

**Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield
Moffett Field, California**

Prepared for

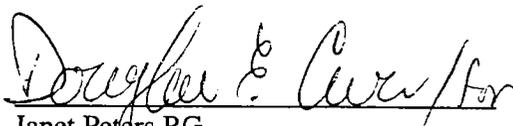
PAI/ISSI

NASA Ames Research Center
Moffett Field, California 94035-1000

Harding ESE Project No. 50487 32



Gary A. Lieberman
Senior Geologist



Janet Peters RG
Principal Geologist

December 28, 2000

Z043



Harding ESE
A MACTEC COMPANY

Harding ESE, a MACTEC Company
Engineering and Environmental Services
90 Digital Drive
Novato, CA 94949 — (415) 883-0112

Harding Lawson Associates

**Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield
Moffett Field, California**

Engineering and Environmental Services



National Aeronautics and
Space Administration
Ames Research Center
Moffett Field, CA 94035-1000



Reply to Attn of:

QE: 218-1

January 3, 2001

TO: Distribution

FROM: Brian Staab, Environmental Protection Specialist
Environmental Services Division

SUBJECT: Draft Environmental Baseline Survey (EBS) for Parcel 5

Enclosed is a copy of the draft EBS for the portion of Moffett Field proposed for development as Parcel 5 in the NASA Research Park. Sections 1, 2, 3, and 5 of the report pertain to all of NASA Research Park, while Section 4 contains only the Findings for Parcel 5. We are finalizing the Findings for Parcel 5 separately to facilitate signing of a land use agreement for this parcel. The final EBS will satisfy the CERCLA 120(h)(1) Notice requirements for this land use agreement, which is planned for signature in early 2001. Please submit comments on this EBS by February 5, 2001.

Thank-you for your cooperation. I can be reached at 650-604-0701 if you have any questions or comments regarding this matter.


Brian Staab

Enclosure

Distribution:

Roberta Blank, EPA
Jim Boarer, Locus Technologies
Jo Ann Cola, EPA
Jeffrey Kellam, ASTDR
Andrea Muckerman, Navy SWDIV (4 copies)
Lynn Suer, RWQCB

Mike Green, NASA HQ, Code JE

19-40/T. Berndt
T23d/H. Gobler
19-4/G. Gold
204-2/M. Harrison
200-10/C. Imprescia

**Environmental Baseline Survey
NASA Research Park Parcel 5
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) 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.

CONTENTS

1.0	INTRODUCTION.....	1
1.1	Purpose.....	1
1.2	Procedures for Conducting an Environmental Baseline Survey	2
1.3	Limitations	2
1.4	Document Organization	3
2.0	SURVEY METHODOLOGY	4
2.1	Approach and Rationale	4
2.2	Program Review.....	4
2.3	Document Review.....	5
2.4	Interviews.....	5
3.0	BACKGROUND.....	6
3.1	Physical Setting.....	6
3.2	History 6	
3.3	Environmental Setting.....	7
3.3.1	Physical Characteristics	7
3.3.1.1	Surface Features.....	7
3.3.1.2	Surface Water	7
3.3.1.3	Meteorology and Climatology	8
3.3.1.4	Geology.....	8
3.3.1.5	Hydrogeology	9
3.3.1.6	Habitat and Threatened or Endangered Species	10
3.3.1.7	Archeological Resources	12
3.4	Environmental Restoration Programs	13
3.4.1	Installation Restoration Program.....	13
3.4.2	Groundwater Contamination - West Side Aquifers/Regional Groundwater Plume North of 101.....	14
3.4.3	Risk Assessments.....	15
3.5	Environmental Compliance Programs	16
3.5.1	Hazardous Materials and Waste Management	16
3.5.2	Storage Tanks.....	17
3.5.3	Medical/Biohazardous Waste.....	17
3.5.4	Lead-Based Paint	17
3.5.5	Spent Abrasive Materials	18
3.5.6	Radioactive Materials.....	18
3.5.7	Mixed Waste	18
3.5.8	Radon	18
3.5.9	Storm Water Discharges and System.....	19
3.5.10	Wastewater.....	20
3.5.11	Air Quality	20
3.5.12	Emissions Inventory.....	20
3.5.13	Indoor Air Testing.....	21
3.5.14	Building 566 Passive Gas Monitoring Survey	22
3.5.15	Asbestos	22
3.5.16	Pesticides.....	23
3.5.17	Polychlorinated Biphenyls	23

3.5.18	Ordnance	23
3.5.19	Mold	23
3.6	Closure Plans	24
4.0	FINDINGS FOR PARCEL 5	25
4.1	History and Current Usage	25
4.2	Environmental Restoration Programs	25
4.2.1	Site 10	25
4.2.2	Site 14	26
4.2.3	Site 15	26
4.2.4	Site 16	26
4.2.5	Site 18	26
4.3	Environmental Compliance Programs	27
4.3.1	Hazardous Waste Management	27
4.3.2	Hazardous Materials Management	27
4.3.3	Storage Tanks	27
4.3.3.1	Underground Storage Tanks, Oil/Water Separators and Sumps	27
4.3.3.2	Aboveground Storage Tanks	27
4.3.4	Lead-Based Paint	28
4.3.5	Air Quality	28
4.3.6	Asbestos	28
4.3.7	Polychlorinated Biphenyls	28
4.4	Discussion of Findings	29
5.0	BIBLIOGRAPHY	30

TABLES

1	History of Installation Operations
2	Installation Restoration Program Sites
3	Underground Storage Tank Status
4	Aboveground Storage Tank Status
5	Lead Sampling Results
6	Asbestos Survey/Sampling Results
7	PCB Impacted Transformers/Capacitors
8	Building List Summary
9	Monitoring and Extraction Well Ownership and Total Depth
10	Former Hazardous Materials and Waste Locations
11	Current Hazardous Materials and Waste Locations

PLATES

1	Site Vicinity Map
2	Site and Parcel Location Map
3	IRP Location Map
4	Well and Treatment System Location Map
5	Storage Tank Location Map
6a	Utility Location Map #1
6b	Utility Location Map #2

APPENDICES

- A PARCEL ENVIRONMENTAL SUMMARY REPORTS
- B PLUME AND ALLOCATION MAPS
- C BURROWING OWL LOCATION MAP
- D ARCHEOLOGICAL SENSITIVE AREAS

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.
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
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	United States Fish and Wildlife Service
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
WATS	West-Side Aquifers Treatment Systems

1.0 INTRODUCTION

Harding ESE has prepared this Environmental Baseline Survey (EBS) to present the results of the assessment of known existing environmental conditions for Parcel 5 at Moffett Federal Airfield (MFA), formerly part of Naval Air Station (NAS) Moffett Field (NAS Moffett Field), California. The subject parcels are heretofore referred to as the NASA Research Park (NRP) Parcels. 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 PAI/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 parcel.

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 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 parcel
- Description of known current or past activities on the parcel
- Interviews with current and/or former employees involved in operations on the parcel
- Description of known hazardous substance or hazardous waste management practices on the parcel and on adjacent parcels
- Documentation of observations made during visual and physical inspections (Not conducted for this EBS)
- Description of possible sources of contaminants on the parcel or on adjacent 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 Cal-EPA, 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
- 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 is presented in Section 3.0
- Sections 4.0 describes the Findings for Parcel 5
- References are provided in Section 5.0
- A summary of the information for Parcel 5 is 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 Parcel 5 are described in Section 4.0.

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 table for Parcel 5 is 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.

A complete list of the documents reviewed is provided in Section 5.0.

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 U.S. EPA 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. None of these areas are located within Parcel 5. 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-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 with 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 set-aside may also be used for mitigation on larger projects.

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; the California State EPA Department of Toxic Substances Control (DTSC) 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 include 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 areas of investigation.

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

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 (Section 4.0).

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, U.S. EPA, 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 U.S. EPA 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 (U.S. EPA 1989), the VOCs in the groundwater are being cleaned up to maximum contaminant levels (MCLs). Quarterly 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 (U.S. EPA, 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 effects 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 Risk Evaluation 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 1 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). However, users are required to augment the protocol to address new requirements, state requirements and unique operations.

Compliance with the various items outlined in the EPA Protocol is established through self-assessments consisting of interviews, site visits, and review of records. If deficiencies are identified during a self-assessment, they are written in draft form and given to the responsible department for a 10-day review period. The purpose of the review period is to allow the affected parties to resolve the issue, correct any inaccuracies in the findings and participate in the recommendations. At the end of the 10-day review period, any deficiencies that could not be fully resolved were included in the final report. Affected parties are required to agree to the recommended corrective action plan and give an estimated date of completion. Progress toward completion is tracked on a monthly basis.

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 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 (Section 4.0).

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 Parcel 5 are discussed in Section 4.0.

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). None of these areas/buildings are located within Parcel 5. 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 picoCuries 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 and Harding ESE, 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 ambient 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 ESE 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 using these buildings as dormitory/living quarters. 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 Parcel 5, is presented in Section 4.0.

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) have 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-foot 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 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 Parcel 5 is presented in Section 4.0.

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 ppm in compliance with 40 CFR 761 to the U.S. EPA. 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. However, since these items are inspected regularly and PCB releases have not been observed these items are not considered an environmental concern. 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 Parcel 5 is discussed in Section 4.0. 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 25m, (NASA, 2000b). No mold has been investigated or identified in Parcel 5.

3.6 Closure Plans

A Closure Plan (CP) was prepared for NASA (*PAI/ISSI, 2000*), which describes the requirements and procedures for the demolition of several buildings and associated structures within Parcel 5. The CP also outlines the environmental requirements for rebuilding these facilities. Closure Plan 1 includes Buildings 111, 146/146A, 161, 574, 958, and 992. In addition, the CP covers the removal of the underground storage tanks 431 and 432 (also known as Tanks 70 and 71). Closure Plan 2 includes Buildings 50, 148, 149, 150, 151, 555, 583A, 583B, 590, 964 and 965. Closure Plan 3 will include Buildings 82, 459, 512A, 512B, 512C, 534, 547B, 547C, 547D, 547E, 572, 583, 945, 966 and 967. It will be completed by February 1, 2001. Closure Plan 4 will include Buildings 184, 343, 544, 585, 950 and 951. It will be completed by March 15, 2001. The CP includes 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 are also included.

4.0 FINDINGS FOR PARCEL 5

This section provides a summary of data collected at Parcel 5 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 5 were constructed between the mid 1940s and the mid 1980s. No buildings were identified on the National Register. Historic use of the buildings was varied and included recreation, barracks, retail and training. 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 and training space, motor pool operations, storage, retail, and recreation or are vacant. Utilities present on Parcel 5 include fresh water, sanitary sewer, telephone, storm drain, power and steam lines and compressed air. (Plates 6a and 6b).

4.2 Environmental Restoration Programs

Parcel 5 includes all or portions of five Sites (10, 14, 15, 16 and 18) and is underlain by the West Side Aquifer. Sites 10, 14, 15, 16 and 18 are discussed below; the West Side Aquifer OU was discussed above in Section 3.4.2. The chemicals detected in the groundwater below Parcel 5 are generally above MCLs for VOCs (*Locus 1999, Tetra Tech, 1999b*). See Appendix B for a recent plume map.

Seventy-five groundwater monitoring and 8 extraction wells lie on Parcel 5 (Table 9 and Plate 4). The monitoring and extraction wells monitor and remove the Westside groundwater contamination plume.

4.2.1 Site 10

Site 10 includes the Chase Park Area and the Moffett Field runways. Only the Chase Park Area is located within the NRP. Chase Park is a recreation area that includes ball fields and a running track. No contamination sources have been identified in the Chase Park Area, but the underlying groundwater is contaminated with volatile organic compounds from the West Side Aquifer groundwater contamination plume (*Tetra Tech, 1998b*). A discussion of the groundwater can be found in Section 3.4.2, no further action decision has been reached for Site 10 (*USEPA, 1993*).

4.2.2 Site 14

Site 14-North (former USTs 67 and 68) is part of OU2-west and is located near Building 88 (former dry cleaning building). The dry cleaning building was investigated as part of the investigation of Site 18 (Section 4.2.5). Tank 67 contained fuel oil and was removed in May 1990. Tank 68 contained solvents and was removed in July 1994 during the Building 88 remedial action. Investigations performed at both tank locations did not identify contamination related to the operation of USTs 67 and 68 (*Tetra Tech, 1998b and PRC, 1997*).

Site 14-south is at an operating vehicle fueling station. Leakage from two removed tanks (Tanks 19 and 20) and piping appears to have contributed to soil and groundwater contamination. A groundwater pump and treat system was previously operated at this site, although low-permeability soils limited flow rates and this approach was abandoned. A recirculating in situ treatment system was designed and installed at Site 14-south in 1995 to replace the pump and treat system (*PRC, 1997*). This system was operated until 1998, when it was turned off to allow natural attenuation to occur. Current benzene concentrations in the groundwater are 3,000 µg/l. The current double-walled tanks were installed in 1986, and upgraded in 1998. The requirements for removal of the contaminated soil associated with Tank 19 and 20 are outlined in the CP (*PAI/ISSI, 2000*).

4.2.3 Site 15

Site 15 includes eight sumps and oil/water separators and one tank located throughout Moffett Field. Four of the sumps are not located on the NRP parcels and are not covered in this EBS; three sumps and oil/water separators (25, 42, and 58) are located on Parcel 5. Tank 25 includes an oil/water separator. The separator collected wastewater generated by aircraft washing activities south of Hangar 1 and has been removed. No evidence of a release was identified in the investigation at oil/water separator 25 (*PRC, 1993*); however, low concentrations of VOCs were detected in groundwater below this area (*Tetra Tech, 1998b*). Sump 42 collected condensed gasoline vapor and was located at the new NEX service station and was removed in October 1990. Low levels of TPH and BTEX were detected in soil samples collected from below the sump; however, no further action for the sump was recommended. Tank 58 is an oil/water separator that received drainage from the work areas and wash water from the wash rack at the hobby shop (Building 544). The wastewater was discharged from the separator to the sanitary sewer. The tank was removed in 1994. Analytical results available for soil surrounding Tank 58 show BTEX present above cleanup levels. The requirements for removal of the contaminated soil associated with Tank 58 are outlined in the CP (*PAI/ISSI, 2000*).

4.2.4 Site 16

Site 16 is a public works steam-cleaning Sump (Tank 60) which included two catch basins that drained a concrete wash pad to an underground oil/water separator. Data for this site were collected during the sump removal and contamination was noted during removal (*PRC, 1997*). A no further action decision has been reached for Site 16 (*USEPA, 1993*). However, TCE has been detected in the groundwater at this location at 250 ppb. The CP discussed the requirements for removal of potentially contaminated soil associated with Tank 60 (*PAI/ISSI, 2000*).

4.2.5 Site 18

Site 18 includes Sump 66 on the northern side of former Building 88 (dry cleaners building). Floor drains in Building 88 flowed into Sump 66, which was removed in 1990 (*PRC, 1996*). Sample data did not indicate contamination from the sump. A remedial action, however, was conducted during 1994 and 1995

to address potential contamination from the Building 88 floor drains. The building, foundation, underground piping, and Tank 68 and Sump 91 (also located on the northern side of Building 88) were demolished and removed. Approximately 400 cubic yards of soils contaminated with cleaning solvents were excavated and treated. Remediation of VOC impacted soil is complete and no further contamination remains (PRC, 1997). This VOC contamination has most likely contributed to the regional VOC plume.

4.3 Environmental Compliance Programs

4.3.1 Hazardous Waste Management

On the basis of the review of the documents discussed above in Section 3.5.1, ten buildings (Tables 10 & 11, Buildings 88, 113, 146/146a, 503, 525, 529, 950, 958, 992) historically (prior to 1994) accumulated hazardous wastes. Hazardous waste is currently (1994 to present) accumulated at ten buildings (111, 146, 152, 156, 529, 543, 544, 583, 944, and 950). A list of the hazardous wastes previously and currently generated in buildings within Parcel 5 is presented in Tables 10 and 11, respectively.

4.3.2 Hazardous Materials Management

Hazardous materials were historically stored or used at fifteen buildings within Parcel 5 (Boeing, 1993b; SEC Donahue Inc., 1993). Hazardous materials are currently stored or used at eight buildings. Tables 10 and 11 list the hazardous materials formerly and currently stored or used in Parcel 5, respectively.

4.3.3 Storage Tanks

4.3.3.1 Underground Storage Tanks, Oil/Water Separators and Sumps

Twenty-eight USTs, four oil/water separators, two active (Tanks 431 and 432 [also known as Tanks 70 and 71]), and seven sumps are or were present within Parcel 5. The USTs, oil/water separators, and sumps that have been present on Parcel 5 are identified on Plate 5 and summarized on Table 3. The majority of the USTs were discussed as part of the Site 14 (Tanks 19, 20, 67, 68), Site 15 (Tanks 25, 42, and 58), Site 16 (Tank 60) and Site 18 (Sump 66) investigations (in Sections 4.2.2, 4.2.3 and 4.3.5 respectively). Tanks 33 through 42 are associated with the Navy Exchange Service Station Investigation, at Building 503. The NEX Site is a gasoline dispensing facility. It contained eight USTs that stored gasoline, a waste oil UST and a vapor recovery sump. All tanks were removed between 1990 and 1994. Dissolved phase gasoline and BTEX were identified in the soil near the former UST areas. No further action for this site was anticipated (Tetra Tech, 1998b). Tank 89 was removed in 1994 by the Navy. Associated soil samples showed concentrations of total petroleum hydrocarbons above cleanup goals. The requirements for removal of contaminated soil associated with Tank 89 are presented in the CP (PAI/ISSI, 2000). Tanks 4, 51, and 113 have no records of being investigated and no record of decisions associated with these tanks are available. Tanks 25, 41b, 57, 57a, 58, 91, 126, 127 and 136 are still being investigated or monitored. Tanks 86a, 86b, 110 and 116 were granted closure by the RWQCB August 8, 2000. Procedures for removing Tanks 431 and 432 and associated soil sampling are outlined in the CP (PAI/ISSI, 2000).

4.3.3.2 Aboveground Storage Tanks

Seven active ASTs are present within Parcel 5 and four have been removed. The active ASTs are lubricant waste oil and gasoline ASTs associated with the active Navy Exchange service station, and a sodium hypochlorite tank associated with Building 104. The ASTs are identified on Plate 5 and summarized on Table 4. On the basis of the size of the active tanks, or because leak detection systems

have not detected any releases, they are unlikely to have impacted the environment; however, no documentation exists nor was a visual survey conducted to support this conclusion.

4.3.4 Lead-Based Paint

Based on the age of the buildings/structures present within Parcel 5 it is assumed that 49 of the 62 buildings/structures contain lead. Review of PAI internal files identified three buildings within Parcel 5 that have been sampled as a result of modifications being performed; all three of the buildings 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 29 buildings within Parcel 5. Lead was detected above the Region 9 residential PRG at two of the building locations and above the industrial PRG at our building location. Table 5 presents a summary of the building perimeters sampled within Parcel 5.

4.3.5 Air Quality

Two emission sources are located within Parcel 5. The first source is the gasoline ASTs associated with the NEX fuel Station (Building 503). The second source is the USTs associated with Building 161. All sources are properly permitted by the Bay Area Air Quality Management District.

Five of the buildings tested as part of the indoor air quality investigations discussed in Section 3.5.11.2 (Buildings 111, 148, 156, 476, and 543) are located within Parcel 5. 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. Benzene, 1,4-dioxane, 1,4-dichlorobenzene and 1,2-dichloroethane were detected above adjusted PRGs for a residential scenario, indicating that VOC infiltration may be an issue for any residential development. No studies have been conducted 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 shall be performed by appropriately trained workers under a Health and Safety Plan which addresses appropriate monitoring and personal protective equipment. Workers in the subsurface environment must have 24-hour hazardous waste site training.

4.3.6 Asbestos

Results of the surveys and sampling discussed in Section 3.5.12 identified 34 buildings within Parcel 5 with confirmed or suspect asbestos present (Table 8). All remaining buildings were not sampled and with the exception of five of the buildings constructed in the mid-1980s, all are assumed to contain ACM.

4.3.7 Polychlorinated Biphenyls

Seven buildings within Parcel 5 contain transformers or capacitors with PCB concentrations above the DHS regulated concentration (5 ppm). In addition, one capacitor located at Building 476 has not been tested and is assumed to contain at least 500 ppm PCBs per 40 CFR 761. Table 7 presents a summary of the Parcel 5 buildings with PCB containing items, their sample dates, and the concentrations of detected PCBs above the DTSC regulated concentration. Because no leaks of these active units have been observed during inspections, they are unlikely to have impacted the environment. Quarterly inspections are recorded on Field Sheets kept electronically on a database and reported annually in the PCB Annual Document Log. A visual survey was not conducted as part of this report. Any buildings with fluorescent

lights may contain PCB light ballast. These must be removed and disposed of properly prior to demolition.

4.4 Discussion of Findings

The potential environmental constraints for Parcel 5 include the following:

- Concentrations of VOCs in the groundwater beneath Parcel 5 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 and one removed AST are still actively being investigated. Regulatory status of these tanks should be further researched. The active USTs and ASTs should be inspected to document their 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 5. 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 BIBLIOGRAPHY

- Boeing Aerospace Operations, Inc. (Boeing), 1993a. *Position Paper 148-156*. January 22
- _____, 1993b. *Report of Findings ,Phase I Building Assessment Building 45*. April
- Brady and Associates, Inc. 1994. *Final Environmental Assessment, Moffett Field Comprehensive Use Plan, Moffett Field, California*. August
- Chemical Waste Management Inc., 1993a. *Draft Preliminary Site Assessment, Hangar 1, Buildings 32, 33, 83, 118, 119, 120, 347, and 584, Naval Air Station, Moffett Field, California*. February 1
- _____, 1993b. *Draft Preliminary Site Assessment, Area 8, Buildings 1A, 105, 249, 256A, 329, 331, 400*. May 17
- _____, 1993c. *Phase I Environmental Site Assessment Area 4, Buildings 77, 449, and 454*. June 1
- _____, 1993d. *Phase I Environmental Assessment, Building 567 Public Works Warehouse, Naval Air Station Moffett Field, California*. August 25
- _____, 1993e. *Surface Soil Lead Survey, Naval Air Station, Moffett Field California*. October 29
- _____, 1994. *Naval Weapons Bunkers and Laboratory Declassification Survey, NASA Ames Research Center*. January 12
- Chou, Joseph, Regional Water Quality Control Board, San Francisco Bay Region, 2000. *Personal communication – telephone. Conversation regarding USB and comments and draft EBS*. October 4
- Department of the Army (Army), Headquarters 124th U.S. Army Reserve Command, 1994. Memorandums discussing Radon Survey Results to USAR Aviation Support Facility 27 and to 3rd BN, 12th Special Forces Group. July 8
- Harding ESE, Inc. (Harding ESE, formerly Harding Lawson Associates), 1988. *Remedial Investigation Report, Middlefield – Ellis-Whisman Area, Mountain View, California*
- _____. 2000. *Draft Air Quality Investigation, 476 and 543, Ames Research Center*. July 14
- ICF-Clement, 1988. *Endangerment Assessment for the Middlefield-Ellis-Whisman Site, Mountain View, California, June 15*.
- Insituform Technologies, Inc. 1997a. *BAMSI, Inc. Solicitation #MSSC-C-96-026, Sewer Rehabilitation, Moffett Field, California*. January
- _____. 1997b. *DMJM Engineers, NASA Ames Research Center, Repair Sanitary Sewer System, Moffett Field, California*. May
- IT Corporation, 1993. *Operable Unit 2 Remedial Investigation Report, Naval Air Station Moffett Field, California Vol. 1*. May

- Iwamura, T.I., 1980. *Saltwater Intrusion in the Santa Clara Valley Baylands Area, California*. Santa Clara Valley Water District. September
- Locus Technologies, 1999. *Remedial Action Report Regional Ground Water Remediation Program Middlefield-Ellis-Whisman Site Mountain View, California*. December
- NASA – ARC, 1989. Memorandum to Steve Brisbin from NWT presenting Radon Survey results for period between 12/27/88 and 1/02/89. February 9
- Naval Air Station Moffett Field, Public Works Environmental Division (NAS Moffett Field), 1990. *Hazard Communication Plan for NAS Moffett Field*
- _____, 1991a. *Hazardous Substance Spill Contingency Plan, Naval Air Station, Moffett Field CA*. January
- _____, 1991b. *Hazardous Waste Management Plan, Naval Air Station, Moffett Field CA*. April
- _____, 1991c. *Oil Spill Prevention, Control, and Countermeasures Plan, Naval Air Station, Moffett Field CA*. April
- _____, 1993. *Draft PCB Survey, Naval Air Station, Moffett Field CA*. November
- Naval Energy and Environmental Support Activity (NEESA, Port Hueneme), 1984. *Initial Assessment Study of Naval Air Stations, Moffett Field, California*. March
- _____, 1989. *Hazardous Waste Minimization Plan for Naval Air Station, Moffett Field CA*. October
- _____, 1991. *Solid Waste Management Plan (SWMP) for Naval Air Station, Moffett Field, CA*. September
- NASA, 1998. *Environmental Self Assessment Report of Findings and Corrective Actions Order*.
- _____, 2000. *Internal documents. Various air permits and emission Source Inventory*.
- _____, 2000b. NASA. Internal Memorandum. *Hazard Notification, Building 25 from Stanleigh Phillips, CIH*. September 22.
- Olliges, Sandy, NASA Project Manager, 2000b E-mail regarding asbestos sampling and other related activities. August 30
- PAI/ISSI Team, 2000, *Closure Plan, Buildings 111, 146, 161, 574, 958, and 992, NASA Ames Research Center, Moffett Field, California*. November
- _____, 2000, *Closure Plan, Buildings 50, 148, 149, 150, 151, 555, 583A, 583B, 590, 964 and 965, NASA Ames Research Center Moffett Field, California*. December
- PRC Environmental Management, Inc. (PRC), 1991. *Site 9 Action Memorandum Volume 1, Naval Air Station Moffett Field, Mountain View, California*. July 3
- _____, 1993. *Final Installation Restoration Program Petroleum Sites (And wastewater Tanks and Sumps) Characterization Report, for Naval Air Station, Moffett Field, California*. October 1.

- _____, 1994. *Base Realignment and Closure Cleanup Plan, Naval Air Station Moffett Field*. March
- _____, 1996. *Final Station-Wide Remedial Investigation Report, Moffett Federal Airfield, California*. May
- _____, 1997. *Base Realignment and Closure Business Plan (BCP) for Naval Air Station, Moffett Field California*. Prepared by PRC EMI. February 21
- _____, and Montgomery Watson (MW), 1995. *Final Phase I Site-wide Ecological Assessment, Moffett Federal Airfield, California*. September
- _____, and Montgomery Watson (MW), 1997. *Final Phase II Site-wide Ecological Assessment, Moffett Federal Airfield, California*. July
- Regional Water Quality Control Board, 2000. *Transmittal of the Closure Letter and Site Summaries for Department of Defense (DOD) Underground Storage Tanks at Moffett Federal Airfield, California*. August 8
- Science Applications International Corporation (SAIC), 1995. *Environmental Multi-Media Audit Results for CANG, Moffett Federal Airfield*. November 20
- _____, 1996. *Hazardous Air Pollutant Emissions Inventory, NASA Ames Research Center, Moffett Field California*. July 18
- _____, 1999a. *Passive Gas Monitoring Survey of Indoor Ambient Air and Subsurface Organic Vapors, Building 566*. January
- _____, 1999b. *Ames Research Complex. 1998-1999 Annual Report for Stormwater Discharges Associated with Industrial Activities, Volume 1*. July 1
- _____, 2000. *Indoor Air Testing Report, Hangar 1 and Buildings 6, 21, 22, 26, 111, 148, 156, and 269 NASA Ames Research Center*. July 18
- SEC Donahue, Inc., 1993. *Preliminary Site Assessment NAS Moffett Field, Bldg, 146 and 146A, Santa Clara County, California*. February 12
- Tetra Tech EM Inc. (Tetra Tech), 1994a. *Baseline Environmental Report for Naval Air Station, Moffett Field, California – Administrative Draft*. January
- _____, 1994b. *Asbestos Survey at Naval Air Station, Moffett Field and NALF Crows Landing, California – Final Report*. January
- _____, 1998a. *West-Site Aquifers Treatment System, Final Long Term Groundwater Monitoring Plan*. January 20
- _____, 1998b. *Final Basewide Petroleum Site Evaluation Methodology Technical Memorandum*. October 2
- _____, 1998c. *Final Station-Wide Feasibility Study Report*. October 30
- _____, 1999a. *Remaining UST Sites Investigation, Field Work Plan. Draft*. February 15

- _____, 1999b. November 1998, *Draft Quarterly Report, Moffett Federal Airfield, California*. March 31
- Unknown Source. Table and Summary presenting results of the NASA Radon Monitoring Program
- Uribe and Associates, 1993. *Report of Findings Phase I Building Assessments, Area 2, and Buildings 10 and 543 Contract No. ARC860805*. April
- U.S. Department of Defense (DoD), 1994. *Findings of Suitability to Transfer BRAC Property*. June 1
- U.S. EPA (USEPA), 1989. *Record of Decision, Middlefield/Ellis/Whisman Study Area (MEW Site), Mountain View, California*. June 9
- _____, 1993. *Letter from Mr. Michael Gill concurring with no further action at Sites 10, 16, and 17. NAS Moffett Field, California*. December 17
- _____, 1998. *Lead Based Paint Investigation Report for NASA Moffett Field*. October
- Vermeere, Bill – PAI/ISSI, Radiological Specialist, 2000. Personal communication - telephone. Conversation regarding radioactive materials. May 23
- Western Ecological Services Company (WESCO), 1993. *Phase I Site-Wide Qualitative Habitat and Receptor Characterization, Naval Air Station*. October

TABLES

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 Parcel 5
Moffett Federal Airfield, California**

Parcel Number	IRP Site	Type of Site	Remedial Action	Confirmation Report/ Approval Reference
5	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
	10	Recreation Area	Complete	Tetra Tech, 1998b/EPA , 1993
	14-North	USTs	Complete	Tetra Tech, 1998b/Navy, 1997 (under re-evaluation)
	14-South	USTs	In Progress	PRC 1993/
	15	Sumps and Oil/Water Separators	In Progress	PRC, 1993/Sump 58 still may contain actionable levels of contaminants
	16	Public Works Sump	Complete (NOFA has been reached)	Tetra Tech, 1998b/ Final Basewide Petroleum Site Evaluation Methodology Technical Memorandum
	18	Dry Cleaners Sump/Floor Drains	Complete for soil; underway for groundwater	Tetra Tech, 1998b/Navy 1997 – Groundwater Cleanup under WATS

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

**Table 3. Underground Storage Tank Status
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Bldg#/ Location	Tank/Sump No.*	Contents	Size Gallons	Year Installed	Date Removed	Comments/status
Parcel 5						
former building 88	66	dry cleaning waste	100	unknown	6/8/90	Sump - TPHg, TPHd, TPHmo, toluene, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, PCE, 1,1,1 TCA, Freon 113, and TCE were present in soil at moderate to high concentrations. High concentrations (3,600 µg/kg PCE) of VOCs were detected in groundwater wells. Part of Site 18
	67	fuel oil	16,000	unknown	5/18/90	TPHd, toluene, 1,2-DCE, and TCE were present in soil at maximum concentrations of 150 mg/kg, 47 µg/kg, 22 µg/kg, and 100 µg/kg respectively. Low concentrations of petroleum hydrocarbons and moderate concentrations of VOCs were detected in groundwater wells. Active monitoring. Part of Site 14 Investigation. Phase I Basewide Tank Closure. Closure granted by RWQCB 8/8/2000
	68	unknown (reportedly solvents)	2,000	unknown	7/15/94	Sump - Toluene, 1,1-DCA, 1,2-DCE, PCE, and TCE were present in soil at maximum concentrations of 12, 6.0, 55, 140, and 28 µg/kg respectively. Low to moderate concentrations of VOCs detected in groundwater well. No further action recommended. Part of Site 14 Investigation.
	91	dry cleaning waste (solvents)	700	unknown	7/1/94	Sump - 1,1-DCA, 1,1-DCE, 1,2-DCE, PCE, and TCE were present in soil at moderate to high concentrations. Low to moderate concentrations (1,300 µg/kg TCE) of VOCs were detected in groundwater wells. Active monitoring.
107	86A	gasoline	5,000	1948	1/7/93	Phase I Basewide Tank Closure. Closure granted by RWQCB 8/8/2000.
	86B	diesel	7,000	1948	1/7/93	Phase I Basewide Tank Closure. Closure granted by RWQCB 8/8/2000.
109	110	diesel	2,060	unknown	Apr-94	Phase I Basewide Tank Closure. Closure granted by RWQCB 8/8/2000.
146	60	steam cleaning solution	350	unknown	10/1/90	Sump, TPHg, TPHd, toluene, xylenes were present in soil at maximum concentrations of 200 mg/kg, 900 mg/kg, 440 µg/kg and 270 µg/kg respectively. Low concentrations of VOCs detected in groundwater well. Area over-excavated, no further investigations recommended
	116	av gas	5,000	1933	unknown	Phase I Basewide Tank Closure AND Remaining UST Sites, closure granted by RWQCB 8/8/2000.
	126 127	oily water oily water	unknown unknown	unknown unknown	active active	Sump - (AKA: Sump #9), unknown regulatory status Oil water separator, unknown regulatory status
161	19	gasoline	5,000	1953	10/1/86	Part of Site 14S investigation, active monitoring
	20	diesel	5,000	1953	10/1/86	Part of Site 14S investigation, active monitoring
431 432	70	gas	12,000	1986	active	Also referred to as Tank 431. Tanks upgraded in 1998
	71	diesel	12,000	1986	active	Also referred to as Tank 432. Tanks upgraded in 1998
503	33	gasoline	10,000	1965	10/11/90	NEX Site Investigation in 1994, active monitoring
	34	gasoline	10,000	1965	10/11/90	NEX Site Investigation in 1994, active monitoring
	35	gasoline	10,000	1965	10/11/90	NEX Site Investigation in 1994, active monitoring
	36	gasoline	10,000	1965	10/11/90	NEX Site Investigation in 1994, active monitoring

**Table 3. Underground Storage Tank Status
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Bldg#/ Location	Tank/Sump No.*	Contents	Size Gallons	Year Installed	Date Removed	Comments/status
	37	gasoline	12,000	1973	12/18/92	NEX Site Investigation in 1994, active monitoring
	38	gasoline	12,000	1973	12/18/92	NEX Site Investigation in 1994, active monitoring
	39	gasoline	12,000	1973	12/18/92	NEX Site Investigation in 1994, active monitoring
	40	gasoline	12,000	1973	12/18/92	NEX Site Investigation in 1994, active monitoring
	41a	waste oil	550	1965	6/1/91	NEX Site Investigation in 1994, active monitoring
	41b	oily water	1,700	1973	1/7/93	Oil water separator. Investigated under Clean Contract, unknown regulatory status.
	42	vapor recovery	100	1978	10/11/90	NEX Site Investigation in 1994 and Site 15 investigation, active monitoring
525	113	sewage	unknown	unknown	inactive	Not regulated as a UST
former building 535	25	wash water	2,000	unknown	5/17/94	Oil/water separator reportedly removed, unknown regulatory status. Part of Site 15 investigation. Received washwater from aircraft wash rack south of Hanger 1
544	57	waste oil	500	unknown	6/1/90	Investigated under clean contract
	58	oily water	300	unknown	4/12/94	Oil water separator, reportedly removed, active investigation in Site 15
554	51	kerosene	unknown	unknown	unknown	UST not found during ERM West 1996 assessment/also listed as containing kerosene, no further assessment recommended; investigations indicated tank did not exist.
585	136	oily water	4,500	unknown	inactive	Oil water separator, reportedly removed, unknown regulatory status
951	89	diesel	500	1955	4/15/94	TPHd present in soil at concentrations above cleanup goals.

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

**Table 4. Aboveground Storage Tank Status
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Bldg#/ Location	Tank No.*	Contents	Size Gallons	Year Installed	Date Removed	Comments
Parcel 5						
109	135	Sodium Hypochlorite	500	unknown	active	Used in swimming pool for chlorination
503	108	lube oil	275	unknown	in place	
	109	transmission fluid	unknown	unknown	in place	
	138	waste oil	560	1991	active	Most likely tank 138
	139	lube oil	unknown	unknown	active	
	—	oil	180	unknown	active	
	—	oil	250	unknown	active	
	—	waste oil	360	1991	active	
	—	gasoline	10,000	unknown	active	
—	gasoline	10,000	unknown	active		
—	gasoline	10,000	unknown	active		

* 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 Parcel 5
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 5 Buildings/Structures/Areas							
50	Condemned	1958	1998	yes	NA	yes	no
82	Athletic Storage (NASA Exchange)	1944	1998	yes	NA	no	no
104	Electric Substation	1943	Not sampled	no	yes	Not sampled	Not sampled
107	ROICC Administration Office	1948	1998	yes	NA	no	no
108	Swimming pool	1948	Not sampled	no	NA	Not sampled	Not sampled
109	Pool Dressing Room	1948	Not sampled	no	yes	no	no
111	Office/Maintenance (Vacant)	1944	Not sampled	no	yes	Not sampled	Not sampled
113	Storage (NEX)	1944	Not sampled	no	yes	Not sampled	Not sampled
146	Transportation Garage (CANG)	1952	Not sampled	no	yes	Not sampled	Not sampled
148	Enlisted Mens Barracks (Vacant)	1953	Not sampled	no	yes	no	no
149	Enlisted Mens Barracks (Vacant)	1953	Not sampled	no	yes	no	no
150	Enlisted Mens Barracks (Vacant)	1953	Not sampled	no	yes	no	no
151	Enlisted Mens Barracks (Vacant)	1953	Not sampled	no	yes	yes	yes
152	Training/Office (Army Reserve)	1953	Not sampled	no	yes	no	no
153	Enlisted Mens Barracks	1953	Not sampled	no	yes	no	no
154	Enlisted Mens Barracks	1953	Not sampled	no	yes	no	no
155	Enlisted Mens Barracks	1953	Not sampled	no	yes	no	no
156	Enlisted Mens Barracks	1953	Not sampled	no	yes	no	no
161	Gas Station (DESC)	1952	Not sampled	no	yes	no	no
184	NASA Environmental Storage	1955	Not sampled	no	yes	Not sampled	Not sampled
343	Storage (Vacant)	1942	Not sampled	no	yes	Not sampled	Not sampled
431	Fuel Tank	1953	Not sampled	no	yes	Not sampled	Not sampled
432	Fuel Tank	1953	Not sampled	no	yes	Not sampled	Not sampled
459	Rec. Storage	1950	Not sampled	no	yes	Not sampled	Not sampled
476	Navy Exchange	1954	Not sampled	no	yes	no	no
493	Covered Picnic Area	1963	Not sampled	no	yes	Not sampled	Not sampled

**Table 5. Lead Based Paint Sampling Results
Environmental Baseline Survey
NASA Research Park Parcel 5
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 ****
503	NEX Service Station	1966	Not sampled	no	yes	Not sampled	Not sampled
512A	BEQ (Vacant)	1970	Not sampled	no	yes	no	no
512B	BEQ (Vacant)	1970	Not sampled	no	yes	no	no
512C	BEQ (Vacant)	1970	Not sampled	no	yes	Not sampled	Not sampled
525	Former Bowling Alley - Storage (NEX)	1970	Not sampled	no	yes	no	no
526	EM Club Storage (Vacant)	1970	Not sampled	no	yes	no	no
529	Office/Storage (Vacant)	1970	Not sampled	no	yes	Not sampled	Not sampled
533	Public Restrooms	1971	Not sampled	no	yes	Not sampled	Not sampled
534	BBQ Shelter	1971	Not sampled	no	yes	Not sampled	Not sampled
543	Office (NEX/USAF)	1973	Not sampled	no	yes	no	no
544	Auto Hobby Shop	1974	Not sampled	no	yes	no	no
547B	BEQ (NAR)	1974	Not sampled	no	yes	Not sampled	Not sampled
547C	BEQ (NAR)	1974	Not sampled	no	yes	no	no
547D	BEQ (NAR)	1974	Not sampled	no	yes	Not sampled	Not sampled
547E	BEQ (NAR)	1974	Not sampled	no	yes	no	no
554	NEX #2	1975	Not sampled	no	yes	no	no
555	Office (Vacant)	1984	Not sampled	no	no	no	no
556	Credit Union	1979	Not sampled	no	no	no	no
572	Racquetball Courts	1963	Not sampled	no	yes	no	no
574	Motorpool Storage (CANG)	1982	Not sampled	no	no	Not sampled	Not sampled
583A	UEPH (USAF)	1985	Not sampled	no	no	Not sampled	Not sampled
583B	Dorm (NASA)	1985	Not sampled	no	no	Not sampled	Not sampled
583C	UEPH (USAF)	1985	Not sampled	no	no	no	no
585	Vehi. Wash Platform	unknown	Not sampled	no	yes	Not sampled	Not sampled
590	Power Station	NA	Not sampled	no	yes	Not sampled	Not sampled
596	McDonalds	1985	Not sampled	no	no	no	no

**Table 5. Lead Based Paint Sampling Results
Environmental Baseline Survey
NASA Research Park Parcel 5
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 ****
944	Recreation Center (Condemned)	1941	Not sampled	no	yes	Not sampled	Not sampled
945	Field House	1941	Not sampled	no	yes	Not sampled	Not sampled
950	Storage (NASA Environmental)	1989	Not sampled	no	no	Not sampled	Not sampled
951	Storage (NASA Environmental)	1959	Not sampled	no	yes	Not sampled	Not sampled
958	Vehicle Shed	1956	Not sampled	no	yes	Not sampled	Not sampled
964	Playing Courts	1942	Not sampled	no	NA	Not sampled	Not sampled
965	Playing Courts	1942	Not sampled	no	NA	Not sampled	Not sampled
966	Softball Field #2	1957	Not sampled	no	NA	Not sampled	Not sampled
967	Softball Field #1	1957	Not sampled	no	NA	Not sampled	Not sampled
992	CANG Warehouse	1957	Not sampled	no	yes	Not sampled	Not sampled

- * 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 exceeds the residential PRG of 400 mg/kg and/or Cal-EPA STLC threshold of 5 mg/l, (CWMI, 1993)
- **** Lead exceeds the industrial PRG of 1000 mg/kg (CWMI, 1993)
- NA Not Applicable

Table 6. Asbestos Survey/Sampling Results
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California

Bldg# Building Name	year(s) sampled/surveyed	Non-friable asbestos present	Friable asbestos present	
Parcel 5 Buildings/Structures/Areas				
50	Condemned	1993	suspect	no
82	Athletic Storage (NASA Exchange)	1993	suspect	no
104	Electric Substation	1993	suspect	no
107	ROICC Administration Office	1993	confirmed	no
108	Swimming pool	not sampled	NA	NA
109	Pool Dressing Room	1993	confirmed	confirmed
111	Office/Maintenance (Vacant)	1993	NA	NA
113	Storage (NEX)	1993	suspect	no
146	Transportation Garage (CANG)	1993/1997	confirmed	confirmed
148	Enlisted Mens Barracks (Vacant)	1993	confirmed	confirmed
149	Enlisted Mens Barracks (Vacant)	1993	confirmed	confirmed
150	Enlisted Mens Barracks (Vacant)	1993	suspect	confirmed
151	Enlisted Mens Barracks (Vacant)	1993	confirmed	confirmed
152	Training/Office (Army Reserve)	1993	confirmed	confirmed
153	Enlisted Mens Barracks	1993	confirmed	confirmed
154	Enlisted Mens Barracks	1993	suspect	confirmed
155	Enlisted Mens Barracks	1993	suspect	confirmed
156	Enlisted Mens Barracks	1993	suspect	confirmed
161	Gas Station (DESC)	not sampled	NA	NA
184	NASA Environmental Storage	not sampled	NA	NA
343	Storage (Vacant)	1993	suspect	no
431	Fuel Tank	not sampled	NA	NA
432	Fuel Tank	not sampled	NA	NA
459	Rec. Storage	1993	NA	NA
476	Navy Exchange	1993	confirmed	confirmed
493	Covered Picnic Area	not sampled	NA	NA
503	NEX Service Station	1993	confirmed	suspect
512A	BEQ (Vacant)	1993	suspect	confirmed
512B	BEQ (Vacant)	1993	suspect	confirmed
512C	BEQ (Vacant)	1993	suspect	confirmed
525	Former Bowling Alley - Storage (NEX)	1993	suspect	confirmed
526	EM Club Storage (Vacant)	1993	NA	NA
529	Office/Storage (Vacant)	1993	suspect	confirmed
533	Public Restrooms	1993	suspect	no
534	BBQ Shelter	not sampled	NA	NA
543	Office (NEX/USAF)	1993	confirmed	no
544	Auto Hobby Shop	1993	suspect	no
547B	BEQ (NAR)	1993/1999	confirmed	confirmed

Table 6. Asbestos Survey/Sampling Results
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California

Bldg#	Building Name	year(s) sampled/surveyed	Non-friable asbestos present	Friable asbestos present
547C	BEQ (NAR)	1993/1999	confirmed	confirmed
547D	BEQ (NAR)	1993/1999	confirmed	confirmed
547E	BEQ (NAR)	1993/1999	confirmed	confirmed
554	NEX #2	1993	confirmed	confirmed
555	Office (Vacant)	1993	confirmed	no
556	Credit Union	1993/1999	suspect	no
572	Racquetball Courts	not sampled	NA	NA
574	Motorpool Storage (CANG)	not sampled	NA	NA
583A	UEPH (USAF)	not sampled	NA	NA
583B	Dorm (NASA)	1999	NA	NA
583C	UEPH (USAF)	not sampled	NA	NA
585	Vehi. Wash Platform	not sampled	NA	NA
590	Power Station	not sampled	NA	NA
596	McDonalds	not sampled	NA	NA
944	Recreation Center (Condemned)	not sampled	NA	NA
945	Field House	not sampled	NA	NA
950	Storage (NASA Environmental)	not sampled	NA	NA
951	Storage (NASA Environmental)	not sampled	NA	NA
958	Vehicle Shed	not sampled	NA	NA
964	Playing Courts	not sampled	NA	NA
965	Playing Courts	not sampled	NA	NA
966	Softball Field #2	not sampled	NA	NA
967	Softball Field #1	not sampled	NA	NA
992	CANG Warehouse	not sampled	NA	NA

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 Parcel 5
Moffett Federal Airfield, California**

Bldg#	Date(s) analyzed	PCBs concentration in ppm *	Comments
Parcel 5 Buildings/Structures/Areas			
104	7/2/95, 8/27/96	33, 34	
146	7/2/95, 10/7/96	8, 6	Three transformers at building, only one exceeded 5 ppm (T-39.1)
149	9/6/93	505,000 - 542,000	Three different transformers
	9/6/93	14 - 17	Three different oil fuse capacitors
476	Not tested	**	Capacitor - assumed greater than 500 ppm
503	8/27/93	17 - 27	Three different oil fuse capacitors
512A	7/2/95, 10/23/96, 1/27/97, 2/25/99	51, 469, 409, 580	(T-32)
525	7/2/95, 8/27/96, 1/27/97	24, 265, 248	(T-35)

* 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 Parcel 5
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 5 Buildings/Structures/Areas							
50	Condemned	600	1958	No	vacant	storage	demolition
82	Athletic Storage (NASA Exchange)	324	1944	No	NEX	storage	demolition
88	Dry cleaner (Demolished)						
104	Electric Substation (Building 88)	200	1943	No	vacant	Utility	Utility
107	ROICC Administration Office	1,766	1948	No	NASA	office	demolition
108	Swimming pool	5,025	1948	No	NEX	recreation	demolition
109	Pool Dressing Room	5,296	1948	No	NEX	recreation	demolition
111	Office/Maintenance (Vacant)	4,141	1944	No	CANG	storage	demolition
113	Storage (NEX)	1,000	1944	No	vacant	storage	demolition
146/146a	Transportation Garage (CANG)	32,865	1952	No	CANG	storage	demolition
148	Enlisted Mens Barracks (Vacant)	15,785	1953	No	vacant	office	demolition
149	Enlisted Mens Barracks (Vacant)	16,013	1953	No	vacant	office	demolition
150	Enlisted Mens Barracks (Vacant)	15,785	1953	No	vacant	office	demolition
151	Enlisted Mens Barracks (Vacant)	15,785	1953	No	vacant	office	demolition
152	Training/Office (Army Reserve)	37,102	1953	No	USAR	retail	USAR
153	Enlisted Mens Barracks	15,785	1953	No	USAR	office	USAR
154	Enlisted Mens Barracks	15,785	1953	No	USAR	office	USAR
155	Enlisted Mens Barracks	16,013	1953	No	USAR	office	USAR
156	Enlisted Mens Barracks	15,785	1953	No	USAR	office	USAR
161	Gas Station (DESC)		1952	No	NASA	retail	demolition
184	NASA Environmental Storage	441	1955	No	vacant	demolition	demolition
343	Storage (Vacant)	1,785	1942	No	vacant	storage	demolition
431	Fuel Tank		1953	No	NASA	retail	demolition
432	Fuel Tank		1953	No	NASA	retail	demolition
459	Rec. Storage	280	1950	No	vacant	storage	demolition
476	Navy Exchange (Building 493)	43,374	1954	No	NEX	retail/storage	demolition
493							
503	NEX Service Station	7,311	1966	No	NEX	retail	demolition
512A	BEQ (Vacant)	27,499	1970	No	vacant	office	demolition
512B	BEQ (Vacant)	18,627	1970	No	vacant	office	demolition
512C	BEQ (Vacant)	1,301	1970	No	vacant	office	demolition
525	Former Bowling Alley - Storage (NEX)	13,877	1970	No	vacant	storage	demolition
526	EM Club Storage (Vacant)	640	1970	No	vacant	demolition	demolition
529	Office/Storage (Vacant)	2,640	1970	No	JP	demolition	demolition
533	Public Restrooms	448	1971	No	vacant	recreation	demolition
534	BBQ Shelter	295	1971	No	vacant	recreation	demolition
543	Office (NEX/USAF)	9,000	1973	No	ONIZUKA	office/flex	office/flex
544	Auto Hobby Shop	11,180	1974	No	vacant	retail	demolition
547B	BEQ (NAR)	2,610	1974	No	vacant	office	demolition
547C	BEQ (NAR)	19,900	1974	No	vacant	office	demolition
547D	BEQ (NAR)	10,212	1974	No	vacant	office	demolition
547E	BEQ (NAR)	19,900	1974	No	vacant	office	demolition
554	NEX #2	27,493	1975	No	vacant	retail	demolition
555	Office	5,270	1984	No	UCSC	office	demolition
556	Credit Union	10,676	1979	No	GBCU	retail	demolition
572	Racquetball Courts	64	1963	No	vacant	recreation	demolition
574	Motorpool Storage (CANG)	1,722	1982	No	CANG	storage	demolition
583A	UEPH (USAF)	30,900	1985	No	NEX	dorm	demolition
583B	Dorm (NASA)	30,900	1985	No	NEX	dorm	demolition
583C	UEPH (USAF)	13,140	1985	No	vacant	dorm support	demolition

**Table 8. Building List Summary
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Bldg#	Building Name/Historical Use	Area (gsf)	Year Constructed	Historic Register	Current Occupant	Fiscal Year 2000 Use	Preferred Development Alternative
585	Vehicle Wash Platform	15,840	unknown	No	vacant	retail	demolition
590	Power Station	317	NA	No	vacant	utility	utility
596	McDonalds	4,784	1985	No	NEX	retail	demolition
944	Recreation Center (Condemned)	11,724	1941	No	vacant	demolition	demolition
945	Field House	2,676	1941	No	vacant	storage	demolition
950	Storage (NASA Environmental)	4,700	1989	No	NASA	storage	demolition
951	Storage (NASA Environmental)	682	1957	No	vacant	storage	demolition
958	Vehicle Shed	800	1956	No	vacant	storage	demolition
964	Playing Courts		1942	No	vacant	recreation	demolition
965	Playing Courts		1942	No	vacant	recreation	demolition
966	Softball Field #2		1957	No	vacant	recreation	demolition
967	Softball Field #1		1957	No	vacant	recreation	demolition
992	CANG Warehouse	2,952	1957	No	CANG	storage	demolition
Total Building Square Footage Parcel 5		571,015					

Explanation:

gsf - gross square feet

Historic - Building identified in the National Register of Historic Places

CANG - California Air National Guard

USAR - United States Army Reserve

GBCU - Golden Bay Credit Union

UCSC - University California - Santa Cruz

JP - Internal NASA

NEX - Naval Exchange

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 Parcel 5
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
<u>Parcel 5</u>			
004B1	MEW	monitoring	64
017B2	MEW	monitoring	94
029B3	MEW	monitoring	136
045B2	MEW	monitoring	113
046B1	MEW	monitoring	50
048B1	MEW	monitoring	55
050B1	MEW	monitoring	83
051B2	MEW	monitoring	99
053B2	MEW	monitoring	104
055B3	MEW	monitoring	134
063A	MEW	monitoring	33
064A	MEW	monitoring	25
065A	MEW	monitoring	29
066A	MEW	monitoring	20
068B1	MEW	monitoring	52
072A	MEW	monitoring	27
074A	MEW	monitoring	27
075A	MEW	monitoring	30
081A	MEW	monitoring	25
082A	MEW	monitoring	33
085A	MEW	monitoring	33
ERM-01A1	Navy	monitoring	23
ERM-02A1	Navy	monitoring	20.5
ERM-03A1	Navy	monitoring	21
ERM-05A1	Navy	monitoring	unknown
ERM-06A1	Navy	monitoring	30
EWNX-1	Navy	monitoring	unknown
PZ9.5-5	Navy	piezometer	unknown
PZNX-1	Navy	piezometer	unknown
PZNX-2	Navy	piezometer	unk
REG-2A	MEW	extraction	25
REG-3A	MEW	extraction	28
REG-4A	MEW	extraction	31
REG-5A	MEW	extraction	29
REG-5B1	MEW	extraction	47
REG-6B1	MEW	extraction	59
REG-7B1	MEW	extraction	58
REG-8A	MEW	extraction	31
T89-01A1	Navy	monitoring	unknown
T89-02A1	Navy	monitoring	unknown
T89-03A1	Navy	monitoring	unknown
VW NX-1	Navy	monitoring	unk
W09-30A1	Navy	monitoring	18.5
W09-37A1	Navy	monitoring	21.5

**Table 9. Monitoring and Extraction Well Ownership and Total Depth
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Well Name	Well Owner	Well Type	Well Depth (feet bgs)
W09-38A1	Navy	monitoring	23
W09-41A2	Navy	monitoring	46
W14-01A1	Navy	monitoring	unknown
W14-01A2	Navy	monitoring	50
W14-02A1	Navy	monitoring	26.5
W14-03A1	Navy	monitoring	33
W14-04A1	Navy	monitoring	23.5
W14-05A2	Navy	monitoring	52
W14-06A2	Navy	monitoring	55
W14-10A1	Navy	monitoring	20
W14-11A1	Navy	monitoring	20
W14-12A1	Navy	monitoring	20
W14-13A1	Navy	monitoring	20
W58-01A1	Navy	monitoring	unknown
W60-01A1	Navy	monitoring	25
W60-02A1	Navy	monitoring	35.5
W89-01A1	Navy	monitoring	30
W89-02A1	Navy	monitoring	30
W89-11A2	Navy	monitoring	63
W89-12A2	Navy	monitoring	65
W9SC-16	Navy	monitoring	15
W9SC-17	Navy	monitoring	23.5
W9SC-20	Navy	monitoring	unknown
W9SC-21	Navy	monitoring	unknown
WNX-01A1	Navy	monitoring	16.5
WNX-02A1	Navy	monitoring	16.5
WNX-03A1	Navy	monitoring	18
WNX-04A1	Navy	monitoring	16.5
WSI-01A1	Navy	monitoring	34.5
WSI-02A1	Navy	monitoring	25
WSI-03A1	Navy	monitoring	26
WT14-01	Navy	monitoring	18
WT57-1	Navy	monitoring	unknown
WT86B-1	Navy	monitoring	unknown
WU4-01A1	Navy	monitoring	29
WU4-02A2	Navy	monitoring	unknown
WU4-03A1	Navy	monitoring	31
WU4-04A2	Navy	monitoring	60
WU4-05A2	Navy	monitoring	60
WU4-06A2	Navy	monitoring	65
WU4-07A2	Navy	monitoring	54
WWR-3	Navy	monitoring	20

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

**Table 10. Former (Prior to 1994) Hazardous Materials and Waste Locations
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Building Number and Name		Hazardous Materials	Hazardous Waste
Parcel 5 <u>Buildings/Structures/Areas</u>			
82	Athletic Storage (NASA Exchange)	Unidentified chemicals	None identified
88	Dry Cleaners	PCE	Waste PCE
104	Electric Substation	Solvents	None identified
113	Storage (NEX)	Unidentified cleaners, unidentified gas cylinder, propane cylinder,	Waste oil
146/146a	Transportation Garage (CANG)	Radiator cleaning bath, caustic solution binfresh motor oil, Ni-Cad batteries car washing solution, floor cleaner, radiator water, antifreeze, cutting fluid transmission oil, lube spray, engine starter spray , brake fluid, lubricants, power steering fluid, grease, paint thinner, paint, mineral spirits, alcohol.	Battery electrolyte, waste oil, waste hydraulic fluid
161	Gas Station	Gasoline and diesel	None identified
503	NEX Service Station	Batteries, solvent, cuttings,	Waste oil, used lube and gear oil, used transmission and brake fluids, dry cleaning solvent
525	Former Bowling Alley - Storage	Cleaners, solvents, flammable materials	Waste grease
529	Office/Storage (Vacant)	Laundry chemicals	Drummed hazardous waste, drummed former photo lab chemicals
543	Office (NEX/USAF)	Nova clean, adhesive, spray sealer, Proclean, paint	None identified
547B	BEQ (NAR)	Cleaners	None identified

**Table 10. Former (Prior to 1994) Hazardous Materials and Waste Locations
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Building Number and Name		Hazardous Materials	Hazardous Waste
556	Credit Union	General cleaning supplies	None identified
596	McDonalds	Cleaners, degreasers, grease	None identified
583C	UEPH (USAF)	Cleaning supplies	None identified
950	Hazardous waste 90-day storage area	Flammable liquids, poisons, corrosives, other regulated materials	None identified
958	Vehicle shed	None identified	Extremely hazardous waste
992	Fuel truck repair shed	Cleaners, solvents, motor oils, methanol	Waste Oil, battery, casings, absorbent material, waste solvents, used lube and gear oil

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 Waste Locations
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

Building Number and Name		Hazardous Materials	Hazardous Waste
<u>Parcel 5 Buildings/Structures/Areas</u>			
109	Swimming Pool Chemical Storage	Sodium hypochlorite, muriatic acid, carbon dioxide, soda ash	None identified
111	Office/Maintenance	Aerosol spray cans, paint, adhesives, solvent primers, paint thinner, gasoline, floor wax, varnish, sealants	Oily rags, grease, containers w/ residual solvent and oil, batteries, asbestos contaminated materials, grease, used oil filters
146	Transportation Garage (CANG/Army Reserve)	Motor oil, transmission fluid, antifreeze, diesel fuel additive, hydraulic oil, heavy duty grease, carpet cleaner, battery cleaner, greases freon R134A	Waste oil, contaminated rags, oil filters, aerosol cans, coolant, laquer thinner, jet fuel, batteries, sodium hypochlorite, oil with halogenated solvents
152	Training/Office (Army Reserve)	Decontamination kits w/ EtOH	Filters containing Ag and Cr, batteries
156	Enlisted Men's Barracks	Acetone, adhesive, paint, wood stain, wood patch	Contaminated diesel and gasoline, hydraulic oil, dry cleaning solvents (with naphthalene), grease, mercury contaminated waste
161	Ellis Street Gas Station	Gasoline, diesel	None identified
529	Office/Storage (Vacant)	None identified	Oil contaminated water
543	Office (NEX/USAF)	Solvents	Engine oil, miscellaneous oils, sump sludge

**Table 11. Current (1994-2000) Hazardous Materials and Waste Locations
Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield, California**

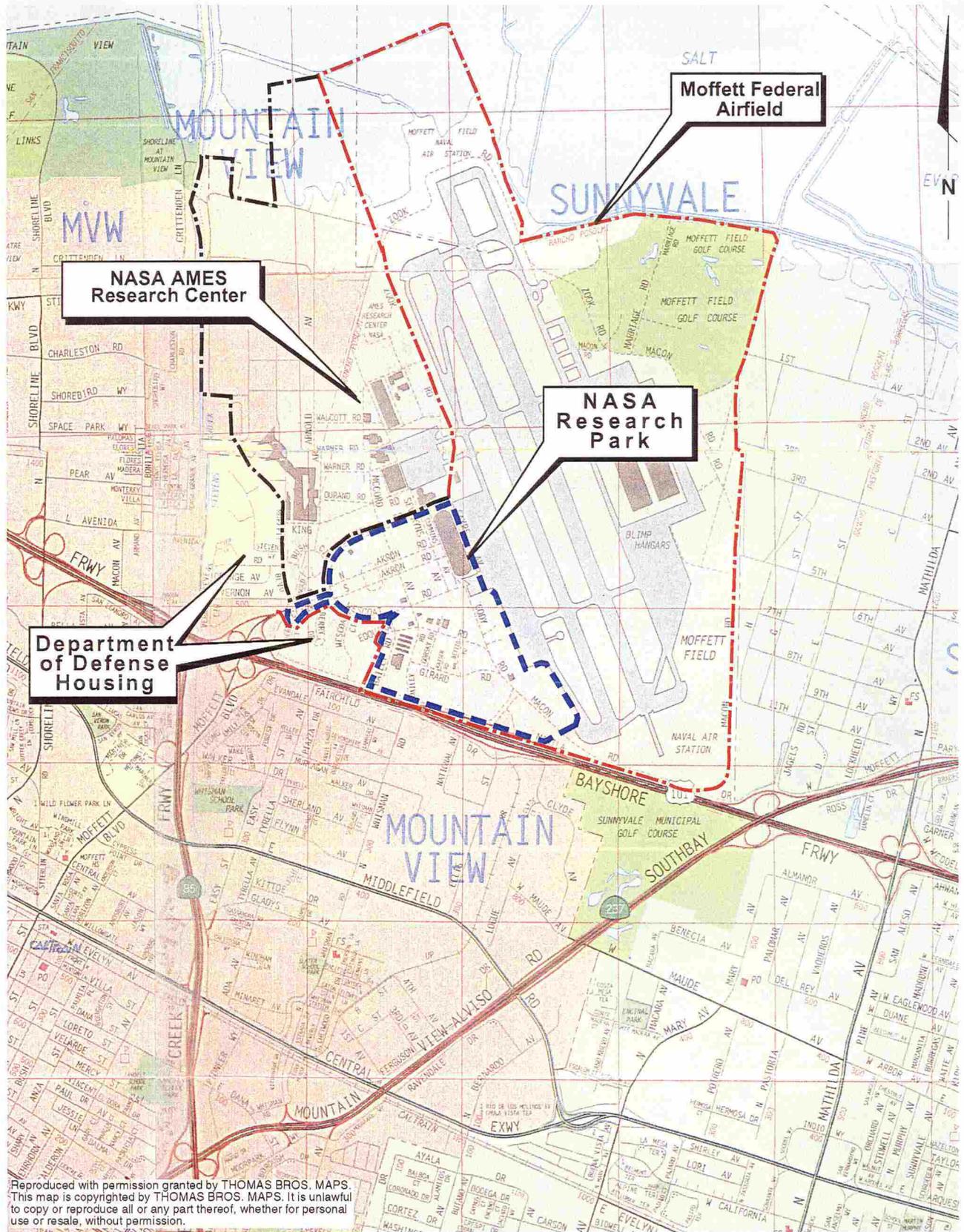
Building Number and Name		Hazardous Materials	Hazardous Waste
544	Auto Hobby Shop	Aerosol spray cans, paint varnish, ethylene glycol flammable solvent	Oily rags, solids contaminated w/ speedy dry, oil, adhesives and resins, oil contaminated water, motor lubricating, engine, gear and hydraulic oil, oil w/ and without halogenated solvents, absorbent w/ oil hydraulic oil/fluid, coolant water w/ antifreeze, PCB light ballasts, grease, welding flux, used oil filters, contaminated kerosene, diesel and gasoline, fluorescent light tubes, grease, used oil filters, brake fluid, batteries, paint contaminated solids, engine degreaser
583A, B and C	UEPH (USAF), Dorm (NASA), and UEPH (USAF)	None identified	Solids contaminated w/ absorbent oil
944	Recreation Center (Condemned)	None identified	Empty compressed gas cylinder, batteries, mastic remover w/ asbestos
950	Hazardous waste 90-day storage area	None identified	Flammable liquids, poisons, corrosives, other regulated materials

Hazardous Materials/Wastes identified from an inventory prepared by NASA

PLATES

PLATES

PLATES



Reproduced with permission granted by THOMAS BROS. MAPS. This map is copyrighted by THOMAS BROS. MAPS. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.



Harding Lawson Associates
Engineering and
Environmental Services

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

PLATE

1

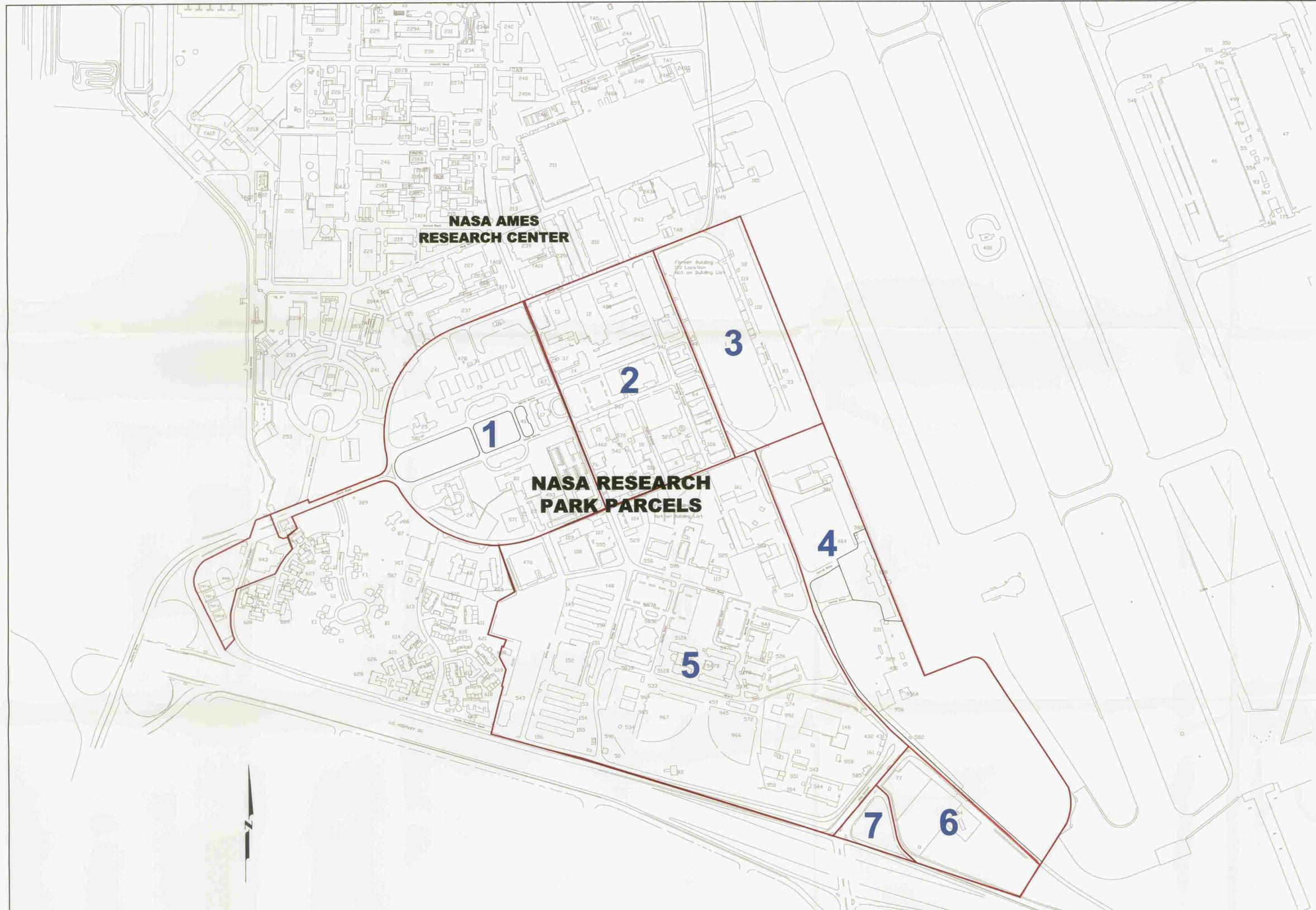
DRAWN
DjP

JOB NUMBER
50487 3.2

APPROVED

DATE
10/00

REVISED DATE



EXPLANATION	
2	PARCEL BOUNDARY AND PARCEL NUMBER

0 300 600
SCALE IN FEET



Harding Lawson Associates
Engineering and Environmental Services

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

PLATE

2

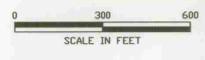
DRAWN	JOB NUMBER 50487 31	APPROVED	DATE 8/31/00	REVISED DATE
-------	------------------------	----------	-----------------	--------------

DATE PLOTTED: 8/31/00



EXPLANATION

- OUI-WEST SITES
- PETROLEUM SITES
- WEST SIDE AQUIFER
5 ug/L PLUME LIMITS



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

PLATE

3

DRAWN	JOB NUMBER 50487 31	APPROVED	DATE 9/26/00	REVISED DATE
-------	------------------------	----------	-----------------	--------------

1000



EXPLANATION

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



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

PLATE

5

DRAWN	JOB NUMBER 50487 31	APPROVED	DATE 9/26/00	REVISED DATE
-------	------------------------	----------	-----------------	--------------

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



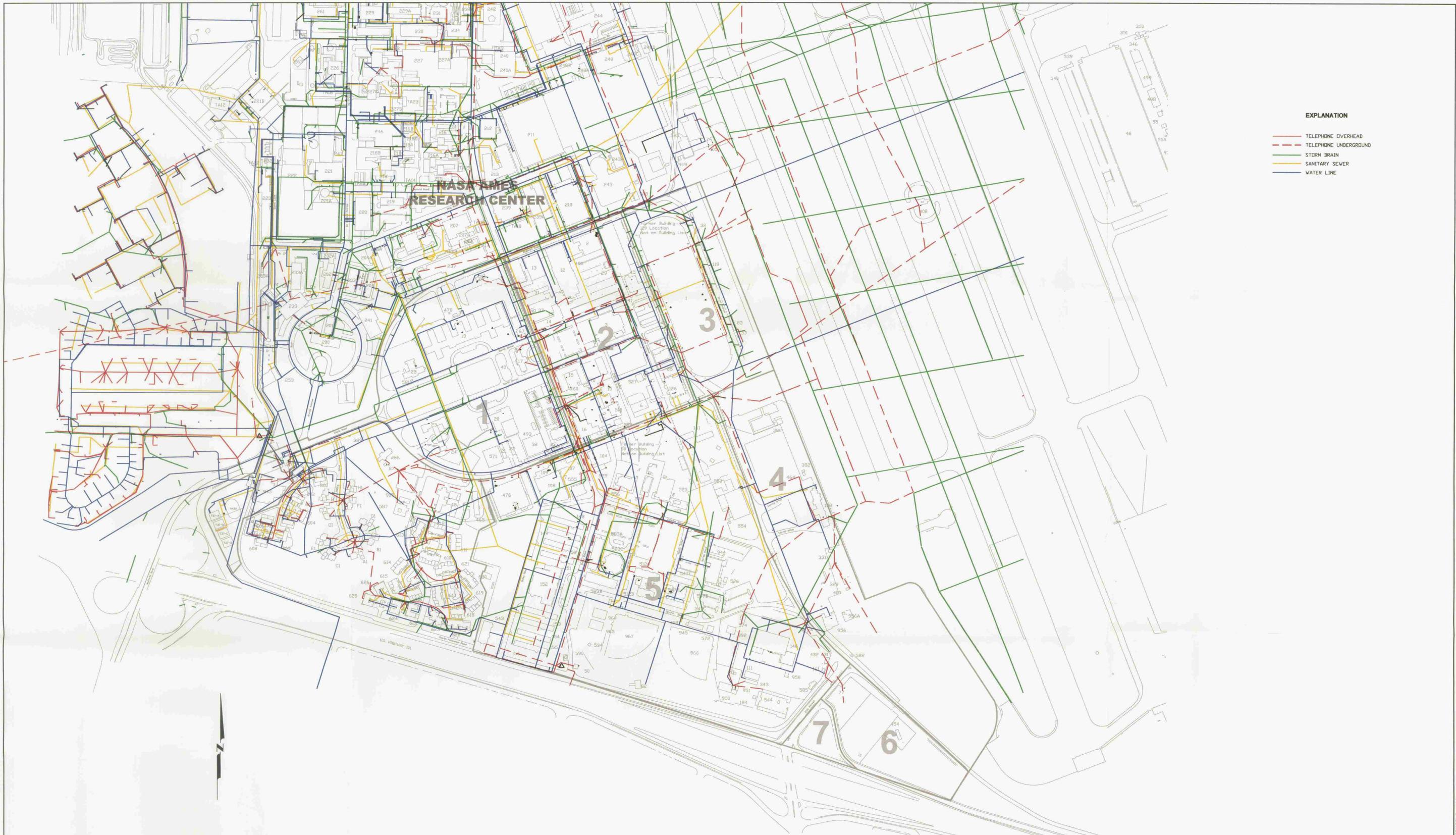
Harding Lawson Associates
Engineering and
Environmental Services

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

PLATE

6a

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



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



	Harding Lawson Associates Engineering and Environmental Services	Utilities Location Map #2 Environmental Baseline Survey NASA Research Park Parcels Moffett Field, California	PLATE 6b	
	DRAWN	JOB NUMBER 50487 31	APPROVED	DATE 8/31/00

1000 EAST BAYVIEW

APPENDIX A

APPENDIX A

PARCEL ENVIRONMENTAL SUMMARY REPORTS

ENVIRONMENTAL SUMMARY REPORT

Parcel No: 5

Parcel Usage: Office

Planned Use: Research development/Educational/Office/Supporting Retail

Current Uses: Office/commercial/vacant

Former Uses: Office/commercial

Estimated Area: 84 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:	6	USTs/Oil water separators/sumps:	33	Radiological Surveys:	0	Closed/demolished Buildings:	1
Buildings/Sites:	63	ASTs:	11	Haz Waste Accumulation Sites:	10	Lead in building/ground surface:	49
Utilities by Parcels:	7	PCB Contaminated Equipment:	14	Haz Waste Storage Areas:	0	Lead Paint Survey:	3
IR/OU Sites:	7	Ordnance Locations:	0	Haz Waste Treatment Facilities:	0	Historical Resources:	0
Radon Survey:	1	Asbestos Sites:	34	Haz Materials Storage Areas:	16	Mold in Buildings:	0

Building	Name	Historic District	Remarks	Year Built	Year Demolished	Total Square Feet	Building Closure Date
50	Radio Station Facility (Condemned)	No	Scheduled for demolition	1958	Not Applicable	600	Not Applicable
82	Athletic Storage (NASA Exchange)	No	Scheduled for demolition	1944	Not Applicable	324	Not Applicable
88	Navy Exchange Dry Cleaning Plant (former)	No	Not Applicable	1945	Late 1980s	13,579	Unknown
104	Electric Substation	No	Scheduled for re use	1943	Not Applicable	200	Not Applicable
107	ROICC Administration Office	No	Scheduled for demolition	1948	Not Applicable	1,766	Not Applicable
108	Swimming pool	No	Scheduled for demolition	1948	Not Applicable	5,025	Not Applicable
109	Pool Dressing Room	No	Scheduled for demolition	1948	Not Applicable	5,296	Not Applicable
111	Office/Maintenance (Vacant)	No	Scheduled for demolition	1944	Not Applicable	4,141	Not Applicable
113	Storage (NEX)	No	Scheduled for demolition	1944	Not Applicable	1,000	Not Applicable

Building	Name	Historic District	Remarks	Year Built	Year Demo	Total Square Feet	Building Closure Date
146/146a	Transportation Garage (CANG)	No	Scheduled for demolition	1952	Not Applicable	32,865	Not Applicable
148	Enlisted Mens Barracks (Vacant)	No	Scheduled for demolition	1953	Not Applicable	15,785	Not Applicable
149	Enlisted Mens Barracks (Vacant)	No	Scheduled for demolition	1953	Not Applicable	16,013	Not Applicable
150	Enlisted Mens Barracks (Vacant)	No	Scheduled for demolition	1953	Not Applicable	15,785	Not Applicable
151	Enlisted Mens Barracks (Vacant)	No	Scheduled for demolition	1953	Not Applicable	15,785	Not Applicable
152	Enlisted Mens Diner (Training/Office [Army Reserve])	No	Scheduled for reuse	1953	Not Applicable	37,102	Not Applicable
153	Enlisted Mens Barracks	No	Scheduled for reuse	1953	Not Applicable	15,785	Not Applicable
154	Enlisted Mens Barracks	No	Scheduled for reuse	1953	Not Applicable	15,785	Not Applicable
155	Enlisted Mens Barracks	No	Scheduled for reuse	1953	Not Applicable	16,013	Not Applicable
156	Enlisted Mens Barracks	No	Scheduled for reuse	1953	Not Applicable	15,785	Not Applicable
161	Gas Station (DESC)	No	Scheduled for reuse	1952	Not Applicable		Not Applicable
184	Office Furniture Storage (NASA Environmental Storage)	No	Scheduled for demolition	1955	Not Applicable	441	Not Applicable
343	PW Riggers Shop (Storage [Vacant])	No	Scheduled for demolition	1942	Not Applicable	1,785	Not Applicable
431	Fuel Tank	No	Scheduled for reuse	1986	Not Applicable	Not available	Not Applicable
432	Fuel Tank	No	Scheduled for reuse	1986	Not Applicable	Not available	Not Applicable
459	Recreation Storage	No	Scheduled for demolition	1950	Not Applicable	280	Not Applicable
476	Navy Exchange	No	Scheduled for demolition	1954	Not Applicable	43,374	Not Applicable
493	Covered Picnic Area	No	Scheduled for demolition	1963	Not Applicable	773	Not Applicable
503	Navy Exchange Service Station	No	Scheduled for demolition	1966	Not Applicable	7,311	Not Applicable
512A	Enlisted Mens Baracks 9BEQ [(Vacant)]	No	Scheduled for demolition	1970	Not Applicable	27,499	Not Applicable
512B	Enlisted Mens Baracks 9BEQ [(Vacant)]	No	Scheduled for demolition	1970	Not Applicable	18,627	Not Applicable
512C	Enlisted Mens Baracks 9BEQ [(Vacant)]	No	Scheduled for demolition	1970	Not Applicable	1,301	Not Applicable
525	Former Bowling Alley (Storage [NEX])	No	Scheduled for demolition	1970	Not Applicable	13,877	Not Applicable
526	EM Club Storage (Vacant)	No	Scheduled for demolition	1970	Not Applicable	640	Not Applicable
529	Exchange Central Warehouse (Office/Storage [Vacant])	No	Scheduled for demolition	1970	Not Applicable	2,640	Not Applicable
533	Public Restrooms	No	Scheduled for demolition	1971	Not Applicable	448	Not Applicable
534	Picnic/Playgrounds - BBQ Shelter	No	Scheduled for demolition	1971	Not Applicable	295	Not Applicable
543	Craft Hobby Shop (Office [NEX/USAF])	No	Scheduled for demolition	1973	Not Applicable	9,000	Not Applicable
544	Auto Hobby Shop	No	Scheduled for re use	1974	Not Applicable	11,180	Not Applicable
547B	BEQ (NAR)	No	Scheduled for demolition	1974	Not Applicable	2,610	Not Applicable
547C	BEQ (NAR)	No	Scheduled for demolition	1974	Not Applicable	19,900	Not Applicable
547D	BEQ (NAR)	No	Scheduled for demolition	1974	Not Applicable	10,212	Not Applicable
547E	BEQ (NAR)	No	Scheduled for demolition	1974	Not Applicable	19,900	Not Applicable
554	Exchange Garden Shop (NEX #2)	No	Scheduled for demolition	1975	Not Applicable	27,493	Not Applicable

Building	Name	Historic District	Remarks	Year Built	Year Demo	Total Square Feet	Building Closure Date
555	Family Housing Unit (Vacant Office)	No	Scheduled for demolition	1984	Not Applicable	5,270	Not Applicable
556	Credit Union	No	Scheduled for demolition	1979	Not Applicable	10,676	Not Applicable
572	Racquetball Courts	No	Scheduled for demolition	1963	Not Applicable	64	Not Applicable
574	Motorpool Storage (CANG)	No	Scheduled for demolition	1982	Not Applicable	1,722	Not Applicable
583A	UEPH (USAF)	No	Scheduled for demolition	1985	Not Applicable	30,900	Not Applicable
583B	Dorm (NASA)	No	Scheduled for demolition	1985	Not Applicable	30,900	Not Applicable
583C	UEPH (USAF)	No	Scheduled for demolition	1985	Not Applicable	13,140	Not Applicable
585	Vehicle Wash Platform	No	Scheduled for demolition	unknown	Not Applicable	15,840	Not Applicable
590	Power Station	No	Scheduled for re use	na	Not Applicable	317	Not Applicable
596	McDonalds	No	Scheduled for demolition	1985	Not Applicable	4,784	Not Applicable
944	Recreation Center (Condemned)	No	Scheduled for demolition	1941	Not Applicable	11,724	Not Applicable
945	Field House	No	Scheduled for demolition	1941	Not Applicable	2,676	Not Applicable
950	Storage (NASA Environmental)	No	Scheduled for re use	1954	Not Applicable	4,700	Not Applicable
951	Storage (NASA Environmental)	No	Scheduled for demolition	1959	Not Applicable	682	Not Applicable
958	Vehicle Shed	No	Scheduled for demolition	1956	Not Applicable	800	Not Applicable
964	Playing Courts	No	Scheduled for demolition	1942	Not Applicable	Not available	Not Applicable
965	Playing Courts	No	Scheduled for demolition	1942	Not Applicable	Not available	Not Applicable
966	Softball Field #2	No	Scheduled for demolition	1957	Not Applicable	Not available	Not Applicable
967	Softball Field #1	No	Scheduled for demolition	1957	Not Applicable	Not available	Not Applicable
992	CANG Warehouse	No	Scheduled for demolition	1957	Not Applicable	2,952	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
50	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
82	yes	yes	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
88	yes	yes	yes	yes	unk.	unk	no	unk.	yes	no	no	no	yes	no	unk.	no	no
104	yes	yes	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	no
107	yes	no	no	no	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
108	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
109	yes	yes	no	no	no	no	no	yes	yes	no	no	yes	no	no	yes	no	no
111	yes	yes	no	yes	no	no	no	no	no	no	no	no	no	no	yes	no	yes
113	yes	yes	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
146/146a	yes	yes	no	yes	no	yes	no	yes	yes	yes	no	no	yes	yes	yes	no	yes
148	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
149	yes	no	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	no
150	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no

Building	IRP Sites	HMS	HWS	HWAA	PCB (Removed)	PCB (In Place)	Ordance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radation	Radon Survey
151	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
152	yes	yes	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
153	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	yes
154	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	yes
155	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	yes
156	yes	yes	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
161	yes	yes	no	yes	no	no	no	no	yes	no	no	no	no	no	yes	no	no
184	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
343	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
431	yes	no	no	no	no	no	no	no	yes	yes	no	no	yes	no	yes	no	no
432	yes	no	no	no	no	no	no	no	yes	yes	no	no	no	no	yes	no	no
459	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
476	yes	no	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	no
493	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
503	yes	yes	no	yes	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	no
512A	yes	no	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	no
512B	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
512C	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
525	yes	yes	no	yes	no	yes	no	yes	no	yes	no	no	no	no	yes	no	no
526	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
529	yes	yes	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
533	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
534	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
535	yes	no	no	no	unk.	unk	no	unk.	yes	no	no	no	no	no	unk.	no	no
543	no	yes	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	no
544	yes	yes	no	yes	no	no	no	yes	yes	no	no	no	yes	yes	yes	no	no
547B	yes	yes	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
547C	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
547D	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
547E	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
554	yes	no	no	no	no	no	no	yes	yes	no	no	no	no	no	yes	no	no
555	yes	no	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
556	yes	yes	no	no	no	no	no	yes	no	no	no	no	no	no	no	no	no
572	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
574	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
583A	yes	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	no

Building	IRP Sites	HMS	HWS	HWAA	PCB (Removed)	PCB (In Place)	Ordance	Asbestos	UST (Removed)	UST (In Place)	AST (Removed)	AST (In Place)	OWS/Sump (Removed)	OWS/Sump (In Place)	Lead Paint	Radation	Radon Survey
583B	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
583C	yes	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
585	yes	no	no	no	no	no	no	no	yes	no	no	no	no	no	yes	no	no
590	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
596	yes	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	no
944	yes	no	no	yes	no	no	no	no	no	no	no	no	no	no	yes	no	no
945	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
950	yes	yes	no	yes	no	no	no	no	no	no	no	no	no	no	yes	no	no
951	yes	no	no	no	no	no	no	no	yes	no	no	no	no	no	yes	no	no
958	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
964	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
965	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
966	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
967	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
992	yes	yes	no	yes	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
50	storage	Radio Station Facility (Condemned)	demo	IRP, asbestos, LBP
82	storage	Athletic Storage (NASA Exchange)	demo	IRP, asbestos, LBP
88	demolished	Navy Exchange Dry Cleaning Plant (former)	Not applicable	IRP, HMS, HWAA, UST, OWS
104	Utility	Electric Substation	Utility	IRP, asbestos, LBP, HMS
107	office	ROICC Administration Office	demo	IRP, asbestos, LBP
108	recreation	Swimming pool	demo	IRP, LBP
109	recreation	Pool Dressing Room	demo	IRP, asbestos, UST, LBP, HMS
111	storage	Office/Maintenance (Vacant)	demo	IRP, LBP, HMS, HWAA
113	storage	Storage (NEX)	demo	IRP, HMS, HWAA, asbestos, UST, OWS, LBP
146/146a	storage	Transportation Garage (CANG)	demo	IRP, HMS, HWAA, asbestos, LBP, Sump
148	office	Enlisted Mens Barracks (Vacant)	demo	IRP, asbestos, LBP
149	office	Enlisted Mens Barracks (Vacant)	demo	IRP, asbestos, UST, LBP
150	office	Enlisted Mens Barracks (Vacant)	demo	IRP, asbestos, LBP
151	office	Enlisted Mens Barracks (Vacant)	demo	IRP, asbestos, LBP
152	retail	Enlisted Mens Diner (Training/Office [Army Reserve])	Army Reserve	IRP, asbestos, LBP, HMS, HWAA

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
153	office	Enlisted Mens Barracks	Army Reserve	IRP, asbestos, LBP
154	office	Enlisted Mens Barracks	Army Reserve	IRP, asbestos, LBP
155	office	Enlisted Mens Barracks	Army Reserve	IRP, asbestos, LBP
156	office	Enlisted Mens Barracks	Army Reserve	IRP, asbestos, LBP, HMS, HWAA
161	Gas Station (NASA)	Gas Station (DESC)	Gas Station	IRP, LBP, HMS, HWAA
184	demo	Office Furniture Storage (NASA Environmental Storage)	demo	IRP, LBP
343	storage	PW Riggers Shop (Storage [Vacant])	demo	IRP, asbestos, LBP
431	Fuel Tank	Fuel Tank (70)	Fuel Tank	IRP, LBP, UST
432	Fuel Tank	Fuel Tank (71)	Fuel Tank	IRP, UST, LBP
459	storage	Recreation Storage	demo	IRP, LBP
476	retail/storage	Navy Exchange	demo	IRP, UST, LBP
493	recreation	Covered Picnic Area	demo	IRP, LBP
503	retail	Navy Exchange Service Station	demo	IRP, HMS, HWAA, PCBs, asbestos, UST, OWS, LBP
512A	office	Enlisted Mens Baracks 9BEQ [(Vacant)]	demo	IRP, asbestos, LBP
512B	office	Enlisted Mens Baracks 9BEQ [(Vacant)]	demo	IRP, asbestos, LBP
512C	office	Enlisted Mens Baracks 9BEQ [(Vacant)]	demo	IRP, asbestos, LBP
525	storage	Former Bowling Alley (Storage [NEX])	demo	IRP, HMS, HWAA, asbestos, LBP
526	demo	EM Club Storage (Vacant)	demo	IRP, LBP
529	demo	Exchange Central Warehouse (Office/Storage [Vacant])	demo	IRP, HMS, HWAA, asbestos, LBP
533	recreation	Public Restrooms	demo	IRP, asbestos, LBP
534	recreation	Picnic/Playgrounds - BBQ Shelter	demo	IRP, LBP
543	office/flex	Craft Hobby Shop (Office [NEX/USAF])	demo	HMS, HWAA, asbestos, LBP
544	retail	Auto Hobby Shop	demo	IRP, asbestos, UST, OWS, LBP, HMS, HWAA, Sump
547B	office	BEQ (NAR)	demo	IRP, HMS, asbestos, LBP
547C	office	BEQ (NAR)	demo	IRP, asbestos, LBP
547D	office	BEQ (NAR)	demo	IRP, asbestos, LBP
547E	office	BEQ (NAR)	demo	IRP, asbestos, LBP
554	retail	Exchange Garden Shop (NEX #2)	demo	IRP, asbestos, LBP
555	office	Family Housing Unit (Vacant Office)	demo	IRP, asbestos
556	retail	Credit Union	demo	IRP, asbestos, HMS
572	recreation	Racquetball Courts	demo	IRP, LBP
574	storage	Motorpool Storage (CANG)	demo	IRP
583A	dorm	UEPH (USAF)	demo	IRP, HWAA

Building	Current Uses	Former Uses	Preferred Alternative Development	Concern
583B	dorm	Dorm (NASA)	demo	IRP
583C	dorm support	UEPH (USAF)	demo	IRP, HMS
585	retail	Vehicle Wash Platform	demo	IRP, LBP, UST
590	utility	Power Station	utility	IRP, LBP
596	retail	McDonalds	demo	IRP, HMS, LBP
944	demo	Recreation Center (Condemned)	demo	IRP, LBP, HWAA
945	storage	Field House	demo	IRP, LBP
950	storage	Hazardous Waste 90-day Storage (NASA Environmental)	demo	IRP, LBP, HMS, HWAA
951	storage	Storage (NASA Environmental)	demo	IRP, UST, LBP
958	storage	Vehicle Shed	demo	IRP, LBP
964	recreation	Playing Courts	demo	IRP,
965	recreation	Playing Courts	demo	IRP
966	recreation	Softball Field #2	demo	IRP
967	recreation	Softball Field #1	demo	IRP
992	storage	CANG Warehouse	demo	IRP, LBP,HMS, HWAA

Notes: IRP = Installation Restoration Program, HMS = Hazardous materials storage, HWS = Hazardous waste storage, 90-day HWAA = Hazardous waste accumulation area, PCB = Polychlorinated bi-phenol, UST = underground storage tank, AST = aboveground storage tank, OWS = Oil Water Separator, NA = Not Applicable, unk = Unknown

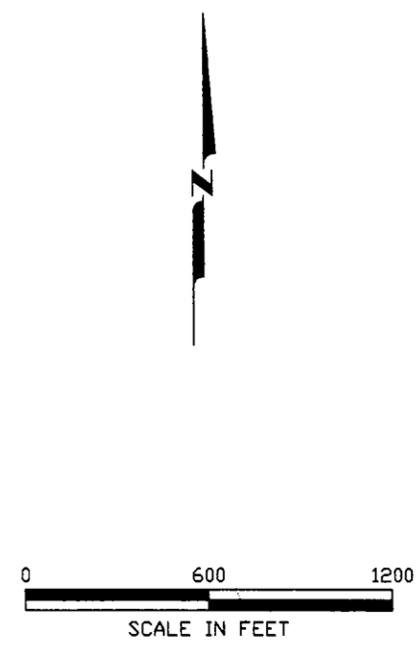
APPENDIX B

APPENDIX B

PLUME AND ALLOCATION MAPS



EXPLANATION
 ~5~ TCE CONCENTRATION CONTOUR (ug/L)



SOURCE: NASA AMES RESEARCH CENTER, 5/00



Harding Lawson Associates
 Engineering and
 Environmental Services

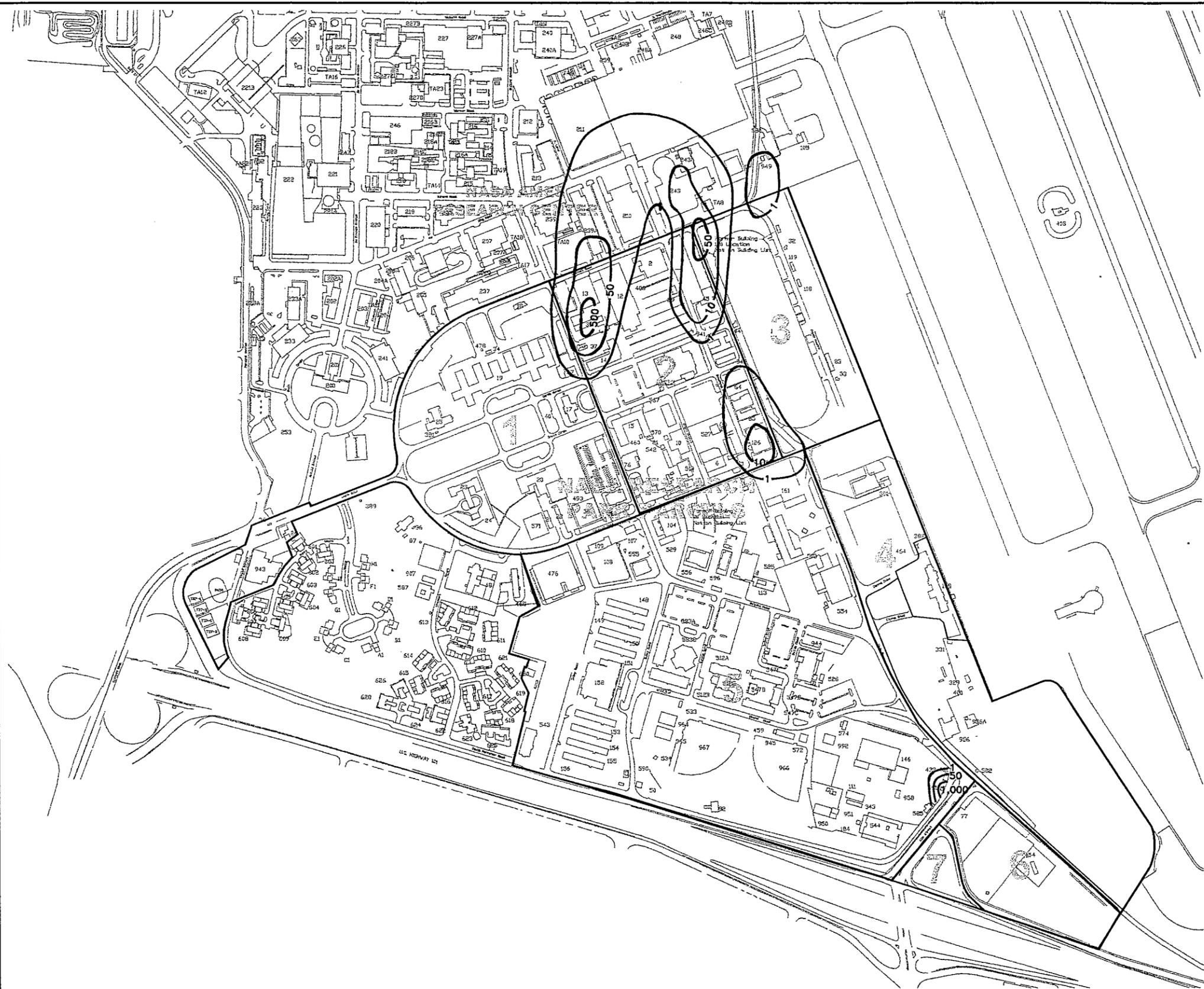
**Isoconcentration Map -
 Trichloroethene
 Environmental Baseline Survey
 NASA Research Park Parcels
 Moffett Field, California**

PLATE

B1

DRAWN TJH	JOB NUMBER 50487 3.1	APPROVED	DATE 9/00	REVISED DATE
--------------	-------------------------	----------	--------------	--------------

50487008.DWG 100.0
20001016.1654



EXPLANATION
 1 — BENZENE CONCENTRATION
 CONTOUR (ug/l)

0 600 1200
 SCALE IN FEET

SOURCE: NASA AMES RESEARCH CENTER, 6/00



Harding Lawson Associates
 Engineering and
 Environmental Services

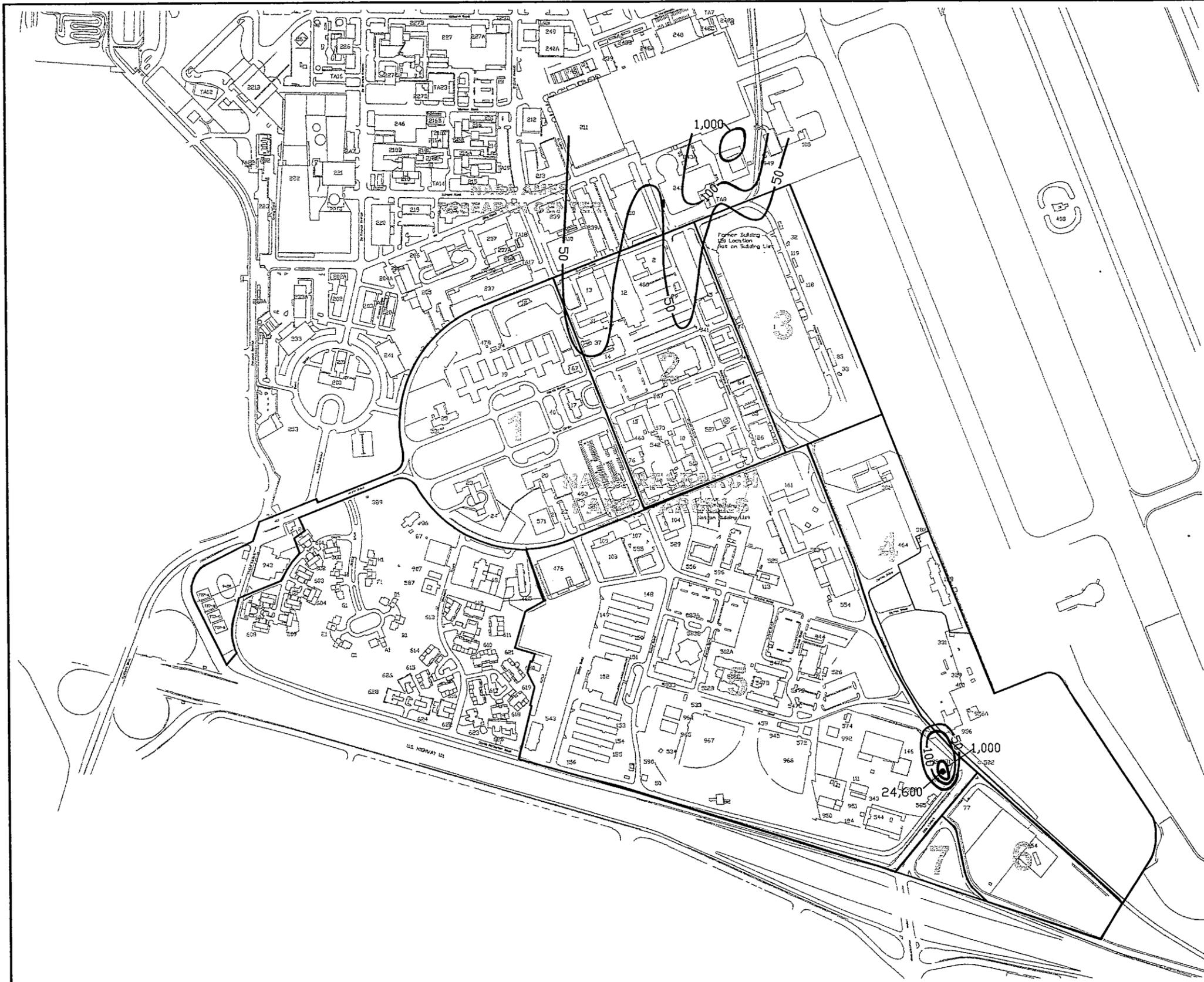
DRAWN: TJH
 JOB NUMBER: 50487 3.1

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

APPROVED: [Signature]
 DATE: 9/00

PLATE
B2
 REVISED DATE

50487009.DWG 100.0
 20000926.2107



EXPLANATION
 1 — TPHg CONCENTRATION
 CONTOUR (ug/l)



0 600 1200
 SCALE IN FEET

SOURCE: NASA AMES RESEARCH CENTER, 6/00



Harding Lawson Associates
 Engineering and
 Environmental Services

DRAWN TJH
 JOB NUMBER 50487 3.1

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

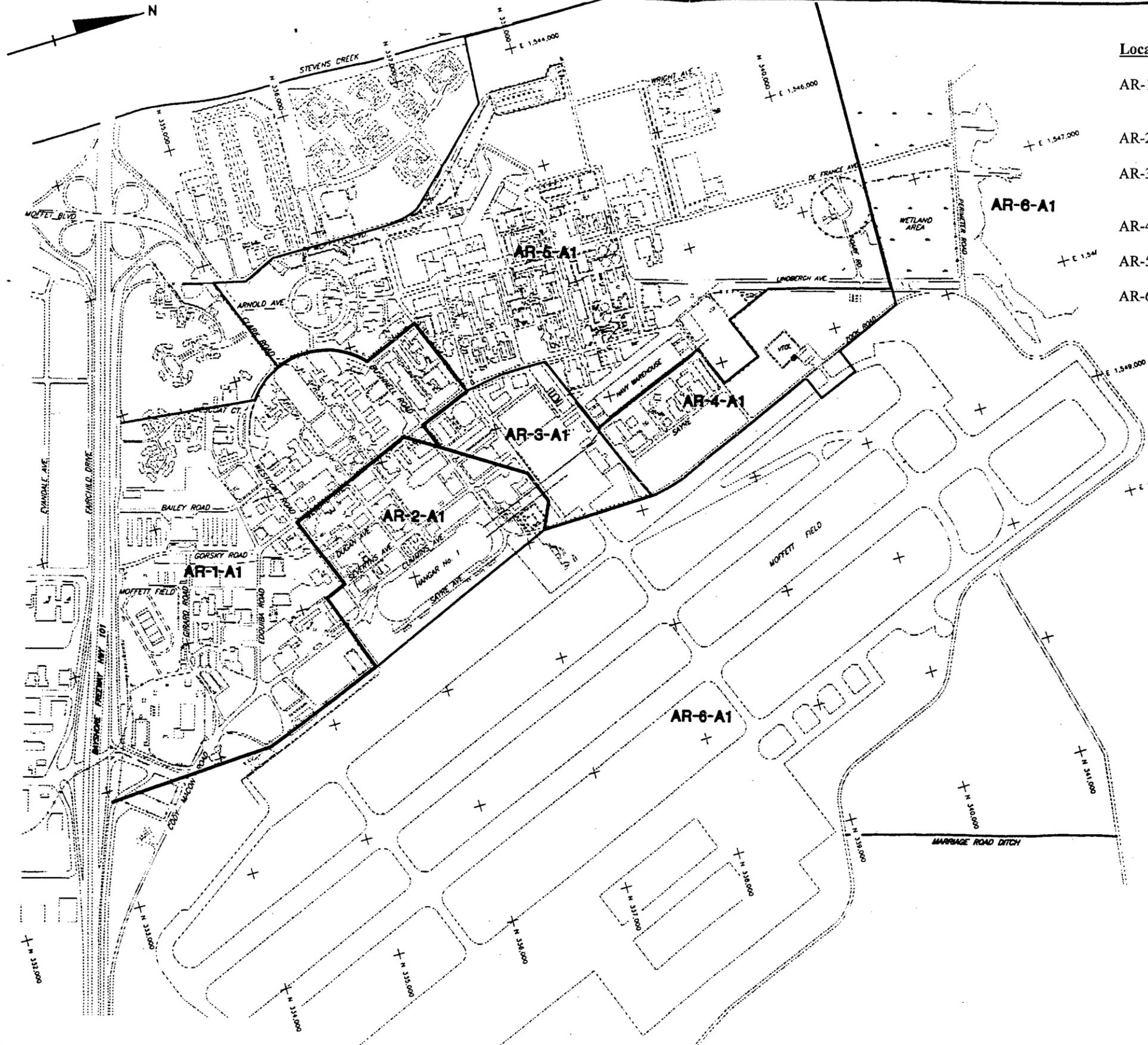
APPROVED
 DATE 9/00

PLATE
B3

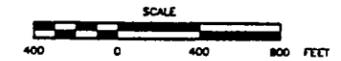
REVISED DATE

50487010.DWG 100.0
 20000926.2122

DRAWING NUMBER 92-023-E504



Location	Responsible Party/Contamination Type
AR-1	MEW/chlorinated solvents in groundwater NAVY/TPH in groundwater
AR-2	NAVY/all soil and groundwater
AR-3	MEW/chlorinated solvents in soil and groundwater NASA/TPH in groundwater
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	ENV	JEB
			DWN BY	CKD BY	APP'D BY

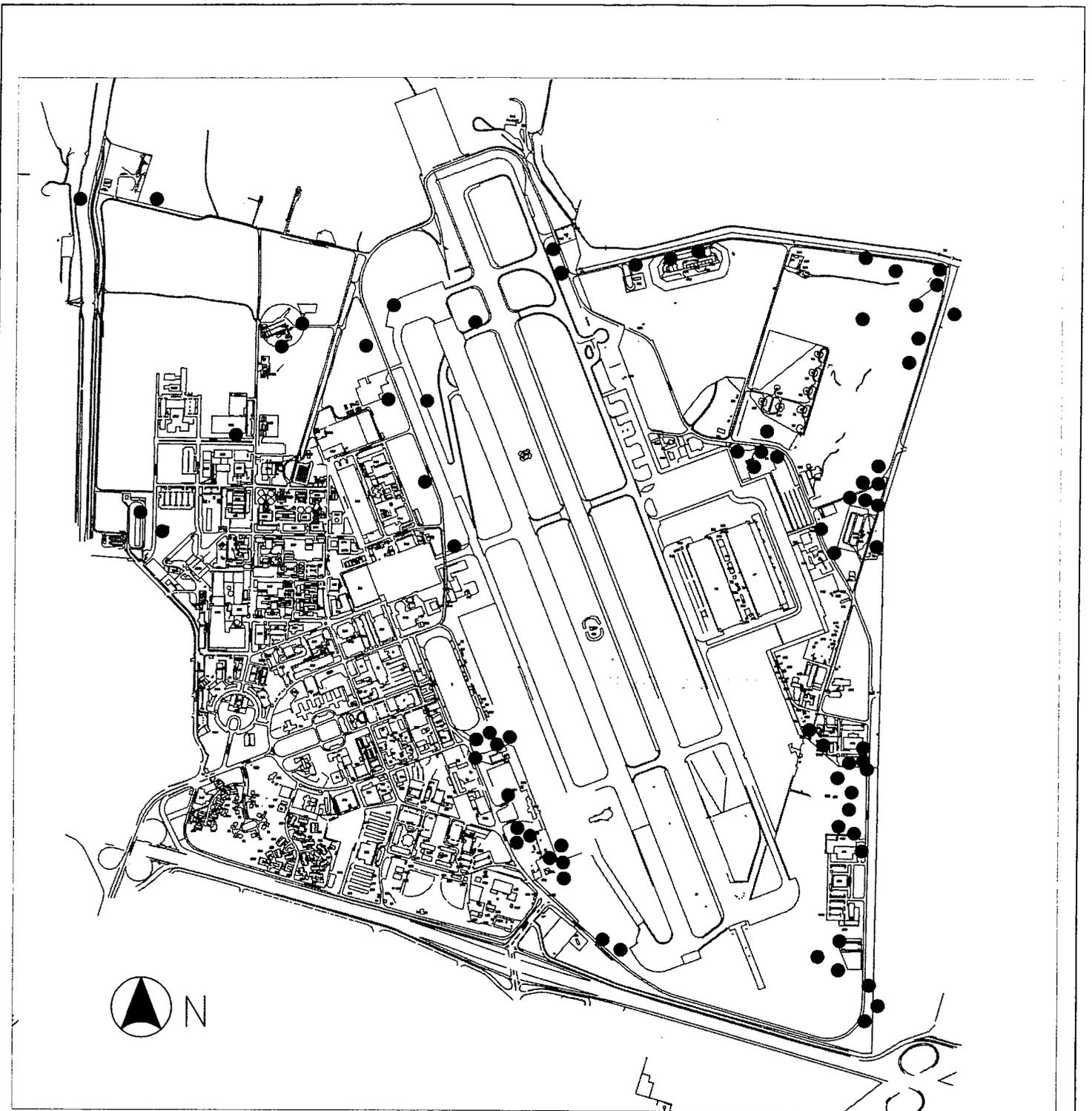
From Allocation and Settlement Agreement

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

17

APPENDIX D

APPENDIX D

ARCHEOLOGICAL SENSITIVE AREAS

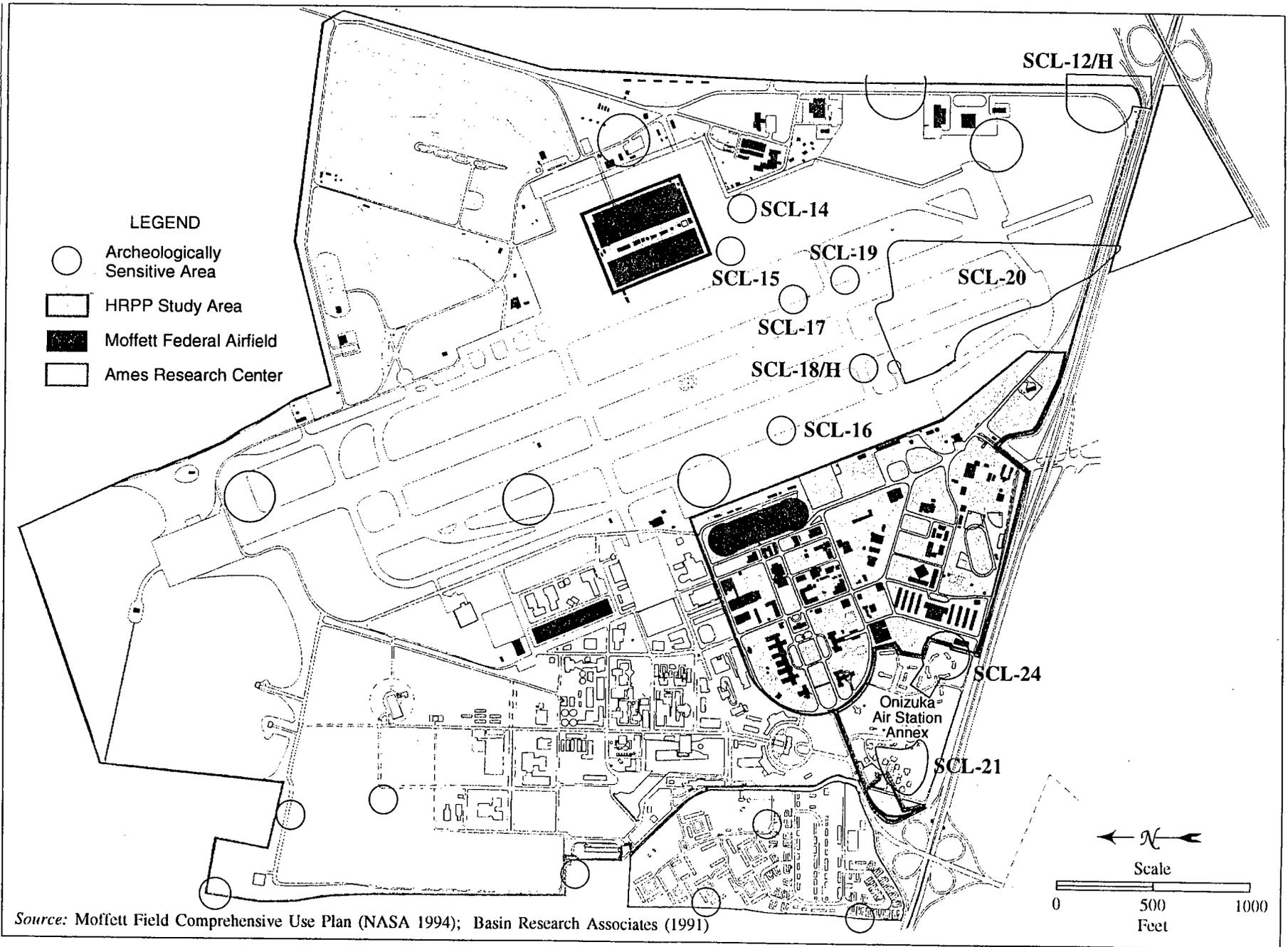


Figure 4-1. Archeological Sensitivity Areas on NASA Ames Research Center, Moffett Field

DISTRIBUTION

Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield
Moffett Field, California

December 28, 2000

Copy No. 14

Copies 1-2: Sandy Olliges
NASA Ames Research Center
MS 218-1
Moffett Field, California 94035-1000

Copy 3: Thomas H Anderson
NASA/Ames Research Center
MS 19-21
Moffett Field, California 94035-1000

Copy 4: Joann Cola
SFD-7-4
US Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Copy 5: Roberta Blank- Superfund Division
SFD-8-2
US Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Copy 6: Joseph Chou
California Regional Water Quality Control Board
1515 Clay Street
Oakland, California 94612

DISTRIBUTION

Environmental Baseline Survey
NASA Research Park Parcel 5
Moffett Federal Airfield
Moffett Field, California

December 28, 2000

Copy 7: Andrea Maclormare
 BRAC – Environmental Coordinator
 BRAC Operations, Code 06CM.MP
 1230 Columbia Street
 Suite 1100
 San Diego, California 92101

Copy 8: Jim Boarer
 Locus Technologies
 299 Fairchild Drive
 Mountain View, California 94043

Copies 9-11: HLA Files

Copy 12: Corporate Copy

Quality Control Reviewer



James C. Davies
Consulting Principal

GAL/JP;klb/KB56338AA.doc.OFS