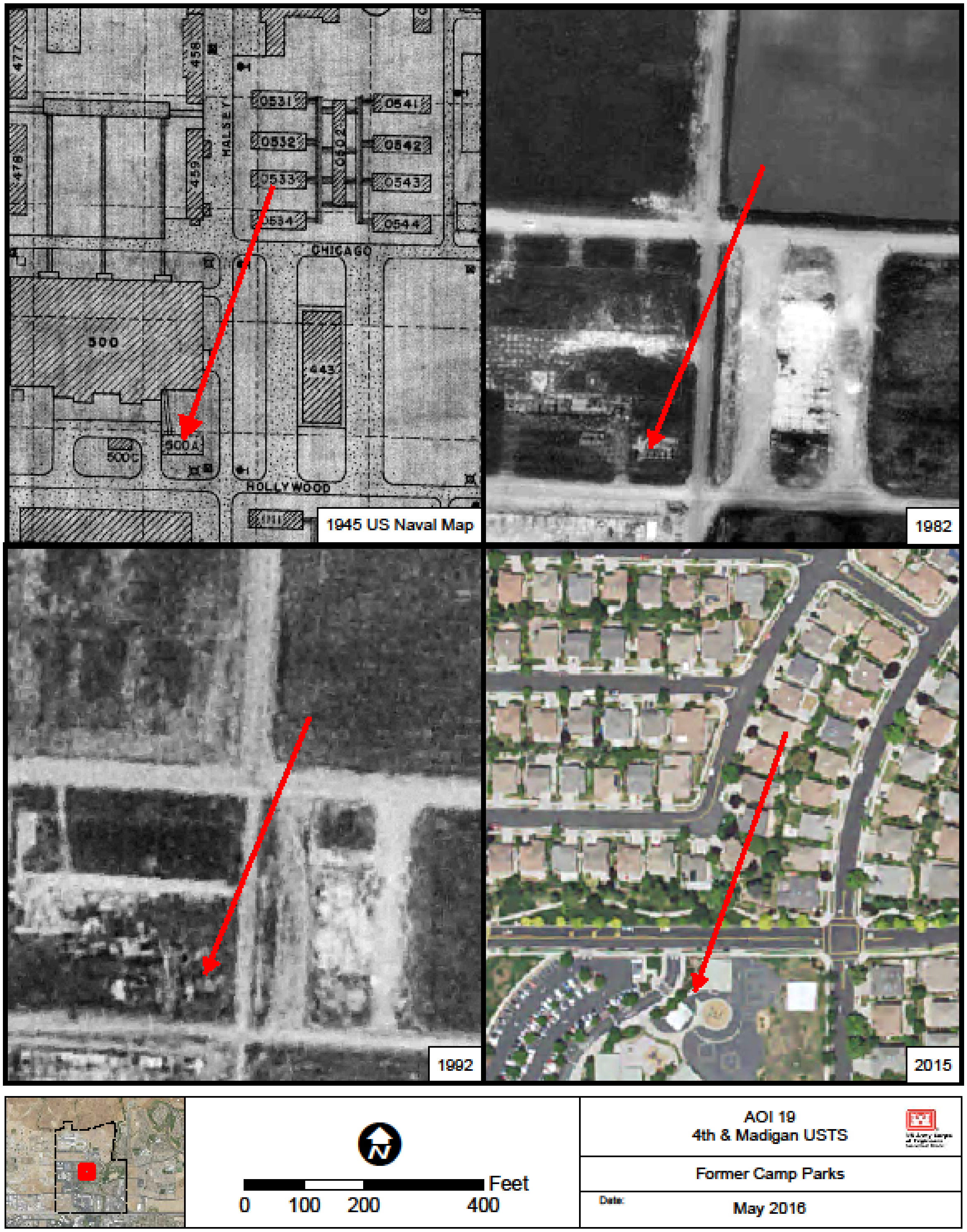


Figure 4-24 AOI 19: 4th and Madigan USTs

4.2.12 AOI 20: Former Prison Farm Tanks

In addition to tanks 11, 12, and 12A covered in AOI 17, there were eight additional tanks located in or near the former Alameda County Prison Farm (Figure 4-25). The Prison Farm was leased to and operated by the Alameda County Sheriff's Department since 1946. In the 1988 Alameda County Tank Management Plan, these tanks were identified as follows: Tanks 6 and 7 (both diesel USTs installed in 1950, not in use), Tank 8 (10,000 gallon diesel AST, installed in 1986, in use), Tank 9 (diesel UST installed in 1950, not in use), Tank 10 (diesel UST, installed in 1950, not in use), Tank 13 (diesel AST, unknown installation, in use), Tank 14 (diesel AST, unknown installation, in use) and Tank 15 (diesel AST, unknown installation, in use) (Gregg, 1988). The entire area has now been redeveloped as a shopping retail center and auto dealership. USTs 6, 7, 9 and 10 were removed by Alameda County on 20 Nov 1990, and these tanks were closed in full compliance of Title 23 CCR by Alameda County in 1995 (Alameda County, 1995) (2 documents in Appendix E). Per Rod Freitag of Alameda County, AST 8 was installed in 1986 to replace 2-20,000 gallon diesel USTs that were closed in-place. AST 8 served the Santa Rita Jail Correctional Facility which was closed in 1989 after the Sheriff moved to the current Santa Rita Jail location. Considering that AST 8 was less than three years old, it was most likely surplused and sold during the closure of the Santa Rita Correctional Facility. As for the area where AST 8 was located, it was excavated in 1998 when development of what is currently Toyota Drive necessitated removal of the previously closed in-place USTs. Closure information in compliance of Title 23, California Code of Regulations for these tanks is included in Appendix E (Alameda County, 1998a). ASTs 13, 14 and 15 were removed in 1992 by an environmental contractor, who noted that all the tanks were located on concrete pads or foundations and no visible contamination was found below the pads when they were broken up and removed (Environmental Science, 1992) (Appendix E). This AOI is FUDS-ineligible because Alameda County installed and/or operated these tanks (Chapter 3-2.6.1 of the FUDS Program Policy [USACE 2004]). As detailed above, all related tanks have closure or removal documentation, with no evidence of contamination left in place; therefore, this AOI is further recommended for NDAI.

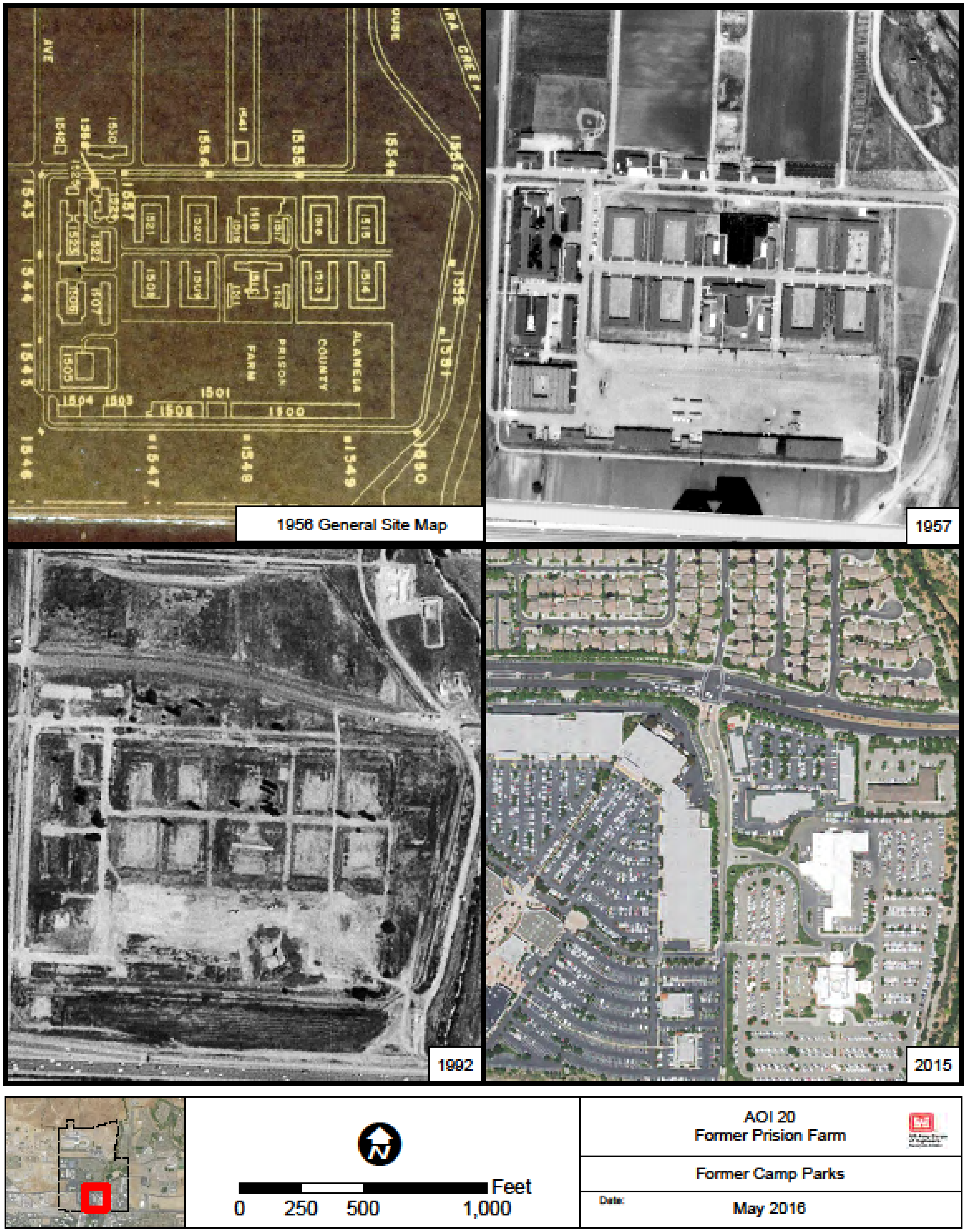


Figure 4-25 AOI 20: Alameda County Prison Farm

4.2.13 AOI 21: Engineer Hill Oil Storage Tanks

Engineer Hill is a small hill in the NE portion of the former Camp Parks (Figure 4-26). On the hill, there is a currently unnamed circle road extending south of the current Barnet Blvd. On the 1959 Army Map this road was named Kindley Circle and had officers housing on it. A 1988 Alameda County Tank Management Plan lists 4 tanks, #23, #24, #25, and #26, on Engineer Hill. Tanks #24, #25 and #26 were listed as 150-300 gallon ASTs, likely used as heating oil storage tanks, which were in use in 1988 (Gregg, 1988). Those tanks had unknown installation dates, and appear to be associated with historical army buildings 1893, 1895, and 1892, respectively. Tank #23 was listed as a 1,000 gallon emergency UST installed in 1950, that was not in use and in an abandoned state in 1988. Its location appears to be near the former building 1894. The Master Plan Central Heating System listing for Parks AFB (Tab G-6, Page 2 of 5, Appendix D) identified the Officer's Family Housing Buildings (Buildings 1892 and 1894) as having oil heating systems. Currently, buildings 1893—1895 are used for scenario training purposes for the Alameda County Sheriff's Department, and Building 1892 is used as a motorcycle repair shop. According to Sergeant McElroy of the Alameda Sheriff's Department, this area housed deputies prior to becoming a training facility and the tanks were still located there. Tanks #24-26 are FUDS-ineligible because the tanks were beneficially used by the Alameda County Sheriff's Department (Chapter 3-2.6.1 of the FUDS Program Policy [USACE 2004]). However, ASTs #24-26 were removed in 1992 by an environmental contractor, who noted that all the tanks were located on concrete pads or foundations and no visible contamination was found below the pads when they were broken up and removed (Environmental Science, 1992) (Appendix E). Tank #23 was removed and found to be leaking by Alameda County in May 1992. With further investigation and a risk analysis, Alameda County determined that no further action was necessary and closed the case pursuant to Section 2721(e) of Title 23 of the CCR (Alameda County, 1997) (Appendix E). Tank #23 is FUDS-eligible however, due to the closure of the case, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

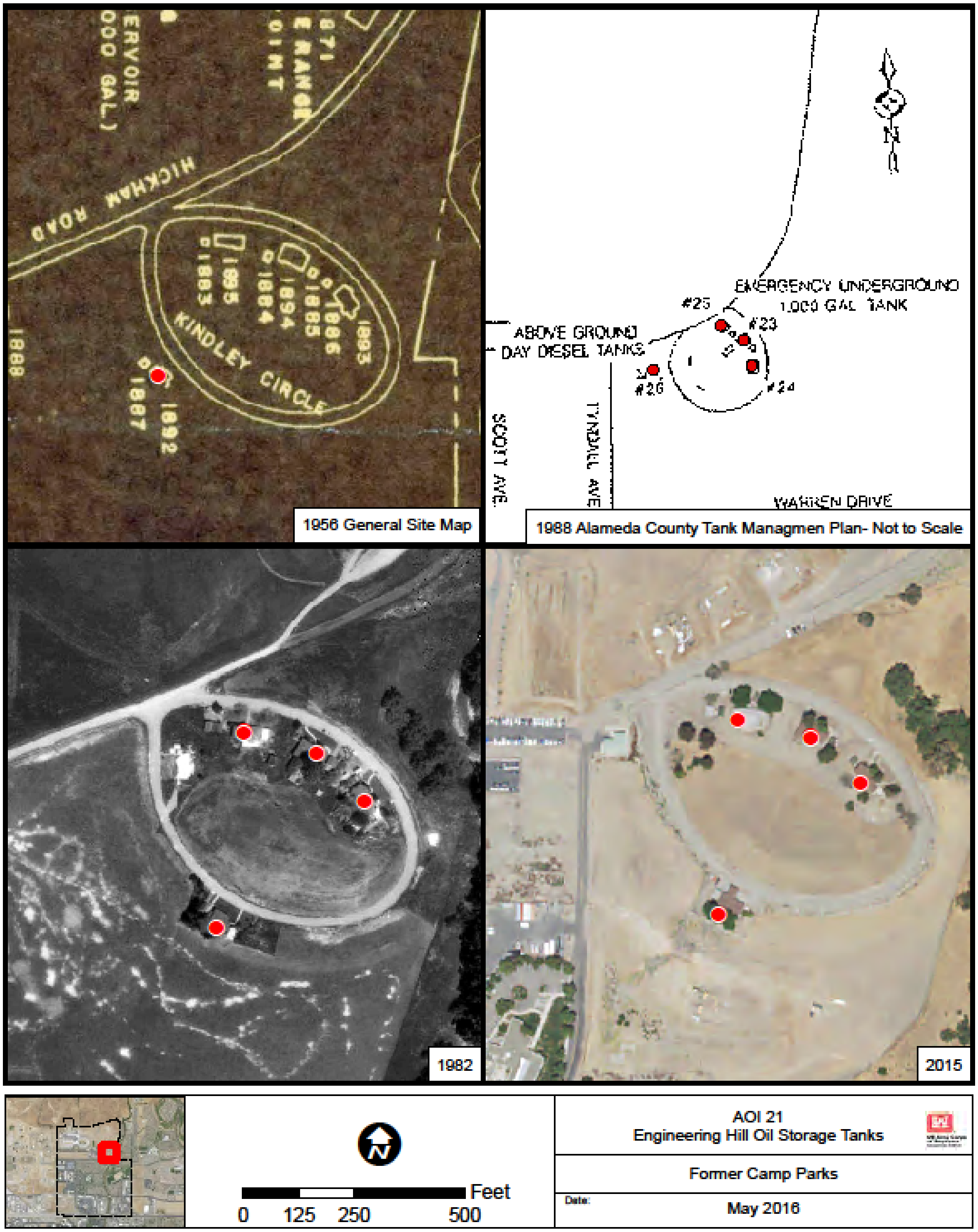


Figure 4-26 AOI 21: Engineer Hill Oil Storage Tanks

4.2.14 AOI 22: Former Underground Fuel Oil Storage Depot

According to the 1945 map of former Camp Shoemaker, northeast of Building 303 [old building number designation] in the rail yard was a former Underground Fuel Oil Storage Depot (Figure 4-27). A report submitted by Erler and Kalinowski on 23 June 1998 and titled *Results of Soil and Groundwater Investigations and Screening Human Health Risk Assessment for Properties located at Hacienda Drive and Dublin Boulevard in Dublin, California* stated that trenching in this area revealed concrete slabs, wood debris, and approximately 100 linear feet of 6-inch-diameter steel pipe. No tanks were found at this location during the excavation and significant releases were not observed during trenching; however, one groundwater sample had significant concentrations of TPH-D “weathered diesel” (120,000 micrograms per liter [µg/L]) downgradient from the former Underground Fuel Oil Storage Depot. All other nearby samples, including 8 probes taken near the location with the high result, had TPHd levels of less than 200 µg/L. BTEX was not detected above the reporting limit in groundwater samples, except one downgradient location, which had a Xylenes result of 6.6 µg/L, well below the screening level. The report states that there is insignificant risk to human health from volatilization in this area (Erler and Kalinowski, 1998). In a July 1998 letter, the Alameda County Environmental Health Services Department found that no further action is required regarding any historic releases at this former underground fuel oil storage depot (Alameda County, 1998). In 2014, Ground Zero Analysis, Inc performed additional environmental investigation of the former fuel oil storage depot. Three to four soil samples and one groundwater sample were taken from each of six borings in the area of the fuel oil storage depot. TPHg, TPHd, and TPHmo were found in soil at levels of up to 19 ppm, 3900 ppm and 290 ppm respectively. The highest concentrations were found in the samples 10-15 ft below ground surface. In groundwater, TPHd was found in all six sample ranging from 100-2,100 ppb, TPHmo was found in 3 samples ranging from 640-1,000 ppb, and TPHg was found in one sample at 170 ppb. No BTEX was found in the soil or groundwater samples. Low levels of MTBE were found in the groundwater samples, ranging from 0.7 - 6.4 ppb. The MTBE is assumed to come from an offsite source, as this wouldn’t be present in historic fuels used by the DOD. Total lead was found at background levels, and organic lead was absent. The site was found to meet the criteria for closure under the State Water Resources Control Boards Low Threat Underground Storage Tank Case Closure Policy (Ground Zero Analysis, 2014). This AOI is FUDS-eligible and was originally included in the SI Work plan (see Chapter 5) in order to verify the risk findings, however no access was granted to perform this SI. Given the previous no further action finding from Alameda County, and the new information from the 2014 Additional investigation, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

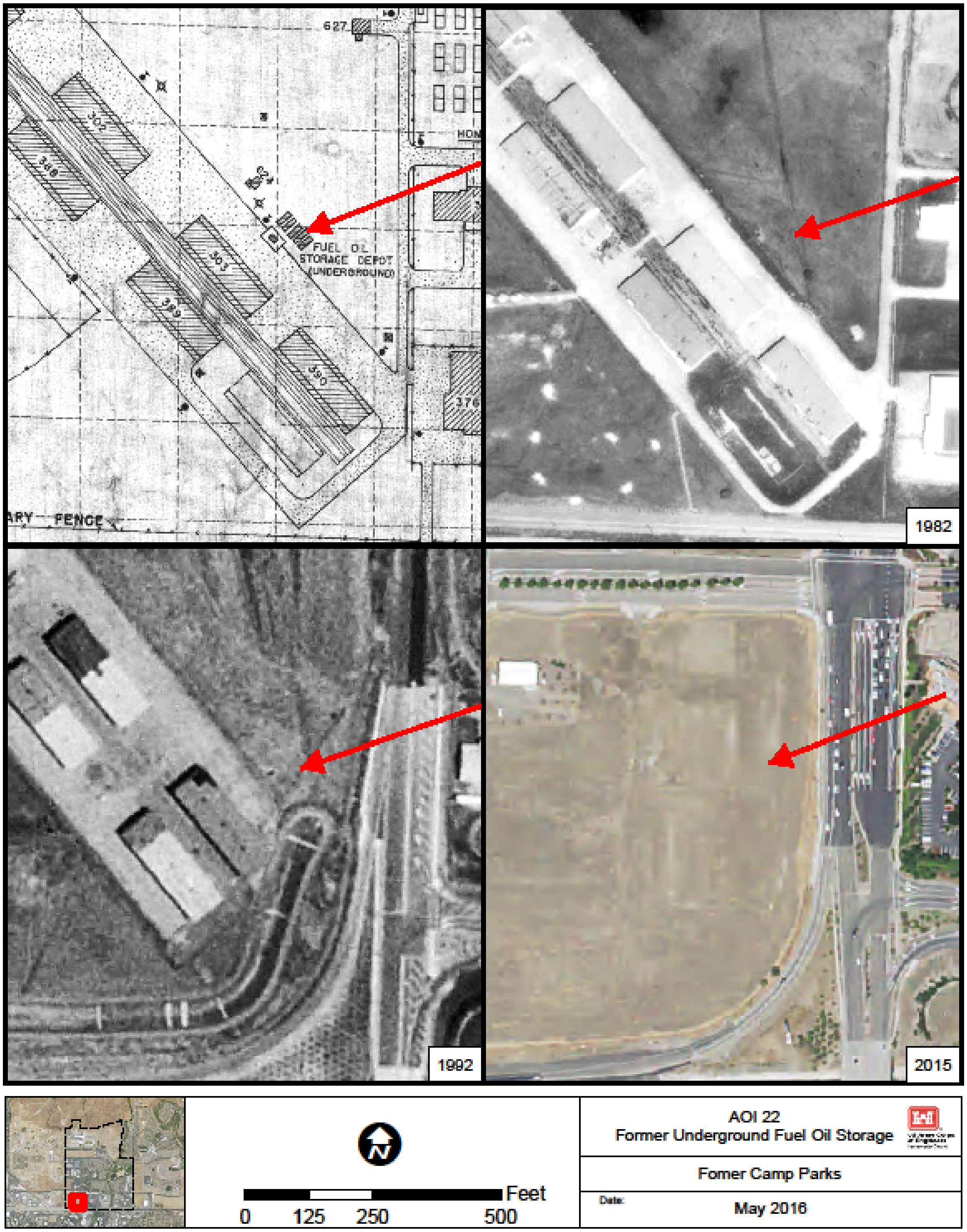


Figure 4-27 AOI 22: Former Underground Fuel Oil Storage Depot

4.2.15 AOI 26: Building 1396 Oil Heating Tank

The Master Plan Central Heating System listing for Parks AFB identified Building 1396 as having an oil heating system (Tab G-6, page 2 of 5, Appendix D). This building was officers housing when the Camp was active (Figure 4-28). No documentation was found regarding the size, type or fate of an associated tank. The tank was not listed in the 1988 Alameda County Tank Management Plan. Currently only the foundation outlines and some rubble of this building remain. During an April 2017 site visit, remnants of an outdoor pond, house with fireplace, and garage were identifiable, however no evidence of the possible location of a fuel tank was found. In 2018, USACE performed a geophysical investigation of this area of interest. The magnetic and ground penetrating radar did not find any indication of a UST at or near the location of the officers housing. A magnetic anomaly was found approximately 55 feet from the nearest building foundation, located in the footprint of the old circular driveway near a steep slope break. Three floor drains coming from the old garage building appear to lead to a drainage pipe which leads to this anomaly. The anomaly is located next to a 2 foot diameter metal cylinder filled with dirt in the ground which appears to be a septic tank access point. Septic systems are not covered under the FUDS program. The workplan and report for this geophysical investigation can be found in Appendix J. This AOI is FUDS-eligible, however, due to the geophysical survey finding no evidence of a heating oil tank near the buildings, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

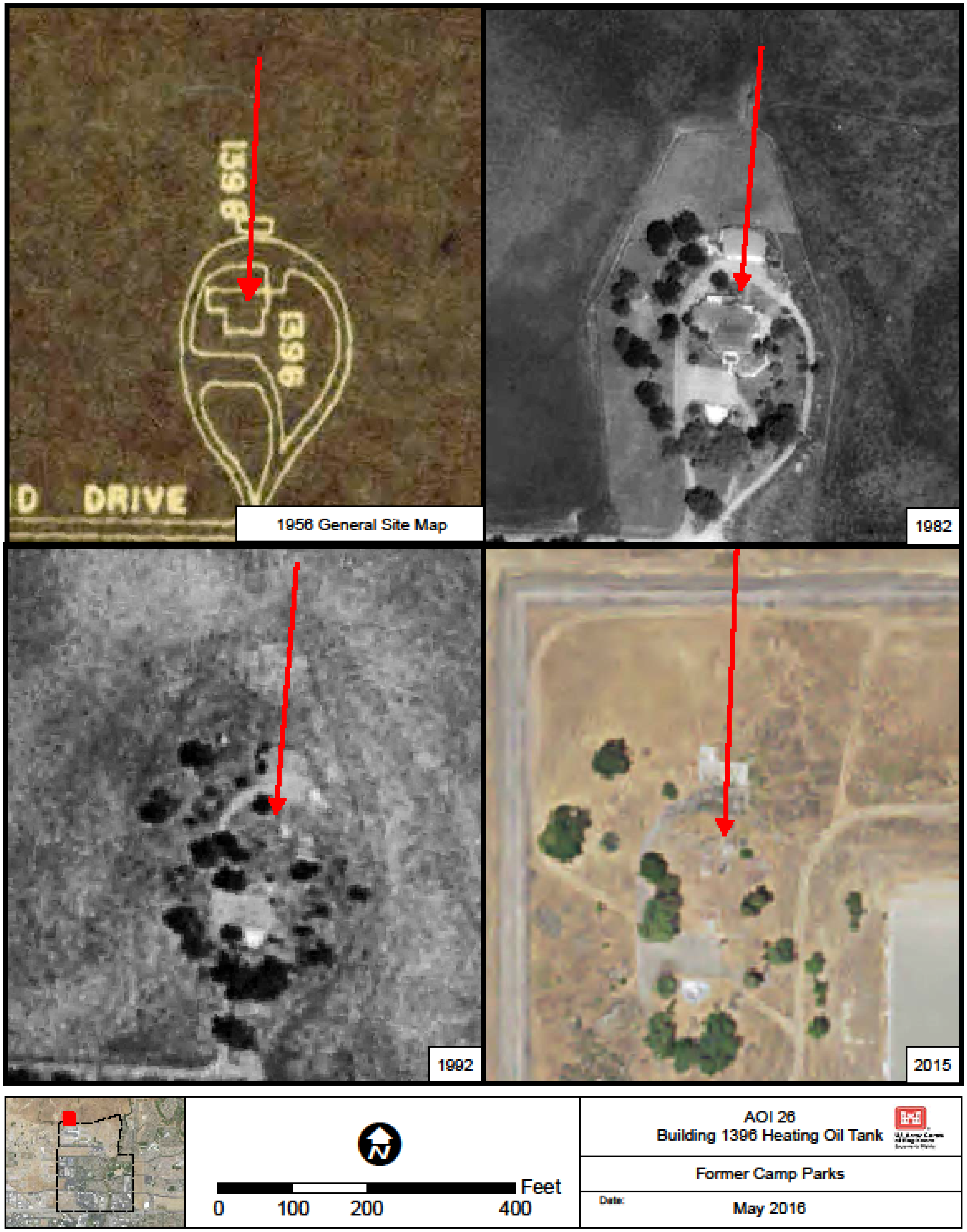


Figure 4-28 AOI 26: Building 1396 Heating Oil Tank

4.2.16 AOI 27: Tyndall Avenue ASTs

In the Alameda County 1988 tank management plan, there are 4 ASTs listed along Tyndall Avenue (Figure 4-29), all with unknown installation dates, but all listed as being in use in 1988. This road is currently Persimmon Drive, and while Camp Shoemaker was operational, it was Scott Avenue. Tank #17 is listed as a 10,000 gallon AST Equipment Fueling Station diesel tank. On the 1945 Camp Shoemaker map, this area had buildings 1244, 1234, 1202: barracks, with a nearby shower, toilet and scrub deck. Tanks #20, 21 and 22 are listed as 300 gal, 150 gal, and 150 gal diesel tanks respectively (Gregg, 1988). On the 1945 Camp Shoemaker map, this area contained buildings 394 and 574, a Bus Terminal and Gate House. Historical aerial photos (Appendix A and Figure 4-29) indicate that these tanks were likely installed after the property was transferred to Alameda County, as the areas appeared to be vacant land or just foundations for decades before the property transferred. This AOI is FUDS-ineligible because the ASTs were beneficially used by others (and even possibly installed by others) subsequent to any DOD use (Chapter 3-2.6.1 of the FUDS Program Policy [USACE 2004]). However, per information obtained from Alameda County, all four ASTs have been removed and no evidence of contamination was ever found by multiple parties inspecting the areas. Per Rod Freitag of Alameda County, AST 17 was most likely sold as surplus during the closure of the Santa Rita Correctional Facility in 1989. ASTs 20, 21 and 22 were located in the paved parking area of the County's carpentry shop for the Santa Rita Correction Facility and were most likely salvaged in 1995/1996 during the demolition of the military hospital and surrounding areas. Gregg and Associates inspected all four ASTs in 1988 and no evidence of leaks or spills were noted (Gregg, 1988, Appendix D). Lowney Associates, on behalf of Kaufman & Broad, collected a soil sample from the former AST 17 location in 1996 and no diesel contamination was detected or observed. Terrasearch, on behalf of Summerhill Homes, conducted a Phase I site investigation of the parcel where ASTs 20, 21 & 22 were formerly located and no evidence of hazardous material spills or contamination was observed. Per Rod Freitag of Alameda County, Summerhill and Alameda County worked closely together for infrastructure and other development of the Santa Rita property and, had it encountered contamination during development, Summerhill would have informed the County. Documentation provided by Alameda County is included in Appendix F. This AOI is further recommended for NDAI based on subsequent actions taken by Alameda County.

Figure 4-29 AOI 27: Tyndall Avenue ASTs

4.3 FUDS-ELIGIBLE AREAS OF INTEREST

Twenty-two FUDS-eligible HTRW or CON/HTRW AOIs were identified at former Camp Parks. The 22 FUDS-eligible AOIs and the recommendation for each are summarized in Table 4-1. The five AOIs recommended for SI are included in Chapter 5, a Quality Assurance Project Plan (QAPP).

Table 4-1 FUDS-Eligible AOIs

AOI	Recommendation			
	NDAI	PRP	SI	RI
AOI 1: Building 1788 Motor Pool	x			
AOI 2: Bldg 627 Incinerator	x			
AOI 3: Bldg 1715 Garbage Incinerator	x			
AOI 6: Hickman Road Firing Range		x		
AOI 8: Bldgs 468A and 468B Gas Stations	x			
AOI 9: Bldgs 297B/D Paint Shop & Store Rm.	x			
AOI 10: Bldg 1210 UST	x			
AOI 11: Bldgs 1391 & 1393 Oil Storage Tanks	x			
AOI 12: Bldg 1746 Oil Storage Tank	x			
AOI 13: Bldg 1778 Gasoline Generator	x			
AOI 14: 4th street & Offutt Ave/4th street & Nellis USTs	x			
AOI 15: Various Transformers	x			
AOI 16: Bldg 1395 Oil Storage Tank			x	
AOI 18: Hospital Boiler USTs	x			
AOI 19: 4th and Madigan USTs	x			
AOI 21: Engineer Hill Oil Storage Tanks	x			
AOI 22: Former Underground Fuel Oil Storage Depot	x		*	
AOI 23: Camp Shoemaker Burn Pit			x	
AOI 24: Naval Small Bore Rifle Range			x	
AOI 25: Bldg 299 Laundry and Boiler Room	x			
AOI 26: Building 1396 UST	x			
AOI 28: Hickman Road Sanitary Fill Area			x	

*AOI 22 was included in the SI Workplan, but access was not granted to perform the SI and later information provided by others indicated that an NDAI was appropriate

4.4 FUDS-INELIGIBLE AREAS OF INTEREST

Six AOIs were determined to be FUDS ineligible at former Camp Parks. The 6 FUDS-ineligible AOIs are listed in Table 4-2.

Table 4-2 FUDS-Ineligible AOIs

AOI	FUDS-Ineligibility Reason	
	On current DoD property	Beneficially Reused, but recommended NDAI
AOI 4: Bldg 1501 Wash Rack and Grease Pit		*
AOI 5: Burn Area	x	
AOI 7: Naval Radiological Defense Laboratory	x	
AOI 17: Old Greystone USTs		*
AOI 20: Former Prison Farm Tanks		*
AOI 27: Tyndall Avenue ASTs		*

*AOIs 4, 17, 20 and 27 are FUDS-Ineligible; however, recommended for NDAI based on additional information and actions by parties other than DoD.

5.0 QUALITY ASSURANCE PROJECT PLAN

This Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) details the quality control processes and procedures for site inspection (SI) sampling at five AOIs recommended in Section 4 to be investigated as part of the Site Inspection Phase at former Camp Parks. The objective of the current sampling activity is to collect sufficient data to either recommend NDAI (No Department of Defense Action Indicated) or if necessary advance to the Remedial Investigation (RI). This QAPP outlines the collection of both soil and groundwater samples at each location as well as the sampling and analytical requirements necessary to provide quality definitive data to support a site recommendation.

This QAPP was prepared in accordance with the *Uniform Federal Policy for Quality Assurance Project Plans* (UFP QAPP; Intergovernmental Data Quality Task Force [IDQTF], 2005). Therefore, the QAPP is organized by a series of worksheets, as defined in the UFP QAPP guidance. This QAPP is intended to be the primary work plan for the SI. It serves as a guideline for the field activities, laboratory analysis of samples, and data quality/data usability assessment.

5.1 WORKSHEET #1 & 2: TITLE AND APPROVAL PAGE

Site Inspection Quality Assurance Project Plan
Parks AFB FUDS
FUDS Project Numbers J09CA0083-01 and J09CA0083-02
Alameda County, Dublin, CA

Approval Signature / Date:

[redacted]Technical Lead, USACE Sacramento District

Approval Signature / Date:

[redacted], Chemist, USACE Sacramento District

Approval Signature / Date:

[redacted], Project Manager, USACE Sacramento District

5.1.1 Former Camp Parks Background

The former Camp Parks FUDS is located in Dublin, approximately 30 miles southeast of San Francisco in Alameda County, California (Figure 1-1). Former Camp Parks was established for DoD use in 1943 in support of WWII efforts. The USAF officially acquired it in 1953 and used the site for training and as a staging area. In 1959 it was transferred to the US Army and renamed Camp Parks. Between 1964 and 1972 various portions of the former Camp Parks were quitclaimed or transferred to Alameda County.

The following five AOIs have been recommended for site inspection based on results of the preliminary assessment:

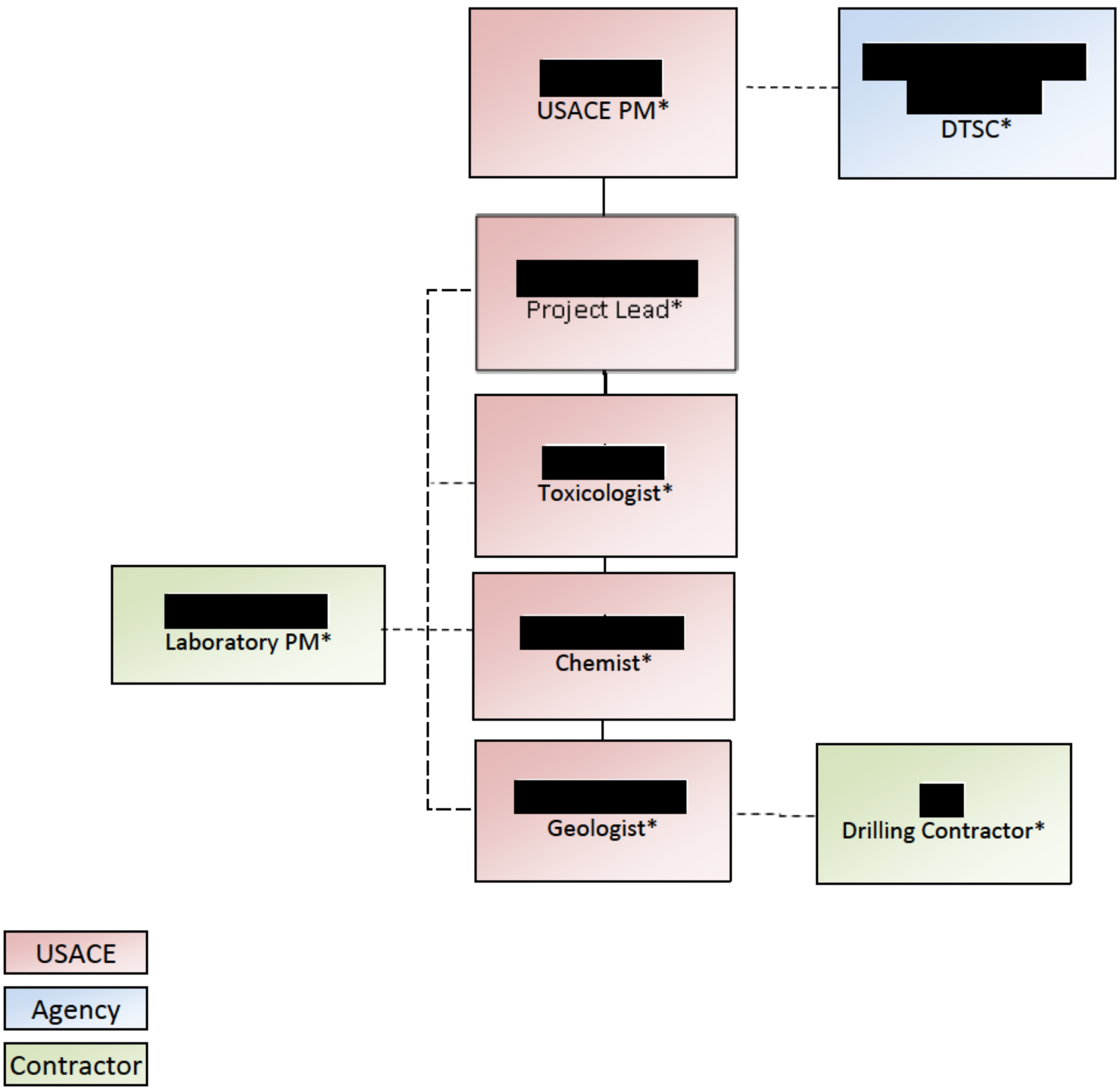
- AOI 16: Building 1395 Oil Storage Tank
- AOI 22: Former Underground Fuel Oil Storage Depot
- AOI 23: Camp Shoemaker Burn Pit
- AOI 24: Naval Small Bore Rifle Range
- AOI 28: Hickman Road Sanitary Fill Area

Detailed descriptions of the AOIs are found in Section 4. The tasks to be completed at each AOI include the collection of additional samples to further characterize soil and groundwater. Specific fieldwork to be conducted at each site and the methodology are described in WS #17-22. For location information please see Figure 5-1.

Figure 5-1 Sampling Location Map

5.2 WORKSHEET #3 & 5: PROJECT ORGANIZATION AND QAPP DISTRIBUTION

***QAPP recipient** **Lines of Communication** -----------------------------



5.2.1 Project Contact Information

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

5.3 WORKSHEET #4, 7 & 8: PERSONNEL SIGN-OFF SHEET

5.3.1 Organization: USACE, Sacramento District

Name	Project Title/Role	Signature/Date*
[redacted]	Project Manager	
[redacted]	Technical Lead	
[redacted]	Chemist	
[redacted]	Geologist	
[redacted]	Toxicologist	

5.3.2 Field Sampling Team Specialized Training Requirements: USACE, Sacramento District

Project Function	Specialized Training	Training Date / Provider	Location of Training Records / Certificates
All Field Team Members	OSHA 40 hour HAZWOPER with current 8-hour Refresher	Annual / USACE	Located with each field team member
Minimum 1 field sampler on-site	First Aid/CPR	3 yr re-certification	Compliance certification held with field team member
All Field Sampling Team Members	Sampling procedures	USACE / Preparatory meeting and daily tailgate meetings	Field log books

5.3.3 Organization: Curtis & Tompkins, LTD

Name	Project Title/Role	Signature/Date*
[redacted]	QA Director	
[redacted]	Project Manager	

*Signatures indicate personnel have read and agree to implement this QAPP as written

5.4 WORKSHEET #6: COMMUNICATION PATHWAYS

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
Regulatory agency interface with DTSC and RWQCB	USACE PM	[redacted]	[redacted]	USACE PM will communicate directly with DTSC and the RWQCB.
Manages all USACE aspects of the Project.	USACE PM	[redacted]	[redacted]	Is responsible for and manages all aspects of USACE support the project sites. Makes final decision(s) in support of the project.
Manage all Project Phases	Project Team Lead	[redacted]	[redacted]	All project related communications are immediately answered or directed to the USACE PM.
Manage Field Work Phase	Technical Team Leader	[redacted]	[redacted]	Field work related communications are immediately directed to the Project Team Lead who forwards the communications to the USACE PM.
Stop work due to safety issues	All Field Team Members			Stop work authority is the responsibility of the all field team members. Communications concerning safety and stop work action will be immediately be communicated to the PM and Project Team Lead. The PM and Team Lead will communicate with the pertinent individual(s) for consultation and corrective action.
QAPP Modifications during execution.	Field Team Leader	TBD		Quality changes and communications concerning modifications to QAPP will be directed to the Project Team Lead. The Project Team Lead will forward the communications to the pertinent individual(s) for consultation and action.
QAPP changes	Chemist	[redacted]	[redacted]	Any amendments or modifications to the QAPP will be completed by the Project Chemist who will submit changes to the USACE Project Manager for approval before the modifications are implemented.
Field corrective actions	Field Team Leader	TBD		The need for corrective action for field issues will be determined by the FTL in consultation with the

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
				Project Team Lead. All corrective actions will be documented in a Corrective Action Report (CAR) to be submitted to and approved by the PM.
Sample receipt variances	Chemist	[redacted]	[redacted]	The project chemist will approve any acceptable requests for laboratory variances concerning sample receipt. Any approved variances will be documented in the final data package for the affected samples.
Laboratory quality control variances	Chemist	[redacted]	[redacted]	The project chemist will approve any acceptable requests for laboratory method QC variances. Approved variances will be documented in writing.
Analytical corrective actions	[redacted] LTD QA Director	[redacted]	[redacted]	All QA/QC issues with project samples will be reported by the Laboratory QA Manager to the Project Chemist and Include recommendations for corrective actions. Corrective actions will be documented in the form of a CAR. The Project Chemist will communicate to the Project Team Lead and Project Manager.
Data verification issues, e.g., incomplete records	Chemist	[redacted]	[redacted]	Data verification issues will be communicated to the laboratory PM by the project chemist with any requested corrective actions.
Data validation issues, e.g., non-compliance with procedures	Chemist	[redacted]	[redacted]	Data validation issues will be communicated to the project team by the project chemist in the form of a Quality Control Summary Report (QCSR) that will detail any limitations to use of the data that resulted from the data validation.
Data review corrective actions	Chemist	[redacted]	[redacted]	All QA/QC issues due to non-compliant procedures will be reported by the project chemist to the Laboratory QA Manager and the laboratory project PM. Any resulting corrective actions will be documented in the form of a CAR. The Project Chemist will communicate to the Project Team Lead and Project Manager.
Release of Analytical Data	Chemist	[redacted]	[redacted]	No analytical data can be released until validation is completed and

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
				[redacted] has approved the release with review and approval from USACE Project Manager.

5.5 WORKSHEET #9: PROJECT PLANNING SESSION SUMMARY

Date: 29 March 2016
Purpose: Former Camp Parks PA/SI Work Plan Discussion Meeting

Participants:

Name	Organization	Title/Role
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Notes/Comments:

Discuss the new plan for moving forward with the Former Camp Parks, including preparation of a single document that will include a PA /SI Work Plan. During the meeting we reviewed 23 identified AOIs, by reviewing a prepared presentation and table with information on the AOIs. Afterwards we all visited the former Camp Parks area in Dublin, visiting the AOIs 4 (Wash Rack and Grease Pit), Site 6 (Hickman Road Sanitary Fill/Firing Range), Site 10 (Bldg 1210 UST), Site 14 (4th St and Offutt Ave/4th St and Nellis St), Site 21 (Bldgs 1892 and 1894 Oil Storage Tanks), Site 22 (Former Underground Fuel Oil Storage Depot), and NA/Site 23 (Burn Pit Santa Rita Jail).

Action Items:

USACE to produce a PA/QAPP for collection of samples and submit for regulatory review and comment.

Date: 21 April, 29 April, 13 May, 18 May, 1 June and 17 June 2016
Purpose: Former Camp Parks PA/SI Work Plan Discussion Meetings

Participants:

Name	Organization	Title/Role
[redacted]	USACE	Technical Advisor
[redacted]	USACE	Technical Lead
[redacted]	USACE	Geologist
[redacted]	USACE	Chemist

Notes/Comments:

Discussions included the addition of appropriate AOIs to the plan, collection of additional historical information from Alameda County and continued discussion of status of the documents to be written.

Action Items:

The USACE will continue to produce PA/SI UFP=QAPP.

5.6 WORKSHEET #10: CONCEPTUAL SITE MODEL

Background Information The conceptual site model (CSM) identifies the affected media, transport mechanisms, exposure routes, and potential receptors at a site. The CSM was prepared based on the background, physical aspects, land use, and history of the site, as presented in other sections of this report. A conceptual site exposure model is presented on Figure 5-2, and AOI specific Conceptual Site Models are presented in Figures 5-3 through 5-7. Additional details on the Sampling design and rational are also included in Worksheet #17.
Known or suspected contaminants Possible Contaminants: <u>AOI 16 Building 1395 Oil Storage Tank</u>– Petroleum Hydrocarbons, including gasoline, diesel, motor oil, and bunker C (SW8015D). Benzene, toluene, ethylbenzene, xylenes (BTEX), Methyl-tert-butyl ether (MTBE) (SW8206C), polynuclear aromatic hydrocarbons (PAHs) SW8270 SIM, and lead (SW6010C) associated with certain fuels. <u>AOI 22 Former Underground Fuel Oil Storage Depot</u> - Petroleum Hydrocarbons, including diesel, motor oil, bunker C (SW8015D); and naphthalene, SW8270 SIM, associated with certain fuels. <u>AOI 23 Camp Shoemaker Burn Pit</u> – Various analytes associated with burn pit and ash piles, including dioxin/furans, volatile organic compounds (VOCs) by SW8260C, semi-volatile organic compounds (SVOCs) by SW8270D, PAHs by SIM, petroleum hydrocarbons, including gasoline, diesel, motor oil, and bunker C (SW8015D).and CAM17 Metals. <u>AOI 24 Naval Small Bore Rifle Range</u> – Total lead (SW6010C) associated with a potential small arms site. <u>AOI 28 Hickman Road Sanitary Fill Area</u> – Various analytes associated with landfills, including VOCs by SW8260C, SVOCs by SW8270D, PAHs, and CAM17 Metals.
Primary release mechanism Releases to the environment are primarily through inadvertent spills/leaks for AOI 16 and AOI 22. Contaminants may have been released during burning and burying of wastes for AOI 23 and AOI 28. Lead contamination is typically associated with bullets/fragments found in a small arms range such as AOI 24. The primary media of concern for these releases are surface and subsurface soils.
Secondary contaminant migration Once released to soil, contaminants may migrate to other media and locations via surface water flow, infiltration to deeper soil and groundwater, volatilization to indoor air, and via fugitive dust.
Fate and transport considerations AOI 16 and 22: The main potential contaminant group is petroleum from former 1) AST storage tank and 2) fueling and maintenance operations. Volatile and semi-volatile TPH constituents (including

BTEX, MTBE, and PAHs) have likely either volatilized or infiltrated through the soil, although residual levels may exist on-site. AOI 23, 24 and 28: The main potential contaminants includes dioxins/furans, PAHs, and CAM17 metals due to burning or disposal of wastes, and lead due to bullets and fragments at a small arms range. These contaminants are typically immobile and not readily degradable in the environment. Therefore, it is unlikely that these contaminants have migrated far from the site, and may still exist in the environment, depending on initial conditions at the site.
Potential receptors and exposure pathways Based on current land use for the site, and likely future uses, potential on-site human receptors include commercial workers (a 'composite' worker that combines the most protective long-term exposure assumptions of both outdoor and indoor workers), outdoor construction or utility workers, and outdoor recreational users and trespassers. These receptors may be exposed by one or more of the following pathways: incidental soil ingestion, dermal contact with soil or inhalation of volatiles or dust containing contaminants. As discussed in Chapter 2, one special-status species habitat was observed during the 2007 site visit—burrowing owl; however, its exact location was not recorded. In addition, one special-status species occurrence was reported within 1 mile of the Site from the California Natural Diversity Database—Congdon's tarplant (*Cetromadia parryi* subspecies. *Congdonii*) reported at Camp Parks Reserve Forces Training Area. Wetlands were mapped within 1 mile of the Site, according to the USFWS National Wetlands Inventory, but none are near any of the AOIs discussed in this document. Although the immediate area has been redeveloped, there are open space areas associated with the site. Given the developed nature of the area, ecological receptors of concern are unlikely; however, exposures to these receptors cannot be ruled out. The conceptual site exposure model presented on Figure 5-2 includes identification of potential exposure pathways for ecological receptors; however, an ecological scoping evaluation will be conducted in the PA/SI report.
Land use considerations All AOIs are land that was originally transferred to Alameda County except AOI 22. AOI 22 is presently owned by private industry. Land use is generally commercial, with open space (undeveloped) land in some portions of the site.
Key physical aspects of the site (e.g., site geology, hydrology, topography, climate) Geology: Former Parks AFB is located in the California Coast Ranges Geomorphic Province, characterized by well-developed northwest-southeast oriented geomorphic features produced by structural features of the same trend (Norris and Webb 1990). In the vicinity of the Site, rock types are dominantly sedimentary underlain by Franciscan basement. Hydrology: The Site is located in the Livermore Valley Groundwater Basin. Within the Livermore Valley Groundwater Basin, faults are the major structural features known to have marked effect on the movement of groundwater. Faults in this region tend to act as barriers to the lateral movement of groundwater. The resulting groundwater levels stand higher on the up-gradient side. The Livermore, Pleasanton, and Parks faults act as such barriers, dividing the Quaternary Alluvium into five groundwater sub basins.

Topography: The Site is located on an alluvial plain in the Livermore Valley, which has moderately steep hills with rounded summits that rise to the north. The elevation at the Site ranges from 337 feet above mean sea level (msl) to 765 feet above msl; however, elevation of some areas within the Site may have been altered due to cutting and filling from land development. Former Camp Shoemaker and U.S. Naval Hospital Shoemaker are relatively flat except for the northeastern portion of the area, which is hilly.

Climate: Climate information for former Parks AFB was obtained from the Western Regional Climate Center (2007) citing the City of Livermore and at City Data (2007) citing the City of Dublin. The climate of the region is typical of the San Francisco Bay Area, characterized by moderately cool, wet winters and dry summers. The following temperatures and precipitation measurements are averages. The mean annual temperature is 59.4 degrees Fahrenheit (ºF). July and August are the warmest months with temperatures of 89.5ºF and 88.8ºF, respectively. December and January are the coolest months with temperatures of 37ºF and 36.4ºF, respectively. The annual precipitation is 14.53 inches.

Current interpretation of nature and extent of contamination

AOIs 16, 24 and 28 have not been previously investigated, and visits to these sites did not present any visual signs of contamination. AOI 16 is the former location of an AST containing heating oil for a residence; a possible AST footing was found near the rubble of the building. AOI 24 is a former Naval Small bore rifle range that was shown on historical maps and aerial photos, but evidence such as bullet casings was not present during the site visit. AOI 28 was identified as a sanitary fill area on 1945 and 1951 maps; currently the area is used for motorcycle training by the Alameda County Sheriff's Office. The presence and extent of potential contamination at the AOIs 16, 24, and 28 are unknown.

AOI 22 Former Underground Storage Fuel Oil Storage Depot

Historic maps show 5 USTs in this location. Trenching and sampling was completed at this location in the late 1990s. No tanks were found at this location during excavation and significant releases were not observed during trenching; however, one groundwater sample contained significant concentrations of "weathered diesel" (120,000 µg/L) downgradient from the former Underground Fuel Oil Storage Depot. All other nearby groundwater samples contained TPHd levels of less than 200 µg/L. BTEX was not detected above the reporting limit in any groundwater sample. A report from the investigation states that there is insignificant risk to human health from volatilization in this area (Erler and Kalinowski, 1998).

AOI 23 Camp Shoemaker Burn Pit

A 1945 map shows a 'burning pit' in this location. A 23 February 2016 site visit to AOI 23 found evidence of a landfill and previous burning of debris. Debris dug up by burrowing animals was present, including what appeared to be bed springs, broken glass and ceramics, a spark plug, and melted glass (see Appendix B for site visit photos). During a 2006 effort to rehabilitate a drainage ditch along Barnet Blvd, a contractor of Alameda County, Fugro West, Inc. found evidence of this former DoD burn pit near part of the drainage ditch. Thirteen soil samples were collected from 13 exploratory trenches in the area of the drainage ditch, and 13 soil samples from underlying clay, at approximately 4 to 5 feet bgs. Samples from the trenches closest in location to the historic burn pit had near surface lead levels from 28 to 840 mg/kg, while deeper samples and those further from the pit had lead levels of 4.2 to 11 mg/kg. No polynuclear aromatic hydrocarbons (PAHs) were found in any samples. (Fugro West, 2006).

See Chapter 4 of this document for additional historical information.
Data gaps and uncertainties No sampling has occurred in AOIs 16, 24 and 28. It is unknown whether the sanitary fill area (AOI 28) was used for disposal of waste. Current environmental sampling results that exist for the burn pit (AOI 23) are limited to one edge of the site; horizontal and vertical extents of buried/burned debris is unknown. While previous sampling at fueling depot (AOI 22) was much more thorough and focused on the fuel storage depot, the data was collected several years ago and site conditions have likely changed due to degradation.

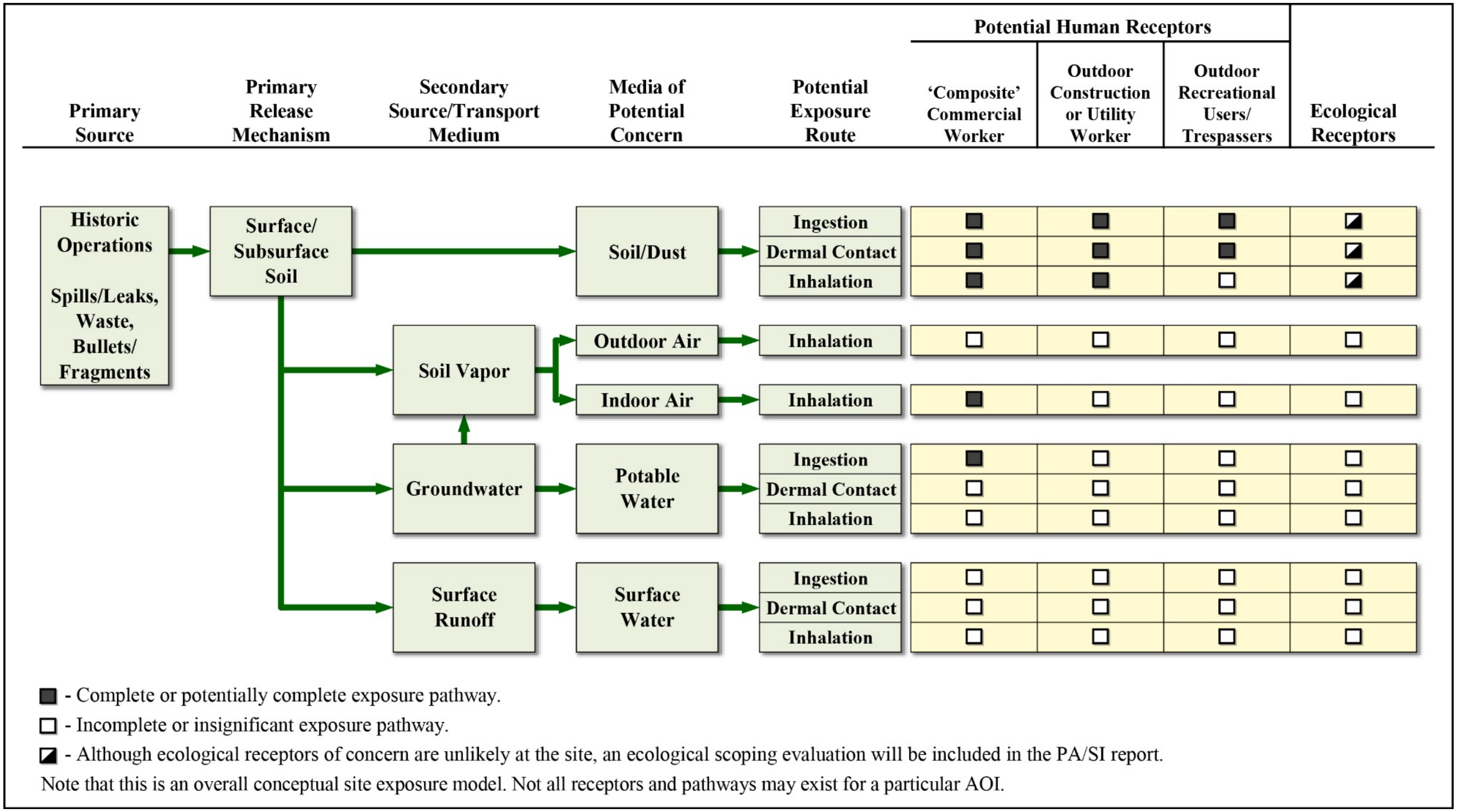
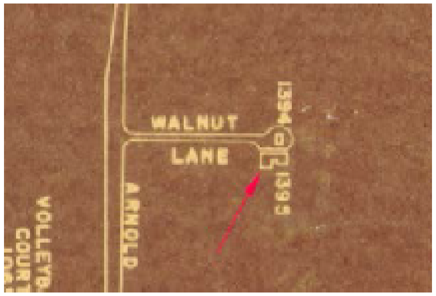


Figure 5-2 Conceptual Site Exposure Model Diagram



1956 Site map

2009 aerial

2016 Site visit

2016 Possible AST footing

Site Description/Source

- Officers housing with oil heating system
- Unknown aboveground tank size and location
- Never used by Sheriffs Office, and AST removed in 1990's per interview
- Only rubble remains, one possible AST footing identified
- No staining of soil visible

Media

- Possible spilling or leaking from AST onto soil
- Heating oil tank, so TPH extractables: Bunker C, Diesel, Motor Oil

Sampling Plan

- Near Surface soil samples (1-4") at footprint of tank
- Surface may have weathered over decades
- Will take one sample on either side of footing

Migration Pathways

Soil→ Groundwater

Soil → Outdoor air

Soil → Indoor air

Groundwater → Indoor Air

Receptors and Exposure Pathways

- 'Composite' Commercial Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
  - Groundwater Ingestion
  - Soil Vapor Inhalation
- Outdoor Construction or Utility Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
- Outdoor Recreational User or Trespasser
  - Soil/Dust Ingestion or Dermal Contact

Approximate Proposed Sampling Locations

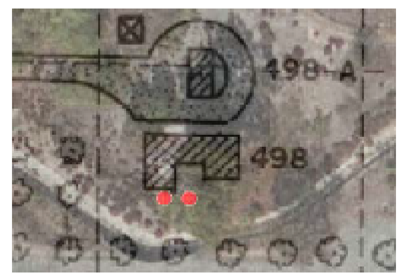
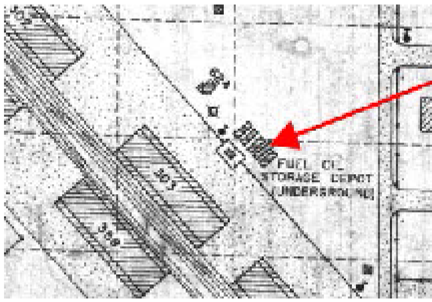
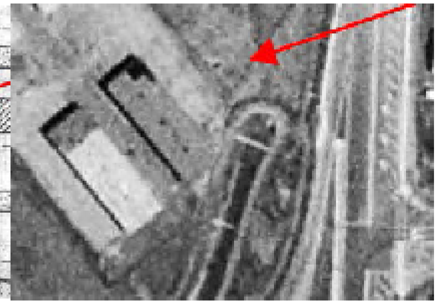


Figure 5-3 AOI 16 Building 1395/498 Oil Storage Tank Conceptual Site Mode

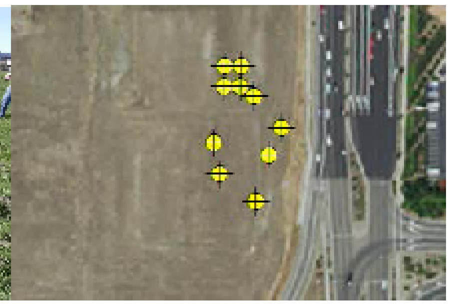


1945 Site map



1992 aerial

2016 Site visit



Approximate Proposed Sampling Locations

Site Description/Source

- Fuel Oil Depot with 5 USTs at former railyard
- No tanks or visual evidence of significant releases found during trenching in late 1990s
- One groundwater sample had TPH-D result of 120,000 µg/L, however all other results were ND or below screening levels
- 1998 Risk Assessment found insignificant risk to human health from volatilization in this area

Media

- Possible leaking from USTs into subsurface soil
- Fuel Oil tanks, so TPH extractables (Bunker C, Diesel, Motor Oil), TPH volatiles (Gasoline, BTEX, MTBE), PAH SIM, and Lead.

Sampling Plan

- 20 LIF-UVOST probes will be used to identify any locations with elevated hydrocarbon levels in field
- 10 borings, with priority given to locations identified with elevated levels by LIF-UVOST, 5 in location of tanks, and 5 down gradient, to 30' bgs or GW, whichever is shallowest (historic GW levels 15 feet bgs or less)
- Soil (2 per boring) and GW samples will be taken at 5 borings at former tank locations, while only GW samples will be taken in 5 downgradient borings

Migration Pathways

Soil→ Groundwater

Soil → Outdoor air

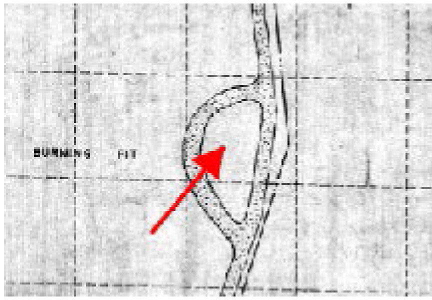
Soil → Indoor air

Groundwater → Indoor Air

Receptors and Exposure Pathways

- 'Composite' Commercial Worker
  - Soil/Dust Inhalation
  - Groundwater Ingestion
  - Soil Vapor Inhalation
- Outdoor Construction or Utility Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation

Figure 5-4 AOI 22 Former Underground Fuel Oil Storage Depot Conceptual Site Model



1945 Site map

2015 aerial

2016 Site visit

Approximate Proposed Sampling Locations

Site Description/Source

- 1945 map identified Burning Pit north of Sanitary Landfill
- Unknown exact type of use
- Debris, including melted glass, found during site visit and over time by current property owner
- Trenching in 2006 for drainage ditch along edge of area found elevated lead levels (up to 840 mg/Kg) in soil approximately 4-5' bgs

Media

- Possible contamination from debris, accelerants, and combustion byproducts into soil
- Dioxins/furans, SVOCs, VOCs, PAHs, TPHs, and CAM17 metals.

Sampling Plan

- 2 trenches, 4-10 feet deep, approximately N-S and E-W, will be dug to identify contents and general extent of waste of burning pit
- 6 borings, five to 30' bgs and one to 100' bgs or GW, whichever is shallowest
- GW sample will be taken from deep well, and Soil samples will be collected (3 per boring and approximately every 25 feet in trench/approx 19 samples from trenches), with priority given to areas that appear stained or otherwise impacted

Migration Pathways

Soil→ Groundwater

Soil → Outdoor air

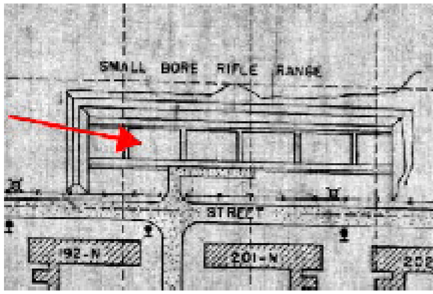
Soil → Indoor air

Groundwater → Indoor Air

Receptors and Exposure Pathways

- 'Composite' Commercial Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
  - Groundwater Ingestion
  - Soil Vapor Inhalation
- Outdoor Construction or Utility Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
- Outdoor Recreational User or Trespasser
  - Soil/Dust Ingestion or Dermal Contact

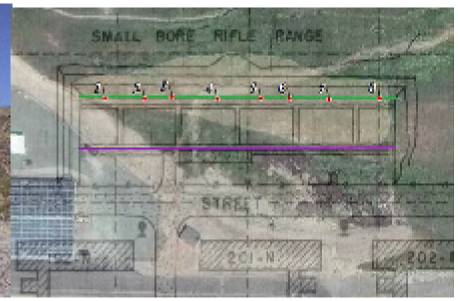
Figure 5-5 AOI 23 Camp Shoemaker Burn Pit Conceptual Site Model



1945 Site map

2015 aerial

2016 Site visit



Approximate Proposed Sampling Locations

<u>Site Description/Source</u>

- 1945 map identified Small Bore Rifle Range
- Berm is identifiable in historical aerials, but no range debris such as bullets or casings have been found or reported by current property owner

<u>Media</u>

- Possible contamination from bullets and casings into soil
- Metals; Total Lead will be tested for to determine presence of range specific metals.

<u>Sampling Plan</u>

- 16 soil samples, taken from 8 locations placed along suspected target line, will be taken. At each of the 8 locations, a soil sample will be taken from near surface (1-4"), and another sample will be taken from ~12-16" bgs. These two depths were chosen to account for any earth movement that may have occurred over the decades.
- The field crew will look for and report in the field notes any range debris such as bullets or casings, on the site as a whole and while digging to take samples.

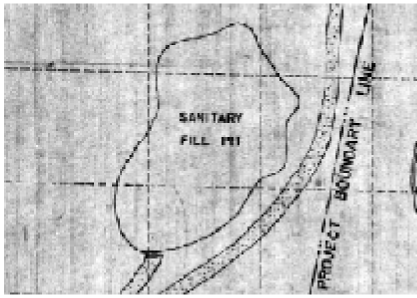
<u>Migration Pathways</u>

Soil → Outdoor air

<u>Receptors and Exposure Pathways</u>

- 'Composite' Commercial Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
- Outdoor Construction or Utility Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
- Outdoor Recreational User or Trespasser
  - Soil/Dust Ingestion or Dermal Contact

Figure 5-6 AOI 24 Naval Small Bore Rifle Range Conceptual Site Model



1945 Site map

2015 aerial

2016 Site visit

Approximate Proposed Sampling Locations

Migration Pathways

Soil→ Groundwater

Soil → Outdoor air

Soil → Indoor air

Groundwater → Indoor Air

Receptors and Exposure Pathways

- 'Composite' Commercial Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
  - Groundwater Ingestion
  - Soil Vapor Inhalation
- Outdoor Construction or Utility Worker
  - Soil/Dust Ingestion, Dermal Contact or Inhalation
- Outdoor Recreational User or Trespasser
  - Soil/Dust Ingestion or Dermal Contact

Site Description/Source

- 1945 map identified Sanitary Fill Pit
- Unknown exact type of debris that may have been placed, or if the site was actually used (it is not on later Army maps)
- Area is currently part asphalt and part gravel, with the asphalt used as a motorcycle training area by Alameda County Sheriffs Office, and the gravel for vehicle storage.

Media

- Possible contamination from leaking or degrading debris into soil
- Dioxins/furans, SVOCs, VOCs, PAHs, TPHs, and CAM17 metals.

Sampling Plan

- 8 borings, 5 to 30' bgs and 3 to 100' bgs or GW, whichever is shallowest.
- GW samples will be taken from the deep wells, and Soil samples will be collected (2 per boring), with priority given to soil that appears stained or otherwise impacted.

Figure 5-7 AOI 28 Hickman Road Sanitary Fill Area Conceptual Site Model

5.7 WORKSHEET #11: PROJECT/DATA QUALITY OBJECTIVES

This worksheet is used to develop and document project quality objectives (PQOs) or data quality objectives (DQOs) using a systematic planning process (SPP). Examples of SPP include: 1) the DQO Process, and 2) the U.S. Army Corps of Engineers' Technical Planning Process (TPP). The project specific information supplied below follows the guidelines provided in EPA's 7-step DQO process.

5.7.1 Problem Statement

Twenty-eight AOIs have been identified at former Camp Parks. Of the 28 AOIs identified, five are recommended for a Site Inspection. These five are AOI 16 – Building 1395 Oil Storage tank, AOI 22 – Underground Fuel Oil storage Depot, AOI 23 – Camp Shoemaker Burn Pit, AOI 24 –Naval Small Bore Rifle Range, and AOI 28 – Sanitary Landfill. The AOIs could contain residual contamination from DOD activities that may pose a threat to human health or the environment through potential ingestion, dermal and inhalation exposure pathways; See Figure 5-2 for details. The PA/SI Work Plan has been developed to collect additional investigative data for the evaluation of NDAI and potential RI recommendations for these five AOIs that have been determined to need further evaluation. During the SI Phase NDAI determination will be based on unrestricted use.

5.7.2 Identifying the Goal of the Study

Goal(s): The primary goal of the PA/SI is to determine the presence or absence of contamination at certain AOIs at levels exceeding default screening levels based on unrestricted use. The PA/SI will obtain sufficient data to achieve this goal and fill data gaps existing from any prior investigations. The presence or absence of contamination will be used to support a NDAI decision or referral to an RI process.

Principal Study Question(s):

1. Do any existing soil and/or groundwater concentrations of detected analytes pose a threat to human health at these sites by exceeding the unrestricted use screening levels.

   - For AOIs except 23 and 28, if all soil and groundwater concentration results are below screening levels, then the AOI will be recommended for NDAI.

   - For AOI 28, if all soil and groundwater concentration results are below screening levels, and no evidence of debris was found any of the 8 boreholes, then the AOI will be recommended for NDAI.

   - For each AOI, if one or more soil or groundwater concentration results are above the screening levels, then the AOI will proceed to the RI phase. For AOI 28, evidence of debris in any borehole will also cause this AOI to proceed to the RI phase, regardless of soil or groundwater concentration results.

AOI 23 will be proceeding to the RI phase due to existing evidence of buried debris and previous sampling results. At AOI 23, the SI phase will simply obtain additional information that will assist in scoping future RI data collection.

If debris is found at AOI 28, an evaluation will be made as to the applicability of CCR Title 27.

5.7.3 Information Inputs

Information Sources:

The primary data inputs will be soil and groundwater data collected for the analytes identified at each of the AOIs. Another information source is the conceptual site model, including the potential receptors and exposure pathways associated with the site for each of the identified receptors. Additionally, the screening levels detailed in Worksheet # 15, which are based on a target cancer risk of 1×10^{-6} and a non-cancer hazard index of 1 (or maximum contaminant levels [MCLs] for groundwater where risk-based screening levels are unavailable), are additional information for the project. Data collected under this current QAPP will supplement any prior data collected at the project sites to fill gaps in the CSM and provide confidence in project decisions to be made for each site. See Worksheet #20 for details on the numbers and types of samples to be collected, and chemicals to be analyzed for at each of the AOIs.

Target Analytes: Analytes of interest include petroleum hydrocarbons (including gasoline, diesel, motor oil, and bunker C), BTEX, MTBE, PAHs, dioxin/furans, VOCs, SVOCs, and CAM17 Metals (Ag, As, Ba, Be, Cd, Co, Cr, Cu, Mo, Pb, Ni, Se, Sb, Tl, V, Zn and Hg).

5.7.4 Boundaries of the Study

Spatial Boundaries: The horizontal spatial boundaries for this project are the physical boundaries detailed on maps in Figures 5-8 through 5-12. The vertical boundaries are currently unknown, and will be determined in the RI phase of the project.

Temporal Boundaries and Constraints: The USACE has scheduled Winter 2016 (FY17 Q2) to begin sampling. See detailed project schedule at QAPP WS#14/16.

5.7.5 Analytical Approach

Sampling locations and depths were chosen in areas determined to have the highest likelihood of contamination based on professional judgement (based on historical practices, likely areas of potential release based on topography, building location, etc.). Samples will be analyzed using the guidelines present in the DoD QSM version 5.0. Analysis will Curtis and Tompkins, Ltd. a DoD and California ELAP accredited laboratory.

All results (note that averaging of the data will not be done in the SI phase of the project) will be compared to the screening levels detailed in Worksheet # 15. [1] For each AOI, if any analytical result is above screening levels detailed in Worksheet # 15, then the AOI will be recommended for further characterization under the RI. For each AOI, if all of the analytical results are below screening levels detailed in Worksheet # 15, then the AOI will be recommended for NDAI (except for AOIs 23 and 28, as detailed in section 5.7.2).

5.7.6 Performance or Acceptance Criteria

The null hypothesis for this project are:

- Concentrations of analytes in groundwater and soil exceed the screening levels.

Decision errors may occur through two scenarios:

- A "false positive" decision would be to conclude that a measured concentration is above the screening level when, in fact, it is not. The consequences of this decision error could be to incur unnecessary expense to study, monitor, and remediate an extent of contamination that does not exist.

- The second scenario is a false negative decision error. In that case, the error would be to assume that a reported analyte concentration below the screening level is not above the screening level when in fact the reported concentration is an underestimate and the true value exceeds the screening level.

Both types of errors are limited by the decision rules. Monitoring and performance decisions are based on trends of quality across the entire sampling area rather than the results of a single discrete measurement. Consequently, a large number of data errors would have to occur at the same location(s) to bias the decision towards a false positive or false negative conclusion. The possibility of simultaneous occurrences of error at a large number of measuring points and over an extended period is very low. Sampling locations are picked based upon historical usage and data that are available. Sampling procedures are then limited to standardized documented procedures. Analysis is performed using approved and accepted methodology.

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[1] Note that screening levels in Worksheet #15 are based on the following hierarchy:
Soil
1. DTSC HERO Note 3 modified regional screening levels (RSLs)
2. EPA RSLs
3. San Francisco Bay Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESLs)
Water
1. California maximum contaminant levels (MCLs)
2. EPA MCLs
3. DTSC HERO Note 3 modified RSLs
4. EPA RSLs
5. San Francisco Bay RWQCB ESLs

Ultimately the requirement that decisions be based only on data that have been reviewed through the data validation process also serves to limit the occurrence and significance of decision errors.

Worksheets #21, 23, and 24 describe the field sampling, analytical and lab calibration SOPs that will be followed. See WS# 15 for the screening levels and laboratory limits of detection (LOD) and limits of quantitation (LOQ) used to support site decisions.

5.7.7 Plan for Obtaining Data

As identified in Section 5.7.2, the primary goal of the PA/SI phase is to determine the presence or absence of contamination at certain AOIs exceeding the screening levels. It is not to determine nature and extent, which will be investigated during the RI phase of the project. See Worksheet #17 – Sample Design and Rationale, for details on data collection to achieve this goal.

5.8 WORKSHEET #12: MEASUREMENT PERFORMANCE CRITERIA

Matrix: Soil/Groundwater
Analytical Group or Method: TPH Extractable (diesel, motor oil, bunker C)/8015D

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 13 and 14.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: TPH Volatiles/8015D

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 13 and 14.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: PAH/SW8270 SIM (Full suite or naphthalene only)

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 27 and 28.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: Dioxin/Furans/SW8290A

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 29 and 30.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Not Applicable (Isotope Dilution)
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: Lead/SW6010C

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 3 and 4.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: Volatile Organics/8260C

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 23 and 24.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: Semi-volatile Organics/8270D

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 25 and 26.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

Matrix: Soil/Groundwater
Analytical Group or Method: CAM17 Metals/SW6010D, SW6020B, SW7074A, SW7471B

Data Quality Indicator (DQI)	QC sample	Measurement Performance Criteria
Overall Precision	Field Duplicates (FD)	RPD ≤ 30% when analytes are detected in both samples ≥ sample specific LOQ
Overall accuracy/bias	Method Blanks Equipment Blanks	No target analyte concentrations ≥ ½ LOQ
Analytical Accuracy/Bias	Laboratory Control Samples (LCS)	Control Limits present in the DoD QSM tables 3, 4, 6, 11 and 12.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	Must meet LCS performance criteria.
Analytical Precision	Laboratory Control Sample Duplicates (LCSD)	RPD ≤ 20%
Analytical Precision	Matrix Spike Duplicates	RPD ≤ 20%
Sensitivity	LOQ verification sample (spiked at LOQ)	Per the DoD QSM.
Completeness	See Worksheet #34	See Worksheet #34

5.9 WORKSHEET #13: SECONDARY DATA USES AND LIMITATIONS

Data type	Source	Data uses relative to current project	Factors affecting the reliability of data and limitations on data use
Previous soil and groundwater data.	Chapter 4 of this document.	Provide historical information to determine a path forward for this SI.	none

5.10 WORKSHEET #14/16: PROJECT TASKS & SCHEDULE

Please see Appendix I.

5.11 WORKSHEET #15: PROJECT SCREENING LIMITS AND LAB-SPECIFIC LOD/LOQS

Matrix: **Soil**
Analytical Method: **SW8015D**
Prep Method: **SW3550C**

Analyte	Screening Level (mg/kg) [4]	Laboratory LOQ (mg/kg)	Laboratory LOD (mg/kg)	Laboratory DL (mg/kg)
TPH-Diesel[1]	230	1.0	0.7	0.3
TPH-Motor Oil[2]	5100	5.0	3.2	1.5
TPH-Bunker C[3]	5100	5.0	NA	NA

1. Diesel Range is carbon range C_{10}-C_{24}
2. Motor Oil Range is carbon range C_{24}-C_{36}
3. Bunker C Range is carbon range C_{12}-C_{40}
4. San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (February 2016)

Matrix: **Water**
Analytical Method: **SW8015D**
Prep Method: **SW3510C**

Analyte	Screening Level (ug/L)[4]	Laboratory LOQ (ug/L)	Laboratory LOD (ug/L)	Laboratory DL (ug/L)
TPH-Diesel[1]	100	50	40	17
TPH-Motor Oil[2]	100	300	200	96
TPH-Bunker C[3]	100	300	NA	NA

1. Diesel Range is carbon range C_{10}-C_{24}
2. Motor Oil Range is carbon range C_{24}-C_{36}
3. Bunker C Range is carbon range C_{12}-C_{40}
4. San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (February 2016)

Matrix: **Soil**
Analytical Method: **SW8015D**
Prep Method: **SW5035A**

Analyte	Screening Level (mg/kg)[2]	Laboratory LOQ (mg/kg)	Laboratory LOD (mg/kg)	Laboratory DL (mg/kg)
TPH-Gasoline[1]	100	1.0	0.2	0.06

1. Gasoline Range is carbon range C_6-C_{12}
2. San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (February 2016)

Matrix: **Water**
Analytical Method: **SW8015D**
Prep Method: **SW5030B**

Analyte	Screening Level (ug/L)[2]	Laboratory LOQ (ug/L)	Laboratory LOD (ug/L)	Laboratory DL (ug/L)
TPH-Gasoline[1]	100	50	30	11.

1. Gasoline Range is carbon range C_6-C_{12}
2. San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (February 2016)

Matrix: **Soil**
Analytical Method: **PAH 8270 SIM**
Prep Method: **SW3550C**

Analyte	CAS #	Screening Level[1] (µg/kg)	Lab LOQ (µg/kg)	Lab LOD (µg/kg)	Lab DL (µg/kg)
1-Methylnaphthalene	90-12-0	18000	5.0	2.0	1.0
2-Methylnaphthalene	91-57-6	240000	5.0	2.0	1.1
Acenaphthylene	208-96-8	3600000[2]	5.0	2.0	1.0
Acenaphthene	83-32-9	3600000	5.0	2.0	1.0
Anthracene	120-12-7	18000000	5.0	2.0	1.0
Benzo(a)anthracene	56-55-3	160	5.0	2.0	1.0
Benzo(a)pyrene	50-32-8	16	5.0	2.0	1.0
Benzo(b)fluoranthene	205-99-2	160	5.0	2.0	1.0
Benzo(k)fluoranthene	207-08-9	1600	5.0	2.0	1.0
Benzo(g,h,i)perylene	191-24-2	1800000[2]	5.0	2.0	1.2
Chrysene	218-01-9	16000	5.0	2.0	1.0
Dibenz(a,h)anthracene	53-70-3	16	5.0	2.0	1.0
Fluoranthene	206-44-0	2400000	5.0	2.0	1.0
Fluorene	86-73-7	2400000	5.0	2.0	1.0

Analyte	CAS #	Screening Level[1] (µg/kg)	Lab LOQ (µg/kg)	Lab LOD (µg/kg)	Lab DL (µg/kg)
Indeno(1,2,3-cd)pyrene	193-39-5	160	5.0	2.0	1.0
Naphthalene	91-20-3	3800	5.0	2.0	1.2
Phenanthrene	85-01-8	1800000[2]	5.0	2.0	1.0
Pyrene	129-00-0	1800000	5.0	2.0	1.0

1. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Residential Soils." EPA May 2016

2. Surrogate value

Matrix: **Water**
Analytical Method: **PAH 8270 SIM**
Prep Method: **SW3510C**

Analyte	CAS #	Screening Level[1] (µg/L)	Lab LOQ (µg/L)	Lab LOD (µg/L)	Lab DL (µg/L))
1-Methylnaphthalene	90-12-0	1.1	0.1	0.04	0.02
2-Methylnaphthalene	91-57-6	36	0.1	0.04	0.03
Acenaphthylene	208-96-8	530[2]	0.1	0.04	0.02
Acenaphthene	83-32-9	530	0.1	0.04	0.02
Anthracene	120-12-7	1800	0.1	0.04	0.031
Benzo(a)anthracene	56-55-3	0.012	0.1	0.04	0.02
Benzo(a)pyrene	50-32-8	0.0034	0.1	0.04	0.02
Benzo(b)fluoranthene	205-99-2	0.034	0.1	0.04	0.02
Benzo(k)fluoranthene	207-08-9	0.34	0.1	0.04	0.02
Benzo(g,h,i)perylene	191-24-2	120[2]	0.1	0.1	0.0253
Chrysene	218-01-9	3.4	0.1	0.04	0.0273
Dibenz(a,h)anthracene	53-70-3	0.0034	0.1	0.1	0.025
Fluoranthene	206-44-0	800	0.1	0.04	0.02
Fluorene	86-73-7	290	0.1	0.04	0.02
Indeno(1,2,3-cd)pyrene	193-39-5	0.034	0.1	0.1	0.025
Naphthalene	91-20-3	0.17	0.1	0.04	0.0222
Phenanthrene	85-01-8	1800[2]	0.1	0.04	0.02
Pyrene	129-00-0	120	0.1	0.04	0.024

1. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Tap Water." EPA May 2016

2. Surrogate value

Not all screening levels were obtainable by the laboratory method, however this is the best available technology.

Matrix: **Soil**
Analytical Method: **VOCs 8260C/Full List/BTEX & MTBE**
Prep Method: **SW5035A**

Analyte	CAS #	Screening Level[1] (µg/kg)	Lab LOQ (µg/kg)	Lab LOD (µg/kg)	Lab DL (µg/kg)
1,1,1,2-Tetrachloroethane	630-20-6	2000	5	1	0.62
1,1,1-Trichloroethane	71-55-6	1700000[3]	5	2	0.81
1,1,2,2-Tetrachloroethane	79-34-5	600	5	1	0.52
1,1,2-Trichloroethane	79-00-5	1100	5	3	0.62
1,1-Dichloroethane	75-34-3	3600	5	2	1.46
1,1-Dichloroethene	75-35-4	230000	5	2	1.28
1,1-Dichloropropene	563-58-6	NE[2]	5	2	0.80
1,2,3-Trichloropropane	96-18-4	1.5[3]	5	2	0.61
1,2,4-Trichlorobenzene	120-82-1	24000	5	2	0.64
1,2,4-Trimethylbenzene	95-63-6	58000	5	1	0.62
1,2-Dibromo-3-Chloropropane	96-12-8	5.3	5	3	1.02
1,2-Dibromoethane	106-93-4	36	5	1	0.65
1,2-Dichlorobenzene	95-50-1	1800000	5	2	1.60
1,2-Dichloroethane	107-06-2	460	5	1	0.93
1,2-Dichloropropane	78-87-5	1000	5	1	0.78
1,3,5-Trimethylbenzene	108-67-8	210000[3]	5	1	0.65
1,3-Dichlorobenzene	541-73-1	NE[2]	5	1	0.53
1,3-Dichloropropane	142-28-9	420000[3]	5	1	0.85
1,4-Dichlorobenzene	106-46-7	2600	5	1	0.54
2-Butanone	78-93-3	27000000	10	5	1.42
2-Chlorotoluene	95-49-8	480000[3]	5	1	0.69
4-Chlorotoluene	106-43-4	440000[3]	5	1	0.65
4-Methyl-2-Pentanone	108-10-1	33000000	10	2	1.02
Acetone	67-64-1	61000000	10	8	3.30
Benzene	71-43-2	330[3]	5	1	0.90
Bromobenzene	108-86-1	290000	5	1	0.53
Bromochloromethane	74-97-5	150000	5	1	0.94
Bromodichloromethane	75-27-4	300[3]	5	1	0.85
Bromoform	75-25-2	19000	5	2	0.47
Carbon Tetrachloride	56-23-5	99[3]	5	1	0.93
Chlorobenzene	108-90-7	280000	5	1	0.69
Chloroethane	75-00-3	14000000	5	2	0.85
Chloroform	67-66-3	320	5	2	1.27
Chloromethane	74-87-3	110000	5	2	1.04
cis-1,2-Dichloroethene	156-59-2	19000[3]	5	1	0.87
cis-1,3-Dichloropropene	10061-01-5	NE[2]	5	2	0.61
Dibromochloromethane	124-48-1	950[3]	5	1	0.52

Analyte	CAS #	Screening Level[1] (µg/kg)	Lab LOQ (µg/kg)	Lab LOD (µg/kg)	Lab DL (µg/kg)
Dibromomethane	74-95-3	24000	5	2	0.77
Ethylbenzene	100-41-4	5800	5	1	0.71
Freon 113	76-13-1	40000000	5	2	0.65
Freon 12	75-71-8	87000	5	2	0.68
Isopropylbenzene	98-82-8	1900000	5	1	0.66
m,p-Xylenes	1330-20-7	580000	5	2	1.38
Methylene Chloride	75-09-2	1900[3]	10	5	3.10
MTBE	1634-04-4	47000	5	3	1.01
Naphthalene	91-20-3	3800	5	2	1.06
n-Butylbenzene	104-51-8	1200000[3]	5	2	0.63
o-Xylene	95-47-6	650000	5	1	0.68
Propylbenzene	103-65-1	3800000	5	1	0.78
sec-Butylbenzene	135-98-8	2200000[3]	5	1	0.64
Styrene	100-42-5	6000000	5	1	0.73
tert-Butylbenzene	98-06-6	2200000[3]	5	1	0.79
Tetrachloroethene	127-18-4	600[3]	5	1	0.67
Toluene	108-88-3	1100000[3]	5	1	0.76
trans-1,2-Dichloroethene	156-60-5	130000[3]	5	1	0.84
trans-1,3-Dichloropropene	10061-02-6	NE[2]	5	2	0.65
Trichloroethene	79-01-6	940	5	1	0.84
Trichlorofluoromethane	75-69-4	1200000[3]	5	1	0.70
Vinyl Acetate	108-05-4	910000	10	8	2.38
Vinyl Chloride	75-01-4	8.8[3]	5	1	0.93

1. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Residential Soils." EPA May 2016

2. NE = None established

3. California HERO Note 3 modified regional screening levels (RSL) = Table 1. DTSC-Recommended Screening Levels for Soil. June 2016

Matrix: **Water**
Analytical Method: **VOCs 8260C/Full List/BTEX & MTBE**
Prep Method: **SW5030B**

Analyte	CAS #	Screening Level[1] (µg/L)	Lab LOQ (µg/L)	Lab LOD (µg/L)	Lab DL (µg/L)
1,1,1,2-Tetrachloroethane	630-20-6	0.57	0.5	0.4	0.144
1,1,1-Trichloroethane	71-55-6	200[3]	0.5	0.4	0.146
1,1,2,2-Tetrachloroethane	79-34-5	0.07[2]	0.5	0.4	0.135
1,1,2-Trichloroethane	79-00-5	0.28	0.5	0.4	0.16
1,1-Dichloroethane	75-34-3	2.7[2]	0.5	0.2	0.159
1,1-Dichloroethene	75-35-4	6[5]	0.5	0.4	0.159
1,1-Dichloropropene	563-58-6	NE[4]	0.5	0.4	0.13
1,2,3-Trichloropropane	96-18-4	0.00075	0.5	0.4	0.154
1,2,4-Trichlorobenzene	120-82-1	1.2	0.5	0.45	0.133
1,2,4-Trimethylbenzene	95-63-6	15	0.5	0.4	0.16
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2	1	0.326
1,2-Dibromoethane	106-93-4	0.0075[2]	0.5	0.4	0.149
1,2-Dichlorobenzene	95-50-1	300	0.5	0.2	0.122
1,2-Dichloroethane	107-06-2	0.17	0.5	0.4	0.15
1,2-Dichloropropane	78-87-5	0.44	0.5	0.2	0.15
1,3,5-Trimethylbenzene	108-67-8	120	0.5	0.4	0.131
1,3-Dichloropropane	142-28-9	110[2]	0.5	0.4	0.149
1,4-Dichlorobenzene	106-46-7	0.48	0.5	0.2	0.12
2,2-Dichloropropane	594-20-7	NE[4]	0.5	0.4	0.155
2-Butanone	78-93-3	5600	10	2	0.581
2-Chlorotoluene	95-49-8	240	0.5	0.2	0.152
2-Hexanone	591-78-6	38	10	2	0.5
4-Chlorotoluene	106-43-4	250	0.5	0.2	0.155
4-Methyl-2-Pentanone	108-10-1	6300	10	2	0.654
Acetone	67-64-1	14000	10	4	3.3
Benzene	71-43-2	0.15[2]	0.5	0.2	0.149
Bromobenzene	108-86-1	62	0.5	0.2	0.142
Bromochloromethane	74-97-5	83	0.5	0.4	0.151
Bromodichloromethane	75-27-4	0.12[2]	0.5	0.4	0.121
Bromoform	75-25-2	2.9[2]	1	0.4	0.179
Bromomethane	74-83-9	7.5	1	0.8	0.209
Carbon Disulfide	75-15-0	810	0.5	0.4	0.12
Carbon Tetrachloride	56-23-5	0.1[2]	0.5	0.4	0.159
Chlorobenzene	108-90-7	70[5]	0.5	0.2	0.13
Chloroethane	75-00-3	21000	1	0.8	0.267
Chloroform	67-66-3	0.22	0.5	0.2	0.117

Analyte	CAS #	Screening Level[1] (µg/L)	Lab LOQ (µg/L)	Lab LOD (µg/L)	Lab DL (µg/L)
Chloromethane	74-87-3	190	1	0.4	0.272
cis-1,2-Dichloroethene	156-59-2	6[5]	0.5	0.4	0.149
cis-1,3-Dichloropropene	10061-01-5	NE[4]	0.5	0.4	0.119
Dibromochloromethane	124-48-1	0.2[2]	0.5	0.2	0.158
Dibromomethane	74-95-3	8.3	0.5	0.2	0.146
Ethylbenzene	100-41-4	1.5	0.5	0.2	0.156
Freon 113	76-13-1	1200[5.]	2	0.8	0.173
Freon 12	75-71-8	200	1	0.6	0.173
Hexachlorobutadiene	87-68-3	0.14	2	1	0.25
Isopropylbenzene	98-82-8	450	0.5	0.35	0.102
m,p-Xylenes	1330-20-7	190	0.5	0.4	0.145
Methylene Chloride	75-09-2	0.93[2]	5	0.4	0.298
MTBE	1634-04-4	13[5.]	0.5	0.4	0.119
Naphthalene	91-20-3	0.17	2	0.45	0.225
n-Butylbenzene	104-51-8	1000	0.5	0.4	0.124
o-Xylene	95-47-6	190	0.5	0.2	0.154
Propylbenzene	103-65-1	660	0.5	0.2	0.107
sec-Butylbenzene	135-98-8	2000	0.5	0.2	0.11
Styrene	100-42-5	100[3]	0.5	0.2	0.147
tert-Butylbenzene	98-06-6	690	0.5	0.4	0.159
Tetrachloroethene	127-18-4	0.083[2]	0.5	0.2	0.156
Toluene	108-88-3	150[5]	0.5	0.2	0.115
trans-1,2-Dichloroethene	156-60-5	10[5]	0.5	0.4	0.158
trans-1,3-Dichloropropene	10061-02-6	NE[4]	0.5	0.4	0.139
Trichloroethene	79-01-6	0.49	0.5	0.2	0.116
Trichlorofluoromethane	75-69-4	150[5]	1	0.4	0.228
Vinyl Acetate	108-05-4	410	10	2	1.15
Vinyl Chloride	75-01-4	0.019	0.5	0.2	0.154

Note: lowest value between the RSLs, DTSC modified RSLs, and MCLs are used as the screening level

1. Regional screening levels (RSL) = “Regional Screening Tables: “Screening Levels for Chemical Contaminants, Tap Water.” EPA May 2016

2. California HERO Note 3 modified regional screening levels (RSL) = Table 2. DTSC-Recommended Screening Levels for Tap Water. June 2016

3. Regional screening levels (RSL) = “Regional Screening Tables: “Screening Levels for Chemical Contaminants, MCL.” EPA May 2016

4. NE = None established

5. California HERO Note 3 modified regional screening levels (RSL) = Table 4. Screening Levels for Tap Water that Exceed the California Maximum Contaminant Levels. June 2016

Not all screening levels were obtainable by the laboratory method, however this is the best available technology.

Matrix: **Soil**
Analytical Method: **SVOCs 8270C/Full List**
Prep Method: **SW3550C**

Analyte	CAS #	Screening Level[1] (µg/kg)	Lab LOQ (µg/kg)	Lab LOD (µg/kg)	Lab DL (µg/kg)
1,2,4-Trichlorobenzene	120-82-1	24000	333	83	22
1,2-Dichlorobenzene	95-50-1	1800000	333	83	33
1,4-Dichlorobenzene	106-46-7	2600	333	167	42
1-Methylnaphthalene *	90-12-0	18000	67	33	13
2,4,5-Trichlorophenol	95-95-4	6300000	333	33	13
2,4,6-Trichlorophenol	88-06-2	7500[3]	333	33	14
2,4-Dichlorophenol	120-83-2	190000	333	33	13
2,4-Dimethylphenol	105-67-9	1300000	333	33	19
2,4-Dinitrophenol	51-28-5	130000	667	600	160
2,4-Dinitrotoluene	121-14-2	1700	333	33	10
2,6-Dinitrotoluene	606-20-2	360	333	83	34
2-Chloronaphthalene	91-58-7	4800000	333	83	55
2-Chlorophenol	95-57-8	390000	333	83	55
2-Methylnaphthalene *	91-57-6	240000	67	33	11
2-Methylphenol	95-48-7	3200000	333	83	62
2-Nitrophenol	88-75-5	NE[2]	667	83	39
3,3'-Dichlorobenzidine	91-94-1	1200	667	167	79
3-Nitroaniline	99-09-2	NE[2]	667	83	33
4,6-Dinitro-2-methylphenol	534-52-1	5100	667	167	77
4-Bromophenyl-phenylether	101-55-3	NE[2]	333	83	59
4-Chloro-3-methylphenol	59-50-7	6300000	333	33	15
4-Chloroaniline	106-47-8	2700	333	33	17
4-Chlorophenyl-phenylether	7005-72-3	NE[2]	333	33	12
4-Methylphenol	106-44-5	6300000	667	83	52
4-Nitroaniline	100-01-6	27000	667	83	33
4-Nitrophenol	100-02-7	NE[2]	667	167	71
Acenaphthene *	83-32-9	3600000	67	33	12
Acenaphthylene *	208-96-8	NE[2]	67	33	13
Aniline	62-53-3	95000	333	83	50
Anthracene *	120-12-7	18000000	67	33	12
Azobenzene	103-33-3	5600	333	33	14
Benzidine	92-87-5	0.53[3]	1670	600	160
Benzo(a)anthracene *	56-55-3	160	67	33	12
Benzo(a)pyrene *	50-32-8	16	67	33	15
Benzo(b)fluoranthene *	205-99-2	160	67	33	14
Benzo(g,h,i)perylene *	191-24-2	NE[2]	67	33	13

Analyte	CAS #	Screening Level[1] (µg/kg)	Lab LOQ (µg/kg)	Lab LOD (µg/kg)	Lab DL (µg/kg)
Benzo(k)fluoranthene *	207-08-9	1600	67	33	18
Benzoic acid	65-85-0	250000000	1670	833	500
Benzyl alcohol	100-51-6	6300000	333	83	51
bis(2-Chloroethoxy)methane	111-91-1	190000	333	33	12
bis(2-Chloroethyl)ether	111-44-4	230	333	83	60
bis(2-Chloroisopropyl) ether	108-60-1	3100000	333	167	83
bis(2-Ethylhexyl)phthalate	117-81-7	39000	333	300	80
Butylbenzylphthalate	85-68-7	290000	333	33	12
Carbazole	86-74-8	NE[2]	1670	33	15
Chrysene *	218-01-9	16000	67	33	15
Dibenz(a,h)anthracene *	53-70-3	16	67	33	15
Dibenzofuran	132-64-9	73000	333	33	14
Diethylphthalate	84-66-2	51000000	333	33	14
Dimethylphthalate	131-11-3	NE[2]	333	33	12
Di-n-butylphthalate	84-74-2	6300000	333	33	15
Di-n-octylphthalate	117-84-0	630000	333	83	34
Fluoranthene *	206-44-0	2400000	67	33	13
Fluorene *	86-73-7	2400000	67	33	12
Hexachlorobenzene	118-74-1	210	333	33	14
Hexachlorobutadiene	87-68-3	1200[3]	333	83	61
Hexachlorocyclopentadiene	77-47-4	1800	667	167	76
Hexachloroethane	67-72-1	1800	333	167	42
Indeno(1,2,3-cd)pyrene *	193-39-5	160	67	33	15
Isophorone	78-59-1	570000	333	33	11
Naphthalene *	91-20-3	3800	67	33	13
Nitrobenzene	98-95-3	5100	333	83	22
N-Nitrosodimethylamine	62-75-9	2	333	167	70
N-Nitroso-di-n-propylamine	621-64-7	78	333	83	50
N-Nitrosodiphenylamine	86-30-6	110000	333	83	56
Pentachlorophenol	87-86-5	1000	667	300	148
Phenanthrene *	85-01-8	NE[2]	67	33	15
Phenol	108-95-2	19000000	333	83	47
Pyrene *	129-00-0	1800000	67	33	12

[1]. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Residential Soils." EPA May 2016

[2]. NE = None established

[3]. California HERO Note 3 modified regional screening levels (RSL) = Table 1. DTSC-Recommended Screening Levels for Soil. June 2016

* Not reported for AOI 23 and 28 due to the analysis of 8270-SIM for PAHs.
Not all screening levels were obtainable by the laboratory method, however this is the best available technology.

Matrix: **Water**
Analytical Method: **SVOCs 8270C/Full List**
Prep Method: **SW3520C**

Analyte	CAS #	Screening Level[1] (µg/L)	Lab LOQ (µg/L)	Lab LOD (µg/L)	Lab DL (µg/L)
1,2,4-Trichlorobenzene	120-82-1	1.2	10	2.5	2.24
1,2-Dichlorobenzene	95-50-1	300	10	2.5	2.09
1,3-Dichlorobenzene	541-73-1	150[3]	10	2.5	1.62
1,4-Dichlorobenzene	106-46-7	0.48	10	2.5	1.65
1-Methylnaphthalene *	90-12-0	1.1	10	2.5	1.98
2,4,5-Trichlorophenol	95-95-4	1200	10	2.5	1.14
2,4,6-Trichlorophenol	88-06-2	4.1	10	2.5	1.13
2,4-Dichlorophenol	120-83-2	46	10	2.5	2.12
2,4-Dimethylphenol	105-67-9	360	10	2.5	2.49
2,4-Dinitrophenol	51-28-5	39	20	18	6.7
2,4-Dinitrotoluene	121-14-2	0.24	10	2.5	2.09
2,6-Dinitrotoluene	606-20-2	0.049	10	2.5	1.77
2-Chloronaphthalene	91-58-7	750	10	2.5	1.83
2-Chlorophenol	95-57-8	91	10	2.5	1.6
2-Methylnaphthalene *	91-57-6	36	10	2.5	1.82
2-Methylphenol	95-48-7	930	10	2.5	2.16
2-Nitroaniline	88-74-4	190	20	5	2.6
2-Nitrophenol	88-75-5	NE[4]	20	5	3.15
3,3'-Dichlorobenzidine	91-94-1	0.13	20	5	2.54
3-Nitroaniline	99-09-2	NE[4]	20	5	3.82
4,6-Dinitro-2-methylphenol	534-52-1	1.5	20	5	4
4-Bromophenyl-phenylether	101-55-3	NE[4]	10	2.5	2
4-Chloro-3-methylphenol	59-50-7	1400	10	2.5	1.54
4-Chloroaniline	106-47-8	0.37	10	5	2.05
4-Chlorophenyl-phenylether	7005-72-3	NE[4]	10	2.5	1.61
4-Methylphenol	106-44-5	1900	10	2.5	1.71
4-Nitroaniline	100-01-6	3.8	20	8	3.33
4-Nitrophenol	100-02-7	NE[4]	20	8	5
Acenaphthene *	83-32-9	530	10	2.5	1.79
Acenaphthylene *	208-96-8	530	10	2.5	1.75
Aniline	62-53-3	13	10	2.5	2
Anthracene *	120-12-7	1800	10	2.5	1.85
Azobenzene	103-33-3	0.12	10	5	1.6
Benzidine	92-87-5	0.00011	50	40	17
Benzo(a)anthracene *	56-55-3	0.012	10	2.5	1.58
Benzo(a)pyrene *	50-32-8	0.0034	10	2.5	1.57
Benzo(b)fluoranthene *	205-99-2	0.034	10	2.5	1.72

Analyte	CAS #	Screening Level[1] (µg/L)	Lab LOQ (µg/L)	Lab LOD (µg/L)	Lab DL (µg/L)
Benzo(g,h,i)perylene *	191-24-2	120	10	2.5	1.87
Benzo(k)fluoranthene *	207-08-9	0.34	10	2.5	1.95
Benzoic acid	65-85-0	75000	50	40	15.7
Benzyl alcohol	100-51-6	2000	10	2.5	1.5
bis(2-Chloroethoxy)methane	111-91-1	59	10	2.5	1.34
bis(2-Chloroethyl)ether	111-44-4	0.014	10	2.5	1.82
bis(2-Chloroisopropyl) ether	108-60-1	710	10	5	2.74
bis(2-Ethylhexyl)phthalate	117-81-7	4[5]	10	5	1.92
Butylbenzylphthalate	85-68-7	16	10	2.5	1.37
Carbazole	86-74-8	NE[4]	50	5	2.81
Chrysene *	218-01-9	3.4	10	2.5	1.72
Dibenz(a,h)anthracene *	53-70-3	0.0034	10	2.5	1.77
Dibenzofuran	132-64-9	7.9	10	2.5	1.87
Diethylphthalate	84-66-2	15000	10	2.5	1.62
Dimethylphthalate	131-11-3	NE[4]	10	2.5	2
Di-n-butylphthalate	84-74-2	900	10	5	1.37
Di-n-octylphthalate	117-84-0	200	10	2.5	1.82
Fluoranthene *	206-44-0	800	10	2.5	1.94
Fluorene *	86-73-7	290	10	2.5	1.75
Hexachlorobenzene	118-74-1	0.0088[3]	10	2.5	1.98
Hexachlorobutadiene	87-68-3	0.14	10	2.5	2.39
Hexachlorocyclopentadiene	77-47-4	0.41	20	18	6.7
Hexachloroethane	67-72-1	0.33	10	2.5	1.74
Indeno(1,2,3-cd)pyrene *	193-39-5	0.034	10	2.5	1.81
Isophorone	78-59-1	78	10	2.5	1.88
Naphthalene *	91-20-3	0.17	10	2.5	1.91
Nitrobenzene	98-95-3	0.14	10	2.5	1.61
N-Nitrosodimethylamine	62-75-9	0.00011	10	2.5	2.3
N-Nitroso-di-n-propylamine	621-64-7	0.011	10	2.5	2
N-Nitrosodiphenylamine	86-30-6	12	10	2.5	1.86
Pentachlorophenol	87-86-5	0.041	20	5	1.93
Phenanthrene *	85-01-8	1800	10	2.5	1.92
Phenol	108-95-2	5800	10	2.5	1.66
Pyrene *	129-00-0	120	10	2.5	1.65

Note: lowest value between the RSLs, DTSC modified RSLs, and MCLs are used as the screening level

1. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Tap Water." EPA May 2016

2. California HERO Note 3 modified regional screening levels (RSL) = Table 2. DTSC-Recommended Screening Levels for Tap Water. June 2016

3. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, MCL." EPA May 2016

4. NE = None established

[5.] California HERO Note 3 modified regional screening levels (RSL) = Table 4. Screening Levels for Tap Water that Exceed the California Maximum Contaminant Levels. June 2016

* Not reported for AOI 23 and 28 due to the analysis of 8270-SIM for PAHs.

Not all screening levels were obtainable by the laboratory method, however this is the best available technology.

Matrix: **Soil/Water**
Analytical Method: **SW8290A**

Analyte	Screening Level	Laboratory LOQ	Laboratory LOD	Laboratory DL
Total Toxic Equivalents[1] (ng/Kg)	4.8[3]	NA	NA	NA
Total Toxic Equivalents[1](ng/L)	0.03[2]	NA	NA	NA

1. Total Toxic Equivalents for 2,3,7,8-TCDD based upon the World Health Organization Toxic Equivalent Factors 2005.
2. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Residential Soils." EPA May 2016
3. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, MCL." EPA May 2016
4. NA – Not applicable. For method SW8290A limits are normally calculated based upon signal to noise in the sample.

Matrix: **Soil**
Analytical Method: **CAM 17 Metals/Lead Only/SW6010C/SW7471B**
Prep Method: **SW3050B/SW7471B**

Analyte	Screening Level[1] (mg/kg)	Laboratory LOQ (mg/kg)	Laboratory LOD (mg/kg)	Laboratory DL (mg/kg)
Antimony	31	0.5	0.4	0.15
Arsenic	0.11[3]	0.625	0.25	0.0823
Barium	15000	0.25	0.13	0.058
Beryllium	15[3]	0.1	0.03	0.01
Cobalt	23	0.25	0.06	0.03
Cadmium	5.2[3]	0.25	0.06	0.03
Chromium	NE[2]	0.25	0.13	0.06
Copper	3100	0.25	0.2	0.08
Lead	80[3]	0.25	0.13	0.07
Molybdenum	390	0.25	0.13	0.05
Nickel	490[3]	0.25	0.13	0.07
Selenium	390	0.5	0.4	0.16
Silver	390	0.25	0.13	0.04
Thallium	0.78	0.5	0.4	0.14
Vanadium	390	0.25	0.13	0.06
Zinc	23000	1.0	0.50	0.20
Mercury	11	0.02	0.01	0.006

1. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Residential Soils." EPA May 2016

2. NA = None established

3. California HERO Note 3 modified regional screening levels (RSL) = Table 1. DTSC-Recommended Screening Levels for Soil. June 2016

Matrix: **Water**
Analytical Method: **CAM17 Metals/Lead Only/ SW6020B/SW7470**
Prep Method: **SW3005A/SW7471B**

Analyte	Screening Level[1] (ug/L)	Laboratory LOQ (ug/L)	Laboratory LOD (ug/L)	Laboratory DL (ug/L)
Antimony	6[2]	1.0	0.3	0.13
Arsenic	0.0082[3]	1.4	0.75	0.465
Barium	1000[4]	1.0	0.5	0.30
Beryllium	4[3]	1.0	0.5	0.13
Cadmium	5[2]	1.0	0.5	0.33
Cobalt	6	1.0	0.5	0.16
Chromium	100[2]	1.0	0.5	0.11
Copper	800	1.0	0.5	0.42
Lead	15	1.0	0.5	0.10
Molybdenum	100	1.0	0.5	0.32
Nickel	100[4]	1.0	0.5	0.11
Selenium	50[2]	1.0	0.5	0.25
Silver	94	1.0	0.5	0.10
Thallium	0.2	1.0	0.25	0.0923
Vanadium	86	1.0	0.3	0.30
Zinc	6000	10	5.0	1.5
Mercury	2[2]	0.2	0.1	0.04

Note: lowest value between the RSLs, DTSC modified RSLs, and MCLs are used as the screening level

1. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, Tap Water." EPA May 2016

2. Regional screening levels (RSL) = "Regional Screening Tables: "Screening Levels for Chemical Contaminants, MCL." EPA May 2016

3. California HERO Note 3 modified regional screening levels (RSL) = Table 2. DTSC-Recommended Screening Levels for Tap Water. June 2016

4. California HERO Note 3 modified regional screening levels (RSL) = Table 4. Screening Levels for Tap Water that Exceed the California Maximum Contaminant Levels.

5.12 WORKSHEET #17: SAMPLING DESIGN AND RATIONALE

Former Camp Parks was used as a training center for the U.S. Navy, U.S Army, U.S Air Force, and the National Guard from 1943 to 1984. Much of the property is still a currently active Reserve Training Area. This project is only focused on the FUDS eligible properties which were transferred to local or private entities prior to October 1986.

The following AOI summaries include those which the USACE deemed to need additional investigation after assessment. At AOIs 22, 23 and 28, boring, sampling, and excavation locations will be surveyed by a professional land surveyor registered with the State of California and labeled with a lath or survey pin.

AOI 16 Building 1395 Oil Storage Tank (AST)

If a release from the former AST occurred, the highest level of contamination would likely be present in the near surface soil under the footprint of the tank. Therefore, near surface soil samples will be taken from AOI 16 (Building 1395 AST). Two grab sample locations at the apparent location of the AST will be approximately 1-4 inches below the surface of the ground and collected with disposable sampling equipment. The disturbed soil will be smoothed back into place. Due to this AST serving a house, and being identified as part of the heating system, samples will analyzed for TPH extractables (Bunker C, Diesel, Motor Oil) and Naphthalene. Full details of the analytical approach are detailed in Worksheet #20.

AOI 22 Underground Fuel Oil Storage Depot

Any contamination from tanks in this depot would likely be present in the location of the five tanks in soil or groundwater, or possibly downgradient in the groundwater. A field screening method will be used across the physical boundaries of the AOI to narrow down where contamination may exist. The location of previous sampling results also have guided the location of the proposed samples. At AOI 22, twenty LIF-UVOST (laser-induced fluorescence Ultra-Violet Optical Screening Tool) probes will be used for screening hydrocarbons. The LIF-UVOST is a direct-push system that provides continuous, real time data as each probe is advanced. The LIF-UVOST field screening investigation will be performed by an operator with training and certification in LIF-UVOST equipment operation and data interpretation. The results shall be reported to the on-site USACE Representative to determine sampling locations and depths.

Ten borings will be drilled, when possible taking samples where the LIF-UVOST may have identified elevated hydrocarbon levels. Five of these borings will be taken in the location of the former tanks and will be small diameter bore holes to approximately 30 feet bgs or until groundwater is hit, whichever comes first Historical depths to groundwater have been at 5-15 feet in this area, so the ability of collection of groundwater samples is anticipated. Soil samples will be taken from the bore holes (two per boring) and if groundwater is encountered, a groundwater sample will be collected. An additional five borings will be taken down gradient of the five former tanks to assess the possible impact to groundwater. The samples collected at these additional borings will be for groundwater only. The bore holes will be filled with grout, and the soil from the holes will be removed from the site.

Based upon the potential of various hydrocarbons in this location, analysis will include a broad range of petroleum related analytes. All soil and groundwater samples will be analyzed for TPH extractables (Bunker C, Diesel, Motor Oil), TPH volatiles (Gasoline, BTEX, MTBE), PAH SIM, and Lead.

AOI 23 Camp Shoemaker Burn Pit

Debris has been discovered at the burn pit area and soil samples near the eastern edge of the site previously had been found to have elevated lead concentrations. Borings and trenches will be sampled at this AOI in order to further evaluate the limits of debris. Six borings will be drilled at the burn pit area, within the boundaries of the site that is suggested by the topography, to provide additional information regarding the extent of debris and possible contamination. Five of these borings will be small diameter bore holes to approximately 30 feet bgs, which will provide information regarding the depth of debris present. The remaining boring will be drilled to 100 feet bgs or until groundwater is encountered, whichever comes first. This depth was chosen to try to obtain a groundwater sample based upon the historical groundwater depths in the local region and taking into account the topographic elevation change. Soil samples will be taken (three per boring) from the soil removed from the bore holes and if groundwater is encountered, a groundwater sample will be collected. Dioxin/furans will be sampled from the middle core only. The bore holes will be filled with grout. Two trenches, 4-10 feet deep, one generally north-south and the other generally east-west will be excavated in order to identify the contents and general extent of the burn pit, as well as collect additional soil samples. The trenches will be shallow due to the fact that the historical trenching done near the perimeter of this site found undisturbed clay at 4-5 feet bgs. The Drilling Contractor will temporarily stockpile excavated soils on a liner during trenching. The DTSC has granted permission to the Government to backfill the trenches with the excavated material (e-mail from John Bystra, 23 May 2016). Dust control will be provided during excavation. The Drilling Contractor will backfill and compact the excavations in one (1) foot lifts up to the ground surface. Once that has been completed, the Drilling Contractor will procure and place a minimum of six (6) inches of clean soil over those areas. The backfilled areas will be contoured to prevent ponding and reseeded. A broad range of analysis is being performed in this AOI to best characterize the area. Included are dioxins/furans, standard lists of semivolatiles and volatiles, low level PAHs determination, petroleum hydrocarbons, including gasoline, diesel, motor oil, and bunker C and CAM17 metals. Please note that while these extensive lists of analytes are being performed not all analytes are considered from a DoD source.

AOI 24 Naval Small Bore Rifle Range

Near surface soil samples will be taken at AOI 24. Two grab samples will be taken at each of eight locations, one at 1-4 inches bgs and at 12-16 inches bgs. These will be collected with disposable sampling equipment. The disturbed soil will be smoothed back into place. Total lead is being characterized to determine any range specific metals.

AOI 28 Hickman Road Sanitary Fill Area

Eight small diameter borings (two samples per boring) will be drilled for AOI 28. Five of these borings will be drilled to approximately 30 feet bgs and soil samples taken, with the intent of trying to identify presence and depth of possible debris in the landfill. The other three will be drilled to approximately 80-100 feet bgs or until groundwater is encountered, whichever comes first. The options on these borings include:

- drilling the first bore hole up to 80 bgs;

- if no water is produced then the next bore hole go up to 100 bgs;
- if still no water then only drill to 30 ft bgs for the last one, otherwise drill up to 100 feet to collect groundwater.

This drilling to depth decision tree was chosen to try to obtain a groundwater sample based upon the historical groundwater depths in the local region and taking into account the elevation change. A broad range of analysis is being performed in this AOI to best characterize the area. Included are standard lists of semivolatiles and volatiles, low level PAHs determination, and CAM17 metals. Note that while these extensive lists of analytes are being performed not all analytes are considered from a DoD source.

All borings will be off of the asphalt area in order to avoid leaving patched areas in the motorcycle training area. During drilling activities at AOI 28, the drilling contractor will be using multi-meter gas detection equipment to monitor ambient air for gases, including methane and its lower explosive limit, which may pose health or explosion hazard while performing drilling/coring activities.

These supplemental investigation data will provide definitive data to support site decisions. The scope and objective of this sampling activity is to fill any data gaps for these sites that resulted from previous investigations. Figures 5-8 to 5-12 show locations of the new sampling locations.

USACE will coordinate work timing and activities with the property owners and tenants to ensure minimization of impacts to property use. The Drilling Contractor will be obtaining all necessary permits for UVOST field screening and drilling. Prior to any subsurface activities, an underground utility clearance will be performed by a private utility clearance company subcontracted by the Drilling Contractor. USACE will coordinate the USA ALERT. The Drilling Contractors qualified Safety and Health Manager will develop and submit for USACE review a Site Safety and Health plan, Accident Prevention Plan, and Injury and Illness Prevention Plan for the drilling and UVOST work. The USACE Safety Office in coordination with environmental engineering technical team will also be preparing a separate Site Safety and Health Plan for the field sampling activities.

Following all field activities, ground surfaces disturbed as a result of the SI shall be restored to the original condition or better and ensure the restoration is sufficient to prevent ponding. All down-hole equipment will be cleaned and decontaminated before arrival to the site and before the start of each new boring. All materials and fluids used for decontamination shall be properly managed as IDW. The Drilling Contractor will characterize, store, transport and dispose all investigative derived waste (IDW) including drilling/coring cuttings and fluids, excavated soils and associated debris offsite to a permitted facility in compliance with all Federal, State, and Local regulations and standards. Drums of cuttings from the borings will need to be stored on or near AOIs 22, 23, and 28 for a few weeks following drilling, to allow time for characterization and proper disposal of the cuttings. The location and timing of this temporary storage will be coordinated with the property owners and tenants prior to drilling activities to ensure minimization of impacts to property use. It is not anticipated that any temporary fencing will be put in place, however during drilling and trenching, it will be asked that personnel not related to the project stay away from the equipment and trenches for safety purposes.

The Drilling Contractor will be following environmental best management practices (BMPs) for all work during this Site Inspection to limit potential impacts to soil and water quality and minimize the potential for drilling IDW releases and potential for hazardous materials spills. The contractor will follow all applicable environmental regulations to this project. If any items of historical or archeological interest are discovered during the process of

this SI, the Drilling Contractor will leave the archeological find undisturbed and will immediately report the find to the USACE so that the proper authorities may be notified. Demobilization will consist of the removal from the site of all investigation equipment and restoration of the work site(s) as nearly as possible to the original condition or better.

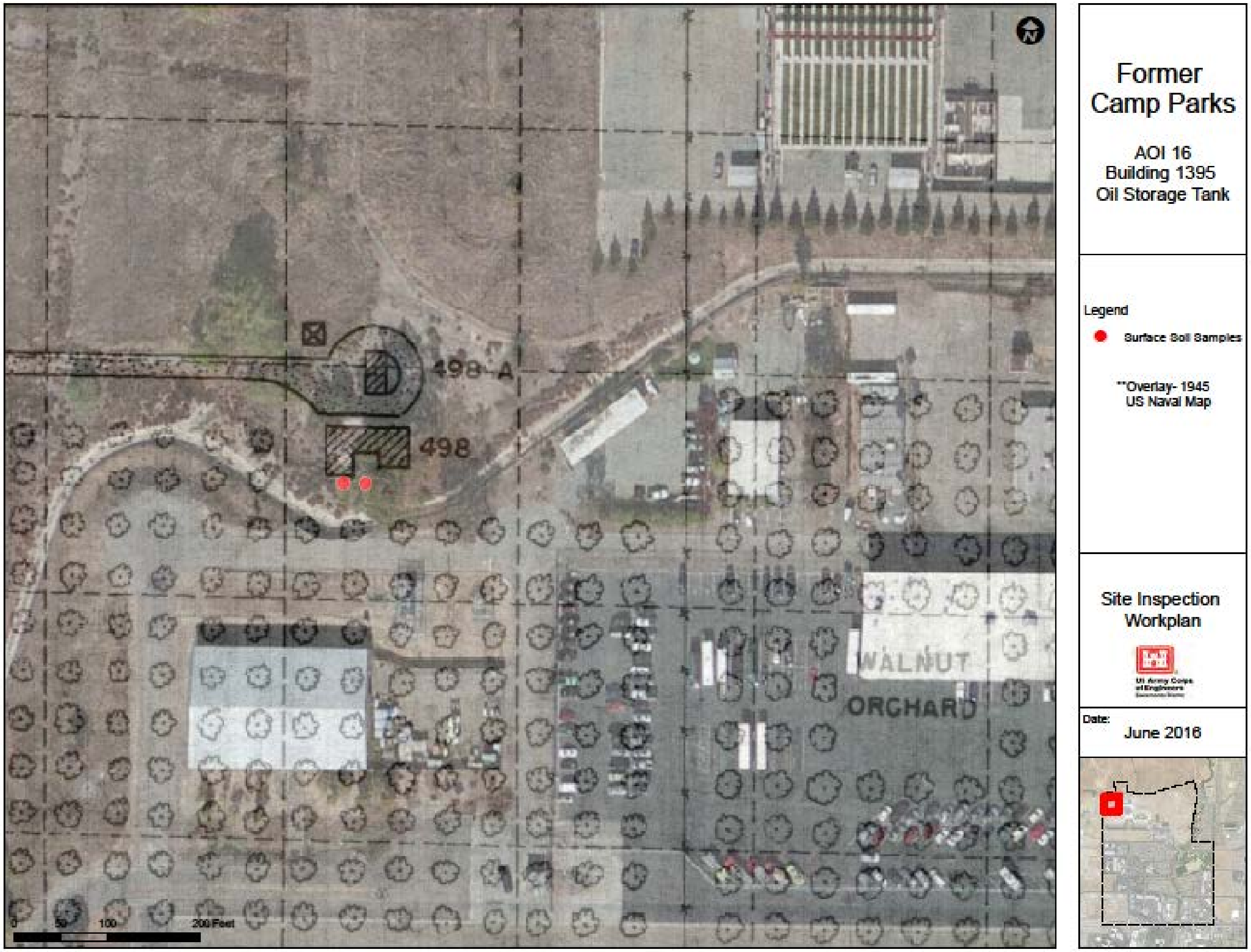

Figure 5-8 AOI 16 Sampling Locations

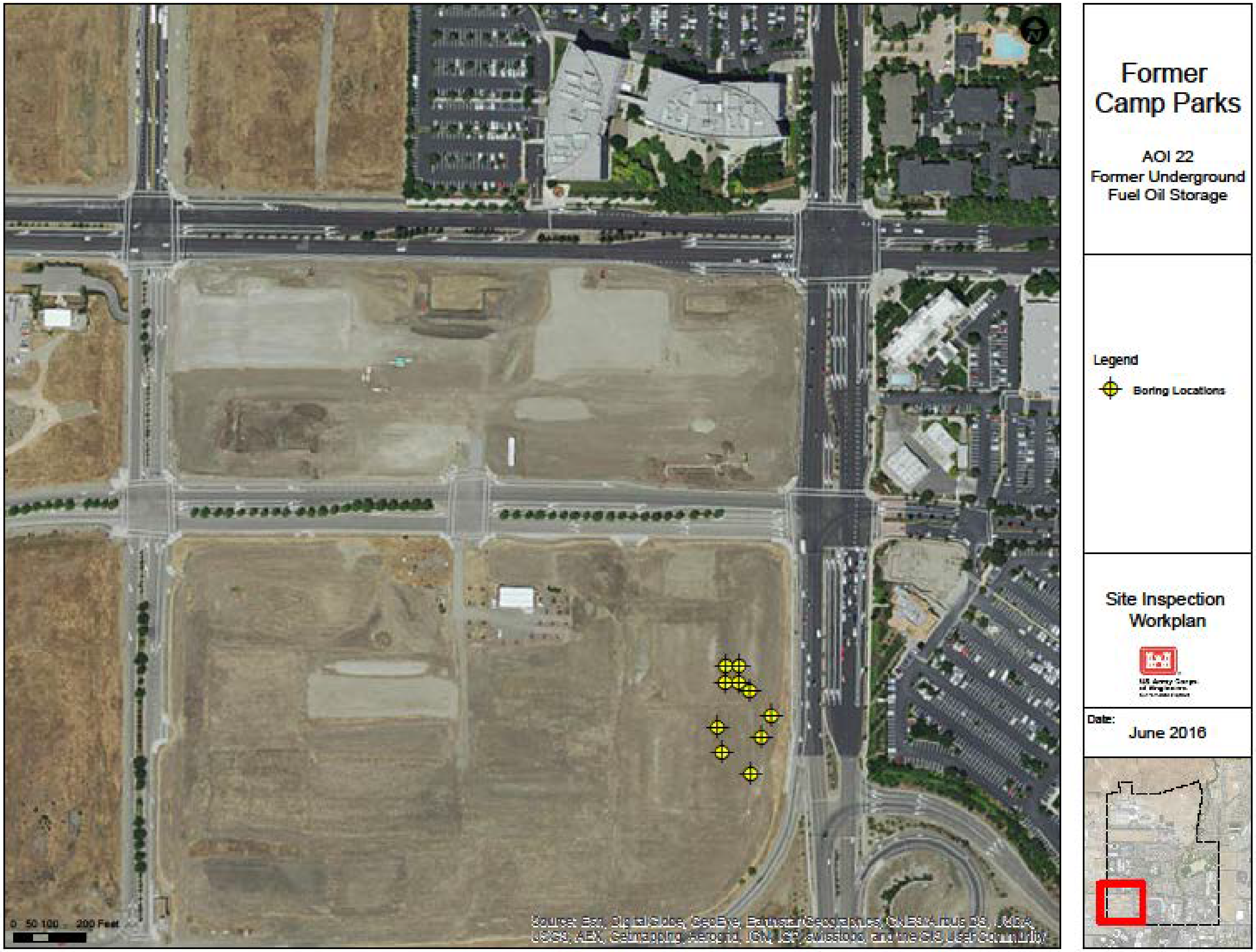

Figure 5-9 AOI 22 Boring Locations

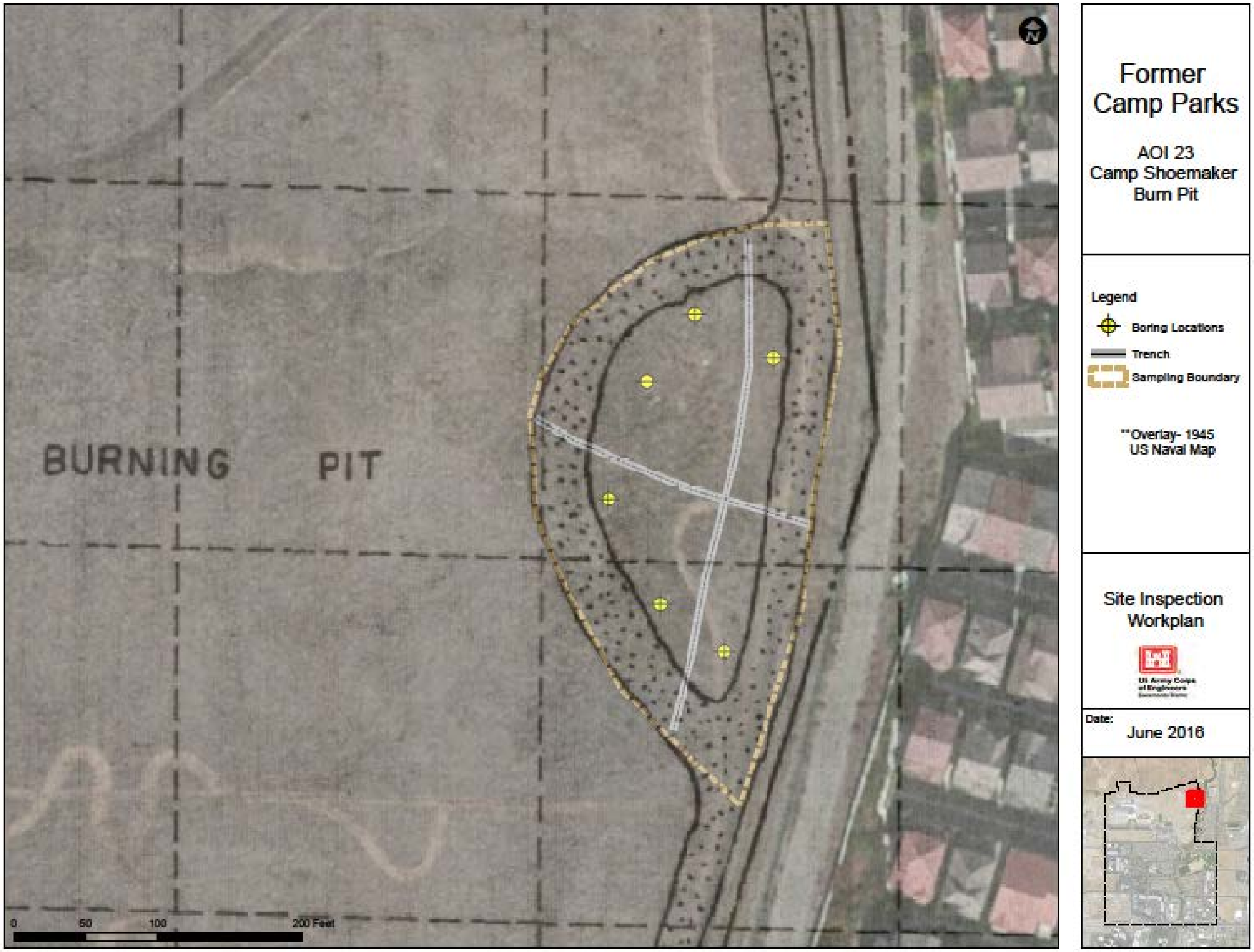

Figure 5-10 AOI 23 Boring and Trenching Locations

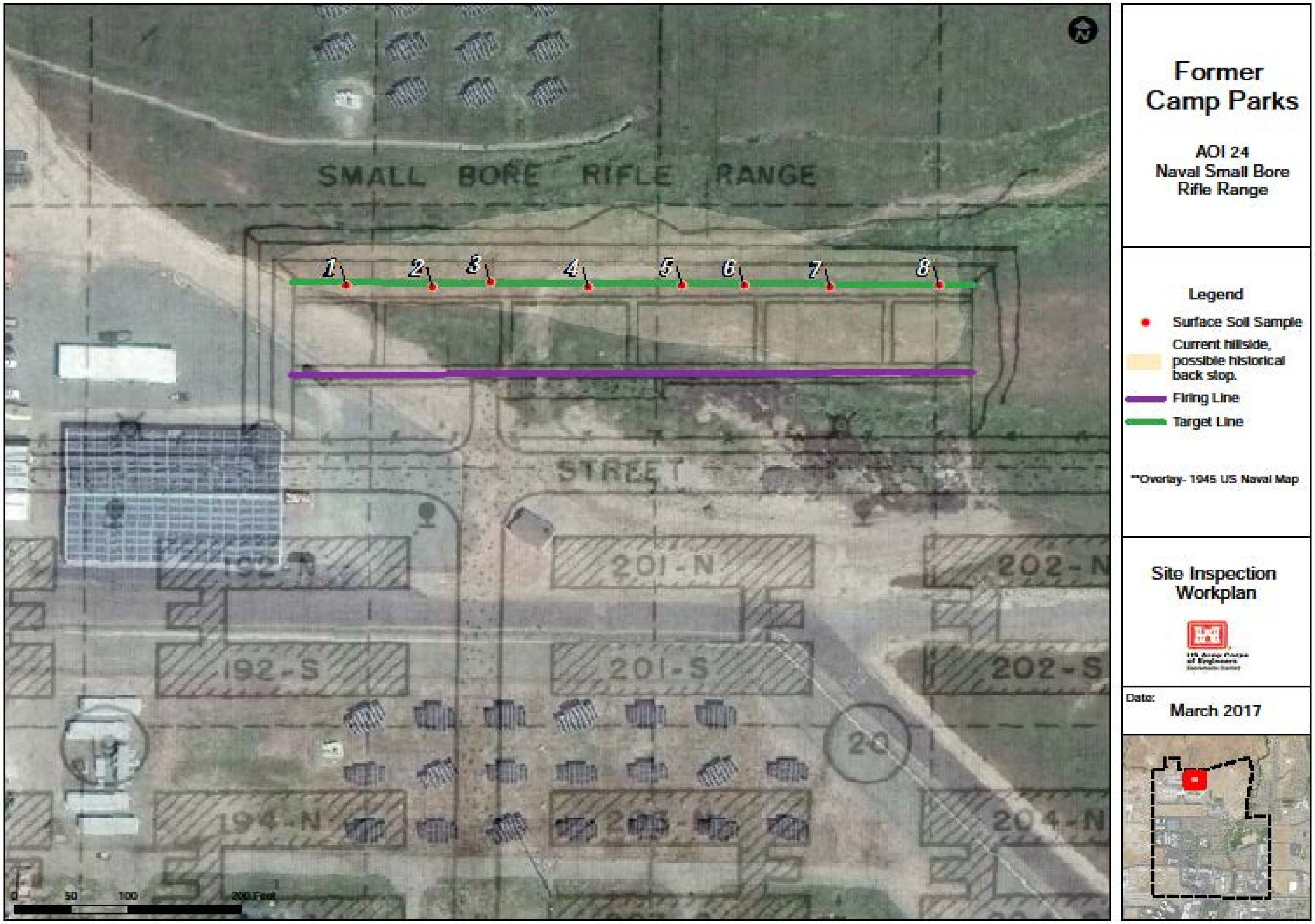

Figure 5-11 AOI 24 Sampling Locations

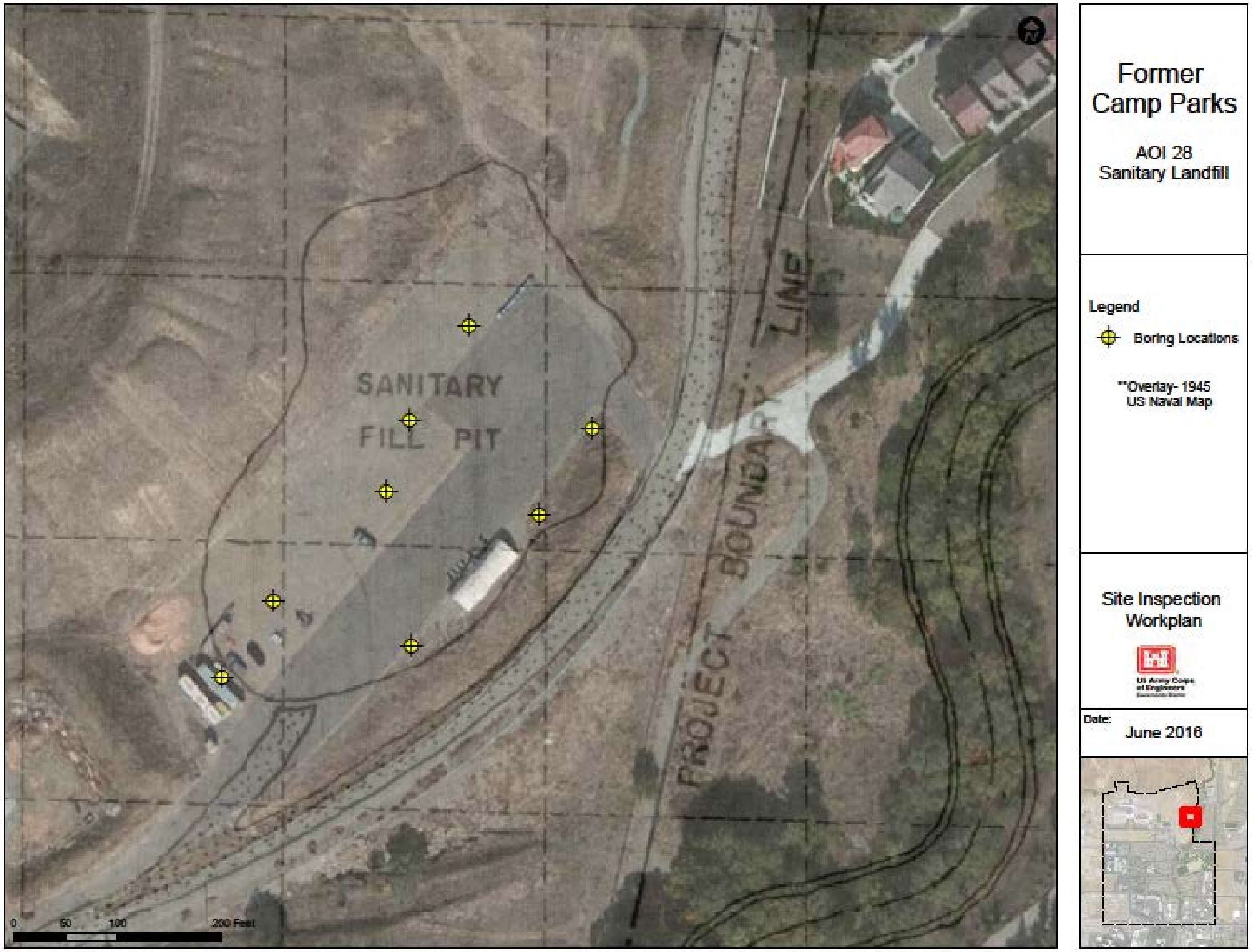

Figure 5-12 AOI 28 Boring Locations

5.13 WORKSHEET #18: SAMPLING LOCATIONS AND METHODS

Sample locations have been chosen based upon historical information and professional judgment (based on historical practices, likely areas of potential release based on topography, building location, etc.). As the number of samples taken will actually depend on field conditions and depth to groundwater an example ID is included below.

Example: AOI16-SI-S-5-001-D

AOI: AOI identification
SI: Site Inspection
S: sample type (S=soil, G=groundwater)
5: sample depth in feet
001: Sequential designation for that site
D: duplicate (if needed) EB: Equipment Blank

The number of samples planned is listed in Worksheet #20 and proposed locations can be seen on Figures 5-8 through 5-12.

5.14 WORKSHEET #19 & 30: SAMPLE CONTAINERS, PRESERVATION, AND HOLD TIMES

Laboratory: **CURTIS & TOMPKINS, LTD.** [1]
2323 5TH STREET
BERKELEY, CA 94710
(510)204-2221

Required accreditations/certifications: NELAP certification and DoD ELAP accreditation

Accreditation / certifications expiration date: NELAP Certificate Number 4044-03 expires 1/29/2017

DoD ELAP accreditation
Certificate Number: L2442 expires 2/23/2017

Sample Delivery Method: Courier

Analyte Group	Matrix	Method	Container(s) number (size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Analytical TAT
VOCs	Soil	8260C/5035	3 ea - 5 gram EnCore or equivalent	0 - 6°C	48 hours to preservation or freeze immediately	14 days from preservation or 14 days if frozen	21 days
VOCs	Water	8260C	3 ea – 40 ml VOA vial	0 - 6°C/Hydrochloric Acid to pH < 2	none	14 days from sampling	21 days
TPH VOCs	Soil	8015D/5035	3 ea - 5 gram EnCore or equivalent	0 - 6°C	48 hours to preservation or freeze immediately	14 days from preservation or	21 days

Analyte Group	Matrix	Method	Container(s) number (size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Analytica l TAT
						14 days if frozen	
TPH VOCs	Water	8015D	3 ea – 40 ml VOA vial	0 - 6°C/Hydrochloric Acid to pH < 2	none	14 days from sampling	21 days
TPH SVOCs	Soil	8015D	1 ea – 4 oz precleaned Amber glass jar	0 - 6°C	14 days	40 days	21 days
TPH SVOCs	Water	8015D	1 ea – 1000 ml precleaned Amber glass bottle	0 - 6°C	7 days	40 days	21 days
SVOCs	Soil	PAH 8270 SIM	1 ea – 4 oz precleaned Amber glass jar	0 - 6°C	14 days	40 days	21 days
SVOCs	Water	PAH 8270 SIM	1 ea – 1000 ml precleaned Amber glass bottle	0 – 6°C	7 days	40 days	21 days
SVOCs	Soil	8270D	1 ea – 4 oz precleaned Amber glass jar	0 – 6°C	14 days	40 days	21 days
SVOCs	Water	8270D	1 ea – 1000 ml precleaned Amber glass bottle	0 – 6°C	7 days	40 days	21 days
SVOCs	Soil	8290A	1 ea – 4 oz precleaned Amber glass jar	0 - 6°C	30 days	40 days	21 days
SVOCs	Water	8290A	1 ea – 1000 ml precleaned Amber glass bottle	0 - 6°C	30 days	40 days	21 days
Metals	Soil	6010D/6020B /7471B	1 ea – 4 oz precleaned glass jar	none	none	6 months	21 days
Metals	Water	6010D/6020B /7470A	1 ea – 250 ml poly bottle (filtered) for dissolved metals	HNO3 to pH<2	none	6 months	21 days

[1] Method SW8290A will be performed by Cape Fear Analytical LLC, Wilmington NC, a DoD accredited laboratory.

5.15 WORKSHEET #20: FIELD QC SUMMARY

AOI 16 Building 1395 Oil Storage tank

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Soil	TPH Extractable Diesel, Motor Oil, Bunker C	2	0	0	0	0	0	0	N/A	2
Soil	PAH 8270 SIM naphthalene	2	0	0	0	0	0	0	N/A	2

AOI 22 Former Underground Fuel Oil Storage Depot

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Soil	TPH Extractable Diesel, Motor Oil, Bunker C	10	1	1	1	0	2	0	N/A	15
Soil	TPH Volatile Gasoline, BTEX, MTBE	10	1	1	1	0	2	0	N/A	15
Soil	PAH 8270 SIM	10	1	1	1	0	2	0	N/A	15
Soil	Lead 6010 D	10	1	1	1	0	2	0	N/A	15
Water	TPH Extractable Diesel, Motor Oil, Bunker C	10	1	1	1	0	1	0	N/A	14
Water	TPH Volatile Gasoline, BTEX, MTBE	10	1	1	1	0	1	3	N/A	17

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Water	PAH 8270 SIM	10	1	1	1	0	1	0	N/A	14
Water	Lead 6010 D	10	1	1	1	0	1	0	N/A	14

AOI 23 Camp Shoemaker Burn Pit

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Soil	SW8290A	12	1	0	0	0	1	0	N/A	14
Soil	SW8260C	37	3	2	2	0	2	0	N/A	46
Soil	TPH Volatile Gasoline	37	3	2	2	0	2	0	N/A	46
Soil	SW8270D	37	3	2	2	0	2	0	N/A	46
Soil	PAH 8270 SIM	37	3	2	2	0	2	0	N/A	46
Soil	TPH Extractable Diesel, Motor Oil, Bunker C	37	3	2	2	0	2	0	N/A	46
Soil	CAM 17 Metals	37	3	2	2	0	2	0	N/A	46
Water	SW8290A	1	0	0	0	0	1	0	N/A	2
Water	SW8260C	1	0	0	0	0	1	1	N/A	3
Water	TPH Volatile Gasoline	1	0	0	0	0	1	1	N/A	3
Water	SW8270D	1	0	0	0	0	1	0	N/A	2
Water	PAH 8270 SIM	1	0	0	0	0	1	0	N/A	2
Water	TPH Extractable	1	0	0	0	0	1	0	N/A	2

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
	Diesel, Motor Oil, Bunker C									
Water	CAM17 Metals	1	0	0	0	0	1	0	N/A	2

AOI 24 Naval Small Bore Rifle Range

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Soil	Metals Lead only	16	2	1	1	0	0	0	N/A	20

AOI 28 Hickman Road Sanitary Fill Area

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Soil	SW8260C	16	1	1	1	0	1	0	N/A	20
Soil	SW8270D	16	1	1	1	0	1	0	N/A	20
Soil	PAH 8270 SIM	16	1	1	1	0	1	0	N/A	20
Soil	CAM 17 Metals	16	1	1	1	0	1	0	N/A	20
Water	SW8260C	4	1	1	1	0	1	2	N/A	10
Water	SW8270D	4	1	1	1	0	1	0	N/A	8
Water	PAH 8270 SIM	4	1	1	1	0	1	0	N/A	8
Water	CAM17 Metals	4	1	1	1	0	1	0	N/A	8

5.16 WORKSHEET #21: FIELD SAMPLING SOPS

5.16.1 Sampling

All samples will be collected using applicable field procedures to avoid dirtying pre-cleaned equipment or cross contaminating samples. Clean disposable gloves will be worn for each sample collection point. Soil samples will be collected by advancing a hollow sampling tube at the designated depth. After the core has been retrieved, each sample for laboratory analysis will be immediately transferred into an appropriate sample container.

Exact depths of soil samples will be determined in the field based on PID readings, odor, and changes in lithology. When groundwater is reached soil sampling will cease and a temporary well will be installed to collect a groundwater sample. The well will be purged using low flow techniques, and a groundwater sample will be collected after excess sediment has been removed from the well, draw down has stabilized, and turbidity is not visible to the eye.

Samples will be collected for the most volatile methods to the least volatile methods. Samples for VOC analysis will be collected first using EnCore or TerraCore soil sample devices following the instruction sheet from the manufacture received with the sample kit from the laboratory. These types of samplers will minimize loss of volatile analytes from the soil during sample collection and shipment to the laboratory.

5.16.2 Sample Shipping

Samples will be shipped to the laboratory following the packaging, shipping and custody requirements outlined in WS#27.

SOP # or reference	Title, Revision, Date	Originating Organization	Sample Type	Modified for Project? Y/N	Comments
Environmental Field Sampling Handbook	DoD Environmental Field Sampling Handbook, April 2013	USACE	Soil	No	Sample documentation, packaging, shipping, and chain of custody requirements.

5.17 WORKSHEET #22: FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION

A methane detector and UVOST will be supplied and maintained by the drilling contractor.

5.18 WORKSHEET #23: ANALYTICAL SOP’S

SOP Reference	Title, Revision Date and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project? Y/N
VOC 2.4	Volatile Organic Compounds by GC/MS, Rev.12	Definitive	Volatile Organics (VOC)	GC/MS	C&T	N
VOC 7.1	TPH-Gasoline & MBTXE by Purge & Trap GC/FID-PID, Rev.23	Definitive	Volatile Organics (VOC)	GC/FID-PID	C&T	N
XLAB 2.2.1	Automated Liquid-Liquid Extraction of Water Samples for Total Extractable Hydrocarbons (TPH-D/MO), Rev.15	Definitive	Semivolatile Organics (SVOC)	n/a	C&T	N
XLAB 3.2.6	Sonication Extraction of Soil Samples for Total Extractable Hydrocarbons (TPH-D/MO), Rev.4	Definitive	Semivolatile Organics (SVOC)	n/a	C&T	N
SVOC 5.1	Total Extractable Hydrocarbons (TPH-D/MO) by GC/FID, Rev.19	Definitive	Semivolatile Organics (SVOC)	GC/FID	C&T	N
XLAB 2.2.7.1	Automated Liquid-Liquid Extraction of Water Samples for 8270-SIM, Rev.5	Definitive	Semivolatile Organics (SVOC)	n/a	C&T	N
XLAB 3.2.5.1	Sonication Extraction of Soil & Solid Samples for 8270-SIM, Rev.5	Definitive	Semivolatile Organics (SVOC)	n/a	C&T	N
SVOC 8.2	Polynuclear Aromatic Hydrocarbons & 1,4-Dioxane by 8270-SIM, Rev.6	Definitive	Semivolatile Organics (SVOC)	GC/MS	C&T	N
MET 2.2	Digestion of Aqueous Samples for Total Metals by ICP-AES, Rev.17	Definitive	Trace Metals	n/a	C&T	N

SOP Reference	Title, Revision Date and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project? Y/N
MET 2.4	Acid Digestion of Soil & Solid Samples for Total Metals by ICP-AES and ICP-MS, Rev.15	Definitive	Trace Metals	n/a	C&T	N
MET 2.5	Digestion of Aqueous Samples for Total Metals by ICP-MS, Rev.8	Definitive	Trace Metals	n/a	C&T	N
MET 4.4	ICP Metals Analysis, Rev.18	Definitive	Trace Metals	ICP-AES	C&T	N
MET 4.6	Metals by ICP-MS, Rev.10	Definitive	Trace Metals	ICP-MS	C&T	N
MET 5.1	Digestion & Analysis of Aqueous Samples for Mercury, Rev.18	Definitive	Trace Metals	CVAA	C&T	N
MET 5.2	Digestion & Analysis of Solid Samples for Mercury	Definitive	Trace Metals	CVAA	C&T	N
SVOC 8.1	Semivolatile Organic Compounds by GC/MS	Definitive	Semivolatile Organics	GS/MS	C&T	N
Cape Fear	Dioxin/Furans by GC/MS/MS 8290A	Definitive	Semivolatile Organics	GS/MS/MS	Cape Fear	N

1 GC/MS, Gas Chromatography/Mass Spectrometry
2 GC/FID, Gas Chromatography / Flame Ionization Detector

5.19 WORKSHEET #24: ANALYTICAL INSTRUMENT CALIBRATION

VOCs by GC/MS (EPA 8260C)
Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC/MS	BFB Tune	Prior to ICAL and at the beginning of each 12hr shift. ≤ 50ng BFB	BFB ion abundance as listed in method	Identify & correct problem. No samples may be analyzed without a valid tune association.	Laboratory analyst	VOC 2.4
GC/MS	Initial Calibration (ICAL)	When new instrument is installed, after major maintenance, and whenever CCVs fail. Minimum of 5 points (or 6 points for quadratic)	Minimum RRF as defined in method (8260C Table 4). Avg RRF RSD <15%, Linear r ≥0.995; Quadratic r2 ≥0.99	Perform maintenance & recalibrate.	Laboratory analyst	VOC 2.4
GC/MS	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis	Minimum RRF as defined in method. %D ≤ 20% for all target analytes.	Perform maintenance & recalibrate. If samples were analyzed, non-detects associated with a high response may be reported.	Laboratory analyst	VOC 2.4
GC/MS	Continuing Calibration Verification (CCV)	At beginning of each 12hour shift, immediately following the BFB	Minimum RRF as defined in the method. Opening CCV %D ≤ 20 Closing CCV %D ≤ 50	Perform maintenance & recalibrate if necessary. Non-detects associated	Laboratory analyst	VOC 2.4

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
		Closing CCV analyzed at end of sequence, within 12 hours of opening CCV.		with a high response may be reported; rerun all others.		
GC/MS	Internal Standards	Each sample & QC sample	RT ±30 seconds from the ICAL mid-point std. Area within 50 - 200% of ICAL mid-point standard	Reanalyze affected samples. Flag and narrate if confirmed by reanalysis.	Laboratory analyst	VOC 2.4
GC/MS	Retention Time Window	Each sample & QC sample	RRT within ±0.06 RRT of the ICAL midpoint or opening CCV (on days that an ICAL is not run)	Update RRTs based on opening CCV. If still out, perform maintenance and recalibrate.	Laboratory analyst	VOC 2.4

Polynuclear Aromatic Hydrocarbons (EPA 8270-SIM)
Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC/MS	Tune Check Standard	Beginning of each 12 hour analytical shift ≤50ng DFTPP	Ion abundance criteria as specified in the method	Retune instrument; if still out, perform instrument maintenance, retune and recalibrate	Laboratory analyst	SVOC 8.2
GC/MS	Initial Calibration (ICAL)	Prior to sample analysis or whenever CCVs fail and maintenance does not correct the problem Minimum of 5 points for average response or linear regression, 6 points required for 2nd order (quadratic) regression. Low point at or below the LOQ.	Avg RRF %RSD ≤ 15, Linear regression coefficient r ≥ 0.995; Quadratic coefficient $r^2 \geq 0.99$ Minimum response as specified in the method. Relative Retention Time: Each analyte within ±0.05 min of mean RRT of curve; internal Standards within 30sec of the CCV	Perform maintenance & recalibrate.	Laboratory analyst	SVOC 8.2
GC/MS	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis	%D ≤ 20	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	SVOC 8.2
GC/MS	Continuing Calibration	Beginning of every 12-hour tune shift, after the	Opening CCV %D ≤ 20 Closing CCV %D ≤ 50	Perform maintenance & recalibrate if	Laboratory analyst	SVOC 8.2

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
	Verification (CCV)	BFB Tune Standard and before samples. Ending CCV analyzed at end of sequence, within 12 hours of opening CCV.		necessary. Non-detects associated with a high response may be reported; rerun all others.		
GC/MS	Internal Standards	Added to every standard, batch QC sample and field sample	Area with 50-200% of the ICAL midpoint standard. Retention Time within +/- 0.167 minutes of the CCV	Perform instrument maintenance and reanalyze. If the failure is repeated, dilute and reanalyze for compounds associated with failing IS.	Laboratory analyst	SVOC 8.2

TPH Extractable Organics by GC-FID (EPA 8015D)
Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC-FID	Initial Calibration (ICAL)	When a new instrument is installed, major maintenance is performed, or when CCVs do not pass and minor maintenance does not correct the problem. Minimum of 5 points and a blank	Avg Response RSD $\leq$ 20%	Perform maintenance & recalibrate.	Laboratory analyst	SVOC 5.1
GC-FID	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis	%D $\leq$ 20	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	SVOC 5.1
GC-FID	Retention Time Verification (Carbon Markers)	At beginning of each sequence	Each alkane marker must fall within the expected RT window.	Update method and reprocess any data associated with the carbon ranges affected by the change.	Laboratory analyst	SVOC 5.1
GC-FID	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the sequence	%D $\leq$ 20	Perform maintenance & recalibrate if necessary. Non-detects associated with a high response may be reported; rerun all others.	Laboratory analyst	SVOC 5.1

TPH Volatile Organics by GC-FID (EPA 8015D)
Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC-FID	Initial Calibration (ICAL)	When a new instrument is installed, major maintenance is performed, or when CCVs do not pass and minor maintenance does not correct the problem. Minimum of 5 points and a blank	Avg Response RSD ≤ 20%	Perform maintenance & recalibrate.	Laboratory analyst	VOC 7.1
GC-FID	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis	%D ≤ 20	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	VOC 7.1
GC-FID	Retention Time Verification (Carbon Markers)	At beginning of each sequence	Each alkane marker must fall within the expected RT window.	Update method and reprocess any data associated with the carbon ranges affected by the change.	Laboratory analyst	VOC 7.1
GC-FID	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the sequence	%D ≤ 20	Perform maintenance & recalibrate if necessary. Non-detects associated with a high response may be reported; rerun all others.	Laboratory analyst	VOC 7.1

ICP Metals (EPA 6010C)

Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
ICP-AES	Initial Calibration (ICAL)	Daily, prior to sample analysis or whenever CCVs fail and maintenance does not correct the problem. Minimum 3 points + a blank	Linear coefficient: r $\geq$ 0.995	Perform maintenance & recalibrate.	Laboratory analyst	MET 4.4
ICP-AES	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis, using a second source standard	%D $\leq$ 10	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	MET 4.4
ICP-AES	Low Level ICV (LLICV, CRI)	Concentration $\leq$LOQ; run after mid-level ICV and before samples	%D $\leq$ 20%	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	MET 4.4
ICP-AES	Initial Calibration Blank (ICB)	After ICV and before samples	< LOD	Flush system and rerun. If contamination persists, perform instrument maintenance and recalibrate.	Laboratory analyst	MET 4.4
ICP-AES	Interference Check Standard A (ICS-A)	Beginning of each sequence, after the ICAL and before samples	Unspiked elements: < | LOQ/RL |	Perform instrument maintenance and rerun any elements that are not verified trace impurities from	Laboratory analyst	MET 4.4

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
				one of the spiked analytes.		
ICP-AES	Interference Check Standard A (ICS-AB)	Beginning of each sequence, after the ICAL and before samples	%D ≤ 20	Perform instrument maintenance and rerun any samples requiring affected elements.	Laboratory analyst	MET 4.4
ICP-AES	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the sequence	%D ≤ 10	Perform maintenance & recalibrate if necessary. Non-detects associated with a high response may be reported; rerun all others.	Laboratory analyst	MET 4.4
ICP-AES	Continuing Calibration Blank (CCB)	After each CCV	<1/2 LOQ	Flush system and rerun. If contamination persists, perform instrument maintenance and recalibrate.	Laboratory analyst	MET 4.4

ICP-MS Metals (EPA 6020A)
Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
ICP-MS	Tune Check	Beginning of analytical sequence, prior to ICAL, and every 12 hours	Resolution and precision as specified in the method	Retune instrument and rerun check; if still out, perform instrument maintenance and retune instrument, then rerun tune check.	Laboratory analyst	MET 4.6
ICP-MS	Initial Calibration (ICAL)	Daily, prior to sample analysis or whenever CCVs fail and maintenance does not correct the problem. Minimum 3 points + a blank	Linear coefficient: $r \geq 0.995$	Perform maintenance & recalibrate.	Laboratory analyst	MET 4.6
ICP-MS	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis, using a second source standard	$\%D \leq 10$	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	MET 4.6
ICP-MS	Low Level ICV (LLICV, CRI)	Concentration $\leq$LOQ; run after mid-level ICV and before samples	$\%D \leq 20\%$	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	MET 4.6
ICP-MS	Initial Calibration Blank (ICB)	After ICV and before samples	< LOD	Flush system and rerun. If contamination persists, perform instrument	Laboratory analyst	MET 4.6

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
				maintenance and recalibrate.		
ICP-MS	Interference Check Standard A (ICS-A)	Beginning of each sequence, after the ICAL and before samples	Unspiked elements: < | LOQ |	Perform instrument maintenance and rerun any elements that are not verified trace impurities from one of the spiked analytes.	Laboratory analyst	MET 4.6
ICP-MS	Interference Check Standard A (ICS-AB)	Beginning of each sequence, after the ICAL and before samples	%D ≤ 20	Perform instrument maintenance and rerun any samples requiring affected elements.	Laboratory analyst	MET 4.6
ICP-MS	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the sequence	%D ≤ 10	Perform maintenance & recalibrate if necessary. Non-detects associated with a high response may be reported; rerun all others.	Laboratory analyst	MET 4.6
ICP-MS	Continuing Calibration Blank (CCB)	After each CCV	<1/2 LOQ	Flush system and rerun. If contamination persists, perform instrument maintenance and recalibrate.	Laboratory analyst	MET 4.6
ICP-MS	Internal Standards	Add to every sample, batch QC, and standard	%Recovery: 30-120	Dilute and reanalyze for elements associated with failing IS	Laboratory analyst	MET 4.6

Mercury by CVAA (EPA 7470A, EPA 7471B)
Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
CVAA	Initial Calibration (ICAL)	Daily, prior to sample analysis. Minimum of 5 points and a blank	Coefficient (r) $\geq$ 0.995 – or r^2 $\geq$ 0.99	Perform maintenance & recalibrate.	Laboratory analyst	MET 5.1, MET 5.2
CVAA	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis	%D $\leq$ 10	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	MET 5.1, MET 5.2
CVAA	Initial Calibration Blank (ICB)	After ICV and before samples	<LOD	Flush system and rerun. If contamination persists, perform instrument maintenance and recalibrate.	Laboratory analyst	MET 5.1, MET 5.2
CVAA	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the sequence	%D $\leq$ 10	Perform maintenance & recalibrate if necessary. Non-detects associated with a high response may be reported; rerun all others.	Laboratory analyst	MET 5.1, MET 5.2
CVAA	Continuing Calibration Blank (CCB)	After each CCV	<LOD	Flush system and rerun. If contamination persists, perform	Laboratory analyst	MET 5.1, MET 5.2

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
				instrument maintenance and recalibrate.		

SVOCs by GC/MS (EPA 8270D)

Analytical Laboratory: Curtis & Tompkins, Ltd.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC/MS	Tune Check Standard	Prior to ICAL and prior to each 12-hour period of sample analysis.	Ion abundance criteria as specified in the method	Retune instrument and verify.	Laboratory analyst	SVOC 8.1
GC/MS	**Performance Check**	At the beginning of each 12-hour period, prior to analysis of samples.	Degradation ≤ 20% for DDT. Benzidine and pentachlorphenol shall be present at their normal responses, and shall not exceed a tailing factor of 2.	Correct problem, then repeat performance checks.	Laboratory analyst	SVOC 8.1
GC/MS	Initial Calibration (ICAL)	At instrument set-up, prior to sample analysis	Each analyte must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%;	Perform maintenance & recalibrate.	Laboratory analyst	SVOC 8.1

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
			Option 2: linear least squares regression for each analyte: $r^2 \geq 0.99$; Option 3: non-linear least squares regression (quadratic) for each analyte: $r^2 \geq 0.99$.			
GC/MS	Initial Calibration Verification (ICV)	Immediately following ICAL curve, prior to sample analysis	%D $\leq$ 20	Perform maintenance & rerun. If still out, recalibrate.	Laboratory analyst	SVOC 8.1
GC/MS	Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	Opening CCV %D $\leq$ 20 Closing CCV %D $\leq$ 50	Perform maintenance & recalibrate if necessary. Non-detects associated with a high response may be reported; rerun all others.	Laboratory analyst	SVOC 8.1
GC/MS	Internal Standards	Added to every standard, batch QC sample and field sample	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	Laboratory analyst	SVOC 8.1

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC?MS	**Retention Time window position establishment**	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA	Laboratory analyst	SVOC 8.1
GC?MS	**Evaluation of Relative Retention Times (RRT)**	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	Laboratory analyst	SVOC 8.1

Dioxin/Furans by GC/MS (EPA 8290A)
Analytical Laboratory:

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC/MS/MS	**Resolving Power**	Prior to ICAL and prior to each 12-hour period of sample analysis.	Static resolving power ≥ 10,000 (10% valley) for identified masses.	Retune instrument and verify. Rerun affected samples	Laboratory analyst	Cape Fear LLC
GC/MS/MS	**Performance Check**	Prior to ICAL or calibration verification. At the beginning of each 12-hr period during which samples or calibration solutions are analyzed.	Peak separation between 2,3,7,8-TCDD and other TCDD isomers: Resolved with a valley of ≤ 25%. Identification of all first and last eluters of the eight homologue	Correct problem, then repeat performance checks.	Laboratory analyst	Cape Fear LLC

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
			retention time windows and documentation by labeling (F/L) on the chromatogram. Absolute retention times for switching from one homologous series to the next ≥ 10 sec. for all components of the mixture			
GC/MS/MS	**Initial calibration (ICAL) for all analytes identified in method**	At instrument setup and after ICV or CCV failure, prior to sample analysis, and when a new lot is used as standard source for HRCC-3, sample fortification (IS), or recovery solutions.	Ion abundance ratios in accordance with the method. S/N ratio ≥ 10 for all reported analyte ions. RSD ≤ 20% for the response factors (RF) for all 17 unlabeled standards. RSD ≤ 20% for the RFs for the 9 labeled IS.	Correct problem, then repeat ICAL.	Laboratory analyst	Cape Fear LLC
GC/MS/MS	**Initial Calibration Verification (ICV)**	Once after each ICAL, analysis of a second source standard prior to sample analysis.	Ion abundance specified in the method must be met;. For unlabeled standards, RF within ± 20% D of RF established in ICAL; and For labeled standards, RF within ± 30%D of the mean of RF established in ICAL.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Laboratory analyst	Cape Fear LLC

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
GC/MS/MS	**Calibration Verification (CCV)**	At the beginning of each 12-hour period, and at the end of each analytical sequence.	Ion abundance specified in the method must be met. For unlabeled standards, RF within ± 20% D of RF established in ICAL; and For labeled standards, RF within ± 30% D of RF established in ICAL.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV. End-of-run CCV: If the RF for unlabeled standards ≤ 25% RPD and the RF for labeled standards ≤ 35% RPD (relative to the RF established in the ICAL), the mean RF from the two daily CCVs must be used for quantitation of impacted samples instead of the ICAL mean RF value. If the starting and ending CCVRFs differ by more than 25% RPD for unlabeled compounds or 35% RPD for labeled compounds, the sample	Laboratory analyst	Cape Fear LLC

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person responsible for Corrective Action	SOP Reference
				may be quantitated against a new initial calibration if it is analyzed within two hours. Otherwise analyze samples with positive detections, if necessary		
GC/MS/MS	**Internal Standards (IS)**	Every field sample, standard, and QC sample.	% Recovery for each IS in the original sample (prior to dilutions) must be within 40 – 135% of the ICAL average RF.	Correct problem, then re-prep and reanalyze the samples with failed IS.	Laboratory analyst	Cape Fear LLC

5.20 WORKSHEET #25: ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
GC/MS	Check syringe. Change septa and liner. Clip column.	8270-SIM	Visual inspection	Daily, prior to opening CCV.	Opening CCV within acceptance limits.	Re-clip column	Laboratory Analyst	SVOC 8.2
GC/MS	Perform leak check of column and ferrules.	8270-SIM	Establish and/or verify calibration curve	Weekly or whenever CCVs do not meet acceptance criteria.	ICAL correlation coefficient within acceptance limits. ICV/CCV %D within limits.	Replace ferrules and reset column.	Laboratory Analyst	SVOC 8.2
GC/MS	Clean ion source	8270-SIM	Analyze tune, CCVs or ICAL	When tune, CCVs or ICAL will not pass.	New tune and ICAL are within acceptance criteria.	Retune and recalibrate	Laboratory Analyst	SVOC 8.2

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
GC/MS	Replace Column	8270-SIM	Analyze CCVs	When peak resolution deteriorates or when a new ICAL does not pass acceptance criteria	Good peak resolution. ICAL within acceptance limits.	Check for leaks. Recondition column or clean ion source.	Laboratory Analyst	SVOC 8.2
GC/FID	Check syringe. Change septa and liner. Clip column.	DRO/ORO	Visual inspection	Daily, prior to opening CCV.	Opening CCV within acceptance limits.	Re-clip column	Laboratory Analyst	SVOC 5.1
GC/FID	Perform leak check of column and ferrules.	DRO/ORO	Establish and/or verify calibration curve	Weekly or whenever CCVs do not meet acceptance criteria.	ICAL correlation coefficient within acceptance limits. ICV/CCV %D within limits.	Replace ferrules and reset column.	Laboratory Analyst	SVOC 5.1

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
GC/FID	Replace Column	DRO/ORO	Analyze CCVs	When CCVs fail and a new ICAL does not pass acceptance criteria	ICAL within acceptance limits. ICV/CCV %D within limits.	Check for leaks. Recondition column or replace detector if needed.	Laboratory Analyst	SVOC 5.1
GC/FID	Perform leak check of column and ferrules.	GRO	Establish and/or verify calibration curve	When CCVs exhibit an unusually low response or Alkane RT markers exhibit tailing.	ICAL correlation coefficient within acceptance limits. ICV/CCV %D within limits.	Replace ferrules and reset column.	Laboratory Analyst	SVOC 7.1
GC/FID	Change the trap	GRO	Analyze CCVs	When response drops or after a sample foams over	CCV passes	Bake trap, replace trap, reanalyze CCV	Laboratory Analyst	VOC 7.1
GC/FID	Replace Column	GRO	Analyze CCVs	When peak resolution deteriorates or an ICAL will	Good peak resolution. ICAL within	Check for leaks. Recondition column or	Laboratory Analyst	SVOC 7.1

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
				not pass acceptance criteria	acceptance limits.	replace detector if needed.		
ICP-AES	Change peristaltic pump tubing	Metals, except Mercury	Visually discolored or cracked, or when bubbles are present in the line.	Daily	ICAL & CCVs pass	Recondition or replace tubing	Laboratory Analyst	MET 4.4
ICP-AES	Clean nebulizer, spray chamber	Metals, except Mercury	Analyze CCV	When ICAL won't pass	ICAL passes	Replace parts, recalibrate	Laboratory Analyst	MET 4.4
ICP-AES	Clean or change torch	Metals, except Mercury	Analyze CCV	When torch alignment intensity drops	CCVs pass	Replace parts, recalibrate	Laboratory Analyst	MET 4.4
ICP-MS	Change peristaltic pump tubing	Metals, except Mercury	Visually discolored or cracked	Daily	ICAL & CCVs pass	Recondition or replace tubing	Laboratory Analyst	MET 4.6

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
ICP-MS	Clean nebulizer, spray chamber & torch	Metals, except Mercury	Analyze CCV	When CCVs fail	CCVs pass	Replace parts, recalibrate	Laboratory Analyst	MET 4.6
ICP-MS	Clean cones	Metals, except Mercury	Analyze CCV	When CCVs fail, low response is observed, or vacuum pressure increases	CCVs pass, pressure returns to normal	Replace parts, recalibrate	Laboratory Analyst	MET 4.6
ICP-MS	Clean extraction lens and Einzel lens assembly	Metals, except Mercury	Analyze Tune Std	When tune standard or calibrations will not pass	Tune & ICAL pass	Change lens stack, replace parts	Laboratory Analyst	MET 4.6
CVAA	Change peristaltic pump tubing	Mercury	Visually discolored or cracked	Daily	ICAL & CCVs pass	Recondition or replace tubing	Laboratory Analyst	MET 5.1, MET 5.2
CVAA	Clean drying tube (gas-	Mercury	Visually discolored,	When ICAL or CCVs fail	ICAL & CCVs pass	Replace parts, recalibrate	Laboratory Analyst	MET 5.1, MET 5.2

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
	liquid separator)		smudged or dirty					
CVAA	Change lamp	Mercury	Analyze ICAL	When low response is observed or voltage reaches 15mV	ICAL & CCVs pass; response returns to normal range	Replace lamp	Laboratory Analyst	MET 5.1, MET 5.2
P&T GC/MS	Change Trap	Volatile Organics		When responses drop or after a foam over sample	CCV passes	Bake trap, replace trap, reanalyze CCV, recalibrate	Laboratory Analyst	VOC 2.4
P&T GC/MS	Back-flush Lines	Volatile Organics	Analyze CCV	When CCV won't pass; after sample foamed over; high level sample analyzed	CCV passes, Blank clean	Backflush lines again, replace lines, recalibrate	Laboratory Analyst	VOC 2.4
P&T GC/MS	Change Column	Volatile Organics	Analyze CCV	When peak resolution deteriorates or	Good resolution,	Check for leaks, recondition column,	Laboratory Analyst	VOC 2.4

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person responsible for corrective action	SOP Reference
				ICAL will not pass	acceptable ICAL	replace column		
P&T GC/MS	Clean Ion Source	Volatile Organics	Analyze Tune Std	When BFB, CCV, or ICAL will not pass	Tune & ICAL pass	Change column, replace parts	Laboratory Analyst	VOC 2.4

5.21 WORKSHEET #26 & 27: SAMPLE HANDLING, CUSTODY, AND DISPOSAL

Sampling Organization: USACE, Sacramento District technical staff
Laboratory: Curtis & Tompkins, LTD.
Method of sample delivery: Courier

Activity		Organization responsible for the activity
Sample Collection, Packaging, And Shipment		
Sample labeling	As samples are collected	USACE field team
Chain-of-custody form completion	As samples are collected	USACE field team
Packaging	Daily	USACE field team
Shipping coordination	Daily	USACE field team
Sample Receipt And Analysis		
Sample receipt, inspection, & log-in	Upon receipt	Curtis & Tompkins, LTD.
Sample custody and storage	Upon receipt	Curtis & Tompkins, LTD.
Sample Archiving		
Field Sample Storage	30 days after receipt in laboratory	Curtis & Tompkins, LTD.
Sample Extract/Digestate Storage	30 days from extraction/digestion	Curtis & Tompkins, LTD.
Sample disposal	30 days after sample reports	Curtis & Tompkins, LTD.

5.21.1 Sample Handling and Custody Requirements

Custody is one of several factors, which are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final files.

A sample is considered under custody if:

- The item is in actual possession of a person; or
- The item is in the view of the person after being in actual possession of the person; or
- The item was in actual physical possession but is locked up to prevent tampering; or
- The item is in a designated and identified secure area.

5.21.2 Field Custody Procedures

Field logbooks will provide the means of recording data collecting activities performed. As such, entries will be described in as much detail as possible so that persons going to the facility could reconstruct a particular situation without reliance on memory. Field logbooks will be bound, field survey books or notebooks. Each logbook will be identified by the project-specific document number.

The title page of each logbook will contain the following:

- Person to whom the logbook is assigned.
- Logbook number.
- Project name.
- Project start date, and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of visitors to the site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook.

Measurements made and samples collected will be recorded. All entries will be made in ink, signed, and dated and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark which is signed and dated by the sampler. Samples will be collected from surveyed well locations. The number of the photographs taken of the station, if any, will also be noted. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in the QAPP on WS#21. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. Sample site-specific identification numbers will be assigned prior to sample collection.

5.21.3 Sample Chain of Custody (CoC) Information

The following information is included on each CoC form:

- Cooler number
- Laboratory
- Laboratory POC
- Project name & location
- USACE POC (chemist)
- Sample ID
- Date collected
- Time collected
- Matrix
- Number of sample containers
- Analyses required
- Samplers signature

5.21.4 Sample Packaging and Shipping

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact. An example of a field chain-of-custody form is found in the Attachments to this QAPP.

1. The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible should handle the samples.

2. All sample containers will be provided by the analytical laboratory. Soil sample containers will be I-Chem Superfund Analyzed™ (or equivalent) precleaned glass (formerly 300 series) with Teflon lined caps or septa. The USACE field lead will note (in a bound notebook) the materials received, condition, date of receipt, and whether or not the materials are acceptable.

3. All sample containers will be labeled. Sample numbers, sampling locations, date/time of collection, and type of analysis, will be included on the label and in the field notebook.

4. All samples will be accompanied by a properly completed CoC form. The CoC is to be completed using waterproof ink. The sample identification, required analyses and number of containers will be listed on the CoC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to the laboratory, or to/from a secure storage area.

5. Soil samples needing temperature preservation will be properly packaged with wet ice and maintained at 0-6 degrees Centigrade (°C) for shipment to the laboratory. Each sample cooler containing samples

that require temperature preservation will contain a temperature blank. The temperature blank is a separate bottle of water that should be packed in the middle of the site sample containers that require temperature preservation. WS#19 details sample preservation requirements.

6. Seal the completed chain of custody in a zip-bag and tape to the lid of the cooler retaining the correct (pink) copy. Soil sample shipping coolers will be locked and secured with strapping tape in at least two locations and custody seals for shipment to the laboratory. The preferred procedure for coolers is to attach a signed custody seal to the front right and back left of the cooler.

5.21.5 Laboratory Receipt and Custody

Once samples are received at the laboratory, the field CoC record is completed and signed by the individual Laboratory Sample Custodian. The Laboratory Sample Custodian will check the sample bottle labels against the corresponding information listed on the field CoC records and note any discrepancies. Additionally, the laboratory sample receipt personnel will note any damaged or missing sample containers. This information will be recorded on the field CoC record and/or in a separate logbook. The temperature of the cooler temperature blank included in each cooler of samples will also be recorded at the time of sample receipt by the laboratory personnel. This temperature will also be recorded on the field CoC record, cooler receipt form, and/or in a separate logbook. Any discrepancies in sample identifications, sample analysis information, any indication that samples are missing upon receipt at the laboratory, or any indication that samples not received at the correct pH or temperature (0°-6°C) will be communicated to the project chemist within 24 hours of sample receipt so that appropriate corrective action can be determined and implemented. Cooler receipt forms will be faxed to the project chemist within 24 hours of sample receipt.

After the sample receipt information is checked and recorded, sample analysis information will be entered into the individual Laboratory Information Management System (LIMS) (or equivalent). Each sample will be provided a unique laboratory identification number and the analysis tests requested on the CoC records entered into the LIMS. After the required information has been entered into the LIMS, the Laboratory Sample Custodian will initiate an internal laboratory CoC. The internal CoC will document the transfer of samples from the storage location to the analyst for analysis and subsequently through final disposition at the laboratory. At a minimum, the internal CoC will include client identification, laboratory sample number, sample matrix, signatures for relinquishing and receiving samples or sample extracts or digestates, and reasons for the change in custody (procedure to be performed).

Samples will be stored in secure, limited access areas in an environment that maintains any required temperature preservation noted in Worksheet 19. Samples are required to be refrigerated at a temperature of 0°-6°C. The temperature of the refrigerators or freezers used to store samples will be monitored by the project laboratories according to their internal standard operating procedures. Samples which do not require temperature preservation will be stored at room temperature. Disposal of unused raw sample volumes, sample extracts, and sample digestates will be in accordance with the laboratory's waste management procedures.

5.22 WORKSHEET #28: ANALYTICAL QUALITY CONTROL AND CORRECTIVE ACTION

Matrix: Water
Analytical Group: PAH 8270-SIM/SVOC SW8270D
Analytical Method/SOP: 8270-SIM/ SVOC SW8270D/SVOC 8.1

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 28	Low recovery: Rerun all samples. High recovery: Rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 28
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 28	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 28

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 28	Low recovery: Rerun affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ & rerun results ≥LOQ	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 28
Internal Standard	Every sample, batch QC sample, and standard	Recovery: 50-200%	Rerun sample; if repeated, narrate	Laboratory Analyst	Sensitivity, Bias	Recovery: 50-200%

Matrix: Soil
Analytical Group: PAH 8270-SIM/SVOC SW8270D
Analytical Method/SOP: 8270-SIM// SVOC SW8270D/SVOC 8.2

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 27	Low recovery: Rerun all samples. High recovery: Rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 27
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 27	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 27
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 27	Low recovery: Rerun affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ & rerun results ≥LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 27
Internal Standard	Every sample, batch QC sample, and standard	Recovery: 50-200%	Rerun sample; if repeated, narrate	Laboratory Analyst	Sensitivity, Bias	Recovery: 50-200%

Matrix: Water
Analytical Group: SVOCs/TPH
Analytical Method/SOP: SW-846 8015/SVOC 5.1

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then reprep and rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 14	Low recovery: Reprep and reanalyze all samples. High recovery: Reprep & rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, reprep & rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 14	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 13

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 14	Low recovery: Reprep & rerun affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ; reprep & rerun results ≥LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13

Matrix: Soil
Analytical Group: SVOCs/TPH
Analytical Method/SOP: SW-846 8015/SVOC 5.1

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then reprep and rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 13	Low recovery: Reprep and rerun all samples.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			High recovery: Reprep and rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, reprep & rerun all others			
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 13	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 13
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 13	Low recovery: Reprep and rerun affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ; reprep & rerun results ≥LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13

Matrix: Water
Analytical Group: VOCs/TPH
Analytical Method/SOP: SW-846 8015/VOC 7.1

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 14	Low recovery: Reanalyze all samples. High recovery: Reanalyze samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 14	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 13

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 14	Low recovery: Reanalyze affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ & reanalyze results ≥LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13

Matrix: Soil
Analytical Group: VOCs/TPH
Analytical Method/SOP: SW-846 8015/VOC 7.1

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 13	Low recovery: Reanalyze all samples. High recovery: Reanalyze samples with results ≥LOQ. Report results <LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			High RPD: Report ND samples, rerun all others			
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 13	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 13
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 13	Low recovery: Reanalyze affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ & reanalyze results ≥LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 13

Matrix: Water
Analytical Group: Metals
Analytical Method/SOP: SW-846 6010/MET 4.4

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOD, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then reprep and rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 4	Low recovery: Reprep and rerun all samples. High recovery: Reprep and rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples; reprep & rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 4
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 4	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 4

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Serial Dilution	1 for every batch of 20 or fewer samples	%D ≤ 10	Flag results as possible matrix interference	Laboratory Analyst	Matrix Interferences	%D ≤ 10
Post Digestion Spike	1 for every batch of 20 or fewer samples	Recovery: 80-120%	Dilute and reanalyze; if again outside limits, flag as possible matrix interference	Laboratory Analyst	Matrix Interferences	Recovery: 80-120%

Matrix: Soil
Analytical Group: Metals
Analytical Method/SOP: SW-846 6010/MET 4.4

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			problem then reprep and rerun all others.			
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 3	Low recovery: Redigest and rerun all samples. High recovery: Redigest and reanalyze samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples; reprep & rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 3
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 3	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 3
Serial Dilution	1 per batch of 20 or fewer samples	%D ≤ 10	Flag results as possible matrix interference	Laboratory Analyst	Matrix Interferences	%D ≤ 10

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Post Digestion Spike	1 per batch of 20 or fewer samples	Recovery: 80-120%	Dilute and rerun; if again outside limits, flag as possible matrix interference	Laboratory Analyst	Matrix Interferences	Recovery: 80-120%

Matrix: Water
Analytical Group: Metals
Analytical Method/SOP: SW-846 6020/MET 4.6

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then reprep and rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 6	Low recovery: Reprep and rerun all samples. High recovery: Reprep and rerun samples with results $\geq$LOQ. Report results <LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 6

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			High RPD: Report ND samples; reprep & rerun all others			
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 6	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 6
Serial Dilution	1 for every batch of 20 or fewer samples	%D ≤ 10	Flag results as possible matrix interference	Laboratory Analyst	Matrix Interferences	%D ≤ 10
Post Digestion Spike	1 per batch of 20 or fewer samples	Recovery: 80-120%	Dilute and rerun; if again outside limits, flag as possible matrix interference	Laboratory Analyst	Matrix Interferences	Recovery: 80-120%
Internal Standard	Every sample, batch QC sample, and standard	Recovery: 30-120%	Rerun sample; if repeated, narrate	Laboratory Analyst	Sensitivity, Bias	Recovery: 30-120%

Matrix: Soil
Analytical Group: Metals
Analytical Method/SOP: SW-846 6020/MET 4.6

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then reprep and rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 5	Low recovery: Redigest and rerun all samples. High recovery: Redigest and reanalyze samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples; reprep & rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 5
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 5	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 5

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Serial Dilution	1 per batch of 20 or fewer samples	%D ≤ 10	Flag results as possible matrix interference	Laboratory Analyst	Matrix Interferences	%D ≤ 10
Post Digestion Spike	1 per batch of 20 or fewer samples	Recovery: 80-120%	Dilute and rerun; if again outside limits, flag as possible matrix interference	Laboratory Analyst	Matrix Interferences	Recovery: 80-120%
Internal Standard	Every sample, batch QC sample, and standard	Recovery: 30-120%	Rerun sample; if repeated, narrate	Laboratory Analyst	Sensitivity, Bias	Recovery: 30-120%

Matrix: Water
Analytical Group: Metals
Analytical Method/SOP: SW-846 7470/MET 5.1

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then reprep and rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 12	Low recovery: Reprep and rerun all samples. High recovery: Reprep & rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, reprep & rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 12
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 12	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 12

Matrix: Soil
Analytical Group: Metals
Analytical Method/SOP: SW-846 7471 MET 5.2

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			problem then reprep and rerun all others.			
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 11	Low recovery: reprep and rerun all samples. High recovery: Reprep and rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples; reprep & rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 11
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 11	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 11

Matrix: Water
Analytical Group: VOCs
Analytical Method/SOP: SW-846 8260/VOC 2.4

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 24	Low recovery: Rerun all samples. High recovery: Rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, rerun all others	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 24
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 24	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 24
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 24	Low recovery: Rerun affected sample High recovery:	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 24

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ & rerun results ≥LOQ			
Internal Standard	Every sample, batch QC sample, and standard	Recovery: 50-200%	Rerun sample; if repeated, narrate	Laboratory Analyst	Sensitivity, Bias	Recovery: 50-200%

Matrix: Soil
Analytical Group: VOCs
Analytical Method/SOP: SW-846 8260/VOC 2.4

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch of 20 or fewer samples	<1/2 LOQ, per QSM 5.0	Report samples that are ND or >10x contamination. Identify & correct the problem then rerun all others.	Laboratory Analyst	Positive bias or false positives	<1/2 LOQ, per QSM 5.0
LCS/LCSD	1 per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 23	Low recovery: Rerun all samples.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 23

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			High recovery: Rerun samples with results ≥LOQ. Report results <LOQ. High RPD: Report ND samples, rerun all others			
MS/MSD	1 pair per batch of 20 or fewer samples	QSM5.0, Appendix C, Table 23	Flag results as possible matrix interference.	Laboratory Analyst	Accuracy/ Bias, Precision	QSM5.0, Appendix C, Table 23
Surrogate Spike	Every sample and batch QC sample	QSM5.0, Appendix C, Table 23	Low recovery: Rerun affected sample High recovery: If due to obvious coelution, flag and narrate without reanalysis. Otherwise, report results <LOQ & rerun results ≥LOQ.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 23
Internal Standard	Every sample, batch QC sample, and standard	Recovery: 50-200%	Rerun sample; if repeated, narrate	Laboratory Analyst	Sensitivity, Bias	Recovery: 50-200%

Matrix: Water/Soil
Analytical Group: SVOCs
Analytical Method/SOP: SW-846 8290A/Cape Fear SOP

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank (MB)	One per preparatory batch, run after calibration standards and before samples.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank.	Laboratory Analyst	Positive bias or false positives	Positive bias or false positives
Laboratory Control Sample (LCS)	One per preparatory batch.	A aboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory Analyst	Accuracy/ Bias	QSM5.0, Appendix C, Table 29 and 30

5.23 WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS

Sample Collection and Field Records			
Record	**Generation**	**Verification**	**Storage location/archival**
Field logbook	TBD USACE Field Team Lead	[redacted]	Project File
Data collection sheets	TBD USACE Field Team Lead	[redacted] Chemist	Project File
Chain-of-Custody Forms	TBD USACE Field Team Lead	[redacted] roject Chemist	Project File
Cooler Receipt Forms / Sample Login Forms	[redacted]	[redacted] Chemist	Project File
Correspondence	[redacted]	[redacted] Chemist	Project File

Project Assessments			
Record	**Generation**	**Verification**	**Storage location/archival**
Data verification checklists	[redacted] Chemist	[redacted] Chemist	Project File
Data validation report	[redacted] Chemist	[redacted] Chemist	Project File
Data usability assessment report	[redacted] Chemist	[redacted] Chemist	Project File

Laboratory Data Deliverables		
Record	**VOCs**	**SVOCs (TPH)**
Cover sheet (laboratory information/signature)	X	X
Case narrative	X	X
Communication records	X	X
Corrective action reports (if any)	X	X
Sample chronology (i.e. sample receipt, preparation records)	X	X
COC	X	X

Laboratory Data Deliverables		
Instrument calibration records	X	X
Results reporting forms	X	X
QC sample results	X	X
Definition of laboratory qualifiers	X	X
Raw data	X	X
Electronic data deliverable	X	X

5.24 WORKSHEET #31, 32 & 33: ASSESSMENTS AND CORRECTIVE ACTION

Assessment Response and Corrective Action:

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Sample Receiving	Cooler Receipt Form	[redacted] Chemist, USACE	Within 8 hours of sample receipt in laboratory	phone record and/or e-mail	[redacted] LTD.	Immediate action, prior to sample analysis
Analytical Data Assessment	Data Quality Assessment Report	[redacted] LTD	Within 3 Days of deficiency discovery	Corrective Action Plan	[redacted]	3 Days

5.25 WORKSHEET #34: DATA VERIFICATION AND VALIDATION INPUTS

Item	Description	Verification (completeness)	Validation (conformance to specifications)
Planning Documents/Records			
1	Approved QAPP	X	
2	Laboratory Contract	X	
4	Field SOPs/references	X	
5	Laboratory SOPs	X	
Field Records			
6	Field logbooks	X	X
7	Equipment calibration records	X	X
8	Chain-of-Custody Forms	X	X
9	Sampling diagrams/surveys	X	X
10	Drilling logs	X	X
11	Relevant Correspondence	X	X
12	Field corrective action reports (if any)	X	X
Analytical Data Package			
13	Cover sheet (laboratory identifying information)	X	X
14	Case narrative	X	X

Item	Description	Verification (completeness)	Validation (conformance to specifications)
15	Sample receipt records	**X**	**X**
16	Sample chronology (i.e. sample receipt, preparation, & analysis)	**X**	**X**
17	Communication records	**X**	**X**
18	LOD/LOQ establishment and verification	**X**	**X**
19	Standards Traceability	**X**	**X**
20	Instrument calibration records	**X**	**X**
21	Definition of laboratory qualifiers	**X**	**X**
22	Results reporting forms	**X**	**X**
23	QC sample results	**X**	**X**
24	Corrective action reports (if any)	**X**	**X**
25	Raw data	**X**	**X**
26	Electronic data deliverable	**X**	**X**

5.26 WORKSHEET #35: DATA VERIFICATION PROCEDURES

Records Reviewed	Requirement Documents	Process Description	Responsible Person, Organization
Field logbook	QAPP	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed and results are documented.	Daily - Field Team Lead At conclusion of field activities - Project Lead
Chain-of-custody forms	QAPP	Verify the completeness of chain-of-custody records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that sufficient sample volume is available for QC samples (e.g., MS/MSD). Verify that all required signatures and dates are present. Check for transcription errors.	Daily - Field Team Lead At conclusion of field activities - Project Chemist
Laboratory Deliverable	QAPP	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the CoCs to verify that results were provided for all collected samples. Review the narrative to ensure all QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Before release – Laboratory QAM Upon receipt - Project Chemist

5.27 WORKSHEET #36 DATA VALIDATION PROCEDURES

Data Validator: Bonnie McNeill, Chemist

Analytical Group/Method:	All Methods
Data deliverable requirements:	SEDD Stage 2b plus chromatograms (pdf)
Analytical specifications:	QAPP, DoD QSM, published method
Measurement performance criteria:	WS# 12
Percent of data packages to be validated:	100%
Percent of raw data reviewed:	100%
Percent of results to be recalculated:	10%
Validation procedure:	EM 200-1-10
Validation code[1] (see table below):	S2bVEM
Electronic validation program/version:	ADR.NET v. 1.5.0.160

[1] Stage 2b Validation is based on Sample-Related Quality Control and Instrument-Related Quality Control results. Checks include review of initial calibrations, continuing calibration verifications, tunes and instrument performance checks.

Validation code and label identifier table

Validation Code[1]	Validation Label
S1VE	Stage 1 Validation Electronic
S1VM	Stage 1 Validation Manual
S1VEM	Stage 1 Validation Electronic and Manual
S2aVE	Stage 2a Validation Electronic
S2aVM	Stage 2a Validation Manual
S2aVEM	Stage 2a Validation Electronic and Manual
S2bVE	Stage 2b Validation Electronic
S2bVM	Stage 2b Validation Manual
S2bVEM	Stage 2b Validation Electronic and Manual
S3VE	Stage 3 Validation Electronic
S3VM	Stage 3 Validation Manual
S3VEM	Stage 3 Validation Electronic and Manual
S4VE	Stage 4 Validation Electronic
S4VM	Stage 4 Validation Manual
S4VEM	Stage 4 Validation Electronic and Manual
NV	Not Validated

[1] Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, U.S. EPA, OSWER No. 9200.1-85, EPA 540-R-08-005, January 2009.

The following data qualifier flags will be applied during data validation. Potential impacts on project-specific data quality objectives will be discussed in the Quality Control Summary Report.

Data qualifier flags

Flag	Definition
U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Limit of Detection (LOD) for sample and method.
J +	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the LOD. The value demonstrates a positive bias. Results are qualitatively acceptable and quantitatively uncertain.
J -	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the LOD. The value demonstrates a negative bias. Results are qualitatively acceptable and quantitatively uncertain.
UJ	The analyte was not detected at a level greater than or equal to the adjusted LOD. However, the reported adjusted LOD is approximate and may be inaccurate or imprecise.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

5.28 WORKSHEET #37: DATA USABILITY ASSESSMENT

- Identify personnel (organization and position/title) responsible for participating in the data usability assessment:
  Project Chemist: [redacted]
  Risk Assessor: [redacted]
  Technical Team Lead: [redacted]
  Project Team Lead: [redacted]
- Describe how the usability assessment will be documented: Quality Control Summary Report (QCSR)

Step 1	**Review the project's objectives and sampling design:** Review the key outputs defined during systematic planning (i.e.,PQOs or DQOs and MPCs) to make sure they are still applicable. Review the sampling design for consistency with stated objectives. This provides the context for interpreting the data in subsequent steps.
Step 2	**Review the data verification and data validation outputs:** Review available QA reports, including the data verification and data validation reports. Summarize the data (using graphs, maps, tables, etc.). Look for patterns, trends, and anomalies (i.e., unexpected results). Review deviations from planned activities (e.g., number and locations of samples, holding time exceedances, broken or damaged samples) and determine their impacts on the data usability. Evaluate implications of any unacceptable QC sample results.
Step 3	**Document data usability and draw conclusions:** Determine if the data can be used as intended, considering implications of deviations and corrective actions. Discuss data quality indicators. Assess the performance of the sampling design and Identify limitations on data use. Update the conceptual site model and document conclusions. Prepare the data usability summary report (QCSR).

6.0 CONCLUSION

6.1 FUDS-ELIGIBLE AREAS OF INTEREST

Twenty-two FUDS-eligible HTRW or CON/HTRW AOIs were identified at former Camp Parks. A full discussion of each AOI is in Chapter 4. The 22 FUDS-eligible AOIs are listed in Table 4-1. Five of the twenty two FUDS –eligible sites were recommended for investigation during the Site Inspection phase, and a workplan for that SI investigation is detailed in Chapter 5 of this document. The five sites in the SI WP are AOI 16: Bldg 1395 Oil Storage Tank, AOI 22: Former Underground Fuel Oil Storage Depot, AOI 23: Camp Shoemaker Burn Pit, AOI 24: Naval Small Bore Rifle Range and AOI 28: Hickman Road Sanitary Fill Area. Access was not granted to AOI 22 to perform the SI investigation, and information obtained later indicated that no further action was warranted. AOI 6, Hickman Road Firing Range, is a PRP site, due to evidence of both military and local entity use. For the other 16 FUDS-Eligible sites, it is recommended that no further investigation be done as part of this PA/SI and that an NDAI determination be made.

6.2 FUDS-INELIGIBLE AREAS OF INTEREST

Six AOIs were determined to be FUDS ineligible at former Camp Parks. A full discussion of each AOI is in Chapter 4. The 6 FUDS-ineligible AOIs are listed in Table 4-2.

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