

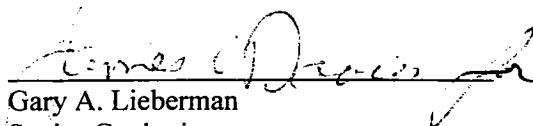
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**Final
Environmental Baseline Survey
NASA Research Park Parcels 2, 3, 4, 6, and 7
Moffett Federal Airfield
Moffett Field, California**

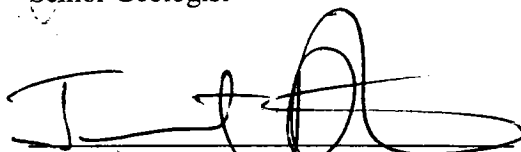
Prepared for

PAI/ISSi
NASA Ames Research Center
Moffett Field, California 94035-1000

Harding ESE Project No. 50487 3.4



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October 3, 2001



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Moffett Federal Airfield
Moffett Field, California**

Harding ESE Project No. 50487 32

This document was prepared by Harding ESE, Inc (Harding ESE, formerly Harding Lawson Associates [HLA]) at the direction of PAI/ISSi for the sole use of PAI/ISSi, NASA, the U.S. Environmental Protection Agency, the California Environmental Protection Agency, Department of Toxic Substances Control, the California Environmental Protection Agency, Regional Water Quality Control Board, the U.S. Navy, the Middlefield-Ellis-Whisman (MEW) Companies, and prospective NASA partners, the only intended beneficiaries of this work. No other party should rely on the information contained herein without the prior written consent of the PAI/ISSi and NASA. This report and the interpretations, conclusions, and recommendations contained within are based in part on information presented in other documents that are cited in the text and listed in the references. Therefore, this report is subject to the limitations and qualifications presented in the referenced documents.

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DISTRIBUTION

ACRONYMS

1,1,1-TCA	1,1,1-Trichloroethane
1,2-DCA	1,2-Dichloroethane
1,1-DCA	1,1-Dichloroethane
1,1,2-TCA	1,1,2-Trichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCE	cis and trans-1,2 -dichloroethene
ACGIH	American Conference of Governmental Industrial Hygienists
ACM	Asbestos Containing Material
AOIs	Areas of Investigation
AST	Aboveground Storage Tank
BRAC	Base Realignment & Closure Program
CalEPA	California Environmental Protection Agency
CANG	California Air National Guard
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CP	Closure Plan
DFG	California Department of Fish and Game
DOI	Department of the Interior
DTSC	Department of Toxic Substances Control
EA	Endangerment Assessment
EBS	Environmental Baseline Survey
ESAs	Environmental Site Assessments
FEMA	Federal Emergency Management Agency
FFA	Federal Facilities Agreement
FOSL	Finding of Suitability to Lease
FS	Feasibility Study
Harding ESE	Harding ESE, Inc.
HLA	Harding Lawson Associates
HHRA	Human Health Risk Assessment
HWAAs	Hazardous Waste Accumulation Areas
HWMP	Hazardous Waste Management Plan
IRP/OU	Installation Restoration Program and Operable Units
LBP	Lead-Based Paint
LTA	Lighter-Than-Air
MCLs	Maximum Contaminant Levels
MFA	Moffett Federal Airfield
MSL	Mean Sea Level
NACA	National Advisory Committee for Aeronautics
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
National Register	National Register of Historic Places
NEX	Navy Exchange
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
°F	Fahrenheit
OSHA	Occupational Safety & Health Administration
PA	Preliminary Assessment
PCBs	Polychlorinated Biphenyls

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PCE	Tetrachloroethene
PELs	Permissible Exposure Limits
PRGs	Preliminary Remediation Goals
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study Program
ROD	Record of Decision
RWQCB	California Regional Water Quality Control Board
STLC	Soluble Threshold Limit Concentration
SWEA	Station-Wide Ecological Assessment
TCE	Trichloroethene
TLV-TWAs	Threshold Limit Values-Time Weighted Averages
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
WATS	West-Side Aquifers Treatment Systems

1.0 INTRODUCTION

Harding ESE Inc. (Harding ESE) has prepared this Environmental Baseline Survey (EBS) to present the results of the assessment of known existing environmental conditions for Parcels 2, 3, 4, 6, and 7 at Moffett Federal Airfield (MFA), formerly part of Naval Air Station (NAS) Moffett Field (NAS Moffett Field), California. The subject parcels are part of the planned redevelopment project referred to as the NASA Research Park (NRP). For presentation purpose, the EBS divides the NRP into 7 parcels, hereafter, referred to as the NRP Parcels. An EBS for Parcel 1 and Parcel 5 were previously prepared (*HLA, 2000b; Harding ESE, 2000*). The location of Moffett Field is shown on Plate 1 and the NRP is shown on Plate 2. Harding ESE conducted the assessment and prepared this report under contract to PA/ISSi on behalf of NASA Ames Research Center.

As shown on Plate 1, the NRP Parcels are located along the southern boundary of the Moffett Field and comprise an area of approximately 213 acres that is being planned for redevelopment as a collaborative research and educational campus. As discussed above and in Section 2.0, the area is within Moffett Field, which was continuously operated by the U.S. military since it was commissioned in 1933 until it was transferred to the National Aeronautics and Space Administration (NASA) in 1994. As described in the Moffett Field Comprehensive Use Plan, Environmental Assessment (*Brady & Associates, 1994*), portions of Moffett Field will be converted from their former military use and redeveloped as a laboratory and associated offices. In addition, the remainder of NRP is proposed for development as a collaborative research and educational campus as described in the *Notice of Intent to Prepare an Environmental Impact Statement*, published in the Federal Register on June 16, 2000.

1.1 Purpose

The purpose of the EBS is to 1) summarize the known existing environmental condition of the NRP in a manner that is easy to use by future partners, and 2) evaluate the potential constraints that the existing conditions may have upon future uses. To the extent that the information was available to the authors, the EBS addresses the following:

- Status of the site investigations and remediation
- Nature and extent of known contamination, if any
- Hazardous materials and waste management
- Underground storage tanks (UST) and aboveground storage tanks (AST)
- Status of building surveys for asbestos, lead-based paint (LBP), and radon
- Other information pertaining to environmental conditions on the parcels.

The EBS focuses on identifying and documenting environmental site characterization and remediation activities and the presence or likely presence of hazardous substances and/or hazardous waste on a portion of real property considered for reuse. The EBS addresses hazardous substances or wastes, including certain substances not usually regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and other substances such as petroleum products, asbestos, LBP, PCBs, and mold in structures to the extent that relevant information is available. The EBS considers soil and groundwater contamination, and a description of potential public health and safety

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issues; for example, those associated with the soil or groundwater contamination or the condition of buildings that may affect NASA's ability or decision to redevelop such property. The EBS does not constitute a complete site characterization because it is based on existing available information. In addition, no confirmation/field verification was conducted.

1.2 Procedures for Conducting an Environmental Baseline Survey

Procedures for conducting an EBS are described in the DoD guidance (*U.S. DoD, 1994*). The EBS is similar to a CERCLA Preliminary Assessment (PA) and may include information from many sources, including ongoing programs, such as CERCLA remedial investigation and remediation, building surveys for asbestos, LBP, and radon, solid and hazardous waste management activities, and other programs, as discussed in Section 2.0. Specific EBS activities may include the following:

- Search, review, and documentation of existing records regarding environmental conditions on the parcels
- Description of known current or past activities on the parcels
- Interviews with current and/or former employees involved in operations on the parcels
- Description of known hazardous substance or hazardous waste management practices on the parcels
- Documentation of observations made during visual and physical inspections (Not conducted for this EBS)
- Description of possible sources of contaminants on the parcels, on the basis of available information
- Documentation and status of ongoing response actions.

1.3 Limitations

This document was prepared at the direction of PAI/ISSi for the sole use of PAI/ISSi, NASA, the U.S. Environmental Protection Agency (USEPA), the California Environmental Protection Agency (CalEPA), Department of Toxic Substances Control (DTSC), the CalEPA, Regional Water Quality Control Board (RWQCB), the U.S. Navy, the Middlefield-Ellis-Whisman (MEW) Companies, and prospective NASA partners, the only intended beneficiaries of our work, to support redevelopment of the NASA Research Park Parcels. No other party should rely on the information contained herein without the prior written consent of NASA and Harding ESE.

Harding ESE's professional services for this EBS, including the preparation of this document, were conducted in accordance with practices and procedures generally accepted in the environmental consulting field at this time; no other warranty is given or implied by this report.

Information about the presence or absence of hazardous substances in the area discussed in this report is based on limited data and observations. Environmental conditions may change over time and may be different away from locations where data or samples were collected or observations made. Harding ESE does not and cannot have complete knowledge of environmental conditions in the area discussed. Furthermore, this report is complete and accurate only to the extent that cited reports and agency information are complete and correct, and to the extent that all relevant information has been provided to Harding ESE. The purpose of the EBS is to identify and describe available information. In the EBS,

Harding ESE has not attempted to independently verify the completeness or accuracy of the information presented, or to independently assess the environmental condition of the described area.

1.4 Document Organization

The remainder of this report is organized as follows:

- Section 2.0 provides a description of the methodology used to complete the EBS
- Section 3.0 presents the background of the site including a physical description, history of the facility, the environmental setting including geology, hydrogeology, surface water, threatened or endangered species and sensitive habitat, and archeological resources, and a summary of the environmental restoration and compliance programs
- Section 4.0 describes the Findings for Parcel 2
- Section 5.0 describes the Findings for Parcel 3
- Section 6.0 describes the Findings for Parcel 4
- Section 7.0 describes the Findings for Parcel 6
- Section 8.0 describes the Findings for Parcel 7
- Section 9.0 provides the Bibliography
- A summary of the information for Parcels 2, 3, 4, 6, & 7 are presented in Appendix A
- Appendix B presents plume and environmental cleanup allocation maps for the NRP
- Burrowing owl locations and archeologically sensitive areas are presented in Appendix C and D, respectively.

2.0 SURVEY METHODOLOGY

2.1 Approach and Rationale

A systematic process was followed in which all available reports, records, maps, and interviews were analyzed. Reported conditions were evaluated to determine their impact on the characterization, remediation, reuse, and occupation of the NRP. On the basis of this information, conclusions were drawn relative to the environmental condition of the NRP. As discussed previously, physical inspections of the NRP to identify any new potential environmental concerns or to verify information obtained during the records review, were not conducted as part of this EBS.

Analysis of the ongoing or completed environmental programs at Moffett Field included the following:

- Building surveys for asbestos and lead based paint (LBP)
- Building surveys for mold
- Radon monitoring (limited to residential units and NASA buildings not within the NRP)
- Management of electrical transformers containing polychlorinated biphenyls (PCBs)
- Underground and aboveground storage tank (USTs and ASTs) management
- Basewide Remedial Investigation/Feasibility Study Program (RI/FS)
- Installation Restoration and Operable Unit Programs (IRP/OU)
- Stormwater Pollution Prevention Plan implementation
- Hazardous Waste Management, Minimization and Spill Contingency Plans
- Assessment of impacts from adjoining properties (MEW Superfund Site)
- Evaluation of air quality.

Results of each of these programs for Parcels 2, 3, 4, 6, and 7 are described in Sections 4.0 through 8.0, respectively.

2.2 Program Review

A review of the ongoing environmental restoration and compliance programs (discussed above) for the NRP was performed. NASA and PAI/ISSi program managers provided relevant and updated program data. The examination of these programs provided a comprehensive overview of the past and current environmental status of the NRP. After data evaluation the information was entered into Parcel Summary tables to facilitate record access and summary report production. The tables for Parcels 2, 3, 4, 6, and 7 are included as Appendix A to support the evaluation of the environmental condition of the NRP.

2.3 Document Review

The document review process focused on identifying parcel specific surveys, inspections, studies, field investigations, and interim and final remedial measures especially those completed subsequent to transfer of the NRP from the Navy.

Documents and information reviewed for this EBS include the following type of reports or investigative and management plans:

- Site reuse plans
- Building preliminary assessment/site inspections
- Work plans and sampling and analysis plans
- Remedial Investigation and Feasibility Study Reports
- Building construction information for buildings
- Results of building surveys for asbestos, LBP, radon, PCBs, and hazardous material/waste
- Inventories and management plans for USTs and ASTs
- Air monitoring reports/emissions inventories
- Closure Plans

A complete list of the documents reviewed is provided in Section 9.0.

2.4 Interviews

Interviews were conducted with NASA and PAI/ISSi staff familiar with historic and current environmental restoration and compliance programs. Interviews with past and present employees who worked in the buildings located within the NRP were not performed as part of this EBS. Mr. Joseph Chou of the Cal/EPA Regional Water Quality Control Board and Ms. Roberta Blank of the USEPA were contacted regarding the environmental restoration programs.

3.0 BACKGROUND

This section presents relevant information about Moffett Field with an emphasis on the NASA Research Park Parcels. It includes a description of the physical setting, the history of Moffett Field, a summary of the environmental setting, and the environmental restoration and compliance programs. Moffett Field includes NASA Ames Research Center and MFA. Moffett Field also includes the Army housing; however, the housing is not operated by NASA and is not included in this report.

3.1 Physical Setting

Moffett Field lies 35 miles south of San Francisco, 10 miles north of San Jose, and about 1 mile south of San Francisco Bay (Plate 1). The facility encompasses about 2,000 acres in Santa Clara County and borders the cities of Mountain View and Sunnyvale, California. To the north of Moffett Field are saltwater evaporation ponds and wetlands associated with San Francisco Bay; Stevens Creek lies to the west; U.S. Highway 101 runs along the southern perimeter; and Lockheed-Martin Aerospace facilities are located to the east. NASA Ames Research Center is in the northwest portion of Moffett Field. The area south of U.S. 101 is and has been industrial and includes a group of companies located or formerly located in a 0.5 square-mile area bounded by East Middlefield Road, Ellis Street, Whisman Road, and U.S. 101 referred to as the MEW Superfund Site. These companies are cleaning up soil and groundwater contamination believed to originate within the MEW Superfund site that has also affected groundwater quality beneath the NRP (*Tetra Tech, 1998c*).

The NASA Research Park Parcels (Plate 2) are in the southern portion of Moffett Field and comprise 213 acres. The NASA Ames Research Center lies to the north and west of the NRP, U.S. 101 bounds the NRP to the south, and the runways and hangars of Moffett Federal Airfield lie to the east.

3.2 History

Since the 19th century, the Moffett Field area was used for agriculture. Historic maps show a series of landings along the bay with connecting roads, stage stops, and residences in the area (*PRC, 1994*).

The U.S. military continuously operated the Naval Air Station (NAS) Moffett Field from its date of commission in April 1933 as the Sunnyvale Naval Air Station until it was transferred to NASA on July 1, 1994. A summary of the history of the base operations is provided in Table 1. NAS Moffett Field's original mission was to serve as a base for the West Coast dirigibles of the lighter-than-air (LTA) program. The Navy continued to use the station as an air base until October 1935 when it was transferred to the Army Air Corps for use as a training base. During the Army's tenure, the National Advisory Committee for Aeronautics (NACA) established Ames Aeronautical Laboratory in December 1939 on land adjacent to the Navy at Moffett Field.

In April 1942, the base was returned to the Navy and renamed Naval Air Station (NAS) Moffett Field.

By 1950, Moffett Field was the largest naval air transport base on the West Coast and became the first all-weather air station. Jets first arrived in 1950 and included fighters (F3Ds, F2Hs, and F7Us). In 1953, the base became home to all Navy fixed-wing, land-based antisubmarine craft. A weapons department was formed on the base in 1954.

In 1958, NASA was created and absorbed NACA; thus it became the NASA Ames Research Center.

In February 1966, the base activated its high-speed refueling facilities, and in 1973, it became the headquarters of the Commander Patrol Wings, U.S. Pacific Fleet.

Between 1973 and 1994, NAS Moffett Field's mission involved support of antisubmarine warfare training and patrol squadrons. At one point, Moffett Field was the largest P-3 base in the world, with nearly 100 P-3C Orion Patrol aircraft. These aircraft were assigned to nine squadrons supported by 5,500 military, 1,500 civilian, and 1,000 reserve personnel. No heavy manufacturing or major aircraft maintenance was conducted during the last mission; mostly unit- and intermediate-level maintenance occurred.

The base was designated for closure as an active military base under the U.S. Department of Defense Base Realignment and Closure (BRAC) program. The base was transferred in July 1994 to NASA, except the military housing units and associated facilities, which were transferred to Onizuka Air Force Base.

3.3 Environmental Setting

3.3.1 Physical Characteristics

The following description of physical characteristics discusses surface features, surface water, meteorology and climatology, geology, hydrogeology, and threatened or endangered species and habitat at Moffett Field.

3.3.1.1 Surface Features

Moffett Field is located near the southern end of San Francisco Bay on nearly flat fluvial basin deposits. Elevations range from approximately 36 feet above mean sea level (msl) to 2 feet below msl (*IT, 1993*). Since topographic relief is minimal, manmade structures are the most noticeable surface features and include buildings, aircraft hangars, roads, parking lots, runways, and landscaped areas.

The eastern and western sides of Moffett Field are separated by northwest trending runways. Most buildings are located on the western side of Moffett Field with the most prominent one being the very large Hangar 1 that at one time housed the dirigible, the USS Macon. Features on the eastern side of Moffett Field include Hangars 2 and 3, the California Air National Guard (CANG) area, a golf course, and other buildings. Most areas surrounding the buildings are landscaped.

The area north of Moffett Field was once tidal salt marshes and mud flats of San Francisco Bay. These marshes and mud flats have been eliminated or greatly altered by diking and filling (*IT, 1993*). Currently, commercial saltwater evaporation ponds are present north of Moffett Field. A stormwater retention pond exists on lands of Midpeninsula Regional Open Space District and NASA Ames.

3.3.1.2 Surface Water

San Francisco Bay, California's largest estuary, is approximately 1 mile north of Moffett Field. Historically, tidal salt marsh and mud flats covered extensive areas of the southern portion of the bay including the northern portion of Moffett Field. However, most of these wetlands have been eliminated or greatly altered. The large area north and northeast of Moffett Field was diked several decades ago and is still used as commercial salt evaporation ponds.

Surface water features at Moffett Field include or have included stormwater drainage ditches, several small ponds, and a stormwater retention pond. There are no streams on Moffett Field, although several streams are present to the east and west. Coyote Creek and Guadalupe Slough drain into San Francisco Bay east of Moffett Field, and Stevens Creek drains into San Francisco Bay to the west.

Stormwater in the eastern portion of the airfield (including the runways and aircraft aprons) drains through a system of surface channels (Patrol Road Ditch and Marriage Road Ditch) and subsurface drains to the Building 191 lift station and is pumped into the Northern Channel at its western end. Water is pumped from the eastern end of Northern Channel to Guadalupe Slough, which drains to San Francisco Bay. During significant rainfall, temporary lift stations pump water from Patrol Road Ditch and Marriage Road Ditch directly into the Northern Channel.

Stormwater in the western portion of the base drains to the stormwater settling basin via underground pipes. From the settling basin, the water flows northward through the Eastern Diked Marsh to the stormwater retention pond.

On the basis of an initial assessment study of Moffett Field performed by the Naval Energy and Environmental Support Activity (NEESA), the Federal Emergency Management Agency (FEMA) projects that the eastern portion of Moffett Field will be inundated by 100-year tidal flooding (NEESA 1984). The 100-year flood is projected to reach 7.5 feet above msl and a significant portion of Moffett Field would be affected.

3.3.1.3 Meteorology and Climatology

Moffett Field experiences a Mediterranean climate with relatively dry, warm summers and cool, wet winters (IT 1993). Influences from the Pacific Ocean, San Francisco Bay, and cool valley breezes help to maintain moderate temperatures. The average annual temperature is 58 degrees Fahrenheit (°F). The average monthly temperature in August is 66° F, and the average monthly temperature in January is 50°F. Maximum temperatures have been recorded above 100°F, and minimum temperatures have been recorded as low as 22°F (IT, 1993).

During the day, moderate northern and northwestern winds are common; during the evening, winds are generally from the west (IT, 1993). Occasionally, winter storms are accompanied by severe southwestern winds. The average annual wind velocity is 7 miles per hour.

The average annual rainfall is 13.2 inches (IT, 1993). Most precipitation falls during the winter with a dry period from May through September. During December, January, and February, the maximum monthly average precipitation is 2.5 inches, which decreases to between 1 and 2 inches per month during the spring and fall. Rainfall during the dry period is usually less than 0.5 inches per month. Thunderstorms are rare and can occur during any month, but are not usually intense. Snow is rare, and if it does fall, it does not accumulate.

Humidity averages 74 percent, with daily highs of 85 percent and lows of 60 percent (IT, 1993). Much of the humidity is attributed to the site's proximity to San Francisco Bay.

3.3.1.4 Geology

Moffett Field is located at the northern end of the Santa Clara Valley Basin, about 1 mile south of San Francisco Bay. The Santa Clara Valley Basin is a Pliocene-age, large, northwest-trending structural

depression between the San Andreas and Hayward faults. The basin is bordered on the west by the Santa Cruz Mountains and on the east by the Diablo Range.

Regionally, the Santa Clara Valley contains up to 1,500 feet of interbedded alluvial, fluvial, and estuarine deposits (*Iwamura, 1980*). Locally, these sediments consist of varying combinations of clay, silt, sand, and gravel that represent interfingering of estuarine and fluvial depositional environments during the late Pleistocene and Holocene epochs. The interfingering of fluvial and estuarine sediments in southern San Francisco Bay is related to world-wide fluctuations in sea level during glacial and interglacial episodes of the late Quaternary period (*Tetra Tech, 1998c*). The fluvial sediments were derived from the Santa Cruz highlands west of the basin and deposited on an alluvial plain bounded by alluvial fan deposits to the west and baylands to the northeast (*Iwamura, 1980*). Surface geologic maps indicate that alluvial fan deposits extend toward the basin approximately to U.S. Highway 101, which forms the southern boundary of Moffett Field. Shallow deposits on Moffett Field are branching river and flood plain deposits. Estuarine deposits are found at the extreme northern end of Moffett Field.

3.3.1.5 Hydrogeology

Within the northern Santa Clara Valley groundwater basin, watershed boundaries are defined by drainage divides in the Santa Cruz Mountains and Diablo Range. The contact between the bedrock and Quaternary alluvium defines the extent of the groundwater basin (*Tetra Tech, 1998c*). Regionally, the Quaternary water-bearing deposits are divided into a deep, confined aquifer, and a shallow, unconfined aquifer based on the extent of a regional confining layer (*Tetra Tech, 1998c*). Four regional subdivisions of the upper 250 feet of Quaternary sediments are as follows:

- Holocene (Recent Interglacial Period) alluvium (A Aquifer zone)
- Late Pleistocene (Wisconsinan Glacial Period) alluvium (B aquifer zone)
- Late Pleistocene (Sangamon) Interglacial deposits (B/C aquitard)
- Pleistocene (Illinoian Glacial Period) alluvium (C aquifer zone).

The shallow aquifer (upper 250 feet) is subdivided into the A, B, and C aquifers. A laterally extensive clay aquitard (B/C aquitard) effectively isolates the C aquifer (160 to 250 feet below ground surface [bgs]) from the upper aquifers. The A/B aquitard may be locally discontinuous.

The remaining discussion focuses on the A aquifer zones beneath the NRP because the aquifer is most accessible and likely to be impacted by contamination and because of the relative lack of contamination in the deeper aquifers.

The A aquifer extends from a depth of 5 to 65 feet bgs at the western side of Moffett Field. The A aquifer is divided into the A1- and A2- aquifer zones by a discontinuous, low-permeability horizon (A1/A2 aquitard) located between 25 and 30 feet bgs (*Tetra Tech, 1998a*). The aquifer consists of sands and gravels with gravel comprising 20 to 90 percent of the coarse material. In general, groundwater flow is toward San Francisco Bay (north) with a horizontal gradient of 0.004 to 0.005 feet per foot (ft/ft) (*PRC, 1996*). Depth to groundwater ranges from 5 to 12 feet bgs (*Tetra Tech, 1998a*).

3.3.1.6 Habitat and Threatened or Endangered Species

This section summarizes the types of habitats occurring at Moffett Field. A comprehensive assessment of Moffett Field ecology can be found in the Phase II Site wide ecological assessment (SWEA; *PRC and Montgomery Watson [MW], 1997*). The habitats at Moffett Field have been classified into two major categories: (1) wetlands and aquatic, and (2) uplands.

The wetlands and aquatic habitats have been defined using the United States Fish and Wildlife Service (USFWS) classification system and the U.S. Army Corps of Engineers (USACE) system discussed in the WESCO (1993) report. The California Department of Fish and Game (DFG) uses the USFWS protocol for wetland classification. The majority of the wetlands are located in the northern section of Moffett Field bordering the commercial salt evaporation ponds. These areas help to support a variety of species including some listed as endangered under the federal Endangered Species Act and as California species of special concern.

The uplands habitat can be further divided into levee banks, disturbed grasslands, and landscaped areas. The disturbed grasslands and landscaped areas occur within the NRP.

The levee banks provide limited upland habitat bordering the saltwater and brackish marshes. They range from 5 to 15 feet in height and are mostly covered by grasses and weeds. This type of vegetation provides cover for species such as the California ground squirrel, mourning dove, and various species of rodents. The location of the banks near the marshes makes them a suitable resting area for waterfowl and wading birds between periods of feeding. They also provide a corridor for predatory mammals that can have an adverse effect on the federally endangered and special status species occupying these areas.

The grasslands are highly disturbed areas that provide limited useable habitat for wildlife. These areas are located between buildings and runways and are mowed on a regular basis. The burrowing owl has been observed foraging in these areas. This species is listed as a California special status species. Appendix C presents a map showing the most recent locations where burrowing owls are nesting at Moffett Field. The majority of these burrows in the NRP are located within Parcel 4. Specific mitigation measures have been developed for areas where burrowing owls have been identified and are as follows:

- 1) Early in the planning process, review all proposed projects, programs, and activities to determine if they may occur near (i.e., within 250 feet) areas occupied or recently occupied by burrowing owls. For projects that may occur near owls or their habitat, submit to the Environmental Services Office as soon as possible a preliminary description of the activity, a map showing its proposed location, and a proposed timeline. When applicable, also submit a NEPA Environmental Checklist. A qualified wildlife biologist must survey the project site. For assistance contact the onsite Wildlife Technician, Chris Alderete at 43532 or (650) 280-7643 (cell).
- 2) Whenever possible, avoid potential impacts to burrowing owls and their habitat (see Appendix C) by:
 - a. Considering alternative project locations during the early planning stages. The 23 acres of burrowing owl habitat south of Building 158, and other owl protection areas identified in Appendix C shall be avoided.
 - b. Scheduling work in areas near burrowing owls to occur outside the nesting season. The nesting season is from February 1 through August 31.
 - c. Considering alternative approaches that reduce or eliminate potential impacts to burrowing

owls.

- d. Reducing the amount of time spent conducting activities near burrowing owls.
- 3) Avoid disturbing active nesting owl burrows during the nesting season, which occurs from February 1-August 31. For disturbances outside the nesting season, obtain proper regulatory approval through the Environmental Services Office.
- 4) Avoid disturbances that occur within 250 feet of an active owl nest during the nesting season or within 160 feet outside the nesting season. For unavoidable disturbances, work with the Environmental Office to determine specific owl impacts and required mitigation based on the nature of the project or activity, and its timing, location, and duration.
- 5) Obtain approval from the Environmental Services Office (Code QE) prior to conducting activities near burrowing owls or their habitat. Code QE will obtain permits and approvals from regulatory agencies, as needed.
- 6) When applicable, obtain the required Construction Permits (AMI 8829.1) and comply with their conditions, including those related to burrowing owls.

Fund and implement mitigation activities identified in the planning stages. These may include the following:

Avoid impacts to owls by conducting work outside the nesting season, or at a distance from active burrows that avoids disturbances (>250 in nesting season, >160 feet outside of nesting season). Prevent physical impacts to owl burrows by:

1. Keeping the project footprint as small as possible.
2. Limiting the movement of construction vehicles, size of staging areas, and other disturbances. Protect areas within 160-foot to 250-foot radius from owl burrows. Use fencing or construction tape to delineate work areas from protected areas.
3. Placing fencing around active owl burrows for the duration of the project. Barriers must be adequate to prevent disturbance to burrows. Remove fencing when the project is completed.

If active owl burrows must be destroyed, work with the Environmental Services Office to develop a plan to evict owls from their natural burrows. Eviction shall occur outside the nesting season. Owls are evicted using temporary "one-way doors" placed on the natural burrow for at least 48 hours. After 48 hours, excavate the natural burrow, and then fill it in to prevent owls from reoccupying those burrows. Replace lost burrows with artificial burrows at a 3:1 ratio within 300 feet of the destroyed burrows, if possible, or within the closest onsite Burrowing Owl Preserve.

Historically active and satellite burrows can also be very important for burrowing owl survival. These lesser-used burrows will be evaluated on a case by case basis by a qualified wildlife biologist, who will determine if mitigation is required. Artificial burrow placement and design will be developed in coordination with the NASA Environmental Services Office. The project proponent must complete construction of any required artificial burrows prior to project initiation (e.g., beginning construction activities), unless agreed to in writing by the NASA Environmental Services Office. Onsite land has been set-aside as mitigation for the development.

The landscaped areas provide habitat similar to urban parks. The vegetation is composed of non-native and/or exotic grasses, shrubs, and trees. These areas can be found near the administration buildings, housing complexes, and the golf course. Species commonly observed in this habitat include the mourning dove, house sparrow, American robin, northern mockingbird, and the fox squirrel.

3.3.1.7 Archeological Resources

No archeological resources are known to occur within NRP. However, prehistoric and historic use of the Moffett Field vicinity is well documented and as yet unidentified buried archeological resources could be encountered during ground disturbing activity. Appendix D presents a plate identifying archeological sensitive areas. To ensure that all resources are properly identified, evaluated and treated (if necessary), the following measures will be initiated:

- Specific language should be included in the General Specifications section of any contract requiring excavation in regard to the required protection of cultural resources and the procedures to be followed by the contractor in an unexpected discovery situation.
- NASA shall develop an Unexpected Discovery Plan to deal with the inadvertent exposure of subsurface archeological resources during construction, in accordance with 36 CFR 800.11.
- In lieu of a formal Unexpected Discovery Plan, any construction operations should stop within 3 meters (10 feet) of the exposure of an unanticipated archeological materials and a qualified archeologist should be contacted to evaluate the materials and recommend an appropriate treatment for them (see 36 CFR 800.11.1).
- It is not considered that there is a high potential for inadvertent exposure of prehistoric Native American skeletal remains and associated grave goods at Moffett Field. However, the region's Native Americans consider the graves of their ancestors to be of utmost importance. The remains and the offerings buried with them are sacred to the Native Americans, and there is a strong desire among this community to prevent disturbance of burial sites. The Native American Graves Protection and Repatriation Act (NAGPRA; Section 3) requires federal agencies to consult with likely descendants and Indian tribes prior to intentional excavation, and requires cessation of activity and notification of tribes when there is an inadvertent discovery of Native American skeletal remains on federal land. The State of California Native American Heritage Commission (ATTN: Execution Secretary, 915 Capitol Mall, Room 288, Sacramento, CA 95814) can provide a list of tribes and most likely descendants on request. In the event of discovery of Native American skeletal remains, the implementing Regulations 43 CFR 10, subpart B (Federal Register 60(232); 62134-62169, December 4, 1995) of NAGPRA shall be followed.
- Curation of any recovered archeological materials not associated with Native American skeletal remains shall be curated in accordance with 36 CFR 79, Curation of Federally Owned and Administered Archeological Collections Final Rule (Federal Register 55 [177: 5-37639], September 12, 1990). Local repositories meeting the curation standards for archeological materials shall be selected over distant repositories whenever possible.
- All archeological work shall be conducted under the direction of professional archeologists meeting the qualification standards described in Archeology and Historic Preservation; Secretary of the Interior Standards (Federal Register 48 (190: 44716-44742, September 29, 1983).

3.4 Environmental Restoration Programs

Naval Air Station Moffett Field was added to the National Priorities List (NPL) in July 1987. Work conducted at Moffett Field is being completed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and coordinated through a Federal Facilities Agreement (FFA) with the U.S. Environmental Protection Agency (EPA), Region IX; and the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). Environmental Restoration Programs at Moffett Field are broken into the CERCLA Installation Restoration Program (IRP) and the non-CERCLA sites, (i.e., Petroleum sites) which were and are being addressed in accordance with applicable state regulations. Groundwater beneath the NRP is impacted by migration of chemicals from the MEW Superfund Site (south of Moffett Field; see also Section 3.1) and from operations at Moffett Field. This is collectively referred to as the Regional Plumes or the West Side Aquifer north of 101 (*Tetra Tech, 1998a; Locus, 1999*). In addition, a number of investigations have been conducted at the adjacent NASA Ames Research Center to evaluate Areas of Investigation (AOIs). However, none of the AOIs are located within the NRP and, therefore, the AOI program is not discussed further.

3.4.1 Installation Restoration Program

Under its IRP, the Navy identified and investigated several locations for the presence of chemical contamination related to site use. Currently, Moffett Field is divided into five Operable Units (OU1, OU2-West, OU2-East, OU5 and OU6), the West Side Aquifer, and two study areas (petroleum sites and station-wide sites). OU1 includes Sites 1 and 2. OU2-West includes Sites 8, 10 (Chase Park), 14-North, 16, 17, and 18. OU2-East includes Sites 3, 4, 6, 7, 10 (runways), 11 and 13. OU5 includes the aquifers on the east side of the Moffett Field, and OU6 includes wetland areas. The West Side Aquifer includes the aquifers located under the western portion of the Moffett Field (aquifers west of the runways). The petroleum sites are the non-CERCLA sites and include Sites 5, 9, 12, 14-South, 15, 19, 20 and 24. The Station-Wide Sites include Sites 21 to 23 as well as other Sites.

All OU1, OU2-East, OU5, OU6, the Station-Wide Sites, and Site 8 (OU2-West), lie outside of the area included in the scope of this EBS and are not discussed further. Of the petroleum sites, only Sites 9, 14-South, 15, 19 and 24 are located within the parcels included in this EBS. The following summarizes the IRP Sites that are located within the NRP. Plate 3 presents their locations, and Table 2 provides a summary.

Parcel 1:	West Side Aquifer
Parcel 2:	West Side Aquifer Sites 9, 15, 17
Parcel 3:	West Side Aquifer Site 24
Parcel 4:	West Side Aquifer Site 19
Parcel 5:	West Side Aquifer Sites 10, 14-North and South, 15, 16, 18
Parcel 6:	None

Final

Parcel 7: None

The next section describes the groundwater contamination (West Side Aquifer and MEW Plume) as it applies to all parcels, and summarizes the risk assessments. The remaining sites are discussed within the parcel findings (Sections 4.0 through 8.0, respectively).

3.4.2 Groundwater Contamination - West Side Aquifers/Regional Groundwater Plume North of 101

Groundwater contamination beneath the NRP consists of the commingled MFA and MEW Plumes often referred to as the West Side Aquifers or the Regional Plume North of U.S. Highway 101. It will be referred to in the remainder of this document as the Regional Plume.

The West Side Aquifer includes the aquifers located under the western portion of Moffett Field (aquifers west of the runways). In 1992, the EPA determined that because the aquifers on the western side of Moffett Field were being impacted by a groundwater plume from the aforementioned MEW Superfund site to the south of Moffett Field, they were subject to the 1989 MEW Record of Decision (ROD). Additionally, historical operations at Moffett Field (primarily from the former dry cleaning facility at former Building 88 [Site 18; Parcel 5 northern boundary] and fuel operations at Site 9 [Parcel 2 northwestern portion] also contributed solvents and fuel products to the MEW groundwater plume. Therefore, cleanup technologies and cleanup levels proposed and used by the Navy for site restoration on the western side of the runway follow those specified in the MEW Record of Decision (ROD; USEPA, 1989).

The remedial investigation (RI) of the MEW area was concluded in 1988 (*Harding ESE, 1988*). The investigation included a regional study area bounded by El Camino Real to the south, San Francisco Bay to the north, Mathilda Avenue to the east, and Stevens Creek to the west; and a local study area focusing on three Superfund sites within the MEW area. Volatile organic compounds (VOCs), especially Trichloroethene (TCE), and 1,1,1-Trichloroethane (1,1,1-TCA), were the most frequently detected. An estimated 98 percent of the mass of TCE and 1,1,1-TCA, and cis- and trans-1,2-dichloroethene (1,2-DCE) in the groundwater that has emanated from the MEW area exists within 100 feet bgs. The regional VOC plume within this shallow zone extends beneath Moffett Field approximately 5,000 feet north of U.S. Highway 101 (*PRC, 1996*). The MEW companies have completed the RI feasibility study (FS) and remedial design, and are currently conducting remedial action activities under USEPA supervision. Construction of the MEW treatment system was completed and routine operations began in October 1998 (*Tetra Tech, 1999a*). Their treatment system is located on Parcel 2 (Plate 4). According to the MEW ROD (*USEPA 1989*), the VOCs in the groundwater are being cleaned up to maximum contaminant levels (MCLs). Monitoring is being conducted to evaluate the plume conditions and remedial progress (*Locus, 1999*).

The remedial investigation work for the Navy portion of West Side Aquifer was completed in 1992 (*Tetra Tech, 1998a*). Several source areas of potential Navy-related groundwater contamination were identified. Potential groundwater source areas identified included an old fuel storage tank farm and former Navy Exchange (NEX) Service Station (Site 9), a former aircraft wash rack and sump (Site 15), and a former dry cleaners (Site 18). The former tank farm and NEX station, (Site 9) have been identified as sources of petroleum-related contamination, but do not appear to be sources of VOC contamination. The former dry cleaner (Site 18, Parcel 5) has been identified as a source of VOC contamination, particularly tetrachloroethene (PCE). The wash rack (Site 15, Sump 25, Parcel 5) is considered a VOC source (*Tetra Tech, 1998a*). The Navy designed and installed the West-Side Aquifers Treatment System (WATS) on Parcel 2 (Plate 4) (*Tetra Tech, 1999b*) to extract VOCs and petroleum contamination from groundwater in

the A1- and A2-aquifer zones. Groundwater is being cleaned up to MCLs for VOCs (*USEPA, 1989*) and for the petroleum hydrocarbons, to the levels shown in the Basewide Petroleum Site Evaluation Methodology Technical Memorandum (*Tetra Tech, 1998b*). Monitoring is being conducted to monitor the plume conditions and remedial progress. Responsibility for remediation of the West Side Aquifer has been allocated among MEW, Navy and NASA in accordance with the Allocation and Settlement Agreement (see Allocation map in Appendix B).

Monitoring of the groundwater contamination plume associated with the MEW site and former Navy activities at Moffett Field (West-side Aquifers) is being conducted; water-levels are measured on a quarterly basis, and groundwater sampling is conducted by the Navy and the MEW Companies. Based on the most recent available data the contaminants of primary concern present in groundwater beneath the parcels include TCE, 1,1,1-TCA, PCE, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis- and trans-1,2-dichloroethene (1,2-DCE), dichlorobenzene, chloroform, freon 113, phenol and vinyl chloride. The VOCs TCE and 1,1,1-TCA are the most frequently detected and widespread (*Tetra Tech, 1999a*).

The current plume limits, for TCE, benzene and TPHs and their respective concentrations are presented in Appendix B. Extraction wells and piping associated with the system are located on Parcels 1, 2, 3, and 5.

3.4.3 Risk Assessments

A human health risk assessment (HHRA) was conducted to evaluate the carcinogenic and noncarcinogenic risk for potential future residential, occupational, and recreational receptors at Moffett Field. The HHRA was included with the station-wide RI report (*PRC, 1996*). In addition station-wide ecological risk assessments (SWEAs) were conducted (*PRC and MW, 1995, and 1997*). Both of these focused on the wetland areas and the runway and surrounding hangars and maintenance facilities and did not address the areas occupied by the redevelopment property.

According to Joseph Chou of the RWQCB, risk assessments are in the process of being prepared for many of the petroleum sites (*Personal communication, 2000*).

In accordance with the MEW ROD, an Endangerment Assessment (EA) was prepared for the MEW Site (including Moffett Field) to address the potential affects to human health and the environment for the environmental conditions at that time (*ICF-Clement, 1988*). The EA evaluated the potential risks posed by contamination existing in 1988 without considering future remedial actions proposed for the Site. The assessment focused primarily on risks from exposure to contaminated groundwater, but also qualitatively evaluated risks to construction workers as well as a worst-case scenario where residential units would be constructed. The EA concluded that there was not a significant risk over most of the MEW area because of the relatively low volatile organic compounds (VOC) concentrations in exposed surface soils under the then current use conditions. However, the EA did qualitatively note that redevelopment of the Site could lead to significant exposure to contaminants present in subsurface soils through inhalation of vapors or dust assuming that no remedial action was taken at the Site.

NASA is preparing a Human Health Risk Assessment specifically for the NRP.

3.5 Environmental Compliance Programs

3.5.1 Hazardous Materials and Waste Management

In the early 1990s the Navy implemented several programs to better manage hazardous materials and waste at the facility. The programs were as follows:

- Hazardous Waste Management Plan - The Hazardous Waste Management Plan (HWMP) was drafted in April 1991 to ensure that NAS Moffett Field's program met all federal, state, and local regulations (*NAS Moffett Field, 1991b*)
- Hazardous Waste Minimization Plan - A used oil and solvent recycling management plan was completed for NAS Moffett Field in October 1989 to reduce generation of NAS Moffett Field's hazardous waste output (*Naval Energy and Environmental Support Activity [NEESA], 1989*)
- Spill Contingency Plan - The NAS Moffett Field Spill Contingency plan was completed in February 1989 to present procedures for responding to spills and notification of organizations if spills occur (*NAS Moffett Field, 1991a*).

No evidence of audits/investigations conducted to evaluate the Navy programs performance exists in the records reviewed.

Review of file documents did indicate that several investigations and assessments have been completed to evaluate the status of the management programs for specific buildings and to address whether hazardous materials or waste were present at the facility at the time of base transfer. These investigations/assessments included:

- A number of Phase I Environmental Site Assessments (ESAs) were conducted in the early 1990s for NASA by Boeing Aerospace Operations Inc. (*Boeing, 1993a and 1993b*), Chemical Waste Management Inc. (*CWMI, 1993a, 1993b, 1993c and 1993d*), SEC Donahue Inc. (*SEC Donahue, 1993*), and Uribe and Associates (*Uribe, 1993*) for buildings at Moffett Field including buildings within the NRP. The ESAs identified whether hazardous materials or waste were present at the buildings evaluated.
- The Base Realignment and Closure (BRAC) Cleanup Plan (*PRC Environmental Management, Inc [PRC], 1994*), presented a history of hazardous waste generating activities at Moffett Field.
- In August 1995, a multi-media audit was conducted for NASA by SAIC (*SAIC, 1995*). As part of the audit, SAIC evaluated hazardous waste management practices. Results of the audit indicated that no significant risk to the environment existed from current hazardous waste management practices.

These investigations/assessments indicated that many of the buildings within the NRP used hazardous materials and generated hazardous wastes.

In 1995, NASA established a three-year schedule for assessing environmental media utilizing the Environmental Protection Agency's (EPA's) *Generic Protocol for Conducting Environmental Audits of Federal Facilities* (1996 Revision). The most recent Environmental Self-Assessment to include hazardous materials management and hazardous waste management was conducted in 1998 (*NASA, 1998*). The pertinent findings from that report (now resolved) indicated that the only non compliance items were labeling deficiencies in hazardous materials storage areas. An inventory of hazardous waste

generated between 1994 and the present has been prepared by NASA. A list of buildings where hazardous waste was generated between 1994 and the present is presented as Table 11.

NASA has begun the preparation of closure plans for the buildings within the NRP parcels. The closure activities will include visual surveys and a determination of whether the problems identified in the above investigations/assessments were addressed or if others exist. Sampling will be conducted if necessary (*Personal Communication, 2000b*).

3.5.2 Storage Tanks

A total of 155 former and current USTs, ASTs, oil/water separators (OWS) and sumps have been identified at NAS Moffett Field (*Tetra Tech, 1999a*). Tanks present on the NRP are identified on Plate 5 and summarized on Tables 3 and 4. The numbering system and location of the storage tanks was derived from the BRAC Cleanup Plan, (*PRC, 1994*) and the Baseline Environmental Report (*Tetra Tech, 1994*). According to Tetra Tech (*1999a*) the majority of tanks/OWS/sumps at Moffett Field have been removed and no further investigations were required. However, documentation indicating regulatory agencies approved closure for the majority of these tanks was not available. In a letter to the Navy dated August 8, 2000, the RWQCB granted closure for 13 tanks at Moffett Field (*RWQCB, 2000*). Five of the former tank locations are present within the NRP. Several of the removed tanks/OWS/sumps required investigations as part of the IRP investigations; discussions for these investigations are included in the parcel findings (Sections 4.0 through 8.0, respectively).

3.5.3 Medical/Biohazardous Waste

No medical/biohazardous waste has been or is generated within the NRP. The only medical/biohazardous waste generated at NAS Moffett Field was by the Naval Regional Hospital Branch Clinic, which is (*NEESA, 1991*) located outside the NRP west of Parcel 1. Medical/biohazardous waste is not discussed further in this document.

3.5.4 Lead-Based Paint

Lead-based paint (LBP) was in common use prior to 1978, at which point its use was discontinued. No LBP survey has been performed at NAS Moffett Field; therefore, based on the age, it is assumed that the majority of buildings/structures within the NRP contain lead. Some buildings at Moffett Field have been sampled as a result of modifications being performed. Table 5 presents a summary of the building construction dates, lists buildings that were sampled and their sample dates, and identifies which sampled buildings detected LBP.

In July and August 1993, as part of a facility wide investigation to evaluate the presence of lead around the perimeter of buildings that may have had lead based painted exteriors, CWMI collected 332 surface soil samples. Lead was detected above the residential Preliminary Remediation Goal (PRG) of 400 milligrams per kilogram (mg/kg) and/or soluble threshold limit concentration (STLC) of five milligrams per liter (mg/L), in perimeter soil at many of the building locations (*CWMI, 1993e*). In addition, perimeter soil at several locations also exceeded the industrial PRG of 1,000 mg/kg. Table 5 presents a summary of the building perimeters sampled within NRP and lists which buildings exceeded residential and industrial PRGs. The EPA conducted a follow-up sampling investigation around some of the buildings in July 1998. Roy F. Weston (Weston), under the direction of the EPA, collected 120 soil samples around 11 selected buildings. These results indicated that the residential or industrial PRG was exceeded in at least one sample collected from seven of the building locations (*USEPA, 1998*). LBP issues for Parcels 2, 3, 4, 6, and 7 are discussed in Sections 4.0 through 8.0, respectively.

Lead surveys of the buildings including sampling of the building material and soil shall be conducted by NASA at the partners expense, if appropriate, prior to demolition, rehabilitation, or occupancy of any buildings within the NRP (*Personal Communications, 2000b*).

3.5.5 Spent Abrasive Materials

Uncontrolled blasting may have occurred in aircraft support zones within the NRP parcels but no documented locations are known. Abrasive materials are not discussed further in this report.

3.5.6 Radioactive Materials

A radiological survey was performed on December 7 and 8, 1993 at the Navy Weapons Storage and Laboratory Buildings (Buildings 459, 484, 486, 487, 490 and 4XC1, all located east of the runway with the exception of Building 459 located in Parcel 5) to declassify and make available the rooms for unrestricted use. The rooms had been used by the Navy for storage of Naval Weapons and handling of hazardous materials used with the weapons. Results of the sampling indicated that all results were below background levels; no radioactive contamination was found during the survey, and the rooms were released for unrestricted use (*CWMI, 1994*).

According to Bill Vermeere, PAI/ISSi Radiologist Specialist (*Personal Communication, 2000*), radiological materials are only used in the Hangar 2 and 3 areas and in several NASA buildings. Additionally, radiation calibration materials are also used in Building 19 (Parcel 1). On the basis of this communication, radioactive materials are not discussed further in this document.

3.5.7 Mixed Waste

On the basis of the results of Phase 1 ESAs conducted in the early 1990s for NASA by CWMI (*CWMI, 1993a, 1993b, 1993c and 1993d*), SEC Donahue (*SEC Donahue, 1993*), Uribe (*Uribe, 1993*), and the multi-media audit conducted by SAIC in August 1995, there are no mixed waste storage areas located within the NRP. Mixed waste is not discussed further in this document.

3.5.8 Radon

Federal law requires every federal department or agency that owns federal buildings to conduct a study to evaluate radon contamination in those buildings. Navy policy also requires that all buildings and housing units occupied for more than four hours per day be tested for radon gas. Any structure that has radon levels greater than four pico-curies needs to have mitigation actions performed.

In 1988 and 1989, a radon survey was conducted for 16 NASA buildings that are not part of the NRP. Samples were taken over a 7 day period between December 27, 1988 and January 2, 1989. Results of the sampling indicated that radon was not detected above detection limits ranging between 0.3 and 0.7 pico-curies per liter of air (pCi/L) (*NASA-ARC, 1989*). Additionally in 1989, as part of a NASA radon monitoring program conducted at 13 NASA installations in the United States, 107 canisters were set up at 23 buildings to monitor for radon over an approximate 116 day period. None of the canisters detected radon above 1 pCi/L (*Unknown Source*).

NAS Moffett Field's initial screening process of the housing units reportedly showed high levels of radon (*Tetra Tech, 1994*). Assessment of the housing units began in March 1993 by installing 807 radon detectors in the housing units. Two non-housing units were also reportedly screened. Building 153

(Parcel 5) and another unidentifiable building screening results indicated that high levels of radon were not identified.

On the basis of several memorandums present in NASA files it appears that radon surveys were also performed for 13 other buildings within Moffett Field. Two of the buildings (23 and 25) are located in Parcel 1, five of the buildings (111, 146, 153, 154, 155) are located in Parcel 5, and the remaining buildings (256, 511, 956B, C, and D and Hangar 3) are scattered throughout Moffett Field. Results of these surveys did not identify radon above 1 pCi/L (*Department of the Army [Army], 1994*).

On the basis of the results of the radon monitoring programs conducted for the Moffett Field buildings and the similarities between those buildings and the NRP buildings, it is unlikely that radon is present in buildings within NRP above the EPA's 4 pCi/L action level, and it is not discussed further in this document.

3.5.9 Storm Water Discharges and System

NASA holds a general industry storm water discharge permit. Additionally, the Navy received a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB on October 20, 1998 and August 25, 1999 for authorization to discharge treated groundwater from the East-Side and West-Side Aquifer Treatment Systems respectively. After treatment discharge requirements are met, the groundwater is discharged to the storm water drain system. In 1994 Stanford University received a NPDES permit from the RWQCB to investigate in-situ biodegradation methodologies for restoration of contaminated aquifers. This program, being performed for the EPA, studies the degradation of halogenated compounds and includes the injection and extraction of small quantities of groundwater. After treatment to meet the NPDES discharge requirements, the groundwater is also discharged to the storm drain system. The MEW companies also discharge treated groundwater under an NPDES permit to Stevens Creek.

NASA implemented a storm water pollution prevention program plan for Moffett Field in 1992 and currently performs storm water monitoring at seven locations within the Moffett Field facility under the general permit. None of the sampling locations are located within the NRP. Review of the latest available storm water monitoring report indicated that TCE, copper, lead, zinc, and pH exceeded the San Francisco Bay Basin Water Quality Control Plan shallow surface water limits during the latest monitoring round (*SAIC, 1999b*). The TCE and pH exceedances were just above the control plan limits of 5.0 micrograms per liter ($\mu\text{g/L}$) and 6.5 – 8.5 respectively. The three metals were three to four times the control plan limits of 23.6, 5.6 and 170 $\mu\text{g/L}$.

Investigations were conducted by Insituform Technologies Inc. (ITI), Salem, Oregon to evaluate the integrity of the storm drain systems. According to the ITI report, the pipelines had problems such as grease inflow, root infiltration, misaligned and broken joints, radial and longitudinal cracks, and holes in pipes. According to the ITI report, the problem areas have been reconstructed using cured in place pipe and appear in like new condition (*ITI, 1997a*)

3.5.10 Wastewater

The wastewater sewer collection system at Moffett Field connects with a force main to the city of Sunnyvale treatment plant. Industrial wastewater discharge occurs within NRP.

Investigations were conducted by ITI to evaluate the integrity of the sanitary sewer system in May 1997. According to the ITI report, the pipelines had grease inflow, root infiltration, misaligned and broken

joints, radial and longitudinal cracks, and holes in the pipe. The pipelines have now been reconstructed using cured in place pipe and appear in "like new" condition (*ITI, 1997b*).

3.5.11 Air Quality

Air quality issues have been investigated as part of several studies undertaken at the facility as follows:

- Hazardous Air Pollutant Emissions Inventory, 1996 (*SAIC, 1996 and 1999*)
- Indoor Air Testing, Various Buildings 1999 and 2000 (*SAIC, 2000; HLA, 2000*)
- Passive Gas Monitoring Survey of Indoor Ambient Air and Subsurface Organic Vapors, Building 566 (*SAIC, 1999*).

Each study is summarized below. Additionally NASA and several of the resident agencies have permits to operate Air Pollution Sources from the Bay Area Air Quality Management District (BAAQMD). A list of current sources is provided as applicable for each parcel.

3.5.12 Emissions Inventory

The Hazardous Air Pollutant Emissions Inventory measured and evaluated emission rates of chemicals from sources around the Moffett Field facility including those within the NRP. This investigation quantified emissions from:

- Abrasive blasting
- External Combustion
- Internal Combustion
- Fuel Storage and Transfer
- Hazardous Materials
- Welding and Soldering.

NASA Ames and Moffett Field were investigated separately and emission results were evaluated for each area. The most significant air emission at NASA was found to be toluene (1298.71 pounds/year) from predominantly hazardous materials use. The most significant air emission at Moffett Field was found to be ethylene glycol (1379.08 pounds/year), also from predominantly hazardous materials use.

3.5.13 Indoor Air Testing

In 1999, SAIC conducted an indoor air quality testing program for NASA to measure the levels of VOCs in Hangar 1 and Buildings 6, 21, 22, 111, 148, and 156. These buildings were selected based on their location with respect to the West Side Aquifer groundwater plume. Buildings 26 and 269 are not located over the plume, and served as background sampling locations. Outdoor air samples were also collected concurrently outside Buildings 6, 111, 148, and 566 in order to determine outdoor VOC levels for the area. With the exception of Building 269, all the buildings discussed above are located within the NRP.

Low levels of 21 VOCs were detected in at least some of the buildings tested. Concentrations of all detected VOCs were far below the Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values – time weighted averages (TLV-TWAs). Eight VOCs were detected above the EPA Region 9 Preliminary Remediation Goals (PRGs), adjusted for a residential exposure scenario of 24 hours per day over 20 years. Those VOCs were TCE, benzene, chloromethane, 1,2-DCA, 1,1,2-trichloroethane, chlorobenzene, 1,4-dichlorobenzene, and 1,4-dioxane. All other compounds detected in the buildings were found at concentrations below their respective PRGs for the adjusted exposure scenario.

In Spring 2000, Harding Lawson Associates (HLA) conducted an indoor air quality testing program for NASA to measure the levels of VOCs in Buildings 476 and 543 (located within Parcel 5) to evaluate the potential for constructing dormitory/living quarters in this area. The analysis for the 26 VOCs was divided into three classes: aromatic hydrocarbons, chlorinated hydrocarbons, and “other VOCs”. Results of the testing program were compared to OSHA PELs, ACGIH TLV-TWAs, and EPA Region 9 PRGs adjusted for an exposure period of 16 hours per day over 5 years. The following results were noted:

- Low levels of some aromatic hydrocarbons (benzene and toluene) were present in all of the rooms in both buildings, and in an outside ambient air sample collected in the vicinity of each of the buildings, but did not exceed any of the standards used for comparison.
- No chlorinated hydrocarbons were detected in the ambient air sample. Perchloroethylene was detected at very low concentrations for two of the five samples taken in Building 476. 1,1,1-TCA was detected in one sample of five in Building 543. All other indoor measurements for chlorinated hydrocarbons were non-detects. None of the measured levels exceeded the PEL, the TLV-TWA, or the adjusted EPA PRG.
- The only “other VOC” detected at concentrations above any of the standards used for comparison was 1,4-dioxane, which was detected above its adjusted EPA PRG. The compound was detected in the ambient air sample and for all indoor samples for both buildings. The levels of 1,4-dioxane exceeded the adjusted PRG for one of five samples in Building 476 and for four of five samples within Building 543. The ambient air concentration for 1,4-dioxane also exceeded the adjusted PRG. All of the “other VOC” compounds were either non-detected or below the respective PEL, TLV-TWA, and the adjusted EPA PRG. Based on the sampling conducted to date, it is unclear whether 1,4-dioxane is emanating from the plume, the building materials, or both.

A discussion of these results, as they pertain to Parcels 2, 3, 4, 6, and 7, are presented in Sections 4.0 through 8.0, respectively.

3.5.14 Building 566 Passive Gas Monitoring Survey

In January 1999, SAIC performed a passive gas monitoring survey for NASA of indoor ambient air and subsurface organic vapors at Building 566 (located within Parcel 1) to evaluate whether chlorinated organic vapors (TCE, PCE, 1,1,1-TCA, cis 1,2-DCE, and vinyl chloride only) had migrated from the groundwater into Building 566 and its surrounding soils. The evaluation used Gore-Sorber technology, a passive soil gas sampling technology that allows transfer of vapors to microporous membranes which absorb the organic materials.

A total of 43 Gore-Sorber modules were used for this evaluation as follows:

- 10 located three-feet bgs around perimeter of building
- 10 located six inches bgs around perimeter of building
- 12 scattered throughout inside of building at floor level
- 5 at in-take vents in ceiling tile inside building
- 1 at floor level of conference room
- 1 in the HVAC unit in north exterior of building
- 1 in the vent intake in north exterior of building
- 3 in "contaminated" groundwater monitoring wells in the building vicinity.

Sampling duration was dependent upon whether the module was located above or below ground surface. Modules above ground surface were sampled between January 12 and 19, 1999 and subsurface modules were sampled over a two week period between January 12 and 26, 1999.

Of the five analytes of concern, only TCE and 1,1,1-TCA were detected or exceeded minimum detection limit in subsurface (excluding wells) or building samples. Additionally, Gore-Sorber reported results of other organic compounds which are part of their standard reporting package. Detected compounds included methyl tertiary-butyl ether (MTBE), 2-methyl naphthalene, chlorobenzene, carbon tetrachloride and BTEX.

Due to the detection of TCE and 1,1,1-TCA and BTEX, SAIC recommended additional studies within the building to determine concentrations of the analytes and their risk to human health. An additional air study performed by SAIC in 1999 for Building 566 using air canisters, indicated that the building was not suitable for use as a child care center.

3.5.15 Asbestos

A limited asbestos survey of the housing units was conducted by the Navy in 1988, and a basewide survey was conducted by Tetra Tech in 1993 (*Tetra Tech, 1994b*). The surveys identified both confirmed and suspect asbestos containing materials (ACMs) including pipe lagging, floor and ceiling tile, mastic, sheetrock and tape mud, water lines and gasket material. Results of the survey identified multiple buildings with confirmed and suspect asbestos present within the NRP. Table 6 presents a summary of the buildings with confirmed and suspect asbestos. In addition, some buildings at Moffett Field were also sampled as a result of modifications being performed. Table 6 also presents a summary of the buildings that were sampled and their sample dates, and identifies which sampled buildings detected ACM. A discussion of these results for Parcels 2, 3, 4, 6, and 7 are presented in Sections 4.0 through 8.0, respectively.

Asbestos surveys and sampling, shall be conducted by NASA at the Partners expense if necessary, prior to demolition, rehabilitation, or occupancy of any buildings within the parcel (*Personal Communication, 2000b*).

3.5.16 Pesticides

Normal use of pesticides, herbicides, and fertilizers has occurred, however the extent and types used is unknown. Therefore, there is the potential for residual levels of pesticides in soil and groundwater within the NRP. No pesticide mixing areas were known to be present within the NRP parcels. The presence of pesticides is not discussed further in this document.

3.5.17 Polychlorinated Biphenyls

The NASA Environmental Services Office performs quarterly inspections, completes Annual Document Logs, and submits transformer registration of equipment with concentrations of polychlorinated biphenyls (PCBs) at greater than or equal to 50 parts per million (ppm) in compliance with 40 CFR 761 to the USEPA. In addition, the NASA Facilities Maintenance group completes additional inventories, inspections and testing of the equipment. Historical documentation includes a PCB inventory of the former Naval Air Station, at Moffett Field conducted by the Navy in 1993 (*NAS Moffett Field, 1993*). In this document, a total of 252 items were identified and sampled, including capacitors, regulators, oil fuse cutouts, oil circuit breakers, oil switches, and transformers. PCB concentrations ranged from non-detect to 542,000 ppm. Since the completion of this 1993 report, many pieces of equipment have been removed and disposed of as indicated in the PCB Annual Document Logs.

Transformers or capacitors with PCB concentrations above the California DHS regulated concentration (5 ppm) for hazardous waste are present within the NRP. Four of these transformers are included because they have not been tested for PCBs and in compliance with 40 CFR 761 are assumed to have concentrations of PCBs >500 ppm. Table 7 presents a summary of the buildings with transformers and/or capacitors with concentrations of detected PCBs above the DHS regulated concentrations. Equipment with PCB concentrations of 5 ppm or greater present in Parcels 2, 3, 4, 6, and 7 are discussed in Sections 4.0 through 8.0, respectively. Any buildings with fluorescent lighting may contain PCB light ballasts. These must be removed and disposed of properly prior to demolition.

3.5.18 Ordnance

There is no evidence that ordnance was used or stored within the NRP parcels (*Tetra Tech, 1994a*). Several high explosive magazines, an ordnance shop, and a missile magazine are located on the northeast side of Moffett Field several thousand feet from the parcel. Ordnance is not discussed further in this document.

3.5.19 Mold

On September 14, 2000, in preparation for a visitor tour scheduled for buildings in Parcel 1, PAI/ISSi conducted hazard reviews of Buildings 20 through 27. Results of the review identified substantial visual molds in Buildings 20, 23, and 25. Laboratory analysis of molds observed in Building 25 during a previous visit indicated that a number of different mold types including aspergillus, penicillium and stachybotrys were present within this building. Deleterious health effects can be produced by mold species, including infectious disease, allergenic response, irritation and dermatitis. Because of the mold hazard, NASA issued a memorandum dated September 22, 2000, detailing precautions which need to be taken prior to entering buildings with molds present, specifically Building 25, (*NASA, 2000b*). No mold has been investigated or identified in Parcels 2, 3, 4, 6, or 7.

3.6 Closure Plans

Closure Plans (CPs) have been or are in the process of being prepared for NASA, which describe the requirements and procedures for the demolition of several buildings and associated structures within the NRP Parcels. The CPs also outline the environmental requirements for rebuilding these facilities. A CP was prepared for Buildings 111, 146/146A, 161, 574, 958, and 992, and covers the removal of the underground storage tanks 431 and 432 (also known as Tanks 70 and 71 within Parcel 5 [*PAI/ISSi, 2000a*]). Closure Plan 2 was prepared for Buildings 50, 148, 149, 150, 151, 555, 583A, 583B, 590, 964 and 965 (*PAI/ISSi, 2000b*). Closure Plan 3 was prepared for Buildings 82, 459, 512A, 512B, 512C, 534, 547B, 547C, 547D, 547E, 572, 583, 945, 966 and 967 (Parcel 5 [*PAI/ISSi, 2001a*]). Closure Plan 4 (*PAI/ISSi, 2001b*) was completed on May 31, 2001 and included Buildings 184, 343, 544, 585, 950 and 951 (Parcel 5). Closure Plan 5 was prepared for Buildings 113, 503, 525, 526, 554, 556, 596, 944, 104, 107, 108, 109, 476, 529 and 543 and was submitted on July 12, 2001 (*PAI/ISSi, 2001c*). Closure Plan 6 was prepared for Buildings 158, 329, 331, 381, 382, 400, 438, 464, 956 and 956A and was submitted on September 21, 2001 (*PAI/ISSi, 2001d*). The CPs include descriptions of the facilities and hazardous materials handling and storage. In addition, infrastructures that may contain hazardous materials (e.g. PCBs in electrical equipment) are also identified. A description of the procedures to protect and/or destroy groundwater monitoring wells and treatment system equipment is also included.

Additional Closure Plans and estimated dates of completion are as follows:

Closure Plan	Buildings	Estimated Date of Completion
District Infill/Training/Conf Ctr CP7	3, 12, 13, 14, 29, 31, 480	11/15/01
District Infill/Training/Conf Ctr CP8	6, 76, 81, 460, 482, 509, 510, 527, 542, 567, 570	12/01/01
Open Space West of Hanger 1 CP9	45, 84, 85, 126, 941, 942	1/20/02
Swing Parcels near South Gate CP10	77, 454, 463	2/18/02

4.0 FINDINGS FOR PARCEL 2

This section provides a summary of data collected at Parcel 2 of the NRP, which is designated for reuse as a collaborative research and educational campus. The findings pertaining to this parcel describe past and current environmental restoration and compliance program activities. A discussion of potential environmental constraints is also provided.

4.1 History and Current Usage

The majority of the buildings on Parcel 2 were constructed in the early 1930s and mid – 1940s and several are included in the National Register of Historic Places (National Register). All of Parcel 2 is within the Shenandoah Plaza Historic District. Demolition and any remodeling or re-habilitation work in the buildings identified on the National Register must adhere to specific ACHD guidelines for National Register facilities. Historic use of the buildings was varied and included administration, base support services, recreation, fuel farm, and a gas station. Table 8 presents a list of buildings and summarizes the following:

- Historic use
- Building Area
- Year Constructed
- Presence on National Register
- Current occupant and use if known
- Preferred development alternative.

The majority of the buildings are currently used for support services, recreation, and by NASA for administration, research support, and storage. Utilities present on Parcel 2 include fresh water, sanitary sewer, telephone, storm sewer, power and steam lines and compressed air. (Plates 6a and b).

4.2 Environmental Restoration Programs

Parcel 2 includes portions of three Sites (9, 15, and 17) and is underlain by the West Side Aquifer. Sites 9 and 15 are petroleum sites, and Site 17 is one of the OU2 West Sites. These sites are discussed below; the West Side Aquifers OU was discussed in detail in Section 3.4.2. The chemicals detected in the groundwater below Parcel 2 are generally above MCLs (*Locus 1999 and Tetra Tech 1999b*). See Appendix B for recent plume maps.

One hundred and fifty-five groundwater monitoring and extraction wells and piezometers lie on Parcel 2 (Table 9 and Plate 4). The monitoring and extraction wells monitor and remove the Westside groundwater contamination plume.

4.2.1 Site 9

Site 9 includes two former groups of underground storage tanks (USTs) located at Buildings 29 and 31. The Building 29 area included 13 USTs (47, 48, 49, 50, 79, 80, 81, 82, 83, 84, 97, 98, and 99) and one

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AST (52). The Building 31 area included four USTs (56A, 56B, 56C, and 56D). The former locations of the USTs are shown on Plate 5. The 17 USTs and the AST associated with Buildings 29 and 31 have been removed. Subsurface soils and groundwater at Site 9 have been contaminated by fuels (primarily in the gasoline and JP-5 range) and BTEX from the USTs and associated leaking pipes. The West Side Aquifers Treatment System (WATS) is in place and contains the migration of petroleum related contaminants from Site 9 as discussed in Section 3.4.2 (*PRC, 1991*).

4.2.2 Site 15

Site 15 included the investigation of nine sumps and oil/water separators and one tank located throughout Moffett Field. The sumps and separators were used for the temporary storage of waste associated with activities occurring on the parcels. Four of the sumps (59, 63, 64, and 65) and one UST (54) are located in the north and eastern portion of the facility and are not on the NRP nor covered in this EBS. Sumps and separators 25, 42, 58, 62 and 62A are located on the NRP. Of the five sumps and oil/water separators, only two (62 and 62A) are located on Parcel 2 (Plate 5). Sumps 62 and 62A are located in the northwestern corner of Building 45 (public works paint shop). Activities began at the paint shop in the late 1930s and ceased in October 1992. Sumps 62 and 62A consisted of two separate pits and were used as an oil/water separator and received excess oil- and latex-based paints and wastewater from painting operations in the paint shop spray booth. The sumps also collected paint over-spray from the paint spray booth through the floor drain. Sumps 62 and 62A were drained, cleaned and are inactive. No evidence of release associated with Sumps 62 and 62A have been identified (*PRC, 1993*).

4.2.3 Site 17

Site 17 is the public works paint shop Sump 61. A concrete sump (61) was located adjacent to Building 45 (paint shop) and received wastes from the paint shop and nearby Hangar 1 (Plate 5). Waste was reported to have included oil- and latex-based paints, thinners, toluene, and turpentine. Sump 61 and surrounding contaminated soils were removed in 1990. No further contamination remains at this site (*USEPA 1993; PRC, 1997*).

4.3 Environmental Compliance Programs

4.3.1 Hazardous Waste Management

No 90-day Hazardous Waste Accumulation Areas (HWAAs) have been located in Parcel 2. On the basis of the review of the documents discussed above in Section 3.5.1, five buildings (Buildings 6, 10, 16, 45, and 542) historically (prior to 1994) accumulated hazardous wastes. Hazardous waste is not currently (1994 to present) stored at any building within Parcel 2 although small amounts are generated at the MEW Treatment System. A list of the hazardous wastes previously accumulated in buildings within Parcel 2 is presented in Table 10 and Plate 2A identifies the locations of the buildings.

4.3.2 Hazardous Materials Management

Hazardous materials were historically stored or used at three buildings within Parcel 2 (Buildings 10, 45 and 567; *Boeing, 1993a; Uribe, 1993*). Hazardous materials are currently stored or used at three buildings (10, 527, 567) and at the MEW treatment system. Tables 10 and 11 list the hazardous materials formerly and currently stored or used in Parcel 2, respectively and Plate 2B identifies the locations of the building.

4.3.3 Storage Tanks

4.3.3.1 Underground Storage Tanks, Oil/Water Separators and Sumps

Twenty-two USTs and three former sumps were present within in Parcel 2. The USTs present on Parcel 2 are identified on Plate 5 and summarized on Table 3. The majority of the USTs were included in the Site 9 (Tanks 47, 48, 49, 50, 56A, 56B, 56C, 56D, 79, 80, 81, 82, 83, 84, 97, 98, 99) Site 15 (Sumps 62 and 62A), and Site 17 (Sump 61) investigations discussed above in Sections 4.2.1, and 4.2.2, and 4.2.3, respectively, and releases associated with the USTs are being actively monitored. The regulatory status for the remaining USTs (1, 32, 85, 85a and 87) is currently being evaluated.

4.3.3.2 Aboveground Storage Tanks

One AST is present within Parcel 2 and one has been removed (Building 29). The active AST is a 60-gallon diesel AST located at Building 12. The ASTs are identified on Plate 5 and summarized on Table 4. On the basis of the size of the active tank, it is unlikely to have impacted the environment; however, no documentation exists nor was a visual survey conducted to support this conclusion. The AST at Building 29 was a 25,000-gallon tank installed in 1941. This tank was moved and put in service as Tank 72 (located outside of the NRP).

4.3.4 Lead-Based Paint

Based on the age of the buildings/structures present within Parcel 2, or the results of previous sampling, it is assumed that all 30 buildings/structures contain lead. Review of PAI internal files identified 14 buildings within Parcel 2 that have been sampled as a result of modifications being performed; 10 of the buildings sampled detected lead. Table 7 presents a summary of buildings that were sampled, their construction and sample dates, and identifies which buildings showed detected LBP.

Surface soil samples were collected from the perimeter of 14 buildings within Parcel 2. Lead was detected above the Region 9 residential PRG at 9 of the building locations and above the industrial PRG at four building locations. Table 5 presents a summary of the building perimeters sampled within Parcel 2.

4.3.5 Air Quality

The boilers located at Building 10 are an air emission source. The Source is properly permitted by the Bay Area Air Quality Management District. The solvent cleaning activities at Building 567 (Public Works Warehouse) also comprise an emission source.

One of the buildings tested as part of the indoor air quality investigations discussed in Section 3.5.13 (Building 6) is located within Parcel 2. No chemicals were detected above the respective OSHA PEL or ACGIH TLB-TWA thresholds, which suggests that VOC infiltration from the regional groundwater plume is unlikely to pose a hazard to onsite workers. Trichloroethylene, benzene, chloromethane, 1,2-dichloroethane, chlorobenzene and 1,4-dioxane were detected above adjusted PRGs for a residential scenario, indicating that VOC infiltration may be an issue for any residential development. NASA is preparing a human health risk assessment to evaluate the potential exposure to construction workers, if any, from inhalation of VOC vapors associated with the regional groundwater plume. Any construction work involving soil disturbance should be performed by appropriately trained workers under a Health and Safety Plan which addresses appropriate monitoring and personal protective equipment.

4.3.6 Asbestos

Results of the surveys and sampling discussed in Section 3.5.15 identified 21 buildings within Parcel 2 with confirmed or suspect asbestos present (Table 6). All remaining buildings were not sampled, however because of their age, they are assumed to contain ACM.

4.3.7 Polychlorinated Biphenyls

One capacitor with PCB concentrations above the DTSC regulated concentration is present in Parcel 2; one other transformer with PCB concentrations exceeding the threshold was reportedly removed from the parcel in 1999. Table 7 presents a summary of the Parcel 2 buildings with PCB containing items, their sample dates, and the concentrations of detected PCBs above the DTSC regulated concentration. Plate 2B identifies the locations of the buildings. Quarterly inspections are recorded on Field Sheets kept electronically on a database and reported annually in the PCB Annual Log. A visual survey was not conducted as part of this report. Any buildings with fluorescent lights may contain PCB light ballasts. These must be removed and disposed of properly prior to demolition.

4.4 Discussion of Findings

The potential environmental constraints for Parcel 2 include the following:

- Several of the buildings within Parcel 2 are on the National Register. The entire Parcel is within a Historic District. As such, any demolition, remodeling, or rehabilitation work must adhere to specific ACHP guidelines.
- Concentrations of VOCs and petroleum hydrocarbons in the groundwater beneath Parcel 2 were detected above MCLs or cleanup goals. Volatilization of these VOCs may constrain any residential development, and shall require that any construction work involving soil disturbance be performed by appropriately trained workers under purview of a Health and Safety Plan.
- Several removed USTs are still actively being investigated. Regulatory status of these tanks should be further researched. The active AST should be inspected to document its conformance with current regulatory guidelines.
- NASA is currently working on the preparation of closure plans which will include visual surveys and a documentation of any hazardous materials or wastes that are present and, if present, if they have impacted the environment.
- Lead-based paint and asbestos containing materials have been identified or are suspected in the majority of the buildings within Parcel 2. In addition, LBP has been identified in the soil associated with many of the buildings. The presence of these materials should be confirmed and remediated prior to demolition, renovation, or reuse of the building. LBP and asbestos surveys should be conducted prior to commencing demolition, renovation, or reuse activities.

5.0 FINDINGS FOR PARCEL 3

This section provides a summary of data collected at Parcel 3 of the NRP, which is designated for reuse as the California Air and Space Center. The findings pertaining to this parcel describe past and current environmental restoration and compliance program activities. A discussion of potential environmental constraints is also provided.

5.1 History and Current Usage

The majority of the buildings on Parcel 3 were constructed in early 1930s and mid – 1940s and several are included in the National Register of Historic Places. All of Parcel 3 is within the Shenandoah Plaza Historic District. Demolition and any remodeling or re-habilitation work on buildings identified on the National Register must adhere to specific ACHP guidelines for National Register facilities. Historic use of the buildings was as a Hangar for the lighter-than-air vehicles, for aircraft maintenance, and support of the runway. Table 8 presents a list of buildings and summarizes the following:

- Historic use
- Building Area
- Year Constructed
- Presence on National Register
- Current occupant and use if known
- Preferred development alternative.

Hangar 1 is used for events including as a museum of the former NAS Moffett Field; the remainder of the buildings are vacant. A portion of Parcel 3 is also being utilized by Stanford University as a bioremediation field site. Stanford is currently conducting passive in-situ treatment via aerobic cometabolism to treat the TCE plume in shallow groundwater in an area just north of Hangar 1. Stanford's field site within Parcel 3 consists of approximately 20 monitoring wells with an average depth of 20 feet deep (*Hopkins, 2001*). Utilities present on Parcel 3 include fresh water, sanitary sewer, telephone, storm sewer, power and steam lines and compressed air. (Plates 6a and b).

5.2 Environmental Restoration Programs

Parcel 3 includes portions of Site 24 and is underlain by the West Side Aquifer. Site 24 is discussed below; the West Side Aquifers OU was discussed above in Section 3.4.2. The chemicals detected in the groundwater below Parcel 3 are generally above MCLs for VOCs (*Locus, 1999; Tetra Tech, 1999b*). See Appendix B for plume maps.

Fifteen groundwater monitoring and extraction wells, in addition to the 20 Stanford wells, lie on Parcel 3 (Plate 4 and Table 9). The monitoring and extraction wells monitor and remove the Westside groundwater contamination plume.

5.2.1 Site 24

Site 24 is the former high-speed fuel system, which consists of the Hangar 1 fuel pits, high-speed fuel hydrants, and the fuel pier. No petroleum contamination was identified in the investigation of the Hangar 1 fuel pits. Solvents, however, were detected in groundwater under Hangar 1, but are probably the result of the underlying regional groundwater plume, including contamination resulting from operations at the Building 88 dry cleaners (*PRC, 1997*).

5.3 Environmental Compliance Programs

5.3.1 Hazardous Waste Management

On the basis of the review of the documents discussed above in Section 3.5.1, two buildings (Buildings 1 and former Building 120) historically (prior to 1994) accumulated hazardous wastes. Hazardous waste is currently (1994 to present) accumulated at Building 1. A list of the hazardous wastes previously and currently generated in buildings within Parcel 2 is presented in Tables 10 and 11 respectively, and Plate 2A identifies the locations of the buildings.

5.3.2 Hazardous Materials Management

Hazardous materials were historically stored or used at two buildings within Parcel 3 (Building 1 and former Building 120; *CWMI, 1993a*). No hazardous materials are currently stored or used in buildings within Parcel 3. Table 10 lists the hazardous materials formerly stored or used in Parcels 3 and 5. Plate 2B identifies the location of the buildings.

5.3.3 Storage Tanks

5.3.3.1 Underground Storage Tanks, Oil/Water Separators and Sumps

One UST, reportedly storing diesel fuel, was present within Parcel 3 (located at Building 1). The UST present on Parcel 3 is identified on Plate 5 and summarized on Table 3. Based on available drawings, Tank 117 was a 1,200-gallon diesel tank for an emergency generator. Generator and tank removal status are unknown. Exploratory excavation at the Site did not reveal the tank or contamination (*Personal Communication – NASA, Don Chuck, 2001*).

5.3.3.2 Aboveground Storage Tanks

No ASTs have been or are currently present within Parcel 3.

5.3.4 Lead-Based Paint

Based on the age of the buildings/structures present within Parcel 3 it is assumed that all of buildings/structures present contain lead. None of the buildings except for Hangar 1 have been sampled for lead. Table 5 presents a summary of buildings and their construction sample dates.

Surface soil samples were not collected from the perimeter of any buildings within Parcel 3.

5.3.5 Air Quality

No emission sources are located in Parcel 3, although emission sources have been or are present on adjacent properties (SAIC, 1996).

One of the buildings tested as part of the indoor air quality investigations discussed in Section 3.5.13 (Hangar 1) is located within Parcel 3. No chemicals were detected above the respective OSHA PEL or ACGIH TLB-TWA thresholds, which suggests that VOC infiltration from the regional groundwater plume is unlikely to pose a hazard to onsite workers. TCE, benzene, 1,2-dichloroethane, and 1,4-dioxane were detected above adjusted PRGs for a residential scenario, indicating that VOC infiltration may be an issue for any residential development. NASA is preparing a human health risk assessment to evaluate the potential exposure to construction workers, if any, from inhalation of VOC vapors associated with the regional groundwater plume. Any construction work involving soil disturbance should be performed by appropriately trained workers under a Health and Safety Plan which addresses appropriate monitoring and personal protective equipment.

5.3.6 Asbestos

Results of the surveys and sampling discussed in Section 3.5.15 identified six buildings within Parcel 3 with confirmed or suspect asbestos present (Table 6). All remaining buildings were not sampled, however because of their age, they are assumed to contain ACM.

5.3.7 Polychlorinated Biphenyls

No transformers with PCB concentrations above the DTSC regulated concentration are present in Parcel 3. Any buildings with fluorescent lights may contain PCB light ballasts. These must be removed and disposed of properly prior to demolition.

5.4 Discussion of Findings

The potential environmental constraints for Parcel 3 include the following:

- Several of the buildings within Parcel 3 are on the National Register. As such, demolition and any remodeling or rehabilitation work must adhere to specific ACHP guidelines.
- Concentrations of VOCs and petroleum hydrocarbons in the groundwater beneath Parcel 3 were detected above MCLs or cleanup goals. Volatilization of the VOCs may constrain any residential development, and shall require that any construction work involving soil disturbance be performed by appropriately trained workers under purview of a Health and Safety Plan.
- The regulatory status of the removed UST is unknown and should be further researched.
- NASA is currently working on the preparation of closure plans which will include visual surveys and a documentation of any hazardous materials or wastes that are present and, if present, if they have impacted the environment.
- Lead-based paint and asbestos containing materials have been identified or are suspected in the majority of the buildings within Parcel 3. In addition, LBP may be present in the soil associated with many of the buildings (no samples have been collected to date). The presence of these materials should be confirmed and remediated prior to demolition, renovation, or reuse of the building. LBP

and asbestos surveys should be conducted prior to commencing demolition, renovation, or reuse activities.

6.0 FINDINGS FOR PARCEL 4

This section provides a summary of data collected at Parcel 4 of the NRP, which is designated for reuse as a collaborative research and development campus and burrowing owl habitat. The findings pertaining to this parcel describe past and current environmental restoration and compliance program activities. A discussion of potential environmental constraints is also provided.

6.1 History and Current Usage

The majority of the buildings on Parcel 4 were constructed in the mid 1950s to mid 1960s. No buildings were identified on the National Register. Historic use of the buildings was for support of Hangar 1 and support of the runway. Table 8 presents a list of buildings and summarizes the following:

- Historic use
- Building Area
- Year Constructed
- Presence on National Register
- Current occupant and use if known
- Preferred development alternative.

The buildings are currently used for office operations, air traffic control, or are vacant. A large portion of this parcel has been identified as a habitat area for burrowing owls; a California species of special concern, and will not be developed. Utilities present on Parcel 4 include fresh water, sanitary sewer, telephone, storm sewer, power and steam lines and compressed air. (Plates 6a and b). A portion of Parcel 4 is also being utilized by Stanford University as a bioremediation field site. Stanford is currently conducting passive in-situ treatment via aerobic cometabolism to treat the TCE plume in shallow groundwater in the vicinity of Building 956A. Stanford's field site within Parcel 4 consists of approximately 34 monitoring wells with an average depth of 30 to 40 feet deep (*Hopkins, 2001*).

6.2 Environmental Restoration Programs

Parcel 4 includes Site 19 and is underlain by the West Side Aquifer. Site 19 is discussed below; the West Side Aquifer OU was discussed above in Section 3.4.2. The chemicals detected in the groundwater below Parcel 4 are generally above MCLs for VOCs (*Locus, 1999; Tetra Tech, 1999b*). See Appendix B for a recent plume map.

Twelve groundwater monitoring wells lie on Parcel 4 (Plate 4 and Table 9). The monitoring wells monitor the Westside groundwater contamination plume. In addition to these wells and as stated in Section 6.1, approximately 34 monitoring wells are present in Parcel 4 associated with Stanford's bioremediation field site. The locations and completion details of these wells are not known. However, Mr. Gary Hopkins of Stanford indicated that approximately 15 of these wells were decommissioned in 2000 and that the locations and completion details are on file at the Santa Clara Valley Water District. NASA staff will review these records to provide additional information.

6.2.1 Site 19

Site 19 includes four former USTs (2, 14, 43 and 53) located throughout Moffett Field. Only UST 14 is located on the NRP covered in this EBS. UST 14 was a 1,100-gallon UST that was used as a standby diesel fuel storage tank for the backup generator in the Operations Building (Building 158). The tank was removed in May of 1990. Soil staining was observed during the initial excavation activities potentially related to tank overfilling (*PRC, 1993*). Data collected from Site 19 indicated no unacceptable human health or ecological risk. All sources of contamination have been removed and the site is being considered for closure (*Tetra Tech, 1998c*).

6.3 Environmental Compliance Programs

6.3.1 Hazardous Waste Management

On the basis of the review of the documents discussed above in Section 3.5.1, none of the buildings located in Parcel 4 historically (prior to 1994) accumulated or temporarily stored hazardous wastes. Hazardous wastes are not currently (1994 to present) accumulated at any buildings within Parcel 4.

6.3.2 Hazardous Materials Management

As shown on Table 10, hazardous materials were formerly stored or used at two buildings within Parcel 4 (Buildings 331 and 400 (*CWMI, 1993b*)). Hazardous materials are not currently stored or used at any buildings within Parcel 4. Plate 2B identifies these building locations.

6.3.3 Storage Tanks

6.3.3.1 Underground Storage Tanks, Oil/Water Separators and Sumps

One former UST (Tank 14 discussed above as part of Site 19) was present within Parcel 4. The former UST present on Parcel 4 is identified on Plate 5 and summarized on Table 3.

6.3.3.2 Aboveground Storage Tanks

No ASTs have been or are currently present within Parcel 4.

6.3.4 Lead-Based Paint

Based on the age of the buildings/structures present within Parcel 4 it is assumed that all 10 buildings/structures contain lead. Review of PAI internal files identified one building (Building 158) within Parcel 4 that has been sampled as a result of modifications being performed; the building sampled detected lead. Table 5 presents a summary of buildings that were sampled, their construction and sample dates, and identifies which buildings showed detected LBP.

Surface soil samples were collected from the perimeter of five buildings within Parcel 4. Lead was detected above both the Region 9 residential and industrial PRGs at 3 of the building locations. Table 5 presents a summary of the building perimeters sampled within Parcel 4.

6.3.5 Air Quality

No emission sources are located within Parcel 4, although emission sources have been or are present on adjacent parcels (*SAIC, 1996*). No buildings within Parcel 4 were tested as part of the indoor air quality investigations discussed in Section 3.5.13.

6.3.6 Asbestos

Results of the surveys and sampling discussed in Section 3.5.15 identified three buildings within Parcel 4 with confirmed or suspect asbestos present (Table 6). All remaining buildings were not sampled, however because of their age, they are assumed to contain ACM.

6.3.7 Polychlorinated Biphenyls

One capacitor containing PCBs was removed from Parcel 4 in 1992 (located at Building 158; Table 7, Plate 2B). Any buildings with fluorescent lights may contain PCB light ballast. These must be removed and disposed of properly prior to demolition.

6.4 Discussion of Findings

The potential environmental constraints for Parcel 4 include the following:

- Concentrations of VOCs in the groundwater beneath Parcel 4 were detected above MCLs or cleanup goals. Volatilization of these VOCs may constrain any residential development, and shall require that any construction work involving soil disturbance be performed by appropriately trained workers under purview of a Health and Safety Plan.
- NASA is currently working on the preparation of closure plans which will include visual surveys and a documentation of any hazardous materials or wastes that are present and, if present, if they have impacted the environment.
- Lead-based paint and asbestos containing materials have been identified or are suspected in the majority of the buildings within Parcel 4. In addition, LBP has been identified in the soil associated with many of the buildings. The presence of these materials should be confirmed and remediated prior to demolition, renovation, or reuse of the building. LBP and asbestos surveys should be conducted prior to commencing demolition, renovation, or reuse activities.

7.0 FINDINGS FOR PARCEL 6

This section provides a summary of data collected at Parcel 6 of the NRP, which is designated for reuse as burrowing owl habitat and parking. The findings pertaining to this parcel describe past and current environmental restoration and compliance program activities. A discussion of potential environmental constraints is also provided.

7.1 History and Current Usage

The two buildings present on Parcel 6 were constructed in 1944 and 1960. Neither building is identified on the National Register. Historic use of the buildings were as a sentry house and radio transmission building. Table 8 presents a list of buildings and summarizes the following:

- Historic use
- Building Area
- Year Constructed
- Presence on National Register
- Current occupant and use if known
- Preferred development alternative.

The building uses are currently unchanged from their historic use. Stanford's field site (described in Section 6.1) within Parcel 6 consists of approximately 2 monitoring wells with an average depth of 30 to 40 feet deep (*Hopkins, 2001*). Utilities present on Parcel 6 include telephone, and power lines (Plates 6a and b).

7.2 Environmental Restoration Programs

No environmental restoration sites lie on Parcel 6 (Plate 5). As stated in Section 7.1, 2 monitoring wells are present in Parcel 6 associated with Stanford University's bioremediation field site (Plate 4). The chemicals detected in the groundwater below Parcel 6 are generally below MCLs for VOCs (*Locus, 1999; Tetra Tech, 1999b*). See Appendix B for current plume maps.

7.3 Environmental Compliance Programs

7.3.1 Hazardous Waste Management

On the basis of the review of the documents discussed above in Section 3.5.1, no buildings within Parcel 6 historically (prior to 1994) accumulated hazardous wastes. According to NASA (*Olliges, 2000*) hazardous wastes were accumulated within the boundaries of Parcel 6 during construction of the adjacent light rail station in 1998. All materials were removed when the light rail construction was completed. A list of materials accumulated is presented in Table 11 and Plate 2A identifies the location of the accumulation area.

7.3.2 Hazardous Materials Management

As shown in Table 10, hazardous materials were stored or used at one building (Building 454) within Parcel 6 (*CWMI, 1993c*). Additional hazardous materials were stored or used in the construction area of the light rail system discussed above. Tables 10 and 11 list the hazardous materials stored or used in Parcel 5 and Plate 2B identifies the location of the storage/use areas.

7.3.3 Storage Tanks

7.3.3.1 Underground Storage Tanks, Oil/Water Separators and Sumps

One UST was present within the Parcel 6 (Tank 21 located at Building 454). The regulatory status of the 1,000-gallon diesel tank is unknown but is currently undergoing review by Navy for eventual closure. The UST present on Parcel 6 is identified on Plate 5 and summarized on Table 3.

7.3.3.2 Aboveground Storage Tanks

No ASTs have been or are currently present within Parcel 6.

7.3.4 Lead-Based Paint

Based on the age of the buildings/structures present within Parcel 6 it is assumed that both buildings/structures contain lead. Neither of the buildings has been sampled for lead. Table 5 presents a summary of buildings and their construction dates.

Surface soil samples were collected from the perimeter of one of the buildings within Parcel 6. Lead was not detected above the Region 9 residential or industrial PRGs. Table 5 presents a summary of the building perimeters sampled within Parcel 6.

7.3.5 Air Quality

No emission sources are located in Parcel 6, although emission sources have been or are present on adjacent properties (*SAIC, 1996*).

No buildings within Parcel 6 were tested as part of the indoor air quality investigations discussed in Section 3.5.13.

7.3.6 Asbestos

Results of the surveys and sampling discussed in Section 3.5.15 identified both buildings within Parcel 6 with confirmed asbestos (Table 6).

7.3.7 Polychlorinated Biphenyls

One transformer with PCB concentrations above the DTSC regulated concentration is present in Parcel 6 (located at Building 77; Table 7, Plate 2B). Quarterly inspections are recorded on Field Sheets kept electronically on a database and reported annually in the PCB Annual Document Log. No visual survey was conducted as part of this report. Any buildings with fluorescent lights may contain PCB light ballasts. These must be removed and disposed of properly prior to demolition.

7.4 Discussion of Findings

The potential environmental constraints for Parcel 6 include the following:

- The regulatory status of the removed UST is unknown; regulatory status of this tank should be further researched.
- NASA is currently working on the preparation of closure plans which will include visual surveys and a documentation of any hazardous materials or wastes that are present and, if present, if they have impacted the environment.
- Lead-based paint and asbestos containing materials were identified or are suspected in both buildings within Parcel 6. In addition, LBP has been identified in the soil associated with one of the buildings. The presence of these materials should be confirmed and remediated prior to demolition, renovation, or reuse of the building. LBP and asbestos surveys should be conducted prior to commencing demolition, renovation, or reuse activities.

8.0 FINDINGS FOR PARCEL 7

This section provides a summary of data collected at Parcel 7 of the NRP, which is designated for reuse. The findings pertaining to this parcel describe past and current environmental restoration and compliance program activities. A discussion of potential environmental constraints is also provided.

8.1 History and Current Usage

No buildings are or have been historically present within this parcel. No utilities are present on Parcel 7 (Plates 6a and b).

8.2 Environmental Restoration Programs

No environmental restoration sites, or groundwater monitoring or extraction wells lie on Parcel 7 (Plate 3 and 4). The chemicals detected in the groundwater below Parcel 7 are below MCLs for VOCs (*Locus, 1999; Tetra Tech, 1999b*). See Appendix B for a recent plume map.

8.3 Environmental Compliance Programs

8.3.1 Hazardous Waste Management

No buildings which could have potentially generated or stored hazardous wastes have been present on Parcel 7.

8.3.2 Hazardous Materials Management

No buildings which could have potentially stored or used hazardous materials have been present on Parcel 7.

8.3.3 Storage Tanks

8.3.3.1 Underground Storage Tanks, Oil/Water Separators and Sumps

No USTs, oil/water separators or sumps have been or are currently present within Parcel 7.

8.3.3.2 Aboveground Storage Tanks

No ASTs have been or are currently present within Parcel 7.

8.3.4 Lead-Based Paint

No buildings/structures have been or are currently present within Parcel 7.

8.3.5 Air Quality

No emission sources are located in Parcel 7, although emission sources have been or are present on adjacent properties (*SAIC, 1996*).

8.3.6 Asbestos

No buildings/structures have been or are currently present within Parcel 7.

8.3.7 Polychlorinated Biphenyls

No items with PCB concentrations above the DTSC regulated concentration are present in Parcel 7.

8.4 Discussion of Findings

There are no identified environmental constraints for Parcel 7.

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TABLES

TABLES

**Table 1. History of Installation Operations
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

DATES	TYPE OF OPERATION
Pre 1933	Agricultural
1933-1935	Site commissioned as Sunnyvale Naval Air Station to support lighter-than-air (LTA) program
1935-1940	Site transferred to U.S. Army Corps for training purposes
1939	Ames Aeronautical Laboratory established on land adjacent to Moffett Field
1940	Site transferred to U.S. Navy and renamed NAS Moffett Field Station became the West Coast's Air Corps Training Center for air cadets
1942	Heavier-than-air (HTA) program started at NAS Moffett Field
1945	HTA program moved to Half Moon Bay NAS Moffett Field used as major overhaul and repair base
1949	Station became home to the Military Air Transport Service Squadron
1950	Station was the largest naval air transport base on the west coast and became first all weather naval air station Jet air craft introduced
1953	NAS Moffett Field became home to all Navy fixed-wing, land-based antisubmarine craft
1954	Weapons department formed

**Table 1. History of Installation Operations
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

DATES	TYPE OF OPERATION
1962	NAS Moffett Field selected as the west coast site to operate the P-3 Orion, the Navy's newest, fastest, and most versatile submarine-hunter-patrol airplane
1966	Station reactivated its high-speed refueling facilities
1973-1991	<p>The mission of NAS Moffett Field was to support antisubmarine warfare training and patrol operations</p> <p>Station became headquarters of the Commander Patrol Wings, U.S. Pacific Fleet</p>
1991-1994	NAS Moffett Field designated for closure as an active military base; transferred to NASA in July 1994
1994-Present	NASA Control

Modified from BRAC Cleanup Plan (PRC 1994)

**Table 2. Installation Restoration Program Sites
Environmental Baseline Survey
Initial Development Parcels
Moffett Federal Airfield, California**

Parcel Number	IRP Site	Type of Site	Remedial Action	Confirmation Report/ Approval Reference
2	Regional Plume/West Side Aquifers	Groundwater Plume	In Progress	Locus, 1999/ Tetra Tech, 1998, West-Side Aquifers Treatment System Final Long-Term Groundwater Monitoring Plan
	9	Old Fuel Farm (USTs)	In Progress	PRC, 1991/
	15	Sumps and Oil/Water Separators	Complete	PRC, 1993/ Groundwater cleanup under WATS
	17	Paint Shop Sump	Complete	PRC, 1993/EPA, 1993/ Groundwater cleanup under WATS
3	Regional Plume/West Side Aquifers	Groundwater Plume	In Progress	Locus, 1999/ Tetra Tech, 1998, West-Side Aquifers Treatment System Final Long-Term Groundwater Monitoring Plan
	24	Hangar 1 Fuel Pits	Complete	Tetra Tech, 1998b/Navy 1997
4	Regional Plume/West Side Aquifers	Groundwater Plume	In Progress	Locus, 1999/ Tetra Tech, 1998, West-Side Aquifers Treatment System Final Long-Term Groundwater Monitoring Plan
	19	USTs	Complete	PRC, 1998, to be addressed in Appendix E

*West Side Aquifers are the commingled MEW and MFA plumes; also commonly called the Regional Plume North of 101.

**Table 3. Underground Storage Tank Status
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#/ Location	Tank/Sump No.*	Contents	Size Gallons	Year Installed	Date Removed	Comments/status
Parcel 2						
6	85A	aviation gasoline	1,000	unknown	1995	Remaining UST Sites Investigation Field Work Plan
6	85	aviation gasoline	1,000	1944	1995	Remaining UST Sites Investigation Field Work Plan
10	1	diesel	2,000	1941	6/1/91	Remaining UST Sites Investigation Field Work Plan
	32	diesel	5,000	unknown	4/15/94	Remaining UST Sites Investigation Field Work Plan
15	87	diesel	10,000	unknown	7/7/93	Remaining UST Sites Investigation Field Work Plan
29	47	aviation gas	25,000	1941	7/15/93	Part of Site 9 Investigation, active monitoring
	48	aviation gas	25,000	1941	7/15/93	Part of Site 9 Investigation, active monitoring
	49	aviation gas	25,000	1941	7/15/93	Part of Site 9 Investigation, active monitoring
	50	aviation gas	25,000	1941	7/15/93	Part of Site 9 Investigation, active monitoring
	79	aviation gas	10,000	1933	7/23/93	Part of Site 9 Investigation, active monitoring
	80	aviation gas	10,000	1933	7/23/93	Part of Site 9 Investigation, active monitoring
	81	aviation gas	10,000	1933	7/23/93	Part of Site 9 Investigation, active monitoring
	82	aviation gas	10,000	1933	7/23/93	Part of Site 9 Investigation, active monitoring
	83	aviation gas	10,000	1933	7/23/93	Part of Site 9 Investigation, active monitoring
	84	aviation gas	10,000	1933	7/23/93	Part of Site 9 Investigation, active monitoring
	97	fuel oil	6,000	unknown	7/28/93	Part of Site 9 Investigation, active monitoring
	98	aviation gas	430	1941	7/28/93	Part of Site 9 Investigation, active monitoring
		aviation gas	430	1941	7/28/93	Part of Site 9 Investigation, active monitoring
31	56A	waste oil	500	1933	10/9/90	Low concentrations of TPHg, toluene, ethylbenzene, and xylenes present in soil. No further action recommended. Part of Site 9 Investigation
	56B	gasoline	8,750	1933	10/9/90	TPHg, TPHd, toluene, ethylbenzene, xylenes and TCE were present in soil at maximum concentrations of 407 mg/kg, 204 mg/kg, 103 µg/kg, 4,400 µg/kg, 4,400 µg/kg, and 44 µg/kg respectively. VOCs and low levels of TPHg also detected in groundwater wells. Active monitoring. Part of Site 9 Investigation.
	56C	gasoline	10,000	1933	10/9/90	TPHg, BTEX were present in soil at maximum concentrations of 4,570 mg/kg, 4,450 µg/kg, 16,000 µg/kg, 30,000 µg/kg, and 197,000 µg/kg respectively. High levels of petroleum hydrocarbons and VOCs detected in groundwater wells. Active monitoring. Part of Site 9 Investigation. See 56C results
45	56D 61	gasoline paint waste	10,000 10,000	1933 unknown	10/9/90 10/23/90	Sump - VOCs detected in soil and groundwater well. Impacted soil removed and no further action recommended. Also listed at building 941 in Tetra Tech report (<i>Tetra Tech, 1994</i>). Part of Site 15 Investigation.

**Table 3. Underground Storage Tank Status
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#/ Location	Tank/Sump No.*	Contents	Size Gallons	Year Installed	Date Removed	Comments/status
	62	paint waste	13,000	unknown	Closed in place	Sump - Closed in place, unknown regulatory status. Part of Site 15 Investigation.
	62A	paint waste	13,000	unknown	Closed in place	
Parcel 3						
1	117	diesel	1200	unknown	unknown	**
Parcel 4						
158	14	diesel	1,100	unknown	1990	Petroleum hydrocarbons detected in soil (max. 4,400 mg/kg) and groundwater (max 5.6 mg/l), Unknown regulatory status. Part of Site 19 investigation.
Parcel 6						
454	21	diesel	1,000	unknown	11/1/95	Remaining UST sites

* Tank designation No.'s from Tetra Tech 1994 and PRC 1994

** Excavation of tank location done, no tank found (See also note in Section 5.3.3.1)

**Table 4. Aboveground Storage Tank Status
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#	Location	Tank No.*	Contents	Size Gallons	Year Installed	Date Removed	Comments
Parcel 2							
12		105	diesel	60	unknown	Active	Still in use. No secondary containment. (Tetra Tech, 1994)
29		52	aviation gasoline	25,000	1941	unknown	Removed and put in service as Tank 72

* Tank designation No.'s from Tetra Tech 1994 and PRC 1994
Table checked against Tetra Tech Oct. 2, 1998 Report.

**Table 5. Lead Based Paint Sampling Results
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#	Building Name	Year constructed	Year sampled/ surveyed *	Confirmed lead present	Assumed lead present **	Lead in soil above residential PRG ***	Lead in soil above industrial PRG ****
Parcel 2 Buildings/Structures/Areas							
2	Gymnasium (NAR)	1933	1998	yes	NA	yes	yes
3	Moffett Conf.	1933	1994	no	yes	no	no
5	Water Tower	1932	1998	yes	NA	Not sampled	Not sampled
6	Public Works/Recycle & Storage (NAR)	1933	Not sampled	no	yes	yes	no
10	Boiler Plant Facility (ISP)	1932	1994	yes	NA	yes	yes
12	Commissary/Admin. (DECA/NAR)	1933	Not sampled	no	yes	Not sampled	Not sampled
13	Commissary Storage (DECA/NAR)	1933	Not sampled	no	yes	no	no
14	Office (NASA)	1933	1998 1994 / 1998 /	yes	NA	yes	yes
15	Security Station	1933	1999	yes	NA	no	no
16	Public Works Center (ISP)	1933	1994	yes	NA	yes	no
29	Office Equipment/Repair (NASA Warehouse)	1932	Not sampled	no	yes	Not sampled	Not sampled
31	Commissary/Storage (DECA)	1933	Not sampled	no	yes	Not sampled	Not sampled
37	Scale House	1933	Not sampled	no	yes	no	no
45	Paint Shop (Vacant)	1944	Not sampled	no	yes	yes	no
64	NASA Storage (Code A)	1940	1998	yes	NA	Not sampled	Not sampled
76	Locksmith	1944	1999	yes	NA	no	no
81	Maintenance Storage	1944	Not sampled	no	yes	Not sampled	Not sampled
85	NASA Storage (Code A)	1944	1998	yes	NA	yes	yes
126	Warehouse (Computer History Center)	1949	1998	yes	NA	Not sampled	Not sampled
460	Storage	1950	Not sampled	no	yes	Not sampled	Not sampled
480	Handball Court	unknown	Not sampled	no	NA	yes	no
482	Storage	1963	1994	no	yes	Not sampled	Not sampled
509	Beauty/Barber Shop	1968	Not sampled	no	yes	Not sampled	Not sampled
510	Facility Maintenance (ISP)	1967	1994	no	yes	Not sampled	Not sampled
527	Storage	1968	Not sampled	no	yes	Not sampled	Not sampled
542	Glass Incin.	1973	Not sampled	no	yes	Not sampled	Not sampled
567	PW Warehouse	1978	1994	no	yes	yes	no
570	Storage	1978	Not sampled	no	yes	Not sampled	Not sampled
941	NASA Maintenance Office (ISP)	1940	Not sampled	no	yes	Not sampled	Not sampled
942	PW Storage	1940	Not sampled	no	yes	Not sampled	Not sampled

**Table 5. Lead Based Paint Sampling Results
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#	Building Name	Year constructed	Year sampled/ surveyed *	Confirmed lead present	Assumed lead present **	Lead in soil above residential PRG ***	Lead in soil above industrial PRG ****
<u>Parcel 3 Buildings/Structures/Areas</u>							
1	Hangar 1	1933	2000	yes	NA	Not sampled	Not sampled
32	North Floodlight Tower	1933	Not sampled	no	yes	Not sampled	Not sampled
33	South Floodlight Tower	1933	Not sampled	no	yes	Not sampled	Not sampled
44	Storage	1942	Not sampled	no	yes	Not sampled	Not sampled
83	A/C Ln Ops Building	1944	Not sampled	no	yes	Not sampled	Not sampled
118	Storage	1944	Not sampled	no	yes	Not sampled	Not sampled
119	Storage (Vacant)	1944	Not sampled	no	yes	Not sampled	Not sampled
347	A/C Line Ops	1942	Not sampled	no	yes	Not sampled	Not sampled
<u>Parcel 4 Buildings/Structures/Areas</u>							
158	Operations Building (Air Ops)	1954	1999	yes	NA	no	no
329	UHF/VHF Receiver Building	1958	Not sampled	no	yes	Not sampled	Not sampled
331	Storage (NASA)	1958	Not sampled	no	yes	yes	yes
381	Storage (NASA)	1950	Not sampled	no	yes	Not sampled	Not sampled
382	A/C Line Ops	1950	Not sampled	no	yes	no	no
400	Airfield Storage	1958	Not sampled	no	yes	yes	yes
464	Ops. Storage	1964	Not sampled	no	yes	yes	yes
582	Marquee	1982	Not sampled	no	yes	Not sampled	Not sampled
956	Parachute Loft	1957	Not sampled	no	yes	Not sampled	Not sampled
956A	Storage	unknown	Not sampled	no	yes	Not sampled	Not sampled
<u>Parcel 6 Buildings/Structures/Areas</u>							
77	Sentry House: South Gate (ISP)	1944	Not sampled	no	yes	Not sampled	Not sampled
454	UHF/VHF Trans	1960	Not sampled	no	yes	no	no

* A full LBP survey has not been completed for any of the sampled buildings
 ** LBP assumed to be present in all pre-1978 buildings or buildings with unknown ages unless sampling confirmed otherwise
 *** Lead exceed the residential PRG of 400 mg/kg and/or Cal-EPA STLC threshold of 5 mg/l, (CWMI, 1993)
 **** Lead exceed the industrial PRG of 1000 mg/kg (CWMI, 1993)
 NA Not Applicable

**Table 6. Asbestos Survey/Sampling Results
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg# Building Name	year(s) sampled/surveyed	Non-friable asbestos present	Friable asbestos present
<u>Parcel 2 Buildings/Structures/Areas</u>			
2 Gymnasium (NAR)	1993	suspect	confirmed
3 Moffett Conf.	1993/1998	suspect	confirmed
5 Water Tower	not sampled	NA	NA
6 Public Works/Recycle & Storage (NAR)	1993/1998/1999	suspect	confirmed
10 Boiler Plant Facility (ISP)	1993/1994	suspect	confirmed
12 Commissary/Admin. (DECA/NAR)	1993	confirmed	confirmed
13 Commissary Storage (DECA/NAR)	1993	suspect	no
14 Office (NASA)	1993	suspect	confirmed
15 Security Station	1993/1994/1999	confirmed	confirmed
16 Public Works Center (ISP)	1993/1994/1999	suspect	confirmed
29 Office Equipment/Repair (NASA Warehouse)	1993	confirmed	confirmed
31 Commissary/Storage (DECA)	1993	suspect	confirmed
37 Scale House	not sampled	NA	NA
45 Paint Shop (Vacant)	1993	suspect	confirmed
64 NASA Storage (Code A)	1993	confirmed	no
76 Locksmith	1993/1999	suspect	no
81 Maintenance Storage	1993	suspect	confirmed
85 NASA Storage (Code A)	1993	NA	NA
126 Warehouse (Computer History Center)	1993/1995	confirmed	confirmed
460 Storage	not sampled	NA	NA
480 Handball Court	NA	NA	NA
482 Storage	1993/1994	no	confirmed
509 Beauty/Barber Shop	1993	suspect	no
510 Facility Maintenance (ISP)	1993/1994	suspect	no
527 Storage	1993	NA	NA
542 Glass Incin.	1993	NA	NA
567 PW Warehouse	1993/1994	suspect	no
570 Storage	1993	NA	NA
941 NASA Maintenance Office (ISP)	not sampled	NA	NA
942 PW Storage	1998	confirmed	no

Parcel 3 Buildings/Structures/Areas

1 Hangar 1	1993/1998	confirmed	confirmed
32 North Floodlight Tower	1993	no	no
33 South Floodlight Tower	1993	confirmed	confirmed
44 Storage	1993	suspect	no
83 A/C Ln Ops Building	1993	suspect	no
118 Storage	Not Sampled	NA	NA
119 Storage (Vacant)	1993	suspect	no
347 A/C Line Ops	1993	confirmed	no

Parcel 4 Buildings/Structures/Areas

158 Operations Building (Air Ops)	1993/1999	suspect	confirmed
329 UHF/VHF Receiver Building	1993	suspect	no
331 Storage (NASA)	not sampled	NA	NA
381 Storage (NASA)	not sampled	NA	NA
382 A/C Line Ops	1993	suspect	suspect
400 Airfield Storage	not sampled	NA	NA

**Table 6. Asbestos Survey/Sampling Results
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg# Building Name	year(s) sampled/surveyed	Non-friable asbestos present	Friable asbestos present
464 Ops. Storage	not sampled	NA	NA
582 Marquee	not sampled	NA	NA
956 Parachute Loft	not sampled	NA	NA
956A Storage	not sampled	NA	NA

Parcel 6 Buildings/Structures/Areas

77 Sentry House: South Gate (ISP)	1993	suspect	no
454 UHF/VHF Trans	1993	suspect	no

NA Not applicable

As discussed in Section 3.5.12 Asbestos results from *Tetra Tech, 1992* and various SAIC asbestos/lead :

* Asbestos abatement conducted in building

**Table 7. PCB Impacted Transformer/Capacitors
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#	Date(s) analyzed	PCBs concentration in ppm *	Comments
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Parcel 2 Buildings/Structures/Areas

3	7/2/95, 8/27/96	33/39	Transformer removed and disposed of in April 1999
6	Not available	9	Three oil fuse capacitors at building, only one exceeded 5 ppm

Parcel 4 Buildings/Structures/Areas

158	Not available	**	PCB containing capacitor removed 6/19/92 - no results available
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Parcel 6 Buildings/Structures/Areas

77	7/2/95	102	(T-41.2)
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- * California DHS regulates liquid PCBs as hazardous waste with concentrations above 5 ppm. PCBs are identified as a hazardous substance under section 66900, Article 15, Title 22 of the CCR
- ** When no analytical results are available, assumed PCB concentration is at >500 ppm per 40 CFR 461.

**Table 8. Building List Summary
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#	Building Name/Historical Use	Area (gsf)	Year Constructed	Historic Register	Current Occupant	Fiscal Year 2000 Use	Preferred Development Alternative
Parcel 2 Buildings/Structures/Areas							
2	Gymnasium (NAR)	24,738	1933	Yes	NEX	gymnasium	gymnasium
3	Moffett Conf.	32,150	1933	No	NASA	conference center	demolition
5	Water Tower	900	1932	Yes	vacant	utility	landmark
6	Public Works/Recycle & Storage (NAR)	15,735	1933	No	Code J	code J recycling	demolition
10	Boiler Plant Facility (ISP)	10,990	1932	Yes	Code J	boiler/shops	boiler/data com
12	Commissary/Admin. (DECA/NAR)	64,152	1933	No	DECA	retail	demolition
13	Commissary Storage (DECA/NAR)	16,080	1933	No	DECA	retail	demolition
14	Office (NASA)	12,000	1933	No	vacant	office	demolition
15	Security Station	17,150	1933	Yes	Code J	security	security
16	Public Works Center (ISP)	16,866	1933	Yes	Code J	shop/manufacturing	work/flex space
29	Office Equipment/Repair (NASA)	1,056	1932	No	Code J	demolition	demolition
31	Commissary/Storage (DECA)	4,955	1933	No	DECA	demolition	demolition
37	Scale House	69	1933	Yes	vacant	vacant	move/demo
45	Paint Shop (Vacant)	10,089	1944	No	vacant	work/flex space	demolition
64	Ceramics (NASA Storage [Code A])	7,020	1940	No	vacant	demolition	demolition
76	Locksmith	450	1944	No	Code J	office	demolition
81	Maintenance Storage	536	1944	No	vacant	storage	demolition
85	Metalizing-Sandblast (NASA Storage)	1,020	1944	No	vacant	demolition	demolition
126	Warehouse (Computer History Center)	13,300	1949	No	vacant	storage	demolition
460	Storage	50	1950	No	vacant	storage	demolition
480	Handball Court	1,804	1968	No	vacant	recreation	demolition
482	Storage	625	1967	No	NEX	demolition	demolition
509	Beauty/Barber Shop	1,813	1968	No	NEX	retail	demolition
510	Facility Maintenance (ISP)	4,620	1973	No	Code J	office	demolition
527	Storage	1,840	1978	No	vacant	storage	demolition
542	Glass Incin.	432	1978	No	vacant	demolition	demolition
567	PW Warehouse	6,327	unknown	No	Code J	storage	demolition
570	Storage	142	1963	No	vacant	demolition	demolition
941	NASA Maintenance Office (ISP)	6,365	unknown	No	vacant	demolition	demolition
942	PW Storage	2,744	unknown	No	NEX	demolition	demolition
Total Building Square Footage Parcel 2		276,018					
Parcel 3 Buildings/Structures/Areas							
1	Hangar 1	385,290	1933	Yes	NASA	special Events	CASC
32	North Floodlight Tower	830	1933	Yes	vacant	vacant	CASC
33	South Floodlight Tower	1,246	1933	Yes	vacant	vacant	CASC
44	Storage	640	1942	No	vacant	demolition	demolition
83	A/C Ln Ops Building	2,000	1944	No	vacant	demolition	demolition
118	Storage	628	1944	No	vacant	demolition	demolition
119	Storage (Vacant)	782	1944	No	vacant	demolition	demolition
120	Demolished Building - Former Waste Accumulation Area	unknown	unknown	No	vacant	not applicable	not applicable
347	A/C Line Ops	1,600	1942	No	vacant	demolition	demolition
Total Building Square Footage Parcel 3		393,016					
Parcel 4 Buildings/Structures/Areas							
158	Operations Building (Air Ops)	21,240	1954	No	Code J	office	demolition

**Table 8. Building List Summary
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Bldg#	Building Name/Historical Use	Area (gsf)	Year Constructed	Historic Register	Current Occupant	Fiscal Year 2000 Use	Preferred Development Alternative
329	UHF/VHF Receiver Building	800	1958	No	Code J	operations	operations
331	Storage (NASA)	525	1958	No	Code J	demolition	demolition
381	Storage (NASA)	446	1950	No	Code J	demolition	demolition
382	A/C Line Ops	192	1950	No	vacant	demolition	demolition
400	Airfield Storage	280	1958	No	vacant	demolition	demolition
464	Operational Storage	290	1964	No	vacant	demolition	demolition
582	Marquee	123	unknown	No	NEX	no occupancy	no occupancy
956	Parachute Loft	8,005	unknown	No	CANG	office/training	demolition
956A	Storage	204	unknown	No	CANG	demolition	demolition
Total Building Square Footage Parcel 4		32,105					
<u>Parcel 6 Buildings/Structures/Areas</u>							
77	Sentry House: South Gate (ISP)	92	1944	No	vacant	guard house/utility	demolition
454	UHF/VHF Trans	1,340	1960	No	vacant	Utility	Utility
Total Building Square Footage Parcel 6		1,432					
<u>Parcel 7 Buildings/Structures/Areas</u>							
No buildings/structures present in parcel							

Explanation:

gsf - gross square feet

Historic - Building identified in the National Register of Historic Places

Code J - Internal Nasa

NAR - Internal Nasa

CCC - Internal Nasa

CANG - Internal Nasa

JP - Internal Nasa

NEX -

Building List and Uses Provided by PAI Corporation, June 2000

**Table 9. Monitoring and Extraction Well Ownership and Total Depth
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
Parcel 2			
080B1	MEW	monitoring	57
090A	MEW	monitoring	32
123B2	MEW	monitoring	96
P152 (B1)	MEW	piezometer	unknown
AS9-1	Navy	monitoring	unknown
AS9-2	Navy	monitoring	unknown
EA1-1	Navy	extraction	25
EA1-3	Navy	extraction	27
EA2-1	Navy	extraction	65
EA2-2	Navy	extraction	55
FP9-01A1	Navy	monitoring	20
FP9-02A1	Navy	monitoring	23
PIC-1	Navy	monitoring	17.5
PIC-10	Navy	monitoring	17.5
PIC-11	Navy	monitoring	17.5
PIC-12	Navy	monitoring	17.5
PIC-13	Navy	monitoring	17.5
PIC-14	Navy	monitoring	17.5
PIC-15	Navy	monitoring	17.5
PIC-16	Navy	monitoring	17.5
PIC-17	Navy	monitoring	17.5
PIC-18	Navy	monitoring	17.5
PIC-19	Navy	monitoring	17.5
PIC-2	Navy	monitoring	17.5
PIC-20	Navy	monitoring	17.5
PIC-21	Navy	monitoring	17.5
PIC-22	Navy	monitoring	17.5
PIC-23	Navy	monitoring	17.5
PIC-24	Navy	monitoring	17.5
PIC-25	Navy	monitoring	17.5
PIC-26	Navy	monitoring	17.5
PIC-27	Navy	monitoring	17.5
PIC-28	Navy	monitoring	17.5
PIC-29	Navy	monitoring	17.5
PIC-3	Navy	monitoring	17.5
PIC-30	Navy	monitoring	17.5
PIC-31	Navy	monitoring	17.5
PIC-32	Navy	monitoring	17.5
PIC-4	Navy	monitoring	17.5
PIC-5	Navy	monitoring	17.5
PIC-6	Navy	monitoring	17.5
PIC-7	Navy	monitoring	17.5
PIC-8	Navy	monitoring	17.5
PIC-9	Navy	monitoring	17.5
PZ9.3-3	Navy	piezometer	unknown
PZ9.8-1	Navy	piezometer	unknown
PZ9.8-2	Navy	piezometer	unknown
PZ9.8-3	Navy	piezometer	unknown

**Table 9. Monitoring and Extraction Well Ownership and Total Depth
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
PZ9.8-4	Navy	piezometer	unknown
PZ9.8-5	Navy	piezometer	unknown
PZ9.8-6	Navy	piezometer	unknown
PZSD-01	Navy	piezometer	unknown
PZSD-02	Navy	piezometer	unknown
PZSD-03	Navy	piezometer	unknown
PZSD-04	Navy	piezometer	unknown
SW9-1A	Navy	monitoring	unknown
SW9-1B	Navy	monitoring	unknown
SW9-1C	Navy	monitoring	unknown
SW9-2A	Navy	monitoring	unknown
SW9-2B	Navy	monitoring	unknown
SW9-2C	Navy	monitoring	unknown
SW9-3A	Navy	monitoring	unknown
SW9-3B	Navy	monitoring	unknown
SW9-3C	Navy	monitoring	unknown
SW9-4A	Navy	monitoring	unknown
SW9-4B	Navy	monitoring	unknown
SW9-4C	Navy	monitoring	unknown
SW9-5A	Navy	monitoring	unknown
SW9-6A	Navy	monitoring	unknown
W09-01A1	Navy	monitoring	30
W09-02A1	Navy	monitoring	31
W09-03C	Navy	monitoring	169
W09-06A1	Navy	monitoring	26.5
W09-07A1	Navy	monitoring	35
W09-08A2	Navy	monitoring	40.5
W09-09A2	Navy	monitoring	46
W09-12B2	Navy	monitoring	97
W09-13A2	Navy	monitoring	46
W09-14A2	Navy	monitoring	52
W09-15B2	Navy	monitoring	108
W09-17A2	Navy	monitoring	40
W09-18A1	Navy	monitoring	25
W09-19A1	Navy	monitoring	32
W09-20A2	Navy	monitoring	46.5
W09-21A2	Navy	monitoring	48
W09-22A2	Navy	monitoring	50
W09-23A1	Navy	monitoring	20
W09-28A2	Navy	monitoring	50
W09-31A1	Navy	monitoring	27
W09-33A2	Navy	monitoring	51.5
W09-34A2	Navy	monitoring	44.5
W09-35A1	Navy	monitoring	25
W09-36A2	Navy	monitoring	44
W09-40B2	Navy	monitoring	79
W09-44A1	Navy	monitoring	25.5
W09-45A1	Navy	monitoring	24
W09-46A1	Navy	monitoring	27.5
W09-47A1	Navy	monitoring	25
W29-02A1	Navy	monitoring	20
W29-03A1	Navy	monitoring	25

**Table 9. Monitoring and Extraction Well Ownership and Total Depth
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
W29-04A1	Navy	monitoring	20
W29-06A1	Navy	monitoring	30
W29-08A2	Navy	monitoring	47.5
W29-09A2	Navy	monitoring	48
W29-10A2	Navy	monitoring	46
W56-01A1	Navy	monitoring	26
W56-02A1	Navy	monitoring	25
W61-01A1	Navy	monitoring	18
W9SC-01A1	Navy	monitoring	unknown
W9SC-02A1	Navy	monitoring	27.5
W9SC-03A2	Navy	monitoring	34.5
W9SC-04A1	Navy	monitoring	unknown
W9SC-05A1	Navy	monitoring	unknown
W9SC-07A1	Navy	monitoring	20.5
W9SC-08A2	Navy	monitoring	34.0
W9SC-09A1	Navy	monitoring	19.5
W9SC-10A1	Navy	monitoring	unknown
W9SC-11A1	Navy	monitoring	22
W9SC-12A2	Navy	monitoring	unknown
W9SC-13A1	Navy	monitoring	22.5
W9SC-14A1	Navy	monitoring	19.5
W9SC-15A2	Navy	monitoring	unknown
W9SC-18A1	Navy	monitoring	unknown
W9SC-19A1	Navy	monitoring	unknown
WIC-1	Navy	monitoring	23.5
WIC-10	Navy	monitoring	17
WIC-11	Navy	monitoring	21.5
WIC-12	Navy	monitoring	26
WIC-2	Navy	monitoring	36
WIC-3	Navy	monitoring	24.5
WIC-4	Navy	monitoring	35
WIC-5	Navy	monitoring	12
WIC-6	Navy	monitoring	16.0
WIC-7	Navy	monitoring	21.5
WIC-8	Navy	monitoring	25
WIC-9	Navy	monitoring	12
WT87-1	Navy	monitoring	unknown
WW-10A	Navy	monitoring	8.5
WW-10B	Navy	monitoring	12.0
WW-10C	Navy	monitoring	16.5
WW-10D	Navy	monitoring	21
WW-11	Navy	monitoring	20
WW-12	Navy	monitoring	20
WW-13A	Navy	monitoring	8.5
WW-13B	Navy	monitoring	12.0
WW-13C	Navy	monitoring	16.5
WW-13D	Navy	monitoring	21
WW-14	Navy	monitoring	20
WW-15	Navy	monitoring	19.5
WW-16A	Navy	monitoring	9.0
WW-16B	Navy	monitoring	11.5
WW-16C	Navy	monitoring	16.5

**Table 9. Monitoring and Extraction Well Ownership and Total Depth
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
WW-16D	Navy	monitoring	21.5
WW-17A	Navy	monitoring	9.0
WW-17B	Navy	monitoring	12
WW-17C	Navy	monitoring	16.5
WW-17D	Navy	monitoring	21.5
WW-18A	Navy	monitoring	8.5
WW-18B	Navy	monitoring	12
WW-18C	Navy	monitoring	16.5
WW-18D	Navy	monitoring	21.5
WW-1A	Navy	monitoring	9.0
WW-1B	Navy	monitoring	12
WW-1C	Navy	monitoring	16.5
WW-1D	Navy	monitoring	20.5
WW-2	Navy	monitoring	20.5
WW-3	Navy	monitoring	20.5
WW-4A	Navy	monitoring	8.0
WW-4B	Navy	monitoring	11
WW-4C	Navy	monitoring	16.5
WW-4D	Navy	monitoring	21.5
WW-5	Navy	monitoring	20
WW-6	Navy	monitoring	20
WW-7A	Navy	monitoring	9.0
WW-7B	Navy	monitoring	12
WW-7C	Navy	monitoring	17
WW-7D	Navy	monitoring	21.5
WW-8A	Navy	monitoring	9.5
WW-8B	Navy	monitoring	12
WW-8C	Navy	monitoring	16.5
WW-8D	Navy	monitoring	21.5
WW-9A	Navy	monitoring	9.5
WW-9B	Navy	monitoring	12
WW-9C	Navy	monitoring	17
WW-9D	Navy	monitoring	21.5

Parcel 3

EA1-2	Navy	monitoring	26
EA1-5	Navy	monitoring	28
W09-27A2	Navy	monitoring	49
W09-29A1	Navy	monitoring	18
W09-42A2	Navy	monitoring	41.5
W09-43A1	Navy	monitoring	33
WU4-08A1	Navy	monitoring	16.5
WU4-09A2	Navy	monitoring	48.5
WU4-10A1	Navy	monitoring	30
WU4-11A2	Navy	monitoring	53
WU4-21A1	Navy	monitoring	19
WU4-24A1	Navy	monitoring	18
WU4-25A1	Navy	monitoring	17.5
WWR-1	Navy	monitoring	22

**Table 9. Monitoring and Extraction Well Ownership and Total Depth
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
<u>Parcel 4</u>			
047B1	MEW	monitoring	64
049B1	MEW	monitoring	71
054B2	MEW	monitoring	86
057B3	MEW	monitoring	129
073A	MEW	monitoring	27
073B1	MEW	monitoring	62.5
086A	MEW	monitoring	27
SU-39-2A	Stanford	monitoring	unknown*
WT14-01A1	Navy	monitoring	18
WWR-2	Navy	monitoring	21
052B2	MEW	monitoring	100
059B3	MEW	monitoring	136
<u>Parcel 6</u>			
SU-40-4A	Stanford	monitoring	unknown*
SU-40-5A	Stanford	monitoring	unknown*

Parcel 7

No wells present within parcel

Note: Approximately 17 Stanford wells are present in Parcel 3 just north of Hangar 1. Approximately 34 Stanford wells were present within Parcel 4 in the vicinity of Building 956A; 15 of these are reported to be decommissioned. Two wells are present in Parcel 6. Wells in Parcel 3 average 20 feet deep and wells in Parcel 4 average 30-40 feet deep. The wells are associated with the Stanford University bioremediation site. Information regarding well details and locations has been requested from Mr. Gary Hopkins, Stanford University.

MEW - Middlefield/Ellis/Whisman Study Area
bgs - below ground surface

**Table 10. Former (Prior to 1994) Hazardous Materials and Waste Accumulation Locations¹
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

Building Number and Name	Hazardous Materials	Hazardous Waste
Parcel 2 <u>Buildings/Structures/Areas</u>		
6 Public Works/Recycle & Storage (NAR)	None identified	Transformer oil, transformer oil filters
10 Boiler Plant Facility (ISP)	Solvents, cutting oil, transformer oil, carbon tetrachloride, engine oil, hand cleaner, general purpose detergent, penetrating oil, spray adhesive, pipe cement, paint, wire pulling compound, acetylene, vacuum pump oil ammonium hydroxide, rubber cement, grease, flux, propane, gasoline,	Boiler wastewater, asbestos, cutting oil, stoddard solvent
16 Public Works Center (ISP)	None identified	Cutting oil, dry cleaning solvent, lube oil
45 Paint Shop (Vacant)	Paint & lacquer residue, aviation related hazardous materials, paints, corrosives, antifreeze, dishwashing compounds, epoxy/polyurethanes, acids, corrosion removal compounds, floor wax, floor strippers adhesive/silicone, thinners/alcohols, corrosion prevention compounds	Paints, thinners, toluene, paint overspray
542 Glass Incinerator	None identified	Ash
567 Public Works Warehouse	Sodium hydroxide based sewer solvents, pipe sealer, pipe solvent pipe glue, Ty-Ion B11 oxygen scavenger, tile mastic, window glazing, Calgon Vestal Labs CB-160 polymeric blend, pipe dope, caulking materials grout patch, silicone sealants, Shell Diala Oil AX, cleaning compound Freon 12, Freon 22, Freon 500, Freon 502, Sodium sulfate for pools, dibasic anhydrous sodium phosphate Sodium hydroxide based waste pipe cleaner, gasoline, mineral and linseed oil, 1-1-1 trichloroethane based degreaser, contact adhesive, soldering flux, CB-409, CB-411, Magamine	None identified
Parcel 3 <u>Buildings/Structures/Areas</u>		
1 Hangar 1	Hydraulic oil, cleaners, adhesives, aerosol paint, aviation fuels, lube oil, grease, Alodine, paint and paint related materials, film developing chemicals, fresh motor oil, isopropyl alcohol, JP-5 fuel, aircraft wash detergent, printing solvents	Waste oil, oily rags, waste hydraulic oil
120 Hazardous Waste Accumulation Area (Former Building)	Hydraulic fluid, engine oil, JP-5, lacquer thinner, paint	Waste oil
Parcel 4 <u>Buildings/Structures/Areas</u>		
331 Storage (NASA)	Empty of: hydraulic fluid	None identified
400 Airfield Storage	Empties of: JP-5, engine gas path cleaner, Freon TMS, motor oil	None identified
Parcel 6 <u>Buildings/Structures/Areas</u>		
454 UHF/VHF Trans	Lead solder, isopropyl alcohol, diesel fuel, CO2 cylinders	None identified

¹ Hazardous Materials/Wastes identified from ESAs completed for MFA (Boeing, 1993a and 1993b, CWMI, 1993a, 1993b, 1993c, and 1993d and SEC Donahue, 1993, and Uribe 1993)

**Table 11. Current (1994-2000) Hazardous Materials and Accumulated Waste Locations¹
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Federal Airfield, California**

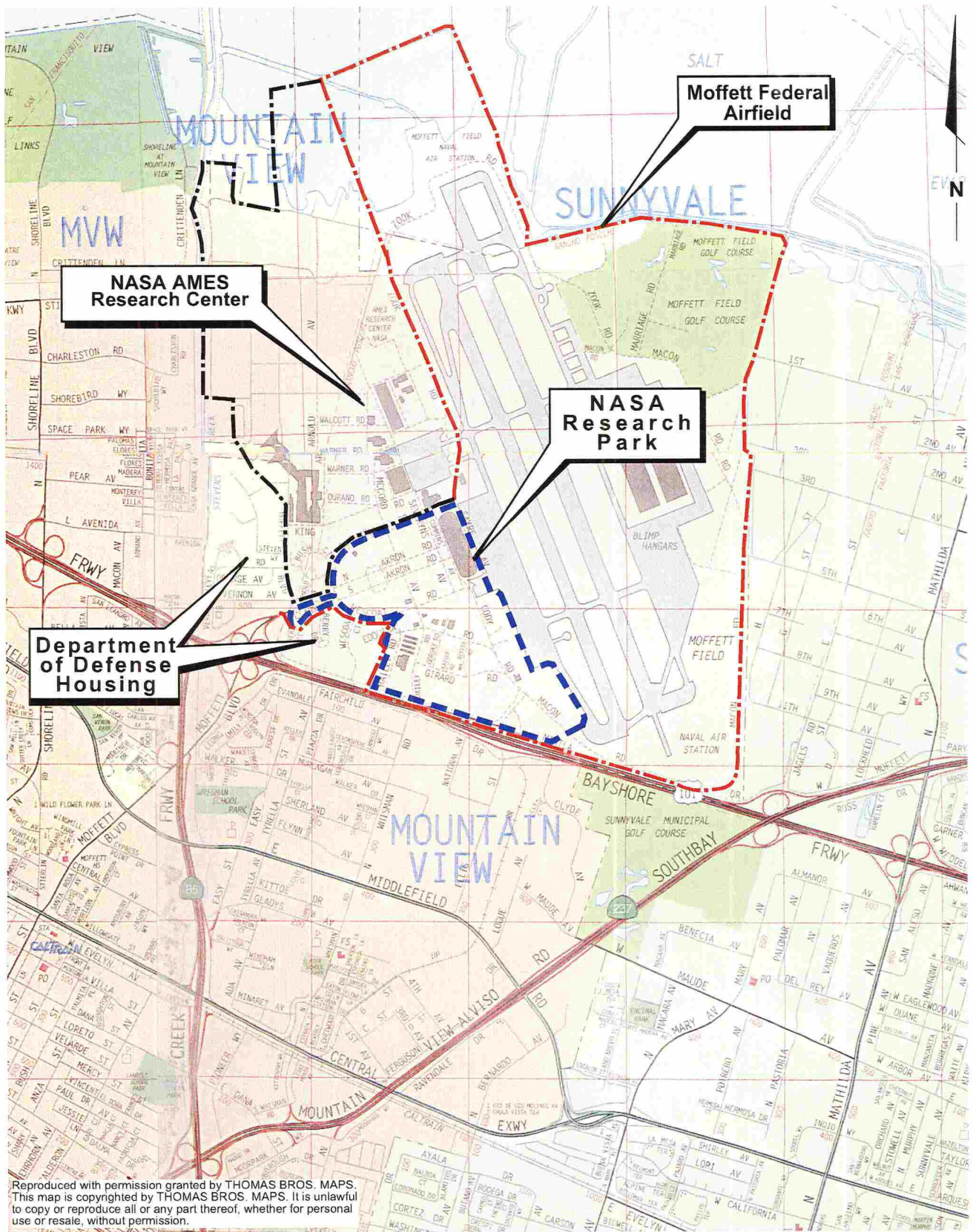
Building Number and Name	Hazardous Materials	Hazardous Waste
<u>Parcel 2 Buildings/Structures/Areas</u>		
10 Boiler Plant Facility	Betz conductivity reagent, Betz phenolphthalein, Betz potassium iodide iodate, Hardness buffer solution, molybdate reagent, stannous reagent, sulfite indicator, biocide	None identified
527 Facilities Chemical Storage Area	Toluene, xylenes, propane, paint, lubricants, adhesives, pipe cement, grease, flux, tar and asphalt remover, solvent cement, paint remover, oils, degreasers, muriatic acid, kerosene, boiler chemicals	None identified
567 Public Works Warehouse	Flammable and combustible liquids, spray	None identified
-- MEW Treatment System	Sulfuric acid, antiscaling carbonate - CE100	Spent carbon, waste oil
<u>Parcel 3 Buildings/Structures/Areas</u>		
1 Hangar 1	None identified	Spill clean up, organic compounds, flammable solvent
<u>Parcel 6 Buildings/Structures/Areas</u>		
VTA Area Lightrail construction ²	Hydraulic oil, gasoline, acetylene, liquid adhesives, flammable liquid, pipe joint lubricant, resin cure	Contaminated soil from oil spill, used oil filters, transformer oil

¹ Hazardous Materials/Wastes identified from an inventory prepared by NASA

² As a result of the date range classifying current and former accumulated hazardous waste locations, the VTA storage location shows on this map as a current location. According to NASA, all hazardous materials were removed upon completion of the Light Rail and no environmental issues regarding this area exist.

PLATES

PLATES



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Harding ESE
A MACTEC COMPANY

Site Vicinity Map
Environmental Baseline Survey
NASA Research Park
Moffett Field, California

PLATE

1

DRAWN
DjP

JOB NUMBER
50487 3.2

APPROVED

DATE
10/00

REVISED DATE

EXPLANATION

2

PARCEL BOUNDARY AND PARCEL NUMBER

**NASA AMES
RESEARCH CENTER**

**NASA RESEARCH
PARK PARCELS**

1

2

3

4

5

7

6



Harding ESE
A MACTEC COMPANY

Property and Parcel Location Map
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	50487 3.4		8/31/00	

PLATE

2

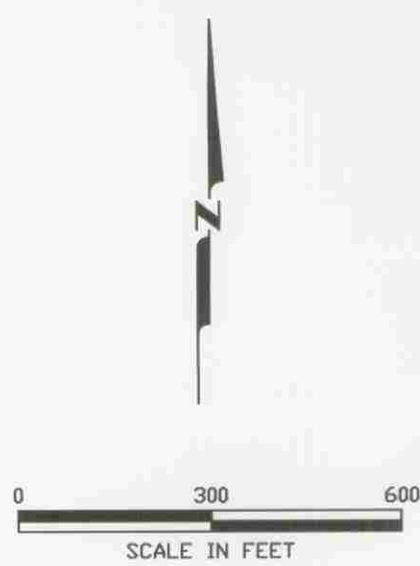
DATE PLOTTED: 8/31/00



EXPLANATION

- 2 PARCEL BOUNDARY AND PARCEL NUMBER
- CURRENT (AFTER 1994) ACCUMULATED HAZARDOUS WASTE LOCATION
- FORMER (PRIOR TO 1994) ACCUMULATED HAZARDOUS WASTE LOCATION

FOOTNOTE:
 PARCEL 6, VTA STORAGE LOCATION: AS A RESULT OF THE DATE RANGE CLASSIFYING CURRENT AND FORMER ACCUMULATED HAZARDOUS WASTE LOCATIONS, THE VTA STORAGE LOCATION SHOWS ON THIS MAP AS A CURRENT LOCATION. ACCORDING TO NASA, ALL HAZARDOUS MATERIALS WERE REMOVED UPON COMPLETION OF THE LIGHT RAIL AND NO ENVIRONMENTAL ISSUES REGARDING THIS AREA EXIST.



NASA RESEARCH PARK PARCELS

NASA AMES RESEARCH CENTER

VTA STORAGE LOCATION
(SEE FOOTNOTE)



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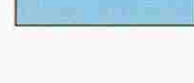
Hazardous Waste Accumulation Locations
 Environmental Baseline Survey
 NASA Research Park Parcels
 Moffett Field, California

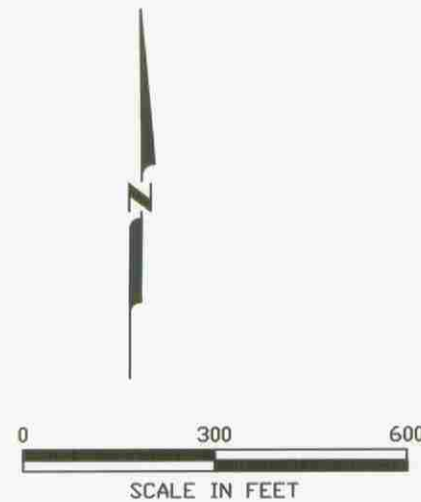
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
PCB	50487 3.4		7/01	

**NASA AMES
RESEARCH CENTER**

**NASA RESEARCH
PARK PARCELS**

EXPLANATION

-  **2** PARCEL BOUNDARY AND PARCEL NUMBER
-  PCB IMPACTED TRANSFORMER/CAPACITORS
-  CURRENT (1994 - 2000) HAZARDOUS MATERIALS LOCATIONS
-  FORMER (PRIOR TO 1994) HAZARDOUS MATERIALS LOCATIONS
-  AIR EMISSIONS SOURCES



Harding ESE
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Hazardous Materials, PCB Impacted Equipment, and Air Emission Source Locations
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

2B

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CN	50487 34		2/01	

PLATE



EXPLANATION

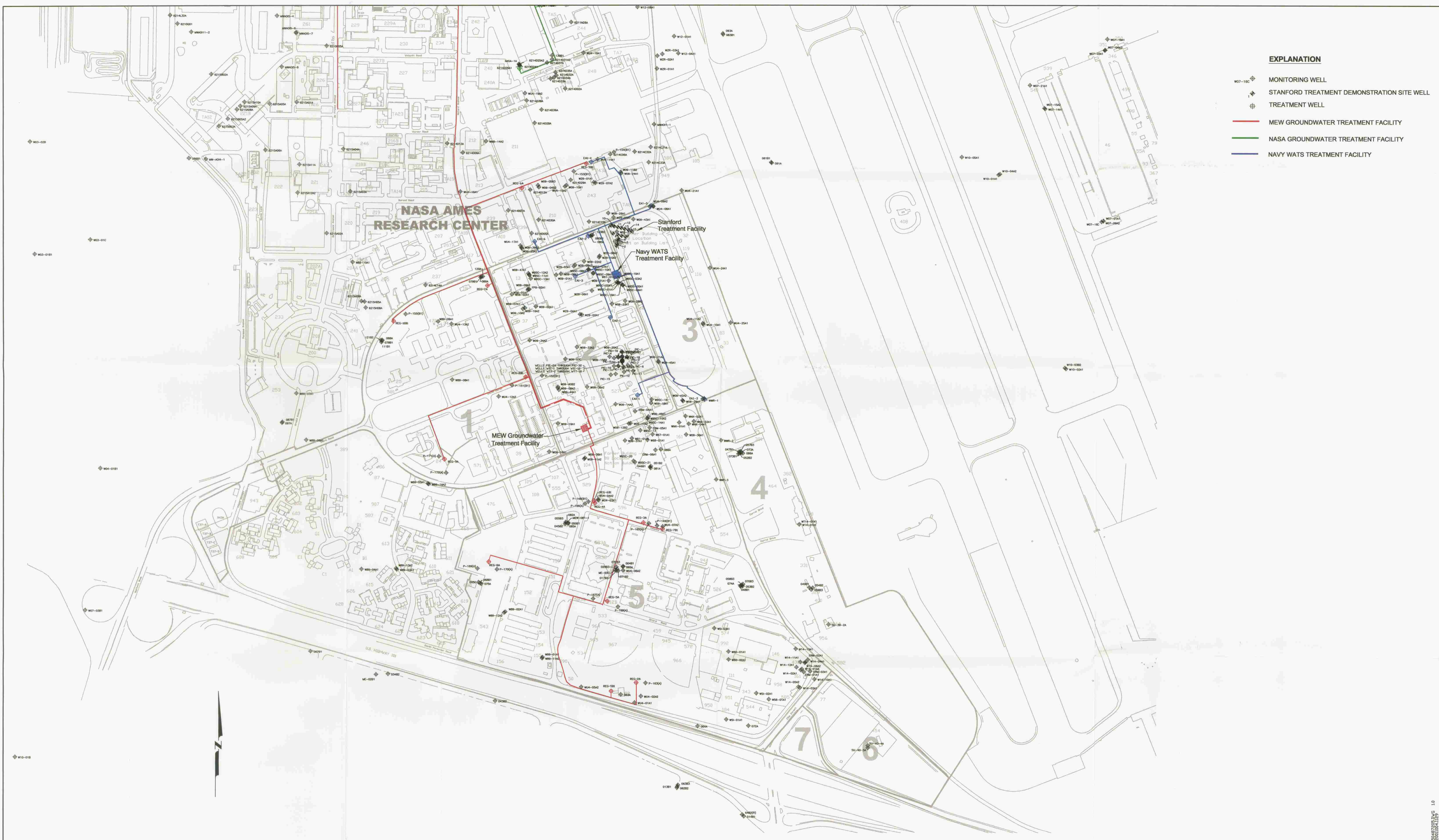
- OUI-2 WEST SITES
- PETROLEUM SITES
- - - WEST SIDE AQUIFER APPROXIMATE PLUME LIMITS
5 µg/L TOTAL TOXIC ORGANICS

0 300 600
SCALE IN FEET



IRP Site Location Map
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	50487 3.4		7/01	



- EXPLANATION**
- ⊕ MONITORING WELL
 - ⊕ STANFORD TREATMENT DEMONSTRATION SITE WELL
 - ⊕ TREATMENT WELL
 - MEW GROUNDWATER TREATMENT FACILITY
 - NASA GROUNDWATER TREATMENT FACILITY
 - NAVY WATS TREATMENT FACILITY

NASA AMES RESEARCH CENTER

MEW Groundwater Treatment Facility

Navy WATS Treatment Facility

Stanford Treatment Facility

0 300 600
SCALE IN FEET



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**Well and Treatment System
Location Map**
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	50487 3.4		9/26/00	





PLATE

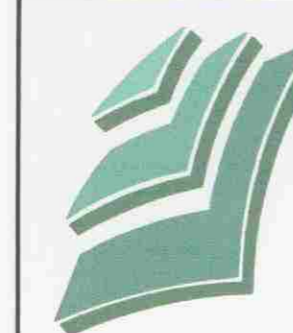
4

1.0

**NASA AMES
RESEARCH CENTER**

EXPLANATION

-  UNDERGROUND STORAGE TANK
-  ABOVE GROUND STORAGE TANK
-  OIL/WATER SEPARATOR
-  SUMP



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A MACTEC COMPANY

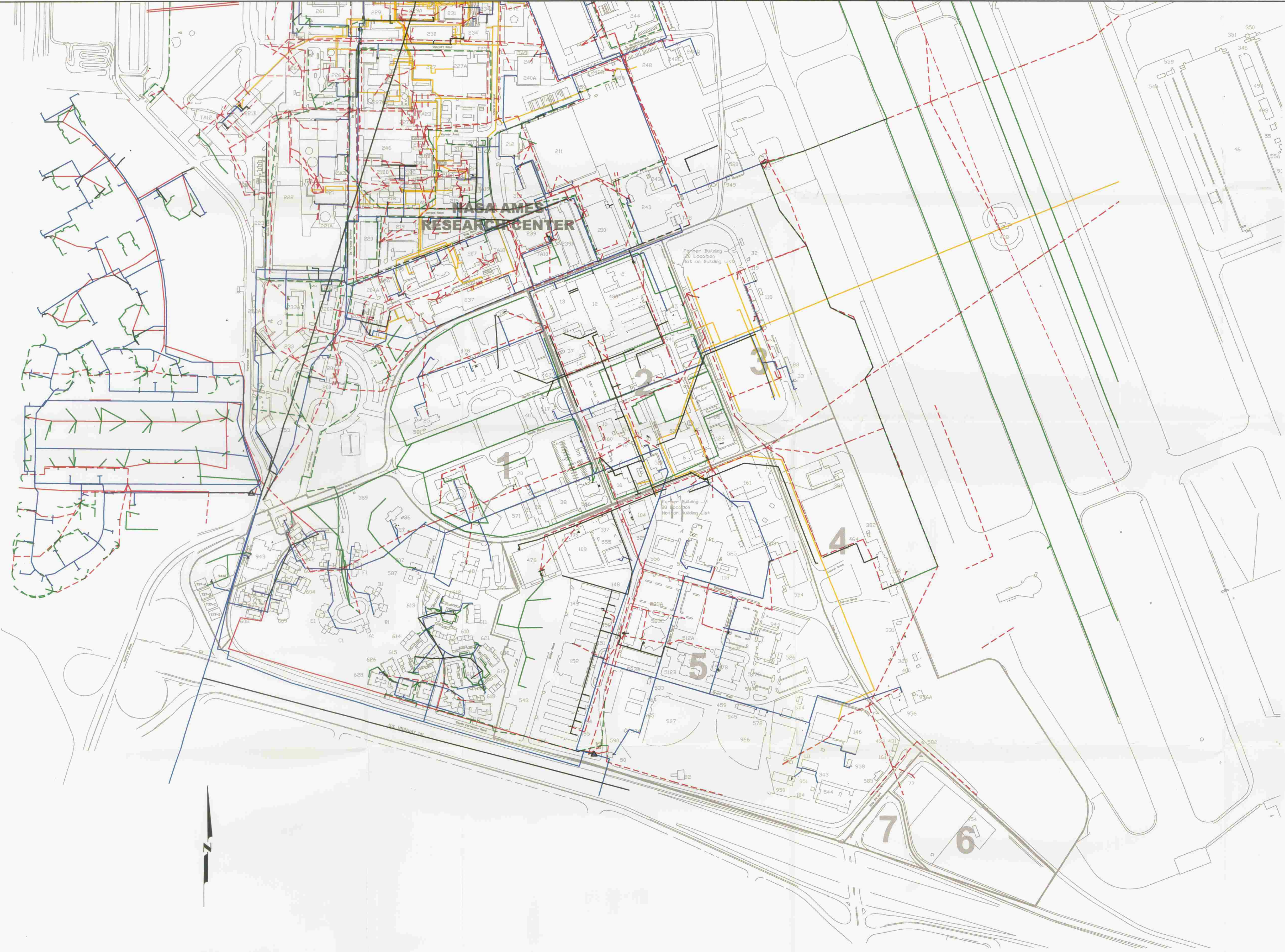
Tank Location Map
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

PLATE

5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	50487 3.4		9/26/00	2/01

B0012845.00 1:0



- EXPLANATION**
- PRIMARY ELECTRIC OVERHEAD
 - - - PRIMARY ELECTRIC UNDERGROUND
 - SECONDARY ELECTRIC OVERHEAD
 - - - SECONDARY ELECTRIC UNDERGROUND
 - GAS PIPE
 - HIGH PRESSURE AIR PIPE
 - STEAM PIPE

0 300 600
SCALE IN FEET



Harding ESE
A MACTEC COMPANY

Utilities Location Map #1
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

6a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	50487 3.4		8/31/00	

PLATE



EXPLANATION

- TELEPHONE OVERHEAD
- - - TELEPHONE UNDERGROUND
- STORM DRAIN
- SANITARY SEWER
- WATER LINE

0 300 600
SCALE IN FEET



Harding ESE
A MACTEC COMPANY

Utilities Location Map #2
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	50487 3.4		8/31/00	

6b

PLATE

APPENDIX A

APPENDIX A

PARCEL ENVIRONMENTAL SUMMARY REPORTS

ENVIRONMENTAL SUMMARY REPORT

Parcel No: 2

Parcel Usage: Office

Planned Use: Office/light industrial

Current Uses: Office/commercial/vacant

Former Uses: Office/commercial

Estimated Area: 27 acres

Elevation: 30 feet

Ground Water: Known contamination

Archeological: None identified

Water Level: 7-12 feet

Water Flow Direction: north- northeast

Ecological: None identified

Environmental Summary

Adjacent Redevelopment Parcels:	3	USTs/Oil water separators:	25	Radiological Surveys:	0	Closed/demolished Buildings:	0
Buildings/Sites:	30	ASTs:	2	Haz Waste Accumulation Sites:	5	Lead in building/ground surface:	30
Utilities by Parcels:	7	PCB Contaminated Equipment:	2	Haz Waste Storage Areas:	0	Lead Paint Survey:	0
IR/OU Sites:	4	Ordnance Locations:	0	Haz Waste Treatment Facilities:	0	Historical Resources:	6
Radon Survey:	0	Asbestos Sites:	21	Haz Materials Storage Areas:	5	Mold in Buildings:	0

Building	Name	Historic Building	Remarks	Year Built	Year Demolished	Total Square Feet	Building Closure Date
2	Gymnasium (NAR)	Yes	Scheduled for re use	1933	Not Applicable	24,738	Not Applicable
3	Moffett Conf.	No	Scheduled for demolition	1933	Not Applicable	32,150	Not Applicable
5	Water Tower	Yes	Scheduled for re use	1932	Not Applicable	900	Not Applicable
6	Public Works/Recycle & Storage (NAR)	No	Scheduled for demolition	1933	Not Applicable	15,735	Not Applicable
10	Boiler Plant Facility (ISP)	Yes	Scheduled for re use	1932	Not Applicable	10,990	Not Applicable
12	Commissary/Admin. (DECA/NAR)	No	Scheduled for demolition	1933	Not Applicable	64,152	Not Applicable
13	Commissary Storage (DECA/NAR)	No	Scheduled for demolition	1933	Not Applicable	16,080	Not Applicable
14	Office (NASA)	No	Scheduled for demolition	1933	Not Applicable	12,000	Not Applicable

Building	Name	Historic Building	Remarks	Year Built	Year Demo	Total Square Feet	Building Closure Date
15	Security Station	Yes	Scheduled for re use	1933	Not Applicable	17,150	Not Applicable
16	Public Works Center (ISP)	Yes	Scheduled for re use	1933	Not Applicable	16,866	Not Applicable
29	Office Equipment/Repair (NASA Warehouse)	No	Scheduled for demolition	1932	Not Applicable	1,056	Not Applicable
31	Commissary/Storage (DECA)	No	Scheduled for demolition	1933	Not Applicable	4,955	Not Applicable
37	Scale House	Yes	Scheduled for demolition	1933	Not Applicable	69	Not Applicable
45	Paint Shop (Vacant)	No	Scheduled for demolition	1944	Not Applicable	10,089	Not Applicable
64	NASA Storage (Code A)	No	Scheduled for demolition	1940	Not Applicable	7,020	Not Applicable
76	Locksmith	No	Scheduled for demolition	1944	Not Applicable	450	Not Applicable
81	Maintenance Storage	No	Scheduled for demolition	1944	Not Applicable	536	Not Applicable
85	NASA Storage (Code A)	No	Scheduled for demolition	1944	Not Applicable	1,020	Not Applicable
126	Warehouse (Computer History Center)	No	Scheduled for demolition	1949	Not Applicable	13,300	Not Applicable
460	Storage	No	Scheduled for demolition	1950	Not Applicable	50	Not Applicable
480	Handball Court	No	Scheduled for demolition	1968	Not Applicable	1,804	Not Applicable
482	Storage	No	Scheduled for demolition	1967	Not Applicable	625	Not Applicable
509	Beauty/Barber Shop	No	Scheduled for demolition	1968	Not Applicable	1,813	Not Applicable
510	Facility Maintenance (ISP)	No	Scheduled for demolition	1973	Not Applicable	4,620	Not Applicable
527	Storage	No	Scheduled for demolition	1978	Not Applicable	1,840	Not Applicable
542	Glass Incin.	No	Scheduled for demolition	1978	Not Applicable	432	Not Applicable
567	PW Warehouse	No	Scheduled for demolition	unknown	Not Applicable	6,327	Not Applicable
570	Storage	No	Scheduled for demolition	1963	Not Applicable	142	Not Applicable
941	NASA Maintenance Office (ISP)	No	Scheduled for demolition	unknown	Not Applicable	6,365	Not Applicable
942	PW Storage	No	Scheduled for demolition	unknown	Not Applicable	2,744	Not Applicable

Building/Site Environmental Data Summary

Building	IRP Sites	HMS	HWS	HWAA	PCBs (Removed)	PCBs (In Place)	Ordnance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radiation	Radon Survey
2	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
3	yes	no	no	no	yes	no	no	yes	no	no	no	no	no	no	yes	no	no
5	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
6	yes	no	no	yes	no	yes	no	yes	yes	no	no	no	no	no	yes	no	no
10	yes	yes	no	yes	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
12	yes	no	no	no	no	no	no	yes	no	no	no	yes	no	no	yes	no	no
13	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
14	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
15	yes	no	no	no	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
16	yes	no	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
29	yes	no	no	no	no	no	no	yes	yes	no	yes	no	no	no	yes	no	no

Building/Site Environmental Data Summary

Build- ing	IRP Sites	HMS	HWS	HWAA	PCB (Removed)	PCB (In Place)	Ordnance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/sump (Removed)	OWS/sump (In Place)	Lead Paint	Radation	Radon Survey
31	yes	no	no	no	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
37	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
45	yes	yes	no	yes	no	no	no	yes	no	yes	no	no	no	no	yes	no	no
64	yes	no	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	no
76	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
81	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
85	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
126	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
460	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
480	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
482	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
509	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
510	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
527	yes	yes	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
542	yes	no	no	yes	no	no	no	no	no	no	no	no	no	no	yes	no	no
567	yes	yes	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
570	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
941	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
942	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no

Building/Site Uses

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
2	Gymnasium	Gymnasium (NAR)	Gymnasium	IRP, asbestos, LBP
3	Conference Center	Moffett Conf.	demo	IRP, asbestos, LBP
5	Utility	Water Tower	Landmark	IRP, LBP
6	Code J recycling	Public Works/Recycle & Storage (NAR)	demo	IRP,HWAA, PCBs, asbestos, UST, LBP
10	Boiler	Boiler Plant Facility (ISP)	Boiler/data com	IRP, HMS, HWAA asbestos, UST,LBP
12	retail	Commissary/Admin. (DECA/NAR)	demo	IRP, LBP
13	retail	Commissary Storage (DECA/NAR)	demo	IRP, asbestos, UST, LBP
14	office	Office (NASA)	demo	IRP, asbestos, LBP
15	security	Security Station	security	IRP, asbestos, LBP

**Appendix A
Parcel 2**

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
16	shop/manufacturing	Public Works Center (ISP)	work/flex space	IRP, asbestos, LBP, HWAA
29	vacant	Office Equipment/Repair (NASA Warehouse)	demo	IRP, asbestos, LBP
31	vacant	Commissary/Storage (DECA)	demo	IRP, asbestos, UST, LBP
37	vacant	Scale House	move/demo	IRP, asbestos, LBP
45	work/flex space	Paint Shop (Vacant)	demo	IRP, asbestos, LBP, OWS, HMS, HWAA
64	vacant	NASA Storage (Code A)	demo	IRP, asbestos, UST, AST, LBP
76	office	Locksmith	demo	IRP, asbestos, LBP
81	storage	Maintenance Storage	demo	IRP, asbestos, LBP
85	vacant	NASA Storage (Code A)	demo	IRP, LBP
126	storage	Warehouse (Computer History Center)	demo	IRP, asbestos, LBP
460	storage	Storage	demo	IRP, LBP
480	recreation	Handball Court	demo	IRP
482	vacant	Storage	demo	IRP, asbestos, LBP
509	retail	Beauty/Barber Shop	demo	IRP, asbestos, LBP
510	office	Facility Maintenance (ISP)	office	IRP, asbestos, LBP
527	storage	Storage	demo	IRP, LBP, HMS
542	vacant	Glass Incin.	demo	IRP, LBP, HWAA
567	storage	PW Warehouse	demo	IRP, asbestos, LBP, HMS, HWAA
570	vacant	Storage	demo	IRP, LBP
941	vacant	NASA Maintenance Office (ISP)	demo	IRP, LBP
942	vacant	PW Storage	demo	IRP, asbestos, LBP

Notes: IRP = Installation Restoration Program, HMS = Hazardous materials storage, HWS = Hazardous waste storage, HWAA = Hazardous waste accumulation area, PCB = Polychlorinated bi-phenol, UST = underground storage tank, AST = aboveground storage tank, OWS = Oil Water Separator, LBP = Lead Based Paint, NA = Not Applicable

Note: Hazardous materials currently used at MEW Treatment System. Treatment System not on Building list or maps.

ENVIRONMENTAL SUMMARY REPORT

Parcel No: 3

Parcel Usage: Office

Planned Use: California Air and Space Center (CASC)

Current Uses: Special events/vacant

Former Uses: Hanger/operations

Topography/Geology/Soil/Water/Ecological

Estimated Area: 18 acres

Ground Water: Known contamination

Water Level: 7-12 feet

Water Flow Direction: north- northeast

Elevation: 30 feet MSL

Archeological: None identified

Ecological: None identified

Environmental Summary

Adjacent Redevelopment Parcels:	3	USTs/Oil water separators:	1	Radiological Surveys:	0	Closed/demolished Buildings:	1
Buildings/Sites:	9	ASTs:	0	Haz Waste Accumulation Sites:	2	Lead in building/ground surface:	8
Utilities by Parcels:	7	PCB Contaminated Equipment:	0	Haz Waste Storage Areas:	0	Lead Paint Survey:	0
IR/OU Sites:	2	Ordnance Locations:	0	Haz Waste Treatment Facilities:	0	Historical Resources:	3
Radon Survey:	0	Asbestos Sites:	6	Haz Materials Storage Areas:	2	Mold in Buildings:	0

Building	Name	Historic Building	Remarks	Year Built	Year Demolished	Total Square Feet	Building Closure Date
1	Hangar 1	Yes	Scheduled for reuse	1933	Not applicable	385,290	Not applicable
32	North Floodlight Tower	Yes	Scheduled for reuse	1933	Not applicable	830	Not applicable
33	South Floodlight Tower	Yes	Scheduled for reuse	1933	Not applicable	1,246	Not applicable
44	Storage	No	Scheduled for demo	1942	Not applicable	640	Not applicable
83	A/C Ln Ops Building	No	Scheduled for demo	1944	Not applicable	2,000	Not applicable
118	Storage	No	Scheduled for demo	1944	Not applicable	628	Not applicable
119	Storage (Vacant)	No	Scheduled for demo	1944	Not applicable	782	Not applicable
120	Hazardous Waste Accumulation Area	No	Demolished	Unknown	Unknown	Unknown	Unknown
347	A/C Line Ops	No	Scheduled for demo	1942	Not applicable	1,600	Not applicable

Building/Site Environmental Data Summary

Building	IRP Sites	HMS	HWS	HWAA	PCBs (Removed)	PCBs (In Place)	Ordnance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radiation	Radon Survey
1	yes	yes	no	yes	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
32	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
33	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
44	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
83	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
118	yes	no	no	no	no	no	no	no	no	no	yes	no	no	no	yes	no	no
119	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
120	no	yes	no	yes	no	no	no	NA	no	no	no	no	no	no	NA	no	no
347	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no

Building/Site Uses

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
1	Special Events (NASA)	Hanger	CASC	IRP, asbestos, LBP, HMS, HWAA
32	Vacant	Floodlight Tower	CASC	IRP, LBP
33	Vacant	Floodlight Tower	CASC	IRP asbestos, LBP
44	Scheduled for demolition	Storage	Demolish	IRP asbestos, LBP
83	Scheduled for demolition	A/C Ln Ops Building	Demolish	IRP asbestos, LBP
118	Scheduled for demolition	Storage	Demolish	IRP, LBP
119	Scheduled for demolition	Storage	Demolish	IRP asbestos, LBP
120	Demolished	HWAA	Not applicable	HMS, HWAA
347	Scheduled for demolition	A/C Line Ops	Demolish	IRP asbestos, LBP

Notes: IRP = Installation Restoration Program, HMS = Hazardous materials storage, HWS = Hazardous waste storage, HWAA = Hazardous waste accumulation area, PCB = Polychlorinated bi-phenol, UST = underground storage tank, AST = aboveground storage tank, OWS = Oil Water Separator, LBP = Lead Based paint; NA = Not applicable, Unkwn = Unknown

ENVIRONMENTAL SUMMARY REPORT

Parcel No: 4

Parcel Usage: Office

Planned Use: Collaborative Research and Development Campus and Burrowing Owl Habitat

Current Uses: Office/training

Former Uses: Operations/storage

Topography/Geology/Soil/Water/Ecological

Estimated Area: 35 acres **Elevation:** 30 feet MSL

Ground Water: Known contamination

Archeological: None identified

Water Level: 7-12 feet **Water Flow Direction:** north- northeast

Ecological: Burrowing Owl Habitat

Environmental Summary

Adjacent Redevelopment Parcels:	3	USTs/Oil water separators:	1	Radiological Surveys:	0	Closed/demolished Buildings:	0
Buildings/Sites:	10	ASTs:	0	Haz Waste Accumulation Sites:	0	Lead in building/ground surface:	10
Utilities by Parcels:	7	PCB Contaminated Equipment:	1	Haz Waste Storage Areas:	0	Lead Paint Survey:	0
IR/OU Sites:	2	Ordnance Locations:	0	Haz Waste Treatment Facilities:	0	Historical Resources:	0
Radon Survey:	0	Asbestos Sites:	3	Haz Materials Storage Areas:	2	Mold in Buildings:	0

Building	Name	Historic Building	Remarks	Year Built	Year Demo	Total Square Feet	Building Closure Date
158	Operations Building (Air Ops)	No	Scheduled for demo	1954		21,240	Not applicable
329	UHF/VHF Receiver Building	No	Scheduled for reuse	1958		800	Not applicable
331	Storage	No	Scheduled for demo	1958		525	Not applicable
381	Storage	No	Scheduled for demo	1950		446	Not applicable
382	A/C Line Ops	No	Scheduled for demo	1950		192	Not applicable
400	Airfield Storage	No	Scheduled for demo	1958		280	Not applicable
464	Ops Storage	No	Scheduled for demo	1964		290	Not applicable
582	Marquee	No	Scheduled for demo	1982		123	Not applicable
956	Parachute Loft	No	Scheduled for demo	1957		8,005	Not applicable
956A	Storage	No	Scheduled for demo	Unknown		204	Not applicable

Building/Site Environmental Data Summary

Building	IRP Sites	HMS	HWS	HWAA	PCBs (Removed)	PCBs (In Place)	Ordnance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radiation	Radon Survey
158	no	no	no	no	yes	no	no	yes	yes	no	no	no	no	no	yes	no	no
329	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
331	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
381	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
382	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
400	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
464	no	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
582	no	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
956	no	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
956A	no	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no

Building/Site Uses

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
158	Office	Operations Building (Air Ops)	Office	Asbestos, LBP, PCB
329	Operations	UHF/VHF Receiver Building	Operations	Asbestos, LBP
331	Scheduled for demolition	Storage	Demolish	LBP, HMS
381	Scheduled for demolition	Storage	Demolish	IRP, LBP
382	Scheduled for demolition	A/C Line Ops	Demolish	Asbestos, LBP
400	Scheduled for demolition	Airfield Storage	Demolish	LBP
464	Scheduled for demolition	Ops Storage	Demolish	LBP, HMS
582	Marquee	Marquee	Demolish	LBP
956	Office/training	Parachute Loft	Demolish	LBP
956A	Scheduled for demolition	Storage	Demolish	LBP

Notes: IRP = Installation Restoration Program, HMS = Hazardous materials storage, HWS = Hazardous waste storage, HWAA = Hazardous waste accumulation area, PCB = Polychlorinated bi-phenol, UST = underground storage tank, AST = aboveground storage tank, OWS = Oil Water Separator, LBP = Lead Based Paint, NA = Not Applicable

ENVIRONMENTAL SUMMARY REPORT

Parcel No: 6

Parcel Usage: Open Space

Planned Use: Collaborative Research and Educational Campus

Current Uses: Open Space

Former Uses: Open Space

Topography/Geology/Soil/Water/Ecological

Estimated Area: 10 acres **Elevation:** 30 feet MSL

Ground Water: Known contamination (Levels below MCLs)

Archeological: None identified

Water Level: 7-12 feet

Water Flow Direction: north- northeast

Ecological: Owl Habitat

Environmental Summary

Adjacent Redevelopment Parcels:	3	USTs/Oil water separators:	1	Radiological Surveys:	0	Closed/demolished Buildings:	0
Buildings/Sites:	2	ASTs:	0	Haz Waste Accumulation Sites:	1	Lead in building/ground surface:	2
Utilities by Parcels:	2	PCB Contaminated Equipment:	1	Haz Waste Storage Areas:	0	Lead Paint Survey:	0
IR/OU Sites:	1	Ordnance Locations:	0	Haz Waste Treatment Facilities:	0	Historical Resources:	0
Radon Survey:	0	Asbestos Sites:	2	Haz Materials Storage Areas:	2	Mold in Buildings:	0

Building	Name	Historic Building	Remarks	Year Built	Year Demo	Total Square Feet	Building Closure Date
77	Sentry House: South Gate (ISP)	No	Scheduled for demo	1944		92	Not applicable
454	UHF/VHF Trans	No	Utility	1960		1,340	Not applicable

Building/Site Environmental Data Summary

Build- ing	IRP Sites	HMS	HWS	HWAA	PCBs (Removed)	PCBs (In Place)	Ordnance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radiation	Radon Survey
77	no	no	no	no	no	yes	no	yes	no	yes	no	no	no	no	yes	no	no
454	no	yes	no	no	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
NA	no	yes	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	no

Building/Site Uses

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
77	Guard house/utility	Sentry House: South Gate (ISP)	Demolish	Asbestos, LBP
454	Utility	UHF/VHF Trans	Utility	Asbestos, UST, PCBs, LBP
	Open Space	Former Light Rail Construction Area	Unknown	HMS, HWAA

Notes: IRP = Installation Restoration Program, HMS = Hazardous materials storage, HWS = Hazardous waste storage, HWAA = Hazardous waste accumulation area, PCB = Polychlorinated bi-phenol, UST = underground storage tank, AST = aboveground storage tank, LBP = Lead Based Paint, OWS = Oil Water Separator

ENVIRONMENTAL SUMMARY REPORT

Parcel No: 7

Parcel Usage: Open Space

Planned Use: Collaborative Research Park

Current Uses: Open Space

Former Uses: Open Space

Topography/Geology/Soil/Water/Ecological

Estimated Area: 2 acres **Elevation:** 30 feet MSL

Ground Water: Known contamination (Levels below MCLs) **Archeological:** None identified

Water Level: 7-12 feet **Water Flow Direction:** north- northeast **Ecological:** Owl Habitat

Environmental Summary

Adjacent Redevelopment Parcels:	2	USTs/Oil water separators:	0	Radiological Surveys:	0	Closed/demolished Buildings:	0
Buildings/Sites:	0	ASTs:	0	Haz Waste Accumulation Sites:	0	Lead in building/ground surface:	0
Utilities by Parcels:	0	PCB Contaminated Equipment:	0	Haz Waste Storage Areas:	0	Lead Paint Survey:	0
IR/OU Sites:	0	Ordnance Locations:	0	Haz Waste Treatment Facilities:	0	Historical Resources:	0
Radon Survey:	0	Asbestos Sites:	0	Haz Materials Storage Areas:	0	Mold in Buildings:	0

Building	Name	Historic Building	Remarks	Year Built	Year Demo	Total Square Feet	Building Closure Date
None	NA	no	NA	NA	NA	NA	NA

Building/Site Environmental Data Summary

Build-ing	IRP Sites	HMS	HWS	HWAA	PCBs (Removed)	PCBs (In Place)	Ordnance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radiation	Radon Survey
None	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no

Building/Site Uses

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
None	Open space	Open space	Unknown	

Notes: IRP = Installation Restoration Program, HMS = Hazardous materials storage, HWS = Hazardous waste storage, HWAA = Hazardous waste accumulation area, PCB = Polychlorinated bi-phenol, UST = underground storage tank, AST = aboveground storage tank, OWS = Oil Water Separator, NA = Not Applicable

APPENDIX B

APPENDIX B

PLUME AND ALLOCATION MAPS



SOURCE: NASA AMES RESEARCH CENTER, 5/00;
 MODIFIED AS PER NASA 9/01

 **Harding ESE**
 A MACTEC COMPANY

DRAWN: TJH
 JOB NUMBER: 50487 3.4
 APPROVED: _____

Isoconcentration Map -
Trichloroethene
 Environmental Baseline Survey
 NASA Research Park Parcels
 Moffett Field, California

PLATE

B1

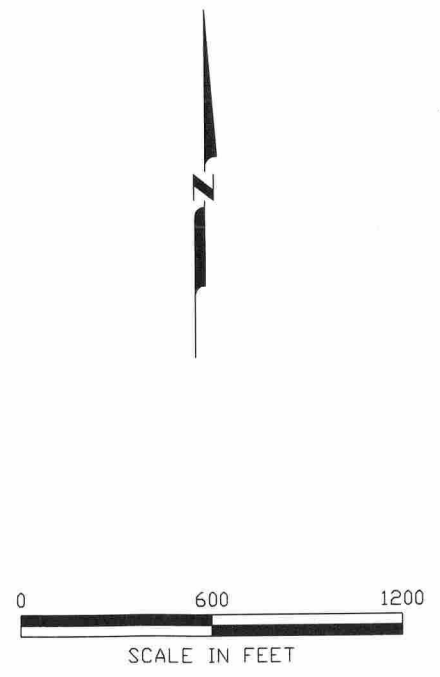
REVISED DATE

DATE
 9/00

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 20011004.1351



EXPLANATION
 1 — BENZENE CONCENTRATION CONTOUR (µg/l)



SOURCE: NASA AMES RESEARCH CENTER, 6/00



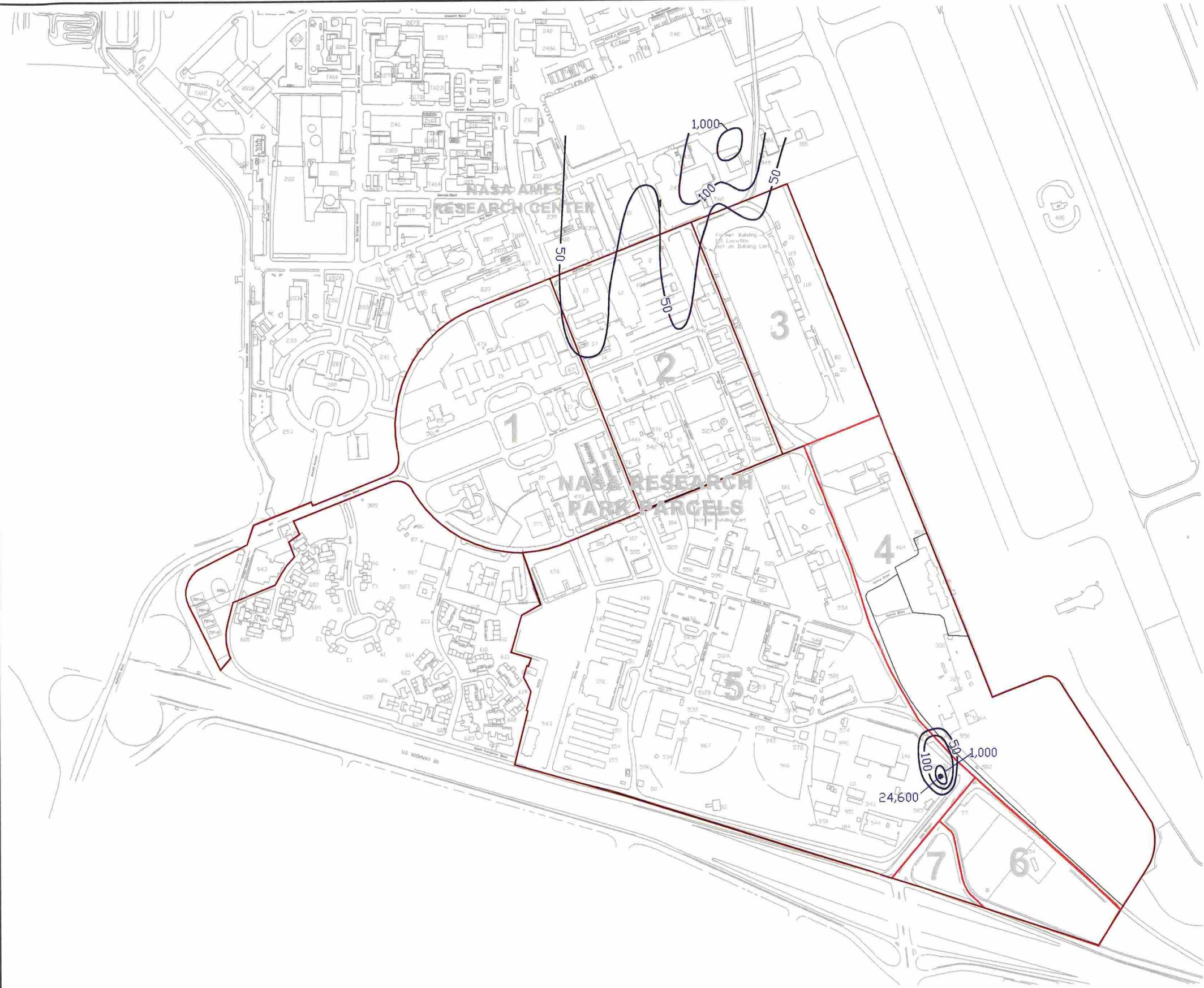
Harding ESE
 A MACTEC COMPANY

Isoconcentration Map - Benzene
 Environmental Baseline Survey
 NASA Research Park Parcels
 Moffett Field, California

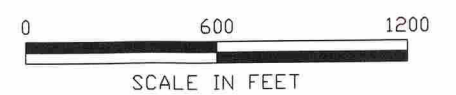
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B2

DRAWN TJH	JOB NUMBER 50487 3.4	APPROVED	DATE 9/00	REVISED DATE
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20011004.1039



EXPLANATION
 1 — TPHg CONCENTRATION CONTOUR (µg/l)



SOURCE: NASA AMES RESEARCH CENTER, 6/00



Harding ESE
 A MACTEC COMPANY

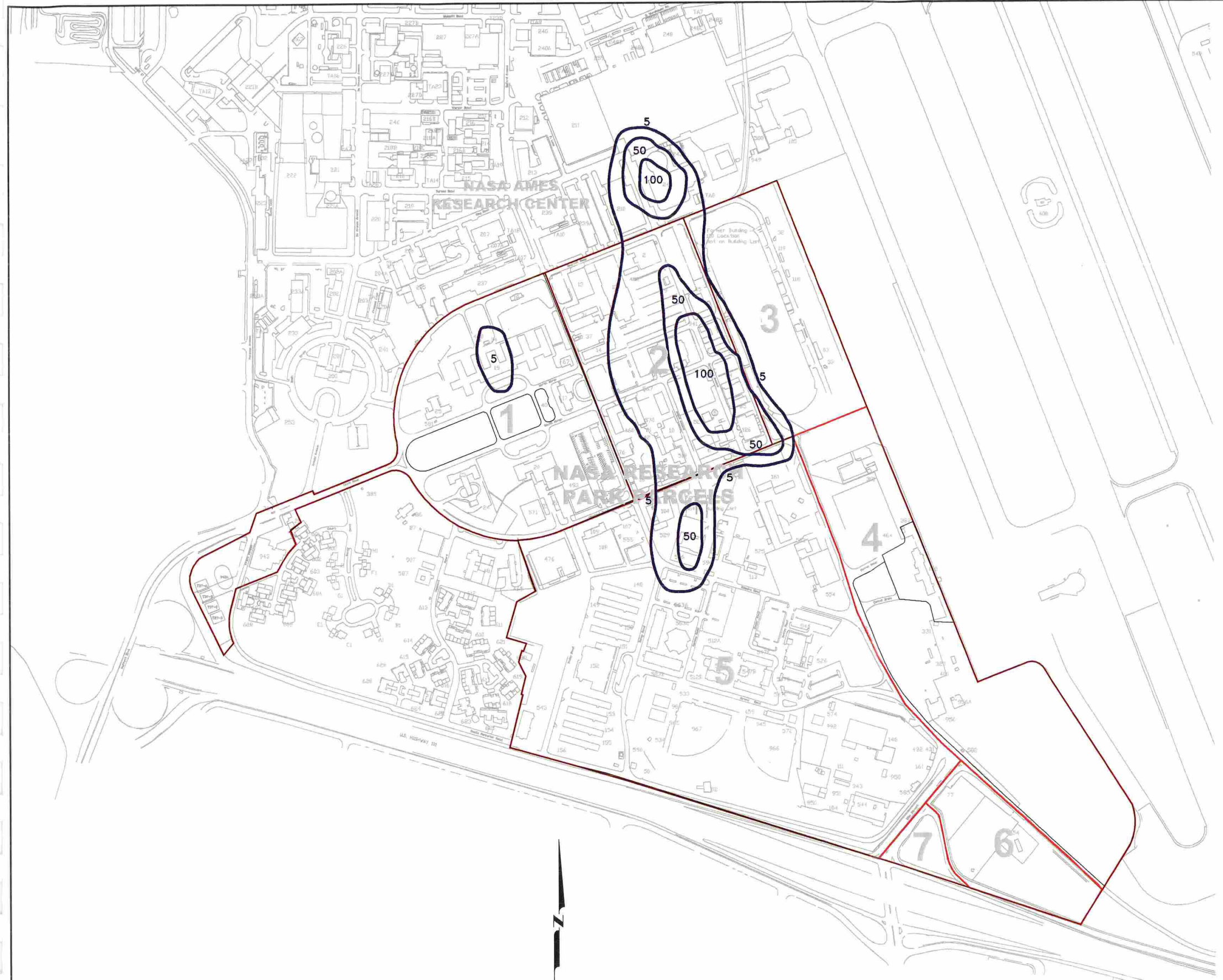
**Isoconcentration Map -
 TPH as Gasoline**
 Environmental Baseline Survey
 NASA Research Park Parcels
 Moffett Field, California

PLATE

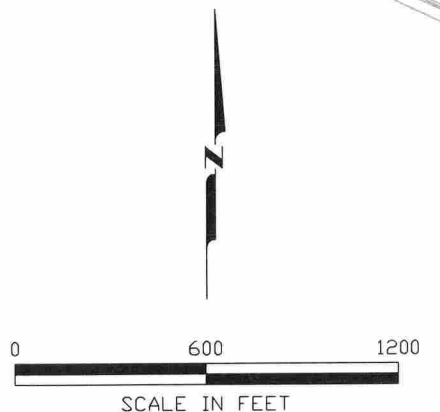
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DRAWN TJH	JOB NUMBER 50487 3.4	APPROVED	DATE 9/00	REVISED DATE
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20011004.1039



EXPLANATION
 ~ 5 ~ PCE CONCENTRATION CONTOUR (ug/l)



SOURCE: NASA AMES RESEARCH CENTER, 5/00

Harding ESE
 A MACTEC COMPANY

DRAWN: PCB
 JOB NUMBER: 50487 3.4
 APPROVED: [Signature]
 DATE: 7/01

Isoconcentration Map -
Tetrachloroethene
 Environmental Baseline Survey
 NASA Research Park Parcels
 Moffett Field, California

PLATE
B4
 REVISED DATE

50487184.DWG 1.0
 20011003.1635

EXPLANATION

— 5 — TOTAL TOXIC ORGANIC CONCENTRATION CONTOUR ($\mu\text{g/l}$)



SOURCE: NASA AMES RESEARCH CENTER, 5/00;
MODIFIED AS PER NASA 9/01

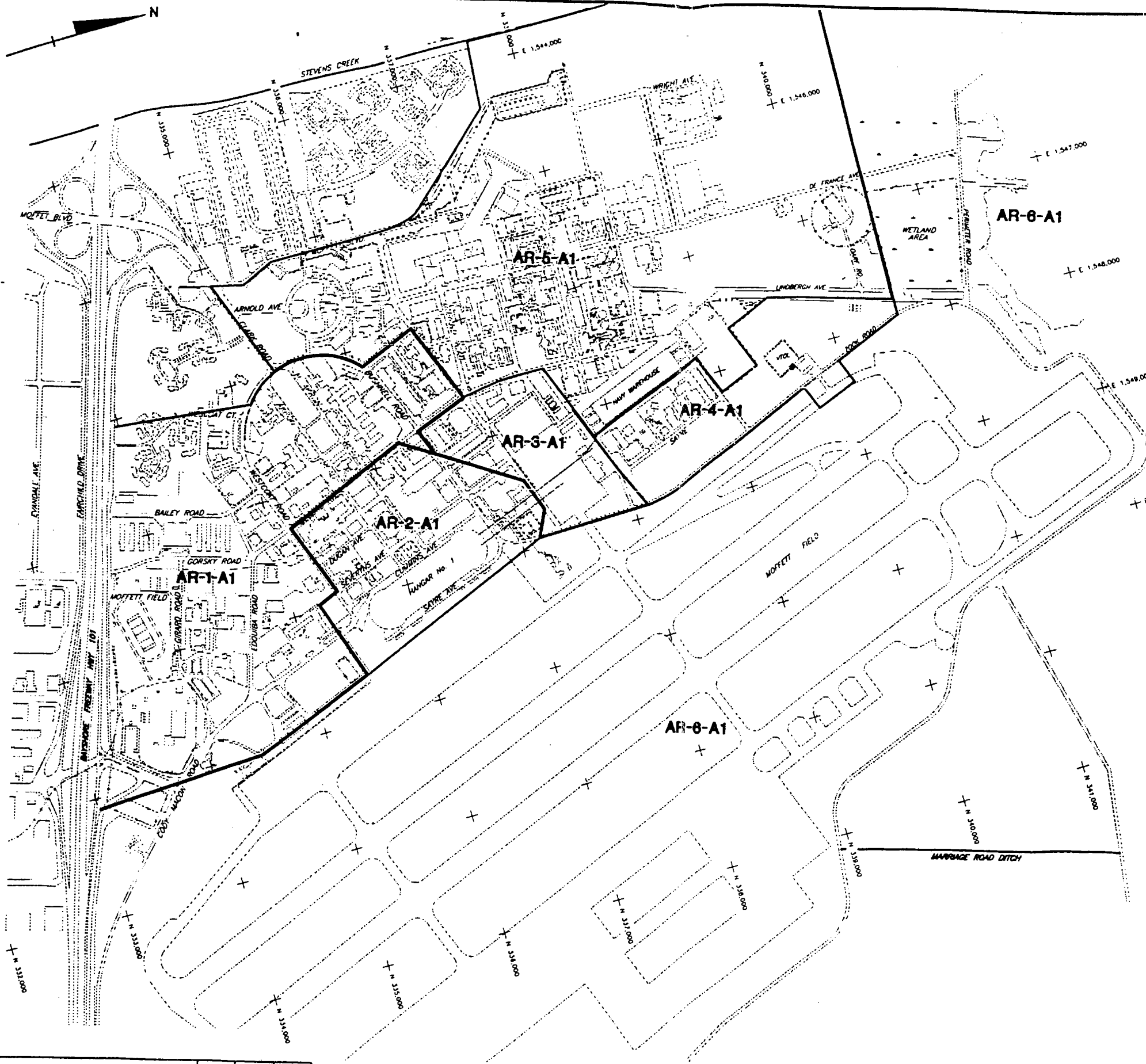
 **Harding ESE**
A MACTEC COMPANY

**Isoconcentration Map -
Total Toxic Organics**
Environmental Baseline Survey
NASA Research Park Parcels
Moffett Field, California

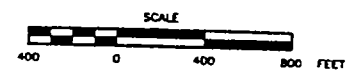
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20011004.1401

DRAWING NUMBER 92-023-E504



Location	Responsible Party/Contamination Type
AR-1	MEW/chlorinated solvents in saturated soil and groundwater NAVY/TPH in saturated soil and groundwater and all vadose zone soil
AR-2	NAVY/all soil and groundwater
AR-3	MEW/chlorinated solvents in saturated soil and groundwater NASA/TPH in saturated soil and groundwater and all vadose zone soil
AR-4	NASA/all soil and groundwater
AR-5	NASA/all soil and groundwater
AR-6	NAVY/all soil and groundwater



A/A1 AQUIFER
CLEANUP RESPONSIBILITY
MOFFETT FIELD, CALIFORNIA
PREPARED FOR
FAIRCHILD
SEMICONDUCTOR. CORP.
SMITH

No.	DATE	ISSUE / REVISION	DS	CHKD	JEB

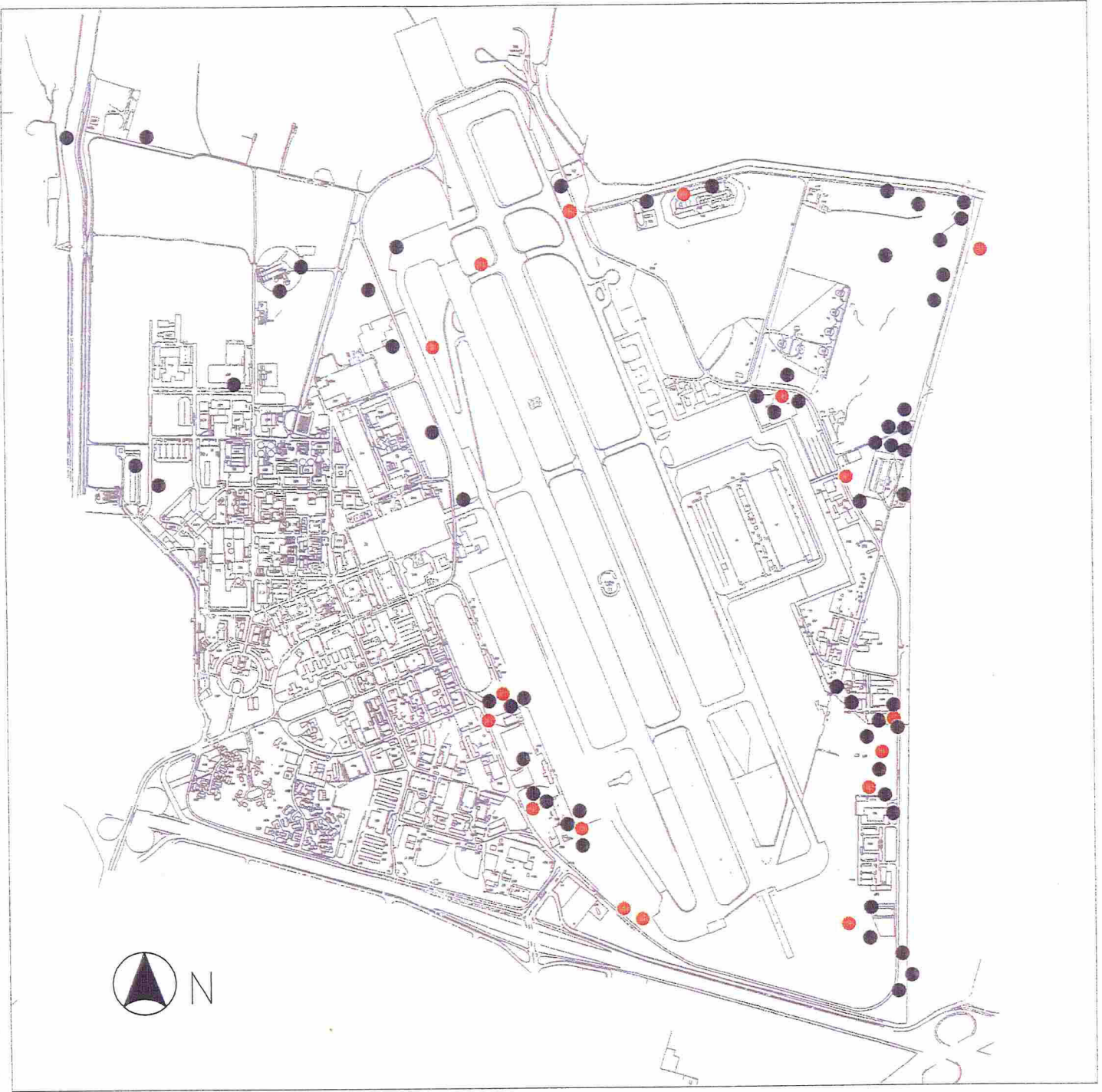
From Allocation and Settlement Agreement

DATE: 8-23-88	EXHIBIT B1	DRAWING NUMBER: 92-023-E504
SCALE: AS SHOWN		

APPENDIX C

APPENDIX C

BURROWING OWL LOCATION MAP



- Active Owl Burrows
 - Former Owl Burrows
- 23 Owls Total

NASA

Ames Research Center
Moffett Federal Airfield
Moffett Field, CA 94035

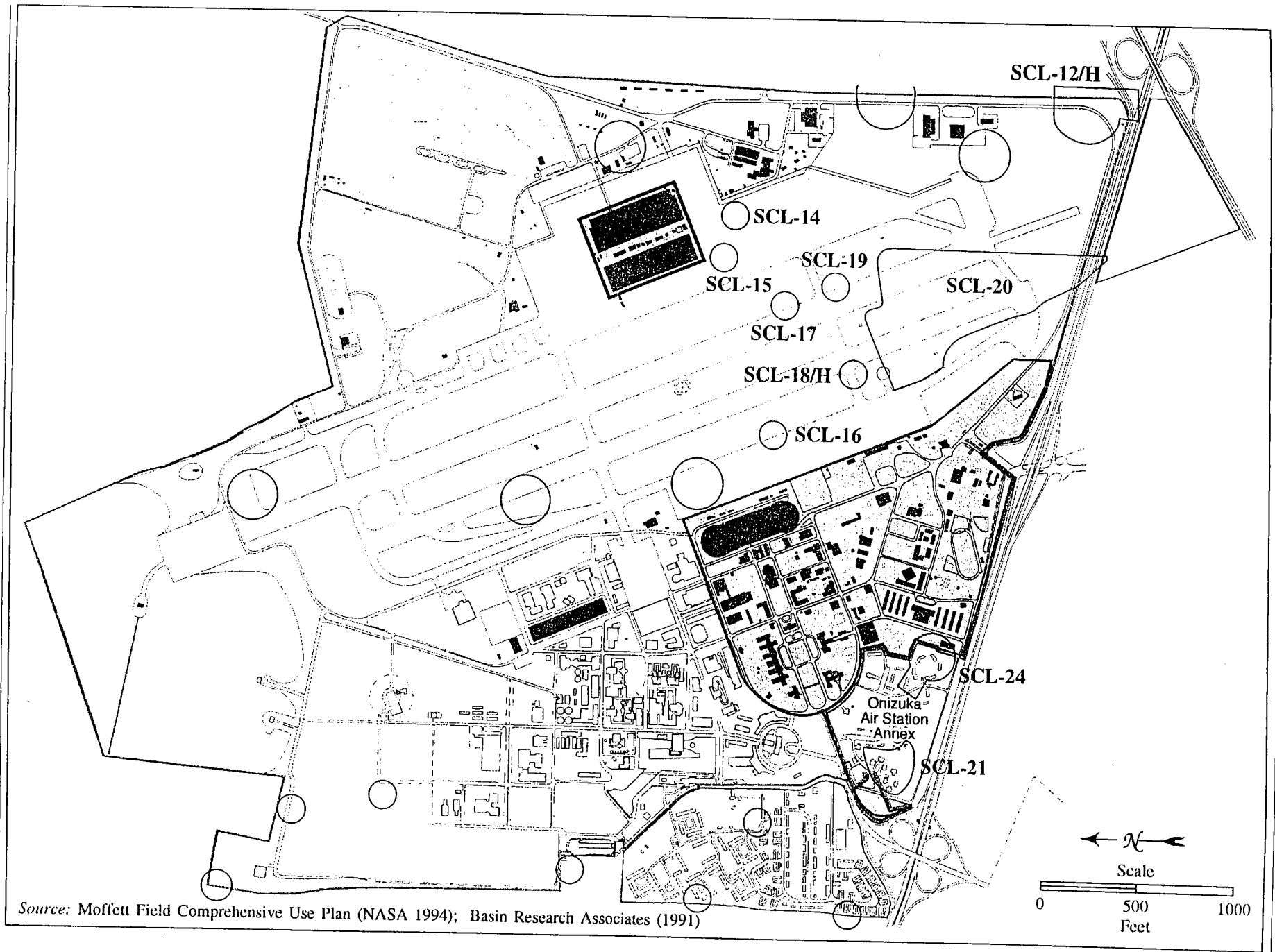
DATE
11/7/2000

TITLE
BURROWING OWL LOCATIONS

APPENDIX D

APPENDIX D

ARCHEOLOGICAL SENSITIVE AREAS



Source: Moffett Field Comprehensive Use Plan (NASA 1994); Basin Research Associates (1991)

Figure 4-1. Archeological Sensitivity Areas on NASA Ames Research Center, Moffett Field

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NASA Research Park Parcels 2, 3, 4, 6, and 7
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Moffett Field, California

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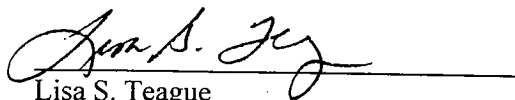
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Quality Control Reviewer



Lisa S. Teague
Principal Geologist