Comprehensive Long-Term Environmental Action Navy (CLEAN) II
Contract No. N62742-94-D-0048
Contract Task Order No. 0104

Final
Environmental Baseline Survey
Former Marine Corps Air Station
El Toro, California

Prepared for

Department of the Navy
Commander, Southwest Division
Naval Facilities Engineering Command
San Diego, California 92132-5190

Prepared by

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September 2003

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EXECUTIVE SUMMARY

Background

This environmental baseline survey (EBS) for former Marine Corps Air Station (MCAS) El Toro, California, has been prepared for the Department of the Navy (DON), Southwest Division, Naval Facilities Engineering Command (SWDIV), as authorized by the Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM), under the Comprehensive Long-Term Environmental Action Navy (CLEAN II) Program, Contract Number N62742-94-D-0048, Contract Task Order (CTO) 104.

The EBS has been prepared to document the environmental condition of property at former MCAS El Toro and adjacent property resulting from the storage, release, treatment, and disposal of hazardous substances and petroleum products and their derivatives over the station's history. The EBS will establish a baseline for use by the DON in making decisions concerning property transactions. The intended reuse of Former MCAS El Toro is primarily recreational (Great Park) with some educational and commercial/light industrial development. Future use of the installation for aviation-related purposes is not anticipated. The preparation of an EBS is required by Department of Defense (DoD) policy before any property can be sold, leased, transferred, or acquired. The EBS can be used by the DON to assist in determining what remedial-type obligations, if any, the DON would retain under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S. Code (U.S.C.), Section 120(h) subsequent to transfer of the property. DON will utilize the EBS to determine, e.g., whether a given parcel can be or has been properly identified as "uncontaminated" in accordance with 42 U.S.C. Section 120(h)(4), or whether the Government can issue a covenant that all necessary remedial action has been taken with respect to a given parcel in accordance with 42 U.S.C. Section 120(h)(3). Guidance is also provided in the 1997 Base Reuse and Implementation Manual (BRIM) Sections F23 to F26 and F29 to F37.

The Community Environmental Response Facilitation Act (CERFA) amends Section 120(h) of CERCLA, and was enacted to facilitate the rapid return of uncontaminated properties to local communities during the Base Realignment and Closure (BRAC) process. CERFA provides a mechanism for identifying and documenting uncontaminated real property, or parcels thereof, that are suitable for transfer and reuse. Uncontaminated property refers to real property on which no hazardous substances and no petroleum products or their derivatives are known to have been released or disposed, including no migration of these substances from adjacent areas. In order to identify uncontaminated properties on military installations undergoing closure or realignment, an EBS is conducted and the results are documented in a report. DON received regulator concurrence on uncontaminated property identified and documented in the 1995 EBS and the Final Community Environmental Response Facilitation Act Report dated April 1, 1995, as required and defined under CERCLA 120(h)(4) (SWDIV 1995). The property now considered Parcel IV in its entirety was found to be uncontaminated in 1995, as well as other portions of Parcels I, II, III and V. This EBS incorporates the CERFA findings from the 1995 EBS and Final CERFA Report.

The findings of this EBS are based on existing environmental information related to past and present release or disposal of hazardous substances and petroleum products on the station. Furthermore, this EBS addresses cleanup-related comments received on the Draft Final and Final Environmental Impact Statement (EIS) for Disposal and Reuse of MCAS El Toro. These comments related to the cleanup program were responded to in the Final EIS (March 2002, Vol. 2), and were forwarded to the Base Environmental Coordinator (BEC) for coordination. Comments that are further addressed by this EBS include L12-13, L12-18, L12-21, L12-23, O1-8, O7-1, O7-2, O7-4, O11-10, O11-130, O11-283, O11-292, C2-2, C25-1, C41-2, C58-16 through -20, C58-24, C104-4, C105-5, C110-8, T2-2, T7-7, and T46-5 (see Appendix D).

This EBS is being prepared as an update to the April 1995 EBS prepared for former MCAS El Toro in support of upcoming property transfer actions. The report updates the status of environmental factors and locations of concern (LOCs) identified in the 1995 EBS and presents information regarding new potential release locations (PRLs) identified since the 1995 EBS was submitted. Additionally, all buildings situated on former MCAS El Toro were visually inspected as part of this EBS, since the station was operational and could not facilitate the visual inspection of buildings and associated operations during the 1995 EBS. The findings of this EBS have been used to determine the Environmental Condition of Property (ECP) and assign Area Type categories to property to determine whether it is suitable for transfer. This report is intended to serve as a reference document for the DON to determine the existing and future environmental suitability of the property for transfer.

This EBS is based on existing environmental information related to the past and present storage, release, treatment, or disposal of hazardous substances or petroleum products on the installation. This EBS includes new information and data from studies, surveys, and investigations conducted since the publication of the 1995 EBS. Information contained within the 1995 EBS was verified, expanded, and/or updated, as necessary, within this document. The information presented in this EBS is complete and accurate as of March 2003. However, as investigation and remediation efforts under the Installation Restoration Program (IRP) and other environmental programs continue, the status of facilities and sites at former MCAS El Toro can be expected to change.

Boundaries of the Survey Area

Former MCAS El Toro is situated in south-central Orange County, California. The majority of the station is within an unincorporated area of Orange County; however, property within the south portion of the station is within the city of Irvine. The station, which currently comprises approximately 3,717 acres, is bordered on the east and southeast by the city of Lake Forest, to the southeast, south, and southwest by the city of Irvine, and to the west, north, and northeast by unincorporated portions of Orange County. Approximately 1,000 acres of the former station's maximum acreage (4,710 acres) have been transferred or are pending transfer and are not addressed within this EBS. In 1998, the Bake Parkway/Interstate 5 public highway expansion project resulted in the transfer of approximately 23 acres of property at the southeast corner of the station to the California Department of Transportation (Caltrans). In 2001, 896.7 acres of property in the northeast portion of the station were transferred to the Federal Aviation Administration (FAA). As these properties are no longer Navy property, they are not included within the survey area addressed by this EBS. In addition, 73.7 acres in the northeast portion of the station are pending transfer to the Federal Bureau of Investigation (FBI). All necessary environmental and property transfer documentation for the FBI transfer has been completed. This acreage is not included within the total station acreage and is not included within the study area addressed by this EBS. Based upon property transfers that have occurred and are pending, the amount of property addressed within this EBS is 3,717 acres.

Content of the Environmental Baseline Survey Report

This EBS is based on information obtained from the 1995 EBS and through a records search, interviews, and visual site inspections (VSIs) conducted in April-May 2002. The records search included a review of available Navy and other agency records within the station files, including environmental restoration and compliance reports, audits, surveys, and inspection reports; an analysis of aerial photographs; and a review of recorded chain-of-title documents for the property. Interviews with caretaker employees and visual and physical inspections of the station property and facilities were also conducted. Former employees were interviewed in support of previous

investigations; information from those reports has been incorporated into this EBS update, as appropriate.

A recorded chain-of-title search was conducted for the 1995 EBS for on-base parcels to determine prior ownership or uses that could reasonably have contributed to an environmental concern. The title search reviewed DoD acquisition of on-station parcels covering a period of at least 60 years (i.e., 1934 to 1994). Prior to government acquisition of the property, the area was primarily used for agricultural purposes. A review of the data obtained from the title search did not identify any areas of environmental concern related to property use prior to government acquisition.

This EBS also includes an assessment of the environmental condition of off-station properties immediately adjacent (contiguous) to or relatively near the station that could pose environmental concern and/or affect the subject property. Visual inspections of adjacent off-station properties were conducted from station property or public roads. Environmental databases maintained by federal and state agencies were also searched to identify sites of concern on adjacent properties.

Based on an analysis of the available data, LOCs were assigned ECP Area Type categories. Depending on the Area Types of the LOCs, property within former MCAS El Toro was classified into one of seven ECP Area Type categories:

- *ECP Area Type 1* - Areas where no release or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).
- *ECP Area Type 2* - Areas where only release or disposal of petroleum products has occurred.
- *ECP Area Type 3* - Areas where release, disposal, and/or migration of hazardous substances have occurred, but at concentrations that do not require a removal or remedial action.
- *ECP Area Type 4* - Areas where release, disposal, and/or migration of hazardous substances have occurred, and all remedial actions necessary to protect human health and the environment have been taken.
- *ECP Area Type 5* - Areas where release, disposal, and/or migration of hazardous substances have occurred, removal and/or remedial actions are under way, but all required remedial actions have not yet been taken.
- *ECP Area Type 6* - Areas where release, disposal, and/or migration of hazardous substances have occurred, but required response actions have not yet been implemented.
- *ECP Area Type 7* - Areas that are unevaluated or require additional evaluation.

Category 2 addresses release or disposal of petroleum products only. A release of petroleum products would not prohibit the affected property's transfer under CERCLA Section 120(h). ECP Area Type 2 property has been divided into five subcategories in order to further define petroleum product releases. Area Types 2a through 2e correspond to Area Types 3 through 7, except the Area Type 2 definitions refer to petroleum products rather than hazardous substances. All Area Type 2 property is suitable for transfer regardless of subcategories. Category 2 definitions are as follows:

- *ECP Area Type 2a* - Facilities where release, disposal, and/or migration of petroleum products have occurred, but at concentrations that do not require a response action.
- *ECP Area Type 2b* - Facilities where release, disposal, and/or migration of petroleum products have occurred, and all response actions to protect human health and the environment have been taken.

- *ECP Area Type 2c* - Facilities where release, disposal, and/or migration of petroleum products have occurred, and response actions are underway, but all required response actions have not been completed.
- *ECP Area Type 2d* - Facilities where release, disposal, and/or migration of petroleum products have occurred, but required response actions have not yet been implemented.
- *ECP Area Type 2e* - Facilities that have never been evaluated or require additional investigation. Category 2e facilities include areas that may have had a release of petroleum products, but have had no sampling or field screening and require such investigations to confirm that a release has or has not occurred.

Areas where no past or present release or disposal of hazardous substances or petroleum products and their derivatives were identified are considered to be Category 1. Category 2 designations were assigned based on evidence of releases of petroleum products. Category 3 designations were based upon existing information (e.g., personnel interviews, VSIs, written records, reports) to document that contaminant levels, if present, are below action levels. Areas where known or suspected contamination has occurred were classified as Category 4 through 7 properties based upon existing documentation or VSIs.

Pursuant to U.S. Environmental Protection Agency (EPA) and DoD guidance, this EBS identifies property as uncontaminated, even if some limited quantity of hazardous substances or petroleum products were released or disposed in cases where the available information indicates that such release or disposal poses no threat to human health or the environment. Examples, as provided in the EPA guidance include usage of common household chemicals and storage of heating fuel in base housing areas, incidental releases of petroleum products on roadways and parking lots, and the routine licensed application of pesticides.

Property designated as Area Types 1 through 4 is suitable for property transfer. In general, a parcel that contains land that is deemed "unsuitable for transfer" (i.e., Area Types 5 and 6) may still be eligible for early transfer or lease (would require deferral of CERCLA covenant), provided that the intended future use is protective of human health and the environment, and with specified recommended restrictions on use of the property to protect human health and the environment or the environmental restoration process. Area Type 7 sites require further evaluation prior to determining suitability to transfer. Area types for property presented in this EBS may have changed since the designation in the 1995 EBS based upon the identification of new LOCs or based upon ongoing or completed response actions that have occurred since the 1995 EBS was published. All sites with hazardous substance or potential hazardous substance releases, disposal, and/or migration should be considered Area Types 5 through 7 until concurrence with a no further action finding is received.

Findings of the Environmental Baseline Survey Report

The following types of LOCs (with the exception of PRLs which are not considered LOCs) have been identified and have been assigned an ECP Area Type in order to determine the overall property categorization and suitability to transfer at former MCAS El Toro. The number of LOCs requiring no further action and the number of LOCs requiring further evaluation, implementation of response actions, or completion of ongoing response action are presented below:

- A total of 76 new PRLs were identified as a result of this 2003 EBS. Of these 76 sites, 15 sites require no further action and 61 sites require further evaluation for potential releases of waste to the environment. The one remaining site (the Airfield Operations Area/Runways) has been identified with a discrete "carve-out" area requiring further evaluation and the remaining portions of this site require no further action.

- A total of 92 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites are addressed within this EBS. Of these 92 RFA sites, 76 sites require no further action and 16 sites require further evaluation, implementation of response actions, or completion of ongoing response actions.
- A total of 64 temporary accumulation area (TAA) sites are addressed within this EBS. Of these 64 TAA sites, 19 of the sites require no further action and 45 sites require further evaluation, implementation of response actions, or completion of ongoing response actions.
- A total of 123 aerial photograph features/anomalies (APHO) sites are addressed within this EBS. Of these 123 APHO sites, 90 of the sites require no further action and 33 sites require further evaluation, implementation of response actions, or completion of ongoing response actions.
- A total of 21 IRP sites are addressed within this EBS. Of these 21 sites, 13 sites require no further action and 7 sites require implementation and completion of response actions. The remaining one site, IRP 24 requires no further action for the vadose zone portion and further action for the shallow groundwater unit.
- A total of 39 aboveground storage tank (AST) sites are addressed within this EBS. Of these 39 AST sites, 36 are suitable for transfer and 3 sites require further evaluation for releases of petroleum products and/or hazardous substances.
- A total of 401 underground storage tank (UST) sites are addressed within this EBS. Of these 401 UST sites, 356 are suitable for transfer and 45 sites require further evaluation or completion of response actions for releases of petroleum products or hazardous substances.
- A total of 55 oil/water separator (OWS) sites are addressed within this EBS. Of these 55 OWS sites, 44 of the sites require no further action and 11 sites require further evaluation for releases of hazardous substances or completion of ongoing response actions.
- A total of 29 wash rack sites are addressed within this EBS. Of these 29 wash rack sites, 26 sites require no further action and 3 sites require further evaluation, implementation of response actions, or completion of ongoing response actions
- Eight silver recovery units (SRU) sites are addressed within this EBS. These eight sites are considered PRLs; of these eight sites, one requires no further action and seven require further evaluation to determine whether releases of hazardous substances have occurred.
- A total of 130 polychlorinated biphenyl (PCB) transformer locations are addressed within this EBS. These 130 transformer locations require no further action. In addition, six areas have been identified as PCB transformer/equipment storage areas or areas where PCBs have been detected. Of these six areas, two areas require no further action and four require further actions.
- A total of 18 miscellaneous LOCs are addressed within this EBS. Of these 18 miscellaneous LOCs, 12 require no further action and 6 require further evaluation for releases of hazardous substances or petroleum products.

Table ES-1 summarizes the types, number, and status of LOCs identified at former MCAS El Toro.

Based on the findings of this EBS, it has been determined that approximately 78 percent of the 3,717 acres of base property is environmentally suitable for transfer at this time. Figure ES-2 depicts the transferable and non-transferable property within former MCAS El Toro. Ongoing and future environmental investigations and response actions will cause the amount of property suitable for transfer to increase in the future.

Table ES-1: Location of Concern Status Table[a]

STATUS	USTs	ASTs	OWSs	APHOs	SWMU (93)/ TAAs (64)	Other MSC	PCB XFRMRs	IRP SITES	PRLs
TOTAL (1,022)	404	39	56	124	157	18	124	24	76
NFA (787)	356	36	45	90	96[b]	12	124	13	15
% Complete (78)	88	92	79	73	61	67	100	54	20
In Review (36)	13	2	2	0	17	2	0	0	0
In Progress (199)	35	1	9	34	44	4	0	11	61

Notes: [a] The total number of LOCs listed include the following number of LOCs within parcels that have already been transferred: USTs -3; OWS-1; APHO-1; SWMU-1; IRP Sites -3. Therefore, the total number of LOCs addressed in this EBS is lower. SRUs are listed under MSC (3) and PRLs (8), and are counted in both categories due to PRLs addressing the entire facility.

[b] Includes 3 SWMUs (104, 105, & 106) with NFA determinations pending results of radiological survey.

APHO = aerial photograph features/anomalies
AST = aboveground storage tank
IRP = Installation Restoration Program
MSC = miscellaneous
NFA = no further action
OWS = oil/water separator
PCB = polychlorinated biphenyl
PRL = Potential Release Location
SWMU = solid waste management unit
TAA = temporary accumulation area
UST = underground storage tank
XFRMR = transformer

Source: United States Marine Corps (USMC) 2003.

LEGEND

- Property Boundary
- Navy Sale Parcel Boundary
- II Navy Sale Parcel Number
- Roads
- Buildings
- Transferable Property - (Category 1-4) - 78 percent
- Non-Transferable Property - (Category 5-7) - 22 percent

SOURCE

Earth Tech 2002

Southwest Division Naval Facilities Engineering Command 2003

Jacobs Engineering Group (JEG) 1995b

N

3000 0 3000 Feet

Figure ES-1
ECP Categories 1-4
and ECP Categories 5-7
Environmental Baseline Survey
Former MCAS El Toro
California

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
AOC	area of concern
APHO	aerial photograph features/anomalies
AQMD	Air Quality Management District
ARB	Air Resources Board
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AVGAS	aviation gasoline
BCP	BRAC Cleanup Plan
BCT	BRAC Cleanup Team
BEC	Base Environmental Coordinator
bgs	below ground surface
BMP	best management practice
BNI	Bechtel National Inc.
BRAC	Base Realignment and Closure
BRIM	Base Reuse and Implementation Manual
CAA	Clean Air Act
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDM	CDM Federal Programs
CERFA	Community Environmental Response Facilitation Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CPSC	Consumer Product Safety Commission
CTO	Contract Task Order
CWA	Clean Water Act
CWM	chemical warfare material
°	degree
DDESB	DoD Explosive Safety Board
DDT	dichlorodiphenyltrichloroethane
DoD	Department of Defense
DOE	Department of Energy
DON	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
EBS	environmental baseline survey
ECP	Environmental Condition of Property
EIR	environmental impact report
EIS	environmental impact statement
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
F	Fahrenheit
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FFA	Federal Facility Agreement

FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FML	flexible membrane liner
FS	feasibility study
GeoSyntec	GeoSyntec Consultants
gpm	gallons per minute
HRA	Historical Radiological Assessment
HSWA	Hazardous and Solid Waste Amendments
HUD	U.S. Department of Housing and Urban Development
IAS	initial assessment study
IBIS	In-Flight Blade Inspection System
IDW	investigation-derived waste
IRP	Installation Restoration Program
IRWD	Irvine Ranch Water District
IWTP	industrial wastewater treatment plant
JEG	Jacobs Engineering Group
JMM	James M. Montgomery Engineers, Inc.
JP	jet propulsion fuel
LBP	lead-based paint
LOC	location of concern
LUST	leaking underground storage tank
'	minute
µCi	microcuries
µg/kg	micrograms per kilogram
µg/l	micrograms per liter
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
mCi	millicuries
MCL	maximum contaminant level
MGD	million gallons per day
mg/cm^2	milligrams per square centimeter
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
MILCON	military construction
MRPP	Monitoring and Reporting Program Plan
MSCR	miscellaneous refuse area
MSL	mean sea level
NAMAR	Navy Marine
National Register	National Register of Historic Places
NBC	nuclear, biological, and chemical
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRMP	Navy Radioactive Materials Permit
OCHCA	Orange County Health Care Agency
OCWD	Orange County Water District
OSHA	Occupational Safety and Health Administration
OU	operable unit
OWS	oil/water separator
PACNAVFACENGCOM	Pacific Division, Naval Facilities Engineering Command
PAH	polynuclear aromatic hydrocarbon

PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
pCi/L	picocuries per liter
P.L.	Public Law
ppm	parts per million
PRG	preliminary remediation goal
PRL	potential release location
PWC	Public Works Center
RASP	Radiological Affairs Support Program
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	remedial investigation
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SCAQMD	South Coast Air Quality Management District
SGU	shallow groundwater unit
SHPO	State Historic Preservation Officer
SRU	silver recovery unit
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division, Naval Facilities Engineering Command
SWMU	solid waste management unit
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAA	temporary accumulation area
TAFDS	Tactical Air Fuel Dispensing System
TCA	trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TRPH	total residual petroleum hydrocarbons
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USMC	U.S. Marine Corps
UST	underground storage tank
VOC	volatile organic compound
VRS	visual reconnaissance survey
VSI	visual site inspection
WWTP	wastewater treatment plant

1. INTRODUCTION

This environmental baseline survey (EBS) for former Marine Corps Air Station (MCAS) El Toro, California, has been prepared for the Department of the Navy (DON), Southwest Division, Naval Facilities Engineering Command (SWDIV), as authorized by the Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM) under the Comprehensive Long-Term Environmental Action Navy (CLEAN II) Program, Contract Number N62742-94-D-0048, Contract Task Order (CTO) 0104.

1.1 BACKGROUND

Former MCAS El Toro was closed in July 1999 in accordance with the Base Realignment and Closure (BRAC) Act. An EBS was prepared in support of the closure in April 1995 in compliance with the provisions of the Community Environmental Response Facilitation Act (CERFA) (Public Law [P.L.] 102-246). CERFA amends Section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and was enacted to facilitate the rapid return of uncontaminated properties to local communities during the BRAC process. CERFA provides a mechanism for identifying and documenting uncontaminated real property, or parcels thereof, that are suitable for transfer and reuse. Uncontaminated property refers to real property on which no hazardous substances and no petroleum products or their derivatives are known to have been released or disposed, including no migration of these substances from adjacent areas. In order to identify uncontaminated properties on military installations undergoing closure or realignment, an EBS is conducted, and the results are documented in a report. DON received regulator concurrence on uncontaminated property identified and documented in the 1995 EBS and the Final Community Environmental Response Facilitation Act Report dated April 1, 1995, as required and defined under CERCLA 120(h)(4) (SWDIV 1995a). The property now considered Parcel IV in its entirety was found to be uncontaminated in 1995, as well as other portions of Parcels I, II, III and V. This EBS incorporates the CERFA findings from the 1995 EBS and Final CERFA Report.

1.2 PURPOSE AND SCOPE

This EBS has been prepared to document the environmental condition of property at former MCAS El Toro and adjacent property resulting from the storage, release, treatment, and disposal of hazardous substances and petroleum products and their derivatives over the station's history. The EBS will establish a baseline for use by the DON in making decisions concerning property transactions. The intended reuse of Former MCAS El Toro is mixed land use consistent with the Orange County General Plan. Future use of the installation for aviation-related purposes is not anticipated. Guidance for preparation of an EBS is provided in the Base Reuse and Implementation Manual (BRIM) Sections F23 to F26 and F29 to F37 (Department of Defense [DoD] 1997). The EBS can be used by the DON to assist in determining what remedial-type obligations, if any, the DON would retain under CERCLA, 42 U.S. Code (U.S.C.), Section 120(h). The DON will potentially utilize the EBS to determine, e.g., whether a given parcel can be or has been properly identified as "uncontaminated" in accordance with 42 U.S.C. Section 120(h)(4), or whether the Government can issue a covenant that all necessary remedial action has been taken with respect to a given parcel in accordance with 42 U.S.C. Section 120(h)(3). The findings of this EBS are based upon existing environmental information related to past and present release or disposal of hazardous substances and petroleum products on the station.

The purpose of the EBS is to describe the current environmental condition of former MCAS El Toro with respect to the presence of hazardous substances and petroleum products. In support of the upcoming property transfer, this EBS report updates the status of environmental factors and locations of concern (LOCs) that had been identified in the 1995 EBS, and presents information regarding new

potential release locations (PRLs) identified since the 1995 EBS was submitted. Additionally, all buildings situated on former MCAS El Toro were visually inspected since the station was operational and could not facilitate the assessment of buildings and associated operations in 1995. The findings of this EBS have been used to assess the Environmental Condition of Property (ECP), and assign Area Type categories to property to evaluate whether it is suitable for transfer.

The 1995 EBS has been used as the baseline for information contained within this EBS. A records search, visual site inspections (VSIs), interviews, and additional research of historical data sources have been conducted in support of this EBS in order to update the status of the sites identified in the 1995 EBS, and to identify new LOCs not previously identified in other environmental investigations and studies.

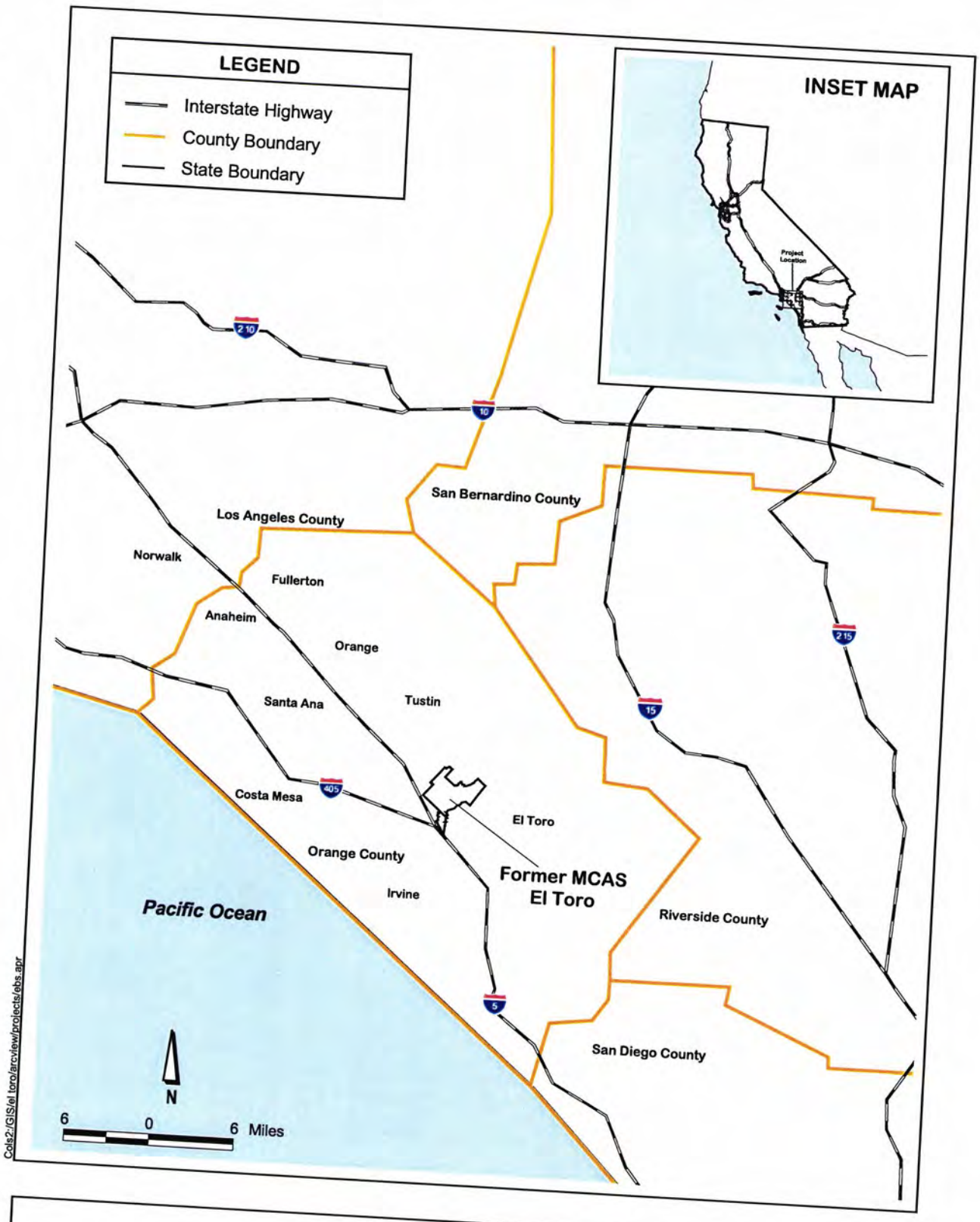
Based on the research performed, the findings of the EBS are an accurate description of the known conditions of the property at Former MCAS El Toro as of August 2003. In accordance with DoD policy, if any new information or evidence is identified that indicates a site is of potential environmental concern, the DON would evaluate such information and, if required under 42 U.S.C. Section 120(h), would perform remedial-type action as appropriate. Furthermore, this EBS addresses cleanup-related comments received on the Draft Final and Final environmental impact statement (EIS) for Disposal and Reuse of MCAS El Toro. These comments related to the cleanup program were responded to in the Final EIS (March 2002, Vol. 2), and were forwarded to the Base Environmental Coordinator (BEC) for coordination. Comments that are further addressed by this EBS include L12-13, L12-18, L12-21, L12-23, O1-8, O7-1, O7-2, O7-4, O11-10, O11-130, O11-283, O11-292, C2-2, C25-1, C41-2, C58-16 through -20, C58-24, C104-4, C105-5, C110-8, T2-2, T7-7, and T46-5 (see Appendix D).

1.3 Boundaries of the Survey Area

Former MCAS El Toro is situated in south-central Orange County, California (Figure 1-1). The majority of the station is within an unincorporated area of Orange County; however, property within the south portion of the station is within the city of Irvine. The station is bordered on the east and southeast by the city of Lake Forest; to the southeast, south, and southwest by the city of Irvine; and to the west, north, and northeast by unincorporated portions of Orange County.

At its maximum acreage, the station comprised approximately 4,710 acres of property. However, approximately 1,000 acres of property have been transferred or are pending transfer and are not addressed within this EBS. In 1998, the Bake Parkway/Interstate 5 public highway expansion project resulted in the transfer of approximately 23 acres in the southeast portion of the station to the California Department of Transportation (Caltrans). In 2001, 896.7 acres of property in the northeast portion of the station were transferred to the Federal Aviation Administration (FAA). As these properties are no longer owned by the DON, they are not included within the survey area addressed by this EBS. In addition, the survey excludes 73.7 acres in the northeast portion of the station that are pending transfer to the Federal Bureau of Investigation (FBI). All necessary environmental and property transfer documentation for the 73.7-acre site has been completed. Therefore, although these 73.7 acres are still included within the total station acreage owned by the DON, this property is not included within the study area addressed by this EBS. Due to property transfers that have occurred since station closure and the property transfer that is pending, the amount of property addressed within this EBS is 3,717 acres.

Various facilities and areas within former MCAS El Toro, totaling approximately 965 acres, are leased. Facilities and areas used by the lessees within the station include the golf course and associated buildings, horse stables, recreational vehicle storage area, indoor training pool, and the



VICINITY MAP
ENVIRONMENTAL BASELINE SURVEY
FORMER MCAS EL TORO
CALIFORNIA

Figure 1-1

fire station. Approximately 580 acres of station property are currently designated for agricultural outleases. Agricultural outlease lands are situated at the northwest and southeast corners of the station, and are used for plant nurseries and crop production. A station map of former MCAS El Toro is provided in Figure 1-2.

The exact location of former MCAS El Toro is 33 degrees (°) 38 minutes (') to 33° 41' north latitude, 117° 41' to 117° 45' west longitude, Township 6 South, Range 6 West (T6S/R6W) (Sections 2-5, 7-11, 16-17, 20-21) and T5S/R8W (Sections 32-33, 35). Former MCAS El Toro is currently owned by the United States, under control of the DON and the U.S. Marine Corps (USMC).

1.4 STATUS OF ENVIRONMENTAL RESTORATION PROGRAM

A total of 1,028 environmental LOCs have been identified at former MCAS El Toro. An LOC is defined as any identified location or area that is potentially contaminated or is a potential source of contamination (USMC 2003). However, PRLs identified during this EBS are not considered LOCs pending further evaluation but are presented here. Table 1-1 summarizes the types, number, and status of LOCs identified at former MCAS El Toro.

Table 1-1: Location of Concern Status Table[a]

STATUS	USTs	ASTs	OWSs	APHOs	SWMU (93)/ TAAs (64)	Other MSC	PCB XFRMRs	IRP SITES	PRLs
TOTAL (1,022)	404	39	56	124	157	18	124	24	76
NFA (787)	356	36	45	90	96[b]	12	124	13	15
% Complete (78)	88	92	79	73	61	67	100	54	20
In Review (36)	13	2	2	0	17	2	0	0	0
In Progress (199)	35	1	9	34	44	4	0	11	61

Notes: [a] The total number of LOCs listed include the following number of LOCs within parcels that have already been transferred: USTs -3; OWS-1; APHO-1; SWMU-1; IRP Sites -3. Therefore, the total number of LOCs addressed in this EBS is lower. SRUs are listed under MSC (3) and PRLs (8), and are counted in both categories due to PRLs addressing the entire facility.

[b] Includes 3 SWMUs (104, 105, & 106) with NFA determinations pending results of radiological survey.

APHO = aerial photograph features/anomalies
AST = aboveground storage tank
IRP = Installation Restoration Program
MSC = miscellaneous
NFA = no further action
OWS = oil/water separator
PCB = polychlorinated biphenyl
PRL = Potential Release Location
SWMU = solid waste management unit
TAA = temporary accumulation area
UST = underground storage tank
XFRMR = transformer

Source: United States Marine Corps (USMC) 2003.

2. SURVEY METHODOLOGY

The methods used to conduct this EBS for former MCAS El Toro are described in this chapter. Section 2.1 includes a description of the approach used to accomplish each of the major components (i.e., records search, visual inspections, interviews, aerial photograph review, chain-of-title search) for the EBS. The process used to inventory and track potential environmental concerns is described in Section 2.2. Assumptions associated with radiological issues at the station are discussed in Section 2.3.

2.1 APPROACH AND RATIONALE

A methodical process was followed for the EBS in which available information was analyzed and conclusions were drawn about the condition of former MCAS El Toro. The highest scrutiny was given to areas of the station where industrial activities occurred and hazardous materials were utilized, as well as areas where spills have been recorded.

The EBS was prepared in accordance with DoD CERFA guidance and the requirements of CERCLA. Methods and types of sources used to determine the environmental condition of former MCAS El Toro include:

- A detailed search and review of available information and records in the possession of DoD and records made available by regulatory agencies or other relevant agencies, including information contained within surveys for asbestos, radon, lead-based paint (LBP), transformers and other equipment containing polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) Facility Assessments (RFAs), and RCRA Facility Investigations (RFIs) to determine what, if any, hazardous substances or petroleum products may be present on the property
- A review of reasonably obtainable federal, state, and local government records for adjacent property where there has been a release of any hazardous substance or petroleum product
- Analysis of aerial photographs that may reflect prior uses of the property
- Interviews with caretaker and/or former employees involved in operations on the property
- Visual inspections of the property; of buildings, structures, equipment, pipes, pipelines, or other improvements on the property; and of properties immediately adjacent to the property, noting conditions that indicate actual or potential release of hazardous substances or petroleum products
- Identification of sources of contamination on the property and on adjacent properties that could migrate to and impact the installation property
- Identification of ongoing response actions or actions that have been taken at or adjacent to the subject property
- A physical inspection of property adjacent to the real property, to the extent permitted by owners or operators of the property
- Sampling, if it is deemed appropriate under the circumstances

The ECP was generally characterized based upon review of existing information in public records, interviews, visual inspections, etc., as set forth in the description of methods and sources listed immediately above. Not all characterization on the installation was based upon sampling. Where the information collected and reviewed pursuant to the listed methods and sources was deemed to be insufficient to characterize the ECP, representative samples were collected and analyzed.

In addition to being used to support this EBS, the sources listed above were also researched for the 1995 EBS (Jacobs Engineering Group [JEG] 1995b), and used to determine the findings presented in the 1995 EBS. The 1995 EBS included inventories of various resource factors, such as aboveground storage tanks (ASTs), underground storage tanks (USTs), transformers, temporary hazardous material accumulation areas, oil/water separators (OWSs), aerial photograph LOCs, etc. Therefore, for the preparation of this EBS, the majority of the baseline information used in this EBS was obtained from the 1995 EBS. This baseline information was not specifically reverified to determine its accuracy; however, where possible, these sites were noted during VSIs and the records review. Sites that have regulatory concurrence for a no further action determination were not reevaluated in support of this EBS. The EBS primarily focused on updating the status of further action sites where additional investigations have occurred or are ongoing and identifying new LOCs that had not been previously identified by other environmental investigations.

2.1.1 Background Review

The following section discusses the sources reviewed for environmental factors discussed within this EBS.

2.1.1.1 Property Categorization Factors

Hazardous Materials and Hazardous Waste. Information on facilities in which hazardous materials and hazardous waste were stored, utilized, or generated was gathered through interviews with current on-site employees (e.g., caretaker, golf course, stables), from a review of station files, and from VSIs conducted in April and May 2002 in support of this EBS (Earth Tech 2002a). The primary documents reviewed were various Installation Restoration Program (IRP) reports, the RFA (JEG 1993b), the BRAC Cleanup Plan (BCP) (USMC 1999) and the 2001, 2002, and 2003 BRAC Business Plans (USMC 2001, 2002, 2003), and other environmental management documents contained in the station files.

Installation Restoration Program. Numerous IRP studies and investigations have occurred at former MCAS El Toro since the IRP was initiated at the station. Information presented in this report concerning the IRP was obtained from the 1995 EBS (JEG 1995b) and IRP studies and investigations performed since the 1995 EBS was completed.

Storage Tanks and Pipeline Systems. Inventories and descriptions of ASTs, USTs, and fuel pipeline systems were provided in the 1995 EBS (JEG 1995b). This information was used as the baseline for the inventory of ASTs and USTs that is presented in this EBS. Storage tanks that were identified as requiring no further action in the 1995 EBS were not reevaluated unless evidence was identified indicating that a site required further investigation. Information regarding fuel pipeline systems was obtained from the 1995 EBS (JEG 1995b), various IRP reports, the RFA (JEG 1993b), and other documents contained in the station files. Closure reports and documentation prepared since the 1995 EBS were obtained in order to update the status of storage tanks and fuel pipeline systems that were recommended for further action in the 1995 EBS. The 2001, 2002, and 2003 BRAC Business Plans (USMC 2001, 2002, 2003) were also used to obtain storage tank status.

Wastewater Treatment and Related Systems. Information on the sanitary sewer system, OWSs, septic tank systems, and other wastewater-related treatment systems was obtained from interviews with current on-site employees, station files, maps of the sewer system, and as-built drawings of buildings.

Medical/Biohazardous Waste. Information on the past generation and disposal of medical/ biohazardous waste was obtained from station files.

Ordnance. Sites on the station where storage or use of ordnance or use of firearms has occurred were identified through VSIs (Earth Tech 2002a), various IRP reports, the RFA (JEG 1993b), Archive Search Report (ASR) (U.S. Army Corps of Engineers [USACE] 2001b), Range Identification and Preliminary Assessment Report (USACE 2001a), historic aerial photographs, and real property records and maps.

Pesticides. Information on current pesticide storage and usage was obtained from the 1995 EBS (JEG 1995b), interviews with current on-site employees, and VSIs (Earth Tech 2002a). Information on past storage and use of pesticides was obtained from a review of station files.

Radioactive Materials. Information regarding radiological concerns at former MCAS El Toro was obtained from radiological assessment and survey reports prepared in 2000 and 2001. These reports include the *Final Historical Radiological Assessment, Marine Corps Air Station, El Toro* (Weston 2000); the *Draft Radiological Release Report, Hangar 296 and 297, Marine Corps Air Station (MCAS) El Toro* (Weston 2002); and the *Final Radiological Report, El Toro Marine Base, Buildings B-360 and B-319* (New World Technology 2001).

2.1.1.2 Facility Disclosure Factors

Disclosure factors are not regulated under CERCLA Section 120(h)(1), but are discussed within the EBS to fulfill real estate transaction requirements. If properly managed (i.e., no release into the environment), these factors were not used in property categorization. The presence of these factors does not necessarily preclude buildings from being eligible for transfer, and the presence of these factors at a building does not make that building an LOC. Discussion of these factors is presented for disclosure purposes. In the event that an issue arose regarding any of these resources (e.g., asbestos debris disposal, PCB spill), it would be discussed as a property categorization factor.

Asbestos-Containing Material. Information regarding asbestos-containing material (ACM) was obtained from the 2001 BRAC Business Plan (USMC 2001) for former MCAS El Toro. The BRAC Business Plan compiled the results of ACM surveys conducted in 1989, 1991, 1194, 1995, and 1999. Additional ACM information was obtained from surveys conducted in 2001 for Buildings 130, 360, 390, and 619.

Lead-Based Paint. Information regarding LBP was obtained from existing LBP surveys conducted for former MCAS El Toro. Reports were reviewed to determine those facilities that may potentially contain LBP. In the absence of LBP survey results, facilities that were constructed prior to or during 1978 are assumed to contain LBP. Information regarding LBP hazard for residential structures was obtained through survey reports for former MCAS El Toro housing areas (Public Works Center [PWC] 1995a, b, c, d, 1996). Information regarding lead in soils was obtained from the *Final Evaluation of Potential Lead-Based Paint Hazards in Soil at Former Housing Areas* (CDM Federal Programs [CDM] 2002).

Radon. A radon survey was conducted in 1991. The findings of this survey were reported in the 1995 EBS (JEG 1995b) and the 1999 BCP (USMC 1999). These findings are also presented in this EBS. Based on the findings for the radon survey conducted in 1991, no further surveys were warranted.

Polychlorinated Biphenyls. Several PCB transformer and PCB equipment surveys have been conducted at former MCAS El Toro. These include the *Inventory of PCB Items and Equipment at Marine Corps Air Station El Toro* (Kennedy/Jenks Consultants 1992), *Marine Corps Air Stations El Toro and Tustin, Installation Restoration Program, Polychlorinated Biphenyl Survey and Transformer Assessment* (SWDIV 1984), and the *Polychlorinated Biphenyl (PCB) Inventory Update*

for Calendar Year 1991 (MCAS El Toro Environmental Office 1992). These surveys and reports were included in the findings of the 1995 EBS (JEG 1995b). The 1995 EBS and the 1999 BCP (USMC 1999), as well as the findings of the VSIs conducted in April and May 2002 in support of this EBS (Earth Tech 2002a), were used to obtain additional information regarding PCBs.

Drinking Water. Information on drinking water quality was obtained from interviews with caretaker employees and from reports in the station files. Data reviewed included drinking water quality sampling results for occupied buildings at former MCAS El Toro for 2000, 2001, and 2002 (Truesdail Laboratories, Inc. 2000, 2001, 2002).

Air Quality. Information on indoor air quality was obtained from interviews with caretaker employees and from reports in the station files (Radian Corporation 1996).

2.1.1.3 Conservation Disclosure Factors

Natural Resources. Information regarding natural resources was obtained from the 1999 BCP (USMC 1999).

Cultural Resources. Information regarding cultural resources was obtained from the 1999 BCP (USMC 1999).

2.1.2 Non-Navy Studies

Environmental Site Assessment. An environmental site assessment (ESA) report for former MCAS El Toro was prepared for the County of Orange by GeoSyntec Consultants (GeoSyntec) in 2001. This report presented findings from an independent assessment of current environmental conditions at former MCAS El Toro, with the assumption that the intended reuse of the station was to be a commercial airport, in accordance with the Orange County Environmental Impact Report (EIR) 573. GeoSyntec conducted the ESA by reviewing existing documents and records, visiting LOCs, conducting interviews, and performing limited surveys of adjacent properties. GeoSyntec identified a total of 339 LOCs that they recommended for further assessment or action. These sites included LOCs for which the DON had already received no further action (NFA) regulatory concurrence; LOCs that already had action planned, underway, or recently completed; and LOCs that GeoSyntec identified as "new" (i.e., a location that was not previously designated or documented as an LOC).

The DON performed a detailed review of the 2001 County of Orange ESA report and all 339 LOCs that were recommended for further action or assessment by GeoSyntec. Of the 339 LOCs recommended for additional assessment or action, 98 of those have been previously assessed, are currently being assessed, or will be assessed in the near future. These sites are listed in Appendix A, Table A-2, and have also been identified in the El Toro Business Plan (DON 2001). Of the remaining 241 LOCs, 198 have closure or NFA letters signed by a regulatory agency, or are currently recommended for NFA and are pending regulatory concurrence. The Navy has reviewed GeoSyntec's rationale for recommending further assessment of the 198 LOCs with NFA concurrence, and concluded, in consultation with regulatory and government representatives (BRAC Cleanup Team [BCT]), that there was insufficient justification to warrant a decision other than NFA for these LOCs. Appendix A, Table A-3, presents the DON's response to GeoSyntec's recommendations for the NFA LOCs. The remaining 43 LOCs that GeoSyntec identified for further assessment were considered new LOCs. After reviewing these 43 new LOCs, the DON determined that 7 of these LOCs identified by GeoSyntec warranted further investigation, and obtained concurrence from the BCT on the recommendation to investigate these 7 LOCs (see Appendix A, Table A-4). These sites will be further investigated and sampled, as appropriate, as described in the *Final Work Plan, Preliminary Assessment of Locations of Concern, Environmental Baseline Survey, Former Marine Corps Air Station El Toro, California* (Earth Tech 2002b). Table A-4 also provides

the rationale for determining that no further action or assessment is required for the other 36 new LOCs identified by GeoSyntec.

The Navy's Underestimation of Solvent Contamination at former MCAS El Toro California (Solvent Study). PES Environmental, Inc., performed an independent technical evaluation of the DON's BRAC Cleanup programs in 2000 on behalf of the city of Irvine. The evaluation specifically focused on the DON's characterization of sources of volatile organic compounds (VOCs) associated with soil and groundwater contamination on former MCAS El Toro. The evaluation indicated that the DON had not adequately accounted for significantly greater quantities of VOCs at locations outside areas evaluated by the DON. It further states that the DON failed to adequately investigate the 26 miles of sanitary sewer system that were used for the discharge of hazardous materials from former industrial operations at former MCAS El Toro. The study also questioned the Navy's designation of Site 24 (representing the southwest quadrant of the base) as the sole source of the regional groundwater contamination. It also indicated that the quantities of solvents that were used and discharged to the sanitary sewer system from within the other three quadrants of the base may exceed the releases documented at Site 24. The study concluded that the following three major consequences would follow due to the Navy's misconceptualization of the solvent contaminant problem: (1) higher costs of remediation, (2) construction projects kept from moving forward, and (3) potential harm caused to the health and safety of construction workers. The report recommended that the Navy investigate and remediate sources of hazardous materials associated with the approximately 26 miles of the sanitary sewer system.

The Navy conducted a thorough review of the city of Irvine's Solvent Study and noted that the following formed the basis of the Solvent Study:

- The cornerstone of the Study is the assumption that all of the processes and facilities described in the report were directly connected to the sanitary sewer system for the entire active life of MCAS El Toro.
- Over 9 million pounds of solvents were discharged to the sanitary sewer system during the 54 years of operation (1943 through 1999).
- An exfiltration rate of 7.6 percent of the maximum flow was estimated. Based on this exfiltration estimate and assumptions of solvent use for various types of activities conducted on station, the study postulated that 7.6 percent of 9 million pounds (approximately 700,000 pounds) of solvent was released to the subsurface; the remainder reached the on-site sanitary sewage treatment plant.
- A total of 20 aircraft wash areas were claimed to be on the base, with an aircraft-washing rate of 56 washings per aircraft per year. The study claims that nearly 48 percent of solvents allegedly discharged to the sanitary sewer are a result of aircraft washing operations.
- A total of 1.7 million pounds (nearly 19 percent of the total solvent calculation of 9 million pounds) of tetrachloroethylene (PCE) was estimated to have been discharged from a single building (Building 307, Dry Cleaning and Laundry facility).

The DON, through its Installation Restoration and Environmental Compliance programs, has systematically conducted investigations at MCAS El Toro to evaluate the presence and extent of contamination throughout the station. These investigations form the basis for the response to the Solvent Study presented below. In particular, the investigations relating to the evaluation of solvents in both the soil and groundwater have been conducted under the DON's CERCLA authority pursuant to Executive Order 12580.

Sanitary Sewer System Discharges

- The assumption that a majority of the flow from industrial operations was discharged to the sanitary sewer system is not substantiated by existing documentation for the base. Investigations by the DON indicate that discharges from industrial operations were typically connected to the storm sewer system. This DON finding is based on the following;
  - Review of station utility drawings dating back to 1957 show many industrial facilities connected directly to the storm sewer system.
  - A 1978 survey titled *Survey of Industrial/Oily Waste Discharges to Storm and Sanitary Sewers, MCAS El Toro, prepared by DoD, WESTDIV, San Bruno, California*, states that ***"there are very few direct connections between industrial areas and the sanitary sewer system..." Only one of the 32 industrial operations surveyed was shown to have a direct disposal connection to the sanitary sewer (via an OWS).***
  - The 1993 RFA cites FY1982 Military Construction (MILCON) Project P-325 data (dated 21 May 1980), which states that ***"operation of existing vehicle and aircraft wash racks and equipment results in discharges of water containing oils, caustic compounds, and detergents to the Station storm drain system. The storm drain system conveys those wastes directly to San Diego Creek...*** " The RFA also states that "***Almost without exception, the contaminated wash water streams [from the vehicle and aircraft wash racks] are discharged to the Station storm drain system."***

- Therefore, based on this information, the DON believes that the Solvents Study's basic premise that a majority of the industrial discharges were conveyed by the sanitary sewer system is incorrect. In addition, the DON used this information gathered as part of the CERCLA discovery process to identify the Storm Sewer System as an area of concern, and designated major drainages as IRP Site 25. The rationale for investigating the major drainage areas was that these areas would have received flow from these industrial processes. Site 24 was also established as part of the IRP to evaluate the VOC source area. The VOC source area encompasses the southwest quadrant of MCAS El Toro. This area was identified as being the area with the highest likelihood of solvent use. As part of the Phase I Remedial Investigation (RI), a comprehensive soil gas survey of IRP Sites 24 and 25 was conducted. The soil gas survey investigated the areas around all buildings where solvents were used as well as the industrial, storm water, and sanitary sewer lines. Data collected from this soil gas survey were used as the basis for conducting additional investigation activities. These activities confirmed IRP Site 24 and, in particular, the area in the vicinity of hangars 296 and 297 as being the primary source of VOCs in both the soil and groundwater.
- For IRP Site 25, the RI concluded that any contamination that may have been discharged to the storm sewer did not pose a significant risk to human health and the environment. In addition, following their review, Federal Facility Agreement (FFA) signatories concurred with the no further action recommendation. This no further action recommendation was presented to the public, and documented in the Proposed Plan and Record of Decision, respectively, for IRP Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and 25.
- In addition, with respect to evaluating the sanitary and storm sewer lines, the industrial sewer lines running from hangars 296 and 297 to the former wastewater treatment plant (WWTP) were investigated as part of the RFA. The lines were designated solid waste management unit (SWMU) 265 and were slated to be IRP Site 23 if the results from the RFA detected a significant release. The SWMU 265 investigation consisted of drilling 10 boreholes to a depth of 25 feet below ground surface (bgs) and sampling for VOCs, total petroleum hydrocarbons

(TPH), and metals. Results from this investigation indicated that there was no release from the sewer line, and the FFA signatories concurred with the recommendation for no further investigation. Consequently, IRP Site 23 was eliminated from the IRP program.

Solvent Release Estimates

The solvent release estimates presented in the Solvent Study are primarily based on the following factors:

- Solvent Usage
- Sewer Flow Rates
- Sewer Exfiltration rates
- Dry cleaning and Laundry Facility discharges

Solvent Usage: The study asserts that solvents were used extensively over the entire station with aircraft washing contributing to 48% of the solvents discharged to the sanitary sewer. This assertion is contrary to what was reported in the Initial Assessment Study (IAS), which states that the use of chlorinated solvents such as trichloroethylene (TCE), PCE, and 1,1,1-trichloroethane (TCA) for aircraft cleaning and washing activities appears to be the exception, rather than the rule, as the Solvent Study claims. Aircraft washing typically used detergents and PD-680 (Stoddard Solvent – a petroleum hydrocarbon distillate). In addition, a 1979 Oil and Hazardous Substance Spill Prevention, Control, and Countermeasure Field Survey Report states that chlorinated solvents were used only in equipment maintenance areas. The study also assumed that aircraft were washed 56 times a year (based on once every 2 weeks, plus after each military mission is flown when a weapons system is used – an additional 30 times per year). However, documentation contained in Appendix W of the report shows that a wash rate of less than one time per aircraft per year occurred in 1947 at MCAS El Toro. The May 1980 (FY1982) MILCON project data noted that "each aircraft at the Station is washed at least once each month." Furthermore, interviews with MCAS Miramar personnel disclosed that USMC policy is to wash aircraft every 14 days (26 times per year), and that this has been the practice for at least the past 20 years. The MCAS Miramar maintenance staff had not heard of the requirement that aircraft be washed after each mission when a weapons system was used. It is important to note that the majority of the current staff at MCAS Miramar are the same staff that operated at former MCAS El Toro. Therefore, the study's assumptions result in an overestimation of solvent use during station activities.

Sewer Flow Rates: The Solvent Study used an average flow rate of 1.5 million gallons per day (MGD). Existing documentation shows the approximate flow rate to be between 1.04 and 1.1 MGD, with 1.5 MGD as the maximum *permitted* flow. This rate served as the basis for calculating exfiltration and the corresponding mass of solvent released in the Solvent Study.

Sewer Exfiltration Rates: The Study used the average of two separate methods for calculating its "*estimated maximum allowable rate of exfiltration.*" Using the "Standard Specifications for Public Works Construction" and a list of assumptions, an estimated maximum allowable exfiltration rate of 272 gallons per minute (gpm) is calculated. The Study also used an equation cited in Appendix OII-A of the *Draft Final Phase II Remedial Investigation Report, Operable Unit 2A – Site 24* (Bechtel National, Inc. [BNI] 1996). The Site 24 RI Report used the equation to calculate the estimated order of magnitude of the storm drain leakage at Site 24 during an average storm event. The Solvent Study applied this equation to vitreous clay pipe and, using its sewer system assumptions, arrived at an estimated maximum allowable exfiltration rate of approximately 221 gpm.

Using these two methods, the Solvent Study arrives at an average rate of 246 gpm, which is 7.6% of the Solvent Study's estimated maximum sewer system flow rate, F_{max} (3,231 gpm.)

In contrast, the American Society for Testing and Materials (ASTM) has published a Standard Test Method for Hydrostatic Infiltration and Exfiltration Testing of Vitrified Clay Pipe Lines (C1091-98). Using this method, the maximum allowable exfiltration rate is calculated to be approximately 32 gpm (or approximately 1.0% of F_{max} [3,231 gpm], as presented in the Solvent Study). Of note is that F_{max} corresponds to a daily flow rate of 4.65 MGD, a value 3 times larger than the "permitted" flow sanitary sewer discharge. Using the permitted discharge rate (1.5 MGD or 1042 gpm) as the basis for exfiltration estimates, the rate would range from 10 gpm based on 1 percent of F_{max} to 79 gpm based on 7.6 percent of F_{max}.

Dry Cleaning and Laundry Facility Discharges: The Solvent Study claimed that more than 1.7 million pounds (nearly 19% of the total solvent calculations) of PCE was discharged to the sewer, all of it from a single building (Building 307, Dry Cleaning and Laundry). Assuming the alleged 7.6% exfiltration rate, approximately 132,000 pounds of PCE would have been discharged to the soil along the sanitary sewer line from Building 307 to the WWTP (approximately 600 linear feet).

Building 307, the Dry Cleaning and Laundry facility, is within the footprint of IRP Site 24. During the RI Phase, extensive soil gas surveys of the entire site were conducted. Findings from this investigation did not detect significant soil gas concentrations in the vicinity of this building. Since the facility could have discharged significant volumes of VOCs, the Navy proposed to conduct a comprehensive soil, soil gas, and groundwater investigation of Building 307. The objective was to evaluate the overall approach, rationale, and assumptions employed in the solvent study. The location and number of samples to be collected was determined through discussions with the BCT. The preliminary assessment conducted at Building 307 confirmed previous investigation (IRP Site 24) conclusions that there has not been a significant release to the environment at Building 307 or the sewer segment from the building to the WWTP. These conclusions and recommendations were presented in the Final Technical Memorandum in July 2002 Preliminary Assessment for Building 307 (Earth Tech 2002). The BCT concurred with the investigation findings that no further response was warranted.

DON Conclusions on the Solvent Study

The report states that the Navy's estimated amount of solvent contamination is underestimated by 8 to 80 times (70,000 to 700,000 pounds). Their estimates concerning operating practices as well as VOC disposal practices, rates, volumes, and locations do not reflect actual operations at former MCAS El Toro, and represent "unrealistic" upper bound estimates. This is demonstrated by comparing the Solvent Study's release estimates of 132,000 pounds of solvent with the results from the Building 307 investigation conclusions that there was no significant release to the environment at this facility. Should the Solvent Study's estimated volume of contamination actually exist on site, the DON believes it would have been discovered by the extensive monitoring well network installed during the numerous studies that have and continue to take place on the base.

The investigative approach taken by the DON to evaluate the potential for releases to the environment was developed with the concurrence of the BCT, and is based on sound engineering principles and thorough research. Based on the review of the City of Irvine Solvent Study, it is concluded that the sanitary sewer lines do not represent a significant source of VOC contamination and, therefore, do not warrant reopening or revising the RI for former MCAS El Toro at this time. This conclusion is supported by the absence of VOC contamination in on- and off-station wells downgradient from the sanitary sewer lines, in soil gas samples taken in support of installation

investigations and various compliance efforts, and the fact that the storm sewers were the primary recipient of waste discharges.

The Navy received several comments on the Draft EIS for the Disposal and Reuse of MCAS El Toro that criticized that document for failing to address the issues raised in the Irvine Solvent Study. The Navy responded to those comments by explaining that the study was being addressed under CERCLA and forwarded the comments to the BEC. The Navy's response to the Irvine Solvent Study set forth in this EBS constitutes the Navy's response to those comments.

2.1.3 Visual Inspections of Subject Property

VSIs of both interiors and exteriors of buildings and visual reconnaissance surveys (VRSs) were conducted in support of this EBS in April and May 2002 (Earth Tech 2002a). VSIs and VRSs are conducted to verify characteristics or features identified in the records search, to update the findings of the 1995 EBS, and to identify new LOCs.

VSIs are focused and detailed inspections conducted for buildings that involve exterior and interior (walk-through) inspections. Interior and exterior VSIs were conducted for all non-residential buildings/facilities on former MCAS El Toro. The VSIs of existing nonresidential facilities were conducted to evaluate or confirm the presence or absence of environmental contamination or concerns, including unusual odors, stained soil, stressed vegetation, storage tanks, or other indicators of potential contamination. More detailed inspections were conducted at those facilities where hazardous materials and hazardous waste were used, industrial processes occurred, or specific features (e.g., storage tanks, OWSs, hydraulic lifts, sumps, drains, wash racks, septic tanks) were identified. VSIs were not performed for individual housing units on station.

VRSs were conducted over open areas on the station to identify areas with potential environmental contamination or LOCs. Generally, VRSs are cursory physical inspections conducted by walking around or through the areas in question. For large, remote areas of the station, the VRSs consisted of visual reconnaissance from an automobile or through walking the property. A VRS was also conducted for the housing areas on former MCAS El Toro.

2.1.4 Personnel Interviews

Interviews with MCAS El Toro personnel have been performed as part of the IRP and preparation of the 1993 RFA. As part of the IRP effort and in support of the 1995 EBS (JEG 1995b), additional interviews with station personnel were conducted in May 1994. Interviews were conducted by the contractor responsible for preparation of the 1995 EBS and regulatory agency representatives, including the U.S. Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC), and Regional Water Quality Control Board (RWQCB) personnel. The purpose of these interviews was to obtain additional information regarding past hazardous substance management practices, activities, and releases at the station. A list of personnel interviewed in support of the 1995 EBS and a detailed set of meeting notes for the interviews conducted is presented in the 1995 EBS.

Additional interviews with former employees were not conducted in support of this EBS update, as comprehensive former employee interviews have been conducted in support of previous investigations. Former MCAS El Toro is currently a closed installation, with most of the buildings vacant. Current employees (e.g., caretaker, golf course, stables) in occupied buildings that are leased were interviewed during the VSIs in support of this EBS update. Meeting notes for these interviews are provided in the VSI sheets within the attached CD-ROM.

2.1.5 Aerial Photograph Review

Two aerial photograph evaluations have been prepared for former MCAS El Toro. These evaluations addressed the historical land use and ECP at the station. These evaluations include (1) *Site Analysis El Toro MCAS, Orange County, California* (EPA 1991), and (2) *Final Report, Aerial Photograph Assessment, MCAS El Toro, Final Report* (Science Applications International Corporation [SAIC] 1993).

The 1991 evaluation, which focused on the station's IRP sites, was performed in support of the IRP at former MCAS El Toro. The photographs were at a scale that enabled detailed feature analysis. The evaluation covered the period between 1938 and 1991.

The 1993 report evaluated aerial photographs between 1946 and 1993 for identification of areas of environmental concern throughout the station. This report addressed features/anomalies observed at IRP sites and various other locations on former MCAS El Toro. The photographs were taken at a scale that provided comparable detail with EPA photographs.

In addition to the 1991 and 1993 aerial photograph evaluation reports, several other aerial photograph collections were reviewed for the 1995 EBS, including the Whittier College Fairchild Aerial Photograph Collection and the Caltrans photographs. The EPA, SAIC, and other photographs were reviewed in support of the 1995 EBS to identify possible LOCs not previously documented.

An additional review of the aerial photographs contained within the 1991 and 1993 reports was conducted in support of this EBS to identify any features of concern that may not have been identified in the 1995 EBS. Field verification was performed in May 2002 for features identified in the aerial photograph review performed in support of this EBS.

2.1.6 Regulatory Records Review

An environmental database search was conducted in support of this EBS (Environmental Data Resources, Inc. 2002). Federal, state, and local environmental databases were searched for information on reported releases at facilities within the study area and on adjacent properties. Databases searched include those records containing information for sites using hazardous materials and/or generating hazardous waste that report a release of hazardous substances, as well as sites with USTs, leaking USTs (LUSTs), ASTs, uncontrolled or abandoned hazardous waste sites, solid waste landfills, and several other types of sites with hazardous substance and petroleum product concerns.

2.1.7 Inspections of Adjacent Properties

Adjacent properties were visually inspected from the perimeter of the station property and public roads to determine properties that, based on their location and use, could impact former MCAS El Toro property. Information obtained from the inspections of adjacent properties is used in conjunction with the adjacent property environmental database search to determine properties with environmental conditions/factors or support activities using hazardous substances that could impact former MCAS El Toro property.

2.1.8 Chain of Title Search

In accordance with DoD guidance, a 60-year chain-of-title search (title search) was completed for former MCAS El Toro in support of the 1995 EBS (JEG 1995b). The purpose of the title search was to review real estate records covering the preceding 60 years (i.e., 1934 to 1994) to identify prior property owners and land uses that could reasonably have contributed to an environmental concern at former MCAS El Toro. The results of the title search were provided in a technical memorandum

prepared in March 1995 entitled *Environmental Baseline Survey Chain-of-Title Search Technical Memorandum* (JEG 1995a). This document is referenced in the 1995 Basewide EBS. The title search was conducted in January-February 1995.

Based on the findings of the title search, numerous land transfers, leases, easements, and rights-of-way have been granted during the past 60 years. No evidence of prior landowners/uses that have contributed to environmental concerns at former MCAS El Toro was identified (JEG 1995a).

Information obtained from the chain-of-title search has been included in this EBS update. Because no additional property has been acquired since 1995, an additional chain-of-title search was not performed in support of this EBS.

2.1.9 Property Categorization

Based on an analysis of the available data, including the records search, building and property inspections, interviews, aerial photograph review, and title search information, the presence or likely presence of storage, release, treatment, or disposal of hazardous substances or petroleum products at buildings or property on former MCAS El Toro was assessed. Based on this assessment and in accordance with DoD guidance, property on former MCAS El Toro was classified into one of seven Area Types in order to facilitate and support transfer of station property. The ECP Area Types are ranked in order of their suitability for transfer, with ECP Area Types 1 through 4 being suitable for transfer by deed, and ECP Area Types 5 through 7 being unsuitable for transfer by deed until all remedial actions are completed, until a remedy has been successfully demonstrated, or until further investigation/evaluation has been completed in order to classify property into one of the other six ECP Area Types. The definitions of the seven ECP Area Types are as follows:

- *ECP Area Type 1* - Areas where no release or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).
- *ECP Area Type* 2 - Areas where only release or disposal of petroleum products has occurred.
- *ECP Area Type 3* - Areas where release, disposal, and/or migration of hazardous substances have occurred, but at concentrations that do not require a removal or remedial action.
- *ECP Area Type 4* - Areas where release, disposal, and/or migration of hazardous substances have occurred, and all remedial actions necessary to protect human health and the environment have been taken.
- *ECP Area Type 5* - Areas where release, disposal, and/or migration of hazardous substances have occurred, removal and/or remedial actions are under way, but all required remedial actions have not yet been completed.
- *ECP Area Type 6* - Areas where release, disposal, and/or migration of hazardous substances have occurred, but required response actions have not yet been implemented.
- *ECP Area Type 7* - Areas that are not evaluated or that require additional evaluation.

The ECP Area Type definitions provided above vary from the definitions used in the 1995 EBS. Since publication of the 1995 EBS, DoD has revised the seven ECP Area Type definitions. In October 1996, DoD proposed several modifications to CERCLA Section 120(h)(4)(A), including the deletion of "storage" as a consideration for property categorization and the creation of a new Category 2 to address release or disposal of petroleum products only. A release of petroleum products would not prohibit the affected property's transfer under CERCLA Section 120(h). Based on the creation of the new definition for Category 2, Category 2 property has been divided into five subcategories in order to further define petroleum product releases. Subcategories 2a through 2e

correspond to Categories 3 through 7, except the Category 2 definitions refer to petroleum products only, rather than hazardous substances. All Category 2 property is suitable for transfer regardless of subcategories. Category 2 definitions are as follows:

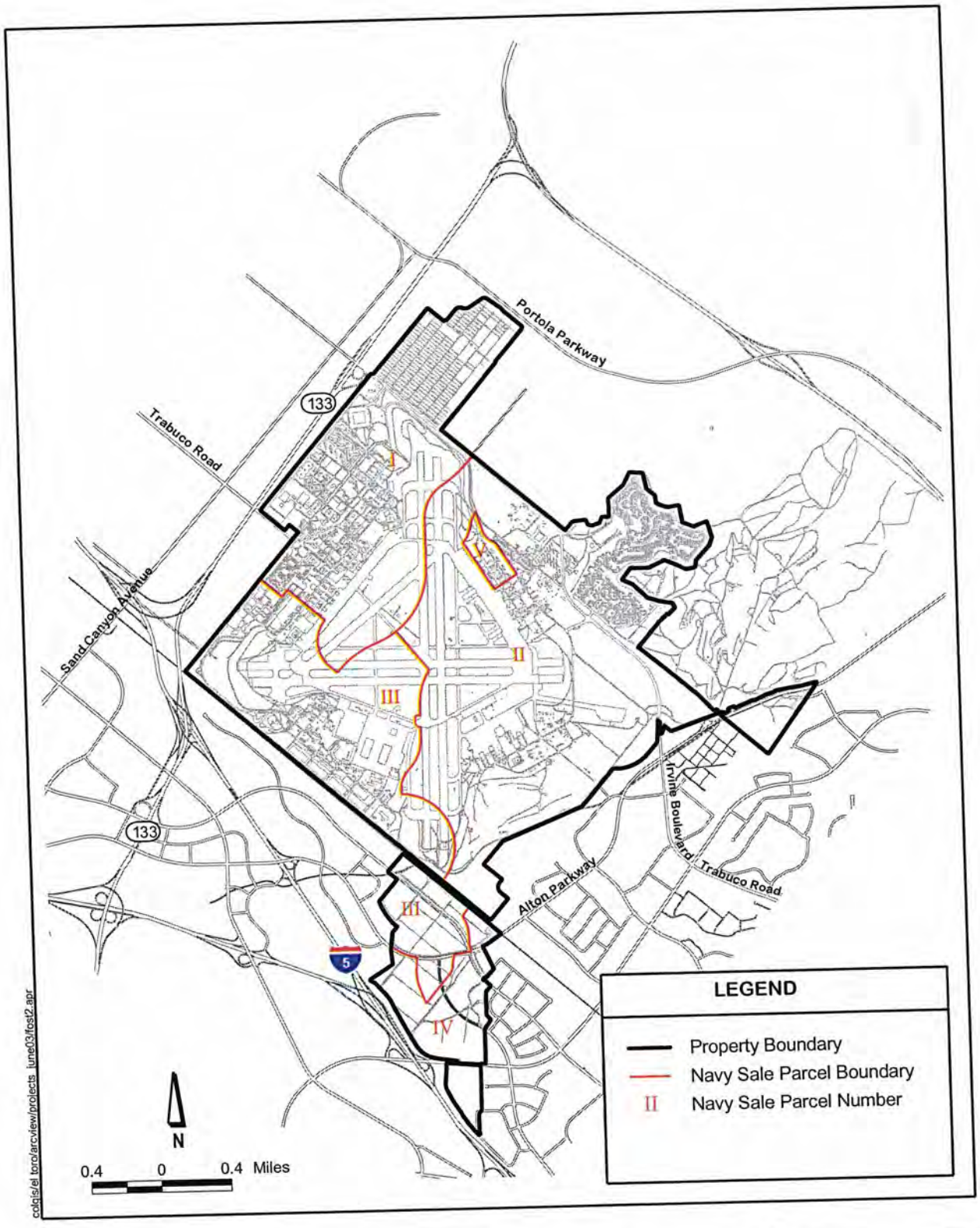
- *ECP Area Type 2a* - Facilities where release, disposal, and/or migration of petroleum products have occurred, but at concentrations that do not require a response action.
- *ECP Area Type 2b* - Facilities where release, disposal, and/or migration of petroleum products have occurred, and all response actions to protect human health and the environment have been taken.
- *ECP Area Type 2c* - Facilities where release, disposal, and/or migration of petroleum products have occurred, and response actions are underway, but all required response actions have not been completed.
- *ECP Area Type 2d* - Facilities where release, disposal, and/or migration of petroleum products have occurred, but required response actions have not yet been implemented.
- *ECP Area Type 2e* - Facilities that have never been evaluated or require additional investigation. Category 2e facilities include areas that may have had a release of petroleum products, but have had no sampling or field screening and require such investigations to confirm that a release has or has not occurred.

Pursuant to EPA and DoD guidance, this EBS identified property as uncontaminated, even if some limited quantity of hazardous substances or petroleum products were released or disposed, in cases where the available information indicates that such release or disposal poses no threat to human health or the environment. Examples, as provided in the EPA guidance entitled *Military Base Closures: Guidance on U.S. Environmental Protection Agency Concurrence in the Identification of Uncontaminated Parcels under CERCLA Section 120(h)(4)*, include usage of common household chemicals and storage of heating fuel in housing areas, incidental releases of petroleum products on roadways and parking lots, and the routine licensed application of pesticides (EPA 1994).

As stated previously, property designated as ECP Area Types 1 through 4 is considered suitable for property transfer. In general, a parcel that contains land that is deemed "unsuitable for transfer" (i.e., Area Types 5 and 6) may still be eligible for early transfer or lease (would require deferral of CERCLA covenant), provided that the intended future use is protective of human health and the environment, and with specified recommended restrictions on use of the property to protect human health and the environment or the environmental restoration process. Area Type 7 sites require further evaluation prior to transfer. ECP Area types for property presented in this EBS vary from those presented in the 1995 EBS. These ECP Area Types have changed based upon the identification of new LOCs or ongoing or completed response actions that have occurred since the 1995 EBS was published. All sites with hazardous substance or potential hazardous substance releases should be considered ECP Area Types 5 through 7 until concurrence with a no further action finding from the regulatory agencies is received.

2.2 USE OF STUDY AREAS

Property associated with former MCAS El Toro was divided into five study areas based on the Navy Sale Parcels that were developed to facilitate its impending sale. The study areas allow for the inventory, categorization, and analysis of LOCs; evaluation of historic and current land uses; and the referencing of findings discussed in this EBS (Figure 2-1). It should be noted that these study areas were used only for the purpose of analysis in preparing the findings of this EBS update, and do not reflect any type of reuse parcelization. Carve-outs associated with non-transferable property (ECP



NAVY SALE PARCELS
ENVIRONMENTAL BASELINE SURVEY
FORMER MCAS EL TORO
CALIFORNIA

Figure 2-1

Types 5-7) are also shown in Figure 2-1 and will be presented in detail in the Finding of Suitability to Lease.

2.3 ASSUMPTIONS

A radiological assessment survey is in progress. Results of the survey were not available for incorporation into this EBS. Therefore, radiological sites at former MCAS El Toro have been assigned an ECP ranking of Category 7. Radiological sites will be recategorized upon receipt of survey data.

3. SITE DESCRIPTION

This section provides a brief description of the site location and environmental setting of the station. It also provides a discussion of station history and historic operations, as well as a summary of station property acquisitions and transfers. The information provided in this section was primarily obtained from existing information contained within the 1995 EBS (JEG 1995b), the 1999 BCP (USMC 1999), and the 2001, 2002, and 2003 BRAC Business Plans (USMC 2001, 2002, 2003).

3.1 SITE LOCATION

Former MCAS El Toro is situated in south-central Orange County, California, approximately 7 miles east of former MCAS Tustin (see Figure 1-1). The majority of the station is within an unincorporated area of Orange County; however, property within the south portion of the station is within the city of Irvine. The station is bordered on the east and southeast by the city of Lake Forest; to the southeast, south, and southwest by the city of Irvine; and to the west, north, and northeast by unincorporated portions of Orange County. The exact location of former MCAS El Toro is 33° 38' to 33° 41' north latitude, 117° 41' to 117° 45' west longitude, T6S/R6W (Sections 2-5, 7-11, 16-17, 20-21) and T5S/R8W (Sections 32-33, 35).

Former MCAS El Toro is currently owned by the United States, under control of the DON and the USMC. The station formerly comprised approximately 4,710 acres. There are approximately 580 acres of station property currently designated for agricultural outleases. Agricultural outlease lands are situated at the northwest and southeast corners of the station and are used for plant nurseries and crop production (USMC 1999).

3.2 ENVIRONMENTAL SETTING

3.2.1 Climate

The climate at former MCAS El Toro is Mediterranean, which is characterized by cool moist winters and warm dry summers. Temperatures rarely drop below 37° Fahrenheit (F) in the winter, and rarely exceed 100°F in summer.

3.2.2 Topography

Former MCAS El Toro is situated on the southeast edge of the Tustin Plain, a gently sloping surface of alluvial fan deposits derived primarily from the Santa Ana Mountains. Bounded to the north and east by the Santa Ana Mountains and to the south by the San Joaquin Hills, the Tustin Plain is at the southeast end of the Los Angeles Basin, a large sedimentary basin in the Peninsular Ranges Geologic Province. The Tustin Plain also lies in the "Central Block" of the Basin, which is bounded on the north by the Whittier Fault zone and on the south by the Newport-Inglewood Fault zone.

The former MCAS El Toro boundaries extend across the Tustin Plain into the Santa Ana Mountains. The majority of the station slopes gently to the west-southwest. Elevations range from approximately 215 feet above mean seal level (MSL) in the west corner of the station, to approximately 550 feet above MSL within the housing area. The Santa Ana Mountains rise steeply north and east of the station; the highest peak is 6,698 feet, and is approximately 10 miles east of the station. The San Joaquin Hills slope gradually to the south; their highest point is 1,170 feet, and is approximately 10 miles south of the station. The land to the northwest of the station is relatively flat.

3.2.3 Surface Water and Hydrology

Surface drainage in the vicinity of former MCAS El Toro generally flows southwest, following the slope of the land perpendicular to the orientation of the Santa Ana Mountains. Several washes originate in the hills northeast of the station, and flow through or adjacent to the station en route to San Diego Creek. Drainage from the hills and upgradient, irrigated off-station farmlands combine with on-station runoff (generated from the station's extensive paved surfaces). These drainage channels are contiguous with natural washes that originate in the Santa Ana Mountains (Borrego Canyon, Agua Chinon, and Bee Canyon washes) and become confluent with San Diego Creek southwest of the station (Figure 3-1).

3.2.4 Geology

Former MCAS El Toro lies on alluvial fan deposits derived primarily from the Santa Ana Mountains. These Holocene materials are comprised of isolated, coarse-grained stream channel deposits contained within a matrix of fine-grained overbank deposits that range up to a maximum of 300 feet in thickness.

The Holocene alluvial materials conformably overlie Pleistocene Age sediments predominantly comprised of interlayered, fine-grained lagoonal and near-shore marine deposits. These materials become increasingly mixed with beach sand, terrace, and stream-channel deposits in the east portion of the Tustin Plain and along the plain margins. Thus, the Quaternary deposits form a heterogeneous mixture of silts and clays with interbedded sand and fine-grained gravels that range up to 500 feet in thickness in the west portion of the Tustin Plain.

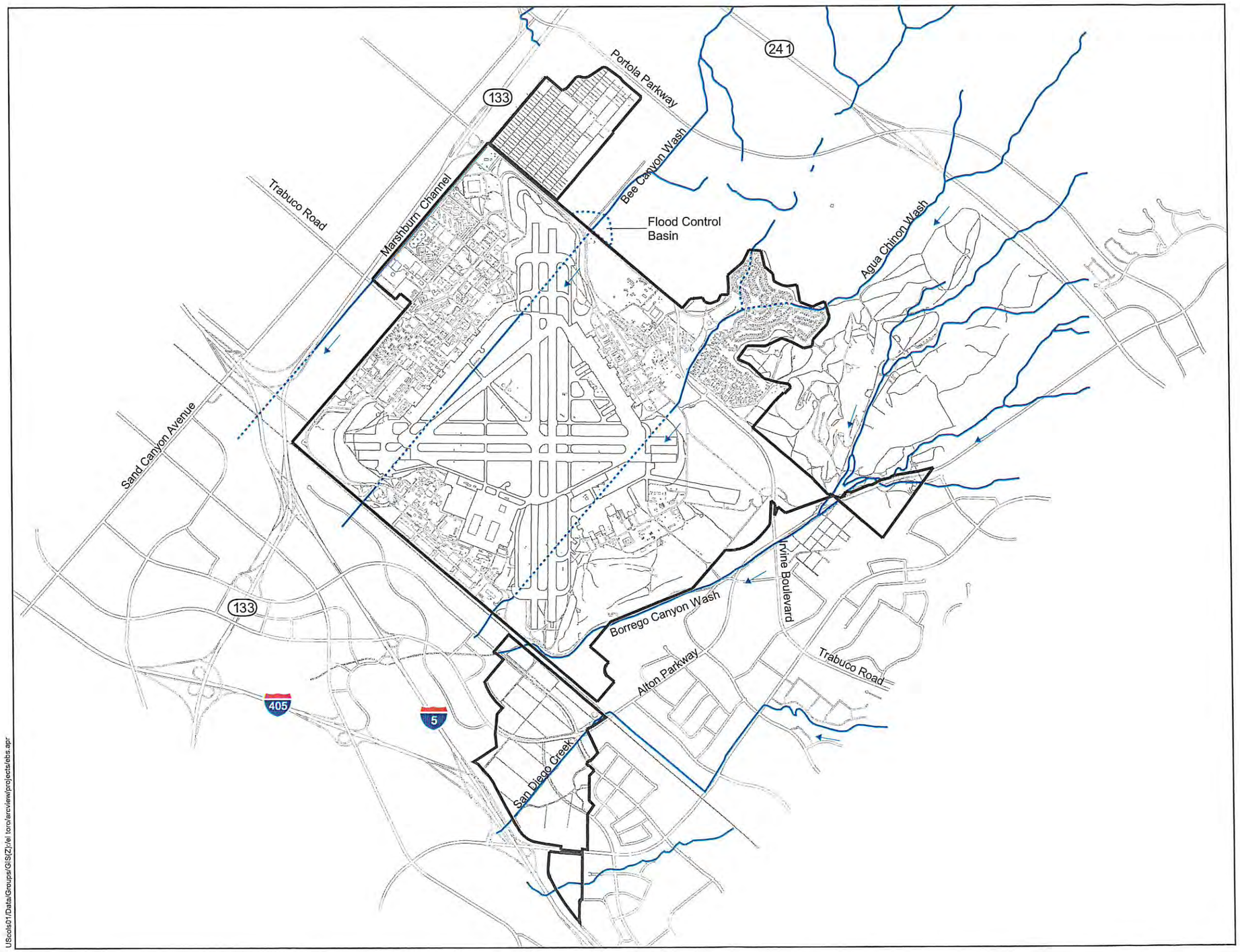
The deeper Quaternary sediments may be equivalent to the lower Pleistocene San Pedro Formation, which is comprised of semi-consolidated silts, clays, and sands with interbedded limestone. These lagoonal and shallow marine deposits are considered to be a major water-bearing unit in the region.

The Pleistocene deposits unconformably overlie older, semi-consolidated marine sandstones, siltstones, and conglomerates of late Miocene to late Pliocene age. These Miocene to Pliocene deposits are divided into the Niguel, Fernando, and Capistrano Formations, and are considered as bedrock near former MCAS El Toro. The lower Pliocene Fernando Formation, considered to be the major aquifer in the Irvine area, is the base of the water-bearing units. This formation likely interfingers with marine clayey and sandy siltstones of the Capistrano and Niguel Formations west of former MCAS El Toro, which together range up to 1,500 feet in thickness.

Beneath the semi-consolidated rocks lies a thick sequence of interbedded marine and nonmarine sedimentary rocks and volcanic rocks of the Monterey, Puente, Vaqueros, and Sespe Formations. These units, which are deposited on a basement of crystalline metamorphic and igneous rocks, have been considered non-water bearing in previous studies.

3.2.5 Groundwater and Hydrogeology

Former MCAS El Toro is situated over the Irvine Subbasin in the Main Orange County Groundwater Basin. Although the aquifers beneath the Tustin Plain are in hydraulic contact with the Main Orange County Groundwater Basin, it is difficult to make correlations among specific aquifer zones. In the Irvine area, aquifers are much thinner and separated by thicker sequences of fine-grained materials. Aquifers tend to be comprised of lenticular clayey and silty sands and fine-grained gravels contained within a complex assemblage of sandy clays and sandy silts. Thus, instead of identifiable aquifers that may be correlated from place to place, the groundwater may be considered to flow in a single, large-scale, heterogeneous system.



LEGEND

- Property Boundary
- Roads
- Buildings
- Open Channels
- Underground Drainage
- Direction of Flow

SOURCE

Station Map
P.W. Drawing No. S-2010
Revised 1989

N

3000 0 3000 Feet

Figure 3-1
Surface Water Drainages
Environmental Baseline Survey
Former MCAS El Toro
California

UScole01/Data/Groups/GIS(Z)/el toro/arcview/projects/ebs.apr

The groundwater system beneath the Irvine Subbasin has been divided into forebay and pressure areas. The forebay area lies along the margin of the basin where relatively shallow and coarse-grained sediments overlie semi-consolidated rock. Groundwater is thought to occur under unconfined conditions in this area. Recharge to the regional system takes place in the forebay area, primarily along washes that exist in the Santa Ana Mountains. The pressure area lies in the central portion of the basin, where sediments are thicker and relatively finer grained. Productive aquifers in this area are present mainly in deeper zones that become increasingly confined with depth. The groundwater has historically been discharged through irrigation wells, or has moved west to the Main Orange County Groundwater Basin.

The depth to groundwater ranged from 82 to 122 feet bgs, along the southwest perimeter of the station in 1988. Reduced pumping and increased water imports over the past 20 years have allowed groundwater levels to rise as much as 100 feet in certain areas. Groundwater beneath the foothills is reported to be within 45 to 60 feet of the ground surface, and groundwater beneath the southwestern boundary is reported to be within 85 feet of the ground surface (BNI 2002).

Groundwater in the shallow aquifer beneath Former MCAS El Toro flows northwest at gradients ranging from 0.005 to 0.025 foot/foot (BNI 2002). Irrigation wells pumping groundwater from the regional (deepest) aquifer west of the base have strongly influenced the hydraulic gradient. Groundwater flow velocities in the regional groundwater aquifer range from 0.02 foot to 1.9 feet per day (James M. Montgomery Engineers, Inc. [JMM] 1990). Average linear groundwater flow velocities are likely to be lower in the uppermost aquifer, where no significant pumping is taking place. Additionally, historical degradation of shallow groundwater quality associated with total dissolved solids (TDS), selenium, and nitrates in the groundwater has been related to the agricultural activities occurring near the base (BNI 2002).

Investigations by the Orange County Water District (OCWD) northwest of the station have revealed the presence of three distinct hydrochemical layers in groundwater related to depth in the aquifer. The first layer, characteristic of shallow groundwater lying within approximately 200 feet of the ground surface, contains relatively high levels of TDS and nitrate, and is dominated by calcium and sulfate ions. The second layer, characteristic of groundwater lying between approximately 200 and 450 feet bgs, contains lower levels of TDS and nitrate, and is dominated by sodium, calcium, and bicarbonate ions. The off-station VOC contamination has migrated from the ground surface through the first and into the second layer. The third layer lies with the lower hydrogeologic system at depths greater than 450 feet, contains relatively high levels of TDS and relatively low levels of nitrate, and is dominated by sodium and sulfate ions.

3.3 STATION HISTORY

Construction of a USMC pilots' fleet operational training facility began in July 1942 on 2,319 acres of land in Orange County, California. The facility was commissioned as MCAS El Toro on 17 March 1943. In 1950, the station was selected for development as a master jet air station and permanent center for Marine aviation on the West Coast to support the operations and combat readiness of Fleet Marine Forces, Pacific. Between 1944 and 1986, additional land was acquired to bring the on-station portion of the installation to 4,710 acres. The station was comprised of this acreage until recently, when portions of the property were transferred. In 1998, the Bake Parkway/Interstate 5 public highway expansion project was completed, resulting in the transfer of approximately 23 acres at the southeast corner of the station to Caltrans. In 2001, 896.7 acres in the northeast portion of the station were transferred to the FAA. In addition, transfer of 73.7 acres of property, also in the northeast portion of the station, to the FBI is pending. Property that has been transferred or is pending transfer is not addressed within this EBS.

The mission of MCAS El Toro was to operate and maintain facilities, and to provide services and material to support the operation of aviation activities and the units of the operating forces of the USMC. MCAS El Toro also provided support for other activities designated by the Commandant of the Marine Corps, in coordination with the Chief of Naval Operations.

3.4 HISTORIC OPERATIONS

A history of operations and associated hazardous substance activities at the station is provided in Table 3-1.

The mission of MCAS El Toro involved the operation and lower-echelon maintenance of military aircraft and ground-support equipment (USMC 1999). The generation of hazardous waste at MCAS El Toro was a result of operations at locations throughout the station, including:

- Aircraft maintenance and testing facilities
- Maintenance shops for automobiles, aircraft ground-support equipment, vehicle equipment, and construction equipment
- Auto hobby shop and Marine Corps Exchange auto repair and service stations
- Wash racks and steam-cleaning facilities
- Hazardous, flammable/combustible, and chemical materials storage areas and hazardous waste accumulation/storage facilities
- Aircraft fueling stations, tactical airfield fuel dispensing systems, and fuel storage areas

Waste was typically generated from aircraft and vehicle maintenance, degreasing processes, and painting operations that produced waste oil, fuels, hydraulic fluid, lubricating oil, antifreeze, cleaning solvents, paints, paint strippers, paint thinners, batteries, and contaminated rags and absorbents. Hazardous waste was also generated at the fuel storage areas when fuel storage tanks were cleaned and sludge was pumped out, or when fueling/defueling or loading/unloading operations resulted in spills and releases (JEG 1995b).

Wash water from wash racks was discharged to OWSs. The effluent water was discharged to the sanitary sewer or the storm drain system, and the waste oil was handled as hazardous waste. OWSs are situated throughout the station at various buildings.

Of relevance to this EBS are the historic operations that may have caused releases of hazardous substances or petroleum products to the environment. The following discussion presents a summary of previous operations at MCAS El Toro that were or may have been significant in past waste generation and disposal procedures (JEG 1995b).

- For approximately 6 months during the 1940s, aircraft refurbishing operations were conducted in the southwest portion of the station, primarily in Buildings 296, 297, and 324 within Study Area C (see Figure 2-1 for study area locations). Refurbishing operations consisted of cleaning and plating activities that may have included the use of solvent materials. Wastewater from this 6-month operation was discharged to currently abandoned industrial wastewater sewer lines and treated at the former industrial wastewater treatment plant (IWTP), which was previously situated within Study Area C. Based on aerial photographs, this plant existed in the 1940s, and was demolished by 1965.
- Sewage was treated at an on-station plant (previously situated within Study Area C) that was constructed in 1943, abandoned in 1972, and demolished in the late 1970s.

Table 3-1: History of Installation Operations

Period	Type of Operation	Weapons System	Hazardous Substance Activity
Pre-1943	New construction MCAS El Toro formally commissioned	None	Potential pesticide use
1943 to 1945	465 aircraft assigned (F4U, TBM, R5C, C-54, SNJ) 15,740 personnel assigned	Fighter, bombing, and training aircraft	Construction, landfilling, STP and sludge drying beds, fuel/oil/chemical storage, discharges to washes, waste burning
1946 to 1952	Marine aircraft groups assigned Aircraft (F4U, F7F, TBM, C-54, SNJ) 4,000 personnel assigned	Fighter, bombing, transport, and training aircraft	Construction, landfilling, fuel/oil/chemical storage, STP and sludge drying beds, discharges to washes, UST petroleum/waste storage, OWSs, aircraft refurbishing operations, waste burning, IWTP
1952 to 1955	Aircraft fleet marine force assigned Marine aircraft groups assigned Aircraft (F3D, F9F, F6F, C-199, C-54, AD, HRS)	Fighter, attack, transport, training aircraft, and helicopters	Petroleum disposal area, landfilling, fuel/oil/chemical storage, STP and sludge drying beds, discharges to washes, UST petroleum/waste storage, OWSs, waste burning, IWTP
1955 to 1960	One Marine Air Wing (3d MAW relocated to former MCAS El Toro from Miami, Florida) Aircraft (AD, A4D, F3D, F4D, F8U, F9F, C-119, C-54)	Fighter, attack, transport, photographic reconnaissance, and tanker aircraft	EOD, petroleum disposal area, landfilling, fuel/oil/chemical storage, STP and sludge drying beds, discharges to washes, UST petroleum/waste storage, OWSs, waste burning, IWTP
1961 to 1975	One Marine Air Wing (3d MAW) Aircraft (AD, A4D, F4H, C-130) 8,600 personnel assigned	Fighter, attack, and tanker aircraft	EOD, petroleum disposal area, landfilling, fuel/oil/chemical storage, STP and sludge drying beds, discharges to washes, UST petroleum/waste storage, OWSs, fire-training area burn pits
1976 to 1985	One Marine Air Wing (3d MAW) Aircraft (A4D, F2H, C-130)	Fighter, attack, and tanker aircraft	EOD, petroleum disposal area, landfilling, fuel/oil/chemical storage, discharges to washes, UST petroleum/waste storage, OWSs, fire-training area burn pits
1986 to 1991	One Marine Air Wing (2d MAW) Includes: MAG-11 (90 F/A-18 fighter attack aircraft, 12 KC-130) MAG-46 (12 F/A-18 fighter attack aircraft) Station (12 CH-46 helicopters, 3 UH-1 aircraft, 3 UC-12 aircraft, 1 CT-39 aircraft) 7,200 personnel assigned	Fighter, attack, and in-flight refueler aircraft, helicopter, and logistic transport	Petroleum disposal area, fuel/oil/chemical storage, discharges to washes, UST petroleum/waste storage, OWSs, fire-training area burn pits

Table 3-1: History of Installation Operations

Period	Type of Operation	Weapons System	Hazardous Substance Activity
1991 to 1995	One Marine Air Wing (3d MAW) Includes: MAG-11 (125 F/A-18 fighter attack aircraft, 12 KG-130) MAG-46 (12F/A-18 fighter attack aircraft) Reserve (12 CH-46 helicopters) Station UH-1 search and rescue helicopter UC-12, T-39 logistic aircraft 8,000 personnel assigned	Fighter, attack, and in-flight refueler aircraft, helicopter, and logistic transport	Fuel/oil/chemical storage, discharges to washes, UST petroleum/waste storage, OWSs, petroleum disposal area, fire-training area burn pits
1995 to 1999	One Marine Air Wing (3d MAW) Includes: MAG-11 (42 F/A-19 fighter attack aircraft, 2 T-34C Trainer aircraft, 14 KC-130 aerial refueler/transport aircraft) MAG-16 (84 CH46 transport helicopters) VMR-2 (3 UH-1 search and rescue helicopters, 3 UC- aircraft, 1 CT-39 logistic aircraft) MAG-46 (12 CH-47 [reserve] helicopters, 9 CH-53 [reserve] helicopters 5,546 personnel assigned (civilians included)	Fighter, attack, and in-flight refueler aircraft, helicopters, and logistic transport	Fuel/oil/chemical storage, discharges to washes, UST petroleum/waste storage, OWSs, petroleum disposal area, fire-training area burn pits
1999 to present	Former MCAS El Toro closed Leases of station property: Golf Course and associated buildings, Horse Stables, Child Development Center, Recreational Vehicle Storage Area, Indoor training Pool, and Fire Station	None	Fuel/oil/chemical storage, discharges to washes, AST petroleum/waste storage, OWSs

AST = aboveground storage tank
EOD = explosive ordnance disposal
IWTP = industrial waste treatment plant
MAW = Marine Air Wing
MCAS = Marine Corps Air Station
OWS = oil/water separator
STP = sewage treatment plant
UST = underground storage tank

Source: USMC 1999.

- Between 1943 and 1955, municipal-type waste generated by station housing and other activities was incinerated to reduce waste volume. The incinerator was situated at the northwest corner of the Original Landfill (IRP Site 3) within Study Area A; ash from the incinerator was disposed of in that landfill.
- Solid waste was disposed of at four on-station landfills. The Original Landfill (IRP Site 3), within Study Area A, operated from 1943 to 1955, and received waste, including municipal solid waste, paint residues, oily waste, and industrial solvents. Ash from an incinerator formerly situated adjacent to the landfill was also disposed at this site. Perimeter Road Landfill (IRP Site 5) operated from 1955 to the late 1960s, and received municipal solid waste, unspecified fuels, solvents and cleaning fluids, scrap metals, paint residues, and unspecified oily waste. Solid waste was burned in place at the Perimeter Road Landfill for volume reduction. After open burning was discontinued at the station in the late 1960s, waste was transported to the Magazine Road Landfill (IRP Site 2) (situated on property that has been transferred and is not addressed within this EBS), where it was disposed through 1980. Materials that were disposed at this site included municipal solid waste, unspecified industrial waste, lead batteries, transformers, various petroleum waste, and industrial solvents. The Communication Station Landfill (IRP Site 17) (situated on property that has been transferred and is not addressed within this EBS), in use from 1981 to 1983, was also used for disposal of municipal debris, cooking grease, oils, and fuels.
- Two burn pit areas were operated for fire-fighting training exercises. Crash Crew Pit No. 1 (IRP Site 9), situated in the southwest portion of the station within Study Area C, was in operation from 1965 to 1971. Crash Crew Pit No. 2 (IRP Site 16), situated near the center of the station within Study Area D, was in operation from 1972 to approximately 1985. The sites consisted of unlined pits that were filled with water and layered with various flammable liquids, including jet propulsion fuel (JP)-5, aviation gasoline, and other waste liquids. A third lined burn pit area was operational as recently as 1999.
- Pesticides and herbicides have historically been used at the station to control rodents and weeds. Chemicals used in the past included Thurshan, Diazinon, chlordane, Crovar, Malathion, Kelthane, strychnine, dichlorodiphenyltrichloroethane (DDT), and Retard-X. Pesticide storage in the past has been in designated storage areas in Building 493. Pesticides have also been stored at the Golf Course in Buildings 782 and 1687 (within Study Area B) and, prior to 1959, in the area now occupied by Building 464 (within Study Area B).

3.5 PROPERTY ACQUISITION AND TRANSFER

MCAS El Toro grew in size since it was initially formed in 1942. A brief summary of property acquisitions and, more recently, property transfers is provided in this subsection and Table 3-2. Figure 3-2 presents the chronology of former MCAS El Toro property acquisition and transfer actions. The original station property was acquired in October 1942. This initial property acquisition from the Irvine Ranch was comprised of approximately 2,319 acres of property and included the central portion of the station (the area where runways are situated). In July 1945, an additional area of approximately 22 acres was acquired from the Irvine Ranch. This area includes the property currently associated with Navy Marine (NAMAR) housing. In January 1952, approximately 161 acres were acquired from the El Toro Development Company. This area is in the northwest portion of the station and is comprised of the current Wherry Housing area. In August 1953, another large portion of land was acquired from The Irvine Company. The land, which included approximately 1,403 acres of property, is situated around the northwest, north, and northeast sides of the station. In April 1972, approximately 87 acres of land in the northeast portion of the station were acquired by exchange from The Irvine Company. In 1976, an additional 729 acres of land were acquired by exchange from The Irvine Company. One section of the property is situated in the south

Table 3-2. Property Acquisitions and Transfers

Tract Number	Previous Land Owner	Fee Land	Easement Land	Acquisition Date	Type of Acquisition/Transfer
Acquisitions					
A	Irvine Ranch Corporation	2,318.833	N/A	27 October 1942	Land acquired from the Irvine Ranch Corporation under the authority of an Act of Congress, approved 27 March 1942
B	Irvine Ranch Corporation	21.515	N/A	1 July 1945	Land acquired from the Irvine Ranch Corporation under the authority of an Act of Congress, approved 24 February 1942
C	El Toro Development Company	160.734	N/A	9 January 1952	Land acquired by a Grant Deed from El Toro Development Company
D	The Irvine Company	1,403.42	N/A	13 August 1953	Land acquired pursuant to a Declaration of Taking filed with the U.S. District Court for the Southern District of California
E	The Irvine Company	86.95	N/A	28 April 1972	Land acquired by exchange from The Irvine Company
F	The Irvine Company	729	N/A	24 March 1976	Land acquired by exchange from The Irvine Company
G	The Irvine Company	17.74	N/A	December 1986	Land purchased from The Irvine Company
Transfers					
---	DON	23	N/A	1998	Bake Parkway/Interstate 5 public highway expansion project
---	DON	896.7	N/A	2001	Federal Aviation Administration
---	DON	73.7	N/A	2002	Federal Bureau of Investigation*

* = pending transfer
DON = Department of the Navy
N/A = not available

Source: USMC 1999.

part of the station, the other in the north part of the station. This property is currently used as an agricultural lease area. Finally, in December 1986, 17.7 acres of land were purchased from The Irvine Company. This property included a small piece of land in the east portion of the station. The total acreage for MCAS El Toro was 4,710 (USMC 1999).

LEGEND

- Property Boundary
- Roads
- Buildings
- Transferred Parcel
- Transfer Pending
- A — Acquired Parcel

NOTES

Table 3-2 provides details of property acquisitions and transfers.

SOURCE

Southwest Division Naval Facilities Engineering Command 2003

Jacobs Engineering Group (JEG) 1995b

N

3000 0 3000 Feet

Figure 3-2
Property Acquisitions and Transfers
Environmental Baseline Survey
Former MCAS El Toro
California

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4. FINDINGS FOR STATION PROPERTY

4.1 PROPERTY CATEGORIZATION FACTORS

Property categorization factors include the resources of PRLs, hazardous materials and hazardous waste, IRP sites, storage tanks and pipeline systems, wastewater treatment and related systems, medical/biohazardous waste, ordnance, pesticides, and radioactive materials. Features associated with each of these resources are assigned ECP rankings, which contribute to the overall categorization of the former MCAS El Toro property. Section 4.1.1 discusses PRLs that were identified during the preparation of this 2002 EBS. These PRLs comprise features from the various property categorization factors; however, in order to identify these sites as locations identified in support of this EBS, they are grouped together in Section 4.1.1. Sections 4.1.2 through 4.1.11 discuss previously identified LOCs grouped by the various property categorization factors. A general discussion of each property categorization factor and its regulatory framework, as applicable, is included in each of the sections following Section 4.1.1.

4.1.1 Potential Release Locations Identified During 2002 EBS

Based on a review of records and VSIs conducted in support of this 2002 EBS, 76 facilities/features at former MCAS El Toro were identified as being associated with a potential release of contaminants to the environment. These sites, which were all identified during the preparation of the 2002 EBS and were not previously identified by prior surveys, are identified as PRLs with the following exceptions: PRL 46 (Silvery Recovery Unit [SRU] 03A); PRL 133 (SRU 03B); PRL 312 (SRU 03); and PRL 439 (SRU 010). These PRLs were previously identified as SRU LOCs and were considered for further evaluation as PRLs to investigate the SRU and associated releases at these facilities. Further evaluation of PRL sites could include, but is not limited to, additional records reviews, geophysical survey, or sampling. All PRLs, regardless of the type of site, are discussed in this section.

The former runways and taxiways are included in this EBS as a PRL site. The evaluation of the former runways and taxiways addressed the potential impact due to the practice of applying waste petroleum products (possibly containing PCBs) for weed control. Based on available documentation, the potentially impacted areas include the edges of the runways/taxiways and associated areas of runway extension. Based on the sample analysis of the runways and the areas encompassed by it, the Runway PRL has been categorized as ECP Area Type 3, with the exception of one sample location that was above action levels at the northern end of the runway; this area has been assigned an ECP Area Type of Category 7.

Table 4-1 lists and describes the newly identified sites, as well as summarizes their status, provides the carve-out location that the PRLs are situated within, and identifies the ECP Area Type category for each site. The sites identified during the 2002 EBS have been designated as "PRL" followed by the associated building number or feature (e.g., 296, railroad, military family housing). Figure 4-1 depicts the locations of these PRLs. A summary of the ECP categories for the PRLs listed in Table 4-1 is presented below.

- Two facilities have been assigned an ECP Area Type of Category 2a because releases of petroleum products below action levels have been identified, no actions were required, and regulatory agency concurrence with a no further action recommendation has been obtained.
- Four facilities have been assigned an ECP Area Type of Category 2e because further evaluation is required to determine whether release, disposal, and/or migration of petroleum products have occurred.

- Fifteen facilities have been assigned an ECP Area Type of Category 3 because releases below action levels have been documented, no actions were required, and regulatory concurrence with a no further action recommendation has been obtained.
- One facility have been assigned an ECP Area Type of Category 5 because the areas were identified as new issue areas where release, disposal, and/or migration of hazardous substances have occurred; however, all remedial actions have not yet been completed.
- A total of 55 facilities have been assigned an ECP Area Type of Category 7 because further evaluation is required to determine whether release, disposal, and/or migration have occurred.

4.1.2 Hazardous Materials and Hazardous Waste Locations of Concern

This section addresses the past management of hazardous materials and hazardous waste at MCAS El Toro. The mission of MCAS El Toro was to support the operation and maintenance of a large number of military aircraft and associated ground support equipment. The utilization of hazardous materials and the generation of hazardous waste was a result of operations at the following locations throughout the installation:

- Aircraft maintenance hangars
- Automobile, aircraft ground support equipment, vehicle equipment, and construction equipment
- Auto hobby shop, Marine Corps Exchange, and auto repair station(s)
- Wash racks and steam-cleaning facilities
- Hazardous, flammable, and chemical materials storage areas
- Aircraft fueling stations, airfield fuel dispensing systems, and fuel farms

As a result of the utilization of hazardous materials and the generation of hazardous waste at the types of facilities identified above, releases of hazardous substances may have occurred from past operations. Due to the continual and extensive industrial activities conducted at MCAS El Toro in the past, a series of surveys has been conducted to identify and document areas where hazardous materials and waste have been stored and/or where releases of these substances have occurred. These surveys include the 1993 RFA (EBS 1993b), 1991 and 1993 surveys of historical aerial photographs (EPA 1991; SAIC 1993), a 1995 stationwide EBS (EBS 1995b), and this EBS update. These surveys resulted in the identification of several RFA sites, temporary accumulation areas (TAAs), and aerial photograph features/anomalies (APHOs), which are discussed in the subsections in the text below.

Hazardous waste typically generated from aircraft, vehicle, and facility operations and maintenance activities includes waste oil, jet fuels, motor vehicle fuels, hydraulic fluid, lube oil, greases, antifreeze, cleaning solvents, paints, paint stripper, paint thinner, batteries, aerosols, acids, contaminated rags, and absorbents. Hazardous waste is also generated at fuel storage areas when fuel storage tanks are cleaned and sludge is pumped out, or when aircraft fueling/defueling or tank loading/unloading operations result in spills. MCAS El Toro operated an RCRA-permitted storage facility at Building 673 until August 1994. In December 1994, the Navy notified DTSC that waste storage at this building had ceased and closure would be performed. This facility was closed out in 1995. At the time MCAS El Toro was closed, hazardous waste was accumulated and either recycled (e.g., waste oil and waste JP-5) or disposed off station by the Defense Reutilization and Marketing Office (DRMO) within 90 days of the accumulation date.

Currently the hazardous materials utilized at former MCAS El Toro are those used by lessees to the Navy during facility maintenance and golf course maintenance operations, and for activities associated with the agricultural (i.e., cultivation and nursery operations) activities occurring on leased portions of the installation. The hazardous materials used for these activities consist primarily of motor fuels, oils, greases, lubricants, paints, thinners, batteries, cleaners/solvents, compressed gases, antifreeze, pesticides, and fertilizers. Most of these products are completely used during the application processes; however, a small amount of hazardous waste is generated and is either recycled (e.g., waste oils and fuels) or properly disposed off station.

4.1.2.1 RCRA Facility Assessment Locations of Concern

An RFA was completed for former MCAS El Toro in 1993 (JEG 1993b). The object of this RFA was to identify SWMUs and other areas of concern (AOCs), evaluate the potential risk for a release of hazardous waste to the environment, assess the need for further action (i.e., remediation or investigation), and identify the potential for incorporating those SWMUs and/or AOCs into an operable unit (OU) under the IRP. The 1993 RFA included the investigation of 305 SWMUs/AOCs; however, 3 of the SWMUs/AOCs were identified at former MCAS Tustin, 15 units were duplicates of other SWMUs/AOCs, and 4 SWMUs/AOCs were researched and identified as phantom sites (sites that were misidentified as SWMU/AOC sites). These sites have been eliminated from the inventory of RFA sites at former MCAS El Toro. DTSC approved the Final RFA in July 1996, following additional sampling of 13 SWMUs and 1 TAA. As a result, the Final RFA identified a total of 283 SWMUs and AOCs. Of these 283 SWMUs and AOCs, regulatory agencies have concurred with a no further action recommendation for 264 of these sites (USMC 2001). The status of the SWMUs and AOCs as presented in the 2003 Draft Base Realignment and Closure Business Plan for MCAS El Toro is provided below. The number of sites addressed in this EBS may be different based on some areas having been transferred and not included in this EBS.

- A total of 102 are addressed as RFA sites (9 were deleted as phantom or non-existent sites during 2002 with regulatory concurrence and are no longer considered or listed as RFA LOCs)
- A total of 64 are addressed as TAAs (see Section 4.1.2.2)
- A total of eight are addressed under the IRP (see Section 4.1.3)
- A total of 76 are addressed as USTs (see Section 4.1.4.2)
- A total of 30 are addressed as OWSs (see Section 4.1.5.1)
- One is addressed under the installation PCB program (see Section 4.1.6) (USMC 2003)

The ESA prepared by Geosyntec identified two additional RFA sites (RFA G-747 and RFA G-770). These sites were evaluated by the DON and were also evaluated in support of this EBS. Both sites were identified as vehicle wash racks, one near Building 747 and the other near Building 770. These sites were recommended for further action in the Geosyntec report; however, based on evaluation of these sites by the Navy and in this EBS, Building 770 was determined to require no further action and is not considered to be an LOC. The wash rack referenced at Building 747 (past use listed as Contractor Refueler Facility) was evaluated by site visits and was not found to exist. However, a concrete slab area, which was partially covered, was identified. A sump is situated in the middle of the covered area. Based on observations made during the VSI, this area is being further evaluated as PRL 747 in this EBS.

A total of 92 RFA sites are addressed in this EBS (RFA 307 is situated in the parcel that was transferred to the FAA and is not included here). Of the 92 RFA sites, 16 require further action and the remaining 76 have been concurred with by the regulatory agencies for an NFA. Table 4-2 lists and describes the RFA sites, as well as summarizes the status of the sites, provides the study area that the sites are situated within, and identifies the ECP Area Type category for each site. Figure 4-2 depicts the locations of the RFA sites. A summary of the ECP categories for the RFA sites identified at former MCAS El Toro is presented below:

- A total of 47 RFA sites have been assigned an ECP Area Type of Category 1 because no release, disposal, and/or migration of hazardous substances or petroleum products have been identified.
- Six RFA sites have been assigned an ECP Area Type of Category 2a because releases of petroleum products below action levels have been identified, no actions were required, and regulatory agency concurrence with a no further action recommendation and site closure has been obtained.
- One RFA site has been assigned an ECP Area Type of Category 2b because releases of petroleum products requiring an action have been identified, all required actions have been completed, and regulatory concurrence with a no further recommendation and site closure has been obtained.
- A total of 18 RFA sites have been assigned an ECP Area Type of Category 3 because releases below action levels have been documented, no actions were required, and regulatory agency concurrence with a no further action recommendation has been obtained.
- Four RFA sites have been assigned an ECP Area Type of Category 4 because releases requiring an action have been documented, all required actions have been completed, and regulatory agency concurrence with a no further action recommendation has been obtained.
- Four RFA sites have been assigned an ECP Area Type of Category 5 because releases requiring an action have been documented and required actions are underway; however, all required actions have not been completed and/or regulatory agency concurrence with a no further action recommendation has not yet been obtained.
- Nine RFA sites have been assigned an ECP Area Type of Category 6 because releases requiring an action have been documented, and required actions have not yet been implemented.
- Three RFA sites have been assigned an ECP Area Type of Category 7 because further evaluation is required to determine whether release, disposal, and/or migration have occurred.

4.1.2.2 Temporary Accumulation Area Locations of Concern

TAA sites are those areas where hazardous waste was collected prior to disposal. TAAs were identified as SWMUs/AOCs in the 1993 RFA (JEG 1993b); additional TAAs were identified under the *Former MCAS El Toro Hazardous Waste Open Drum Inspection Report* (SWDIV 1996), the Final Addendum to the RFA (BNI 1996) and the El Toro Hazardous Waste Management Plan. A total of 64 TAA sites are addressed within this EBS.

The ESA prepared by Geosyntec identified four additional TAA sites (TAA G-165, TAA G-295, TAA G-320B, TAA G-636). These sites were evaluated by the DON and were also evaluated in support of this EBS. TAA G-295, TAA G-320B, and TAA G-636 were recommended for further action in the Geosyntec report; however, based on evaluation of these sites by the Navy and in this EBS, TAA G-295, TAA G-320B, and TAA G-636 were determined to require no further action and

are not considered to be LOCs. TAA G-165 was determined to require further evaluation and is included in this document as PRL 165. This site is addressed in Section 4.1.1.1 and Table 4-1.

Table 4-3 lists and describes the 64 TAA sites, as well as summarizes the status of the sites, provides the study area that the sites are situated within, and identifies the ECP Area Type category for each site. Figure 4-3 depicts the locations of the TAA sites. A summary of the ECP categories for the TAA sites identified at former MCAS El Toro is presented below:

- A total of 19 TAA sites have been assigned an ECP Area Type of Category 3 because releases below action levels have been documented, no actions were required, and regulatory agency concurrence with a no further action recommendation has been obtained.
- Seven TAA sites have been assigned an ECP Area Type of Category 5 because releases requiring an action have been documented and required actions are underway; however, all required actions have not been completed and/or regulatory agency concurrence with a no further action recommendation has not yet been obtained.
- A total of 32 TAA sites have been assigned an ECP Area Type of Category 6 because releases requiring an action have been documented, and required actions have not yet been implemented.
- Six TAA sites have been assigned an ECP Area Type of Category 7 because further evaluation is required to determine whether release, disposal, and/or migration have occurred.

4.1.2.3 Aerial Photograph Feature/Anomaly Locations of Concern

Aerial photographs of MCAS EL Toro dated from 1952 to 1991 were reviewed by the EPA in 1991 as part of the CERCLA process (EPA 1991). An additional review of aerial photographs dated from 1946 to 1992 was conducted for the DON in 1993 (SAIC 1993). These reviews were conducted in order to identify sites/areas on the photographs that may represent a potential environmental concern. Features indicative of potential releases of hazardous substances or petroleum products included, but were not limited to, areas of staining, surface liquids and/or wet soils, impound facilities, areas of ground disturbance (e.g., excavations, trenches, surface debris/refuse), drum storage areas, open storage areas/yards, and storage tanks.

These aerial photograph reviews identified over 500 APHO sites. The majority of these features/anomalies were associated with IRP sites and were further evaluated/investigated as part of the IRP (i.e., Phase II RI). However, 53 features/anomalies could not be associated with an IRP site and, therefore, required additional investigation as APHO LOCs. Subsequent reviews of aerial photographs increased the number of APHO LOCs to 68. In addition to these 68 APHO sites, 14 APHOs were identified and evaluated with the Stable Area Anomalies, and 46 APHOs were identified in a letter from DTSC dated 12 May 1999. Of the 46 APHOs identified by DTSC, 3 were already included in the original 68 APHO sites and 1 was included with the Stable Area Anomalies. The total number of APHO sites addressed in this EBS is 123.

The ESA prepared by Geosyntec identified additional APHO sites (APHOs G-69 through G-86). These sites were evaluated by the DON and were also evaluated in support of this EBS. Based on evaluation of these sites by the DON (Tables A-1, A-2, and A-3, Appendix A) and in support of this EBS, the additional APHOs identified by Geosyntec were determined to require no further action. These sites are not considered to be LOCs and are not discussed further in this EBS.

Anomaly Area 3 comprises APHO Sites 59, 60, 61, 62, 63, 64, and 65 identified by SAIC during a review of historical aerial photographs taken during the period from 1946 through 1992 (SAIC 1993) in the northwest portion of the installation near the Wherry Housing Area. Anomaly Area 3

encompasses an area of approximately 9 acres and is situated in the northwestern section of former MCAS El Toro facility near Pusan Way, adjacent to the Agua Chinon Wash. Historically, the site was used as a source of borrow material. Records indicate that some of the borrow pits and trenches were backfilled with construction debris and later covered with 5 feet or more of fill soil (IT/OHM 2000). Anomaly Area 3 is also referred to as Miscellaneous Refuse Area 1 (MSCR1). A review of historical aerial photographs and topographic maps suggests that placement of construction debris occurred between 1972 and 1988. Interviews with former station personnel indicate that construction debris generated during the construction of the investigation-derived waste (IDW) management area at IRP Site 3 was disposed at Anomaly Area 3.

In order to further investigate the site and to collect data necessary for developing a response action, a Removal Site Evaluation work plan (Earth Tech 2002c) was prepared and submitted to the regulatory agencies for their review and comments. The objectives of the work plan were:

- Collect soil vapor, soil, groundwater, and surface water and sediment samples to evaluate the impact, if any, due to waste placement
- Confirm lateral limits of the waste placement
- Evaluate human health and ecological risk
- Collect soil samples to conduct a geotechnical assessment of the existing soil cover

After the final work plan was approved by the regulatory agencies, the field activities were initiated in October 2002. Air, surface soil, shallow and deep subsurface soil vapor, perimeter soil gas (from existing and newly installed wells), groundwater (from existing and newly installed wells), wash sediment and surface water samples were collected at the site. Cone penetrometer survey, habitat assessment and exploratory trenching were conducted at the site. Screening level human health and ecological risk assessments were also performed using the data collected during this investigation.

A report is in preparation to document the results of the expanded site inspection and to present the results of the human health and ecological risk assessments. The draft report will be submitted to the regulatory agencies for their review and comments. Anomaly Area 3 is currently an ECP Type 7.

Table 4-4 lists and describes the APHO sites, as well as summarizes the status of the sites, provides the study area that the sites are situated within, and identifies the ECP Area Type category for each site. Figure 4-4 depicts the locations of the APHO sites. A summary of the ECP categories for the APHO sites identified at former MCAS El Toro is presented below:

- A total of 74 APHO sites have been assigned an ECP Area Type of Category 1 because no release, disposal, and/or migration of hazardous substances or petroleum products have been identified.
- Two AHPO sites have been assigned an ECP Area Type of Category 2a because releases of petroleum products below action levels have been identified, no actions were required, and regulatory agency concurrence with a no further action recommendation and site closure has been obtained.
- One APHO site has been assigned an ECP Area Type of Category 2c because releases of petroleum products requiring an action have been identified and required actions are underway; however, all required actions have not been completed and/or regulatory agency concurrence with no further action recommendation and site closure have not been obtained.

- Two AHPO sites have been assigned an ECP Area Type of Category 2e because further evaluation is required to determine whether release, disposal, and/or migration of petroleum products have occurred.
- Fourteen APHO sites have been assigned an ECP Area Type of Category 3 because releases below action levels have been documented, no actions were required, and regulatory agency concurrence with a no further action recommendation has been obtained.
- One APHO site has been assigned an ECP Area Type of Category 5 because releases requiring an action have been documented and required actions are underway; however, all required actions have not been completed and/or regulatory agency concurrence with a no further action recommendation has not yet been obtained.
- Four APHO sites have been assigned an ECP Area Type of Category 6 because releases requiring an action have been documented and required actions have not yet been implemented.
- Twenty-five APHO sites have been assigned an ECP Area Type of Category 7 because further evaluation is required to determine whether a release, disposal, and/or migration have occurred.

4.1.3 Installation Restoration Program

The IRP was established to identify, characterize, and remediate CERCLA-related contamination on military installations. The program is designed to evaluate past disposal sites, control the migration of contaminants, and control potential hazards to human health and the environment. The IRP at former MCAS El Toro was established as the mechanism for the CERCLA (42 U.S.C. Section 9601) process, incorporating applicable RCRA and state regulations, as well as meeting requirements of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Part 300). To ensure compliance with CERCLA/RCRA regulations, the IRP was implemented to identify potentially contaminated sites, investigate those sites, and evaluate and select remedial actions.

In June 1988, MCAS El Toro was recommended by the EPA for listing on the National Priorities List (NPL). The listing was based on the presence of VOC contamination in the groundwater at the MCAS boundary and in the agricultural wells to the west of the station. MCAS El Toro was listed on the NPL in February 1990. In October 1990, the EPA, the California Department of Health Services (part of which is currently DTSC), the California RWQCB Santa Ana Region, and the Navy signed an FFA to conduct an RI/feasibility study (FS) and implement required removal/remedial actions for MCAS El Toro following the NCP and EPA guidance.

A total of 24 sites have been identified as part of the IRP (Sites 1 through 22, 24, and 25). Of these, 22 sites were evaluated during the Phase I RI, which was completed in May 1993. Site 23 (Wastewater Treatment Plant Sewer Lines) was evaluated during the RFA; however, this site is not listed among the inventory of IRP sites. Because the sewer lines were investigated as a potential source of VOC impacts, Site 23 was eventually included as part of the investigation of Site 24, the VOC Source Area. Therefore, Site 23 was eliminated from the IRP.

Two additional sites (Sites 24 and 25) were identified in the Phase II RI, bringing the total of IRP sites to 24. The sites are grouped into three OUs: OU-1, OU-2, and OU-3. The following is a summary of the site groupings for these OUs.

- OU-1 addresses groundwater chemical constituents and consists of one IRP site (Site 18).
- OU-2 consists of three subunits (OU-2A, OU-2B, and OU-2C) and addresses potential source areas of chemicals in groundwater.
  - OU-2A includes Site 24 (VOC Source Area) and Site 25 (Major Drainages).
  - OU-2B addresses Site 2 (Magazine Road Landfill) and Site 17 (Communications Station Landfill).
  - OU-2C addresses Site 3 (Original Landfill) and Site 5 (Perimeter Road Landfill).
- OU-3 comprises the remaining 17 sites, which are Sites 1, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 20, 21, and 22. Portions of three sites (Sites 15, 19, and 20) are no longer part of the IRP; they have been withdrawn due to CERCLA petroleum exclusion and have been closed under the Corrective Action Program.

Three of the IRP sites are within former station property that has been transferred or is scheduled for transfer from the Navy to other agencies and are no longer Navy property. These are IRP Sites 1 (Explosive Ordnance Disposal Range) (impending transfer), 2 (Magazine Road Landfill), and 17 (Communication Station Landfill). Former MCAS El Toro property that has been transferred is not addressed within this EBS; therefore, these IRP sites will not be categorized or discussed further within this document (except for a brief discussion of Site 1 in the context of basewide perchlorate investigations that is found at the end of this section). Of the 21 IRP sites discussed within this EBS, 13 of the sites have been determined to require no further action, and Records of Decision (RODs) have been signed for site closure. The remaining eight sites are active sites with ongoing or planned response actions.

A summary of the IRP sites by ECP category is provided below. The following subsections briefly summarize each of the IRP Sites within the former MCAS El Toro property. IRP sites are listed in Table 4-5 and their locations are shown in Figure 4-5.

- A total of 12 sites have been assigned an ECP Area Type of Category 3 because releases below action levels have been documented, no actions were required, and regulatory agency concurrence with a no further action recommendation has been obtained.
- One site has been assigned an ECP Area Type of Category 4 because releases requiring an action have been documented, all required actions have been completed, and regulatory agency concurrence with a no further action recommendation has been obtained.
- Two sites have been assigned an ECP Area Type of Category 5 because releases requiring an action have been documented and required actions are underway; however, all required actions have not been completed and/or regulatory concurrence with a no further action recommendation has not yet been obtained.
- Six sites have been assigned an ECP Area Type of Category 6 because releases requiring an action have been documented, and required actions have not been implemented to date.

Perchlorate was initially identified at low concentrations in groundwater near MCAS El Toro during sampling conducted by the Orange County Water District (OCWD) in December 1997 in a groundwater monitoring well 100 feet west of the west MCAS El Toro boundary (BNI 1999). Of the three samples collected at multiple depths at this well, two had concentrations above the detection limit of 4 µg/L, with a maximum detected concentration of 7.6 µg/L.

In response to the OCWD findings, DON collected groundwater samples and analyzed for perchlorate between January and March 1998 in conjunction with ongoing volatile organic

compound (VOC) sampling activities being conducted at the western corner of MCAS El Toro (BNI 1999). Twenty-eight samples were collected at 7 locations upgradient from the off-Station OCWD well. Perchlorate was detected in 27 of the 28 samples at concentrations ranging from 4 µg/L (est.) to 23 µg/L (detection limit was 10 µg/L).

DON then conducted a Stationwide investigation during October 1998 to evaluate the presence and concentrations of perchlorate in groundwater at MCAS El Toro. A total of 50 sampling locations were identified, including monitoring wells located at the following areas (BNI 1999):

- IRP Site 1, the Explosive Ordnance Disposal (EOD) Range, where rocket motors and missiles containing solid propellants are known to have been burned or destroyed. This site is part of the property slated for a federal agency to agency transfer to the FBI
- The four on-Station inactive landfills (IRP Sites 2, 3, 5, and 17). IRP Sites 2 and 17 have been transferred to the FAA
- Adjacent to two former burn pits used for firefighter training exercises (IRP Sites 9 and 16)
- Near runways, taxiways, and aircraft parking areas
- Within on- and off-station VOC plumes (IRP Sites 18 and 24)
- On- and off-Station background monitoring well locations

Perchlorate was reported in groundwater at 15 of the 50 locations sampled, including several background wells, both on and off-Station. Detected concentrations ranged from 2 µg/L to 280 µg/L; however, all but one ranged between 2 µg/L and 13 µg/L (the 1999 California provisional action level was 18 µg/L). The only sample with a concentration above the 1999 California provisional action level was collected at IRP Site 1, the EOD Range, which is not addressed in this EBS. The results indicated that low concentrations of perchlorate are present in groundwater at scattered locations throughout the Station and in off-Station wells. These scattered, low concentrations are consistent with off-station groundwater well data obtained by OCWD (pers. comm., Mr. Herndon, OCWD).

Additional stationwide sampling for perchlorate is performed periodically as part of the CERCLA groundwater monitoring program. Results from these sampling events are consistent with the original findings, i.e., low concentrations at scattered locations both on-Station and off-Station, with perchlorate results ranging from non-detect (ND) to a highest concentration of 9.9 µg/L for sampling performed between 2000 and 2002 (for property addressed in this EBS). Sampling of IRP Sites 3 and 5 in 2002 indicated all ND results. In addition, vadose zone sampling at Building 165, an ammunition storage facility, did not detect perchlorate. These results coupled with low concentrations, the lack of increasing concentration trends, and similar findings off-Station, support the premise that with the exception of IRP Sites 1 and 2, there are no other sources of perchlorate at MCAS El Toro. Therefore, consistent with DON policy and the results cited above, no further investigation activities to assess the source of perchlorate in the areas slated for transfer is required.

Regarding Site 1, a perchlorate verification study was conducted in 1999-2000 in order to provide information pertaining to the nature and extent of perchlorate in groundwater, to provide supplemental data regarding local hydrogeologic conditions, and to evaluate potential perchlorate presence in soil (Earth Tech 2001). Results of the investigation confirmed that perchlorate was present in groundwater at Site 1, with the highest concentrations localized in the central portion of Site 1, and significantly lower concentrations elsewhere. Perchlorate was also detected in soil at depths less than 5 feet bgs; however, the concentrations were below residential and industrial PRGs.

The extent of perchlorate in groundwater at Site 1 is currently being evaluated as part of the Site 1 remedial investigation.

4.1.3.1 SITE 3 – ORIGINAL LANDFILL

IRP Site 3 encompasses approximately 11 acres and is situated between Irvine Boulevard and North Marine Way within Navy Sale Parcel II (see Figure 2-1). The Site 3 landfill, which was the original station landfill, was active from 1943 to 1955 and operated as a cut-and-fill disposal facility. Waste was burned at a former incinerator to reduce volume prior to burial. Site 3 contains a variety of materials disposed at assorted locations within the landfill. Reportedly, almost any waste generated at former MCAS El Toro may have been disposed at the site. The waste likely included scrap metal, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily waste, municipal solid waste, and various inert solid waste.

Investigations conducted at Site 3 include an IAS in 1985 (Brown and Caldwell 1986), a Phase I RI during 1992-1993, a Phase II RI during 1995-1996, and an FS for landfill sites in 1997. Soil sampling results indicated that arsenic, beryllium, and manganese concentrations exceeded residential preliminary remediation goals (PRGs) in a few locations; however, only arsenic values were above former MCAS El Toro background concentrations. Groundwater sampling indicated that the only VOC in excess of the maximum contaminant level (MCL) was benzene; however, because the monitoring well in which it was detected is situated downgradient of Tank Farm No. 5, it was not clear whether the source was the landfill, the tank farm, or the Agua Chinon Wash. A Proposed Plan was prepared in 1998, and the draft Record of Decision (ROD) for Sites 3 and 5, which details the selected remedy, was issued in 1999. The ROD will be finalized after the results of the radiological survey are incorporated in the remedy selection process.

A pre-design investigation is currently underway at Site 3. The selected remedy described in the draft ROD consists of a single-barrier landfill cap with a 2-foot-thick foundation layer, a flexible membrane liner (FML) barrier, and a 2-foot-thick soil layer to support vegetation. The cap also includes erosion control features to regulate surface water flow and protect the integrity of the cap. Environmental monitoring at the site includes landfill gas, leachate, and groundwater. Site 3 has been assigned an ECP Area Type of Category 6 because releases of hazardous substances have been identified and response actions are required. However, response actions have not been implemented to date, and further action is required at the site.

4.1.3.2 SITE 4 – FERROCENE SPILL AREA

IRP Site 4 encompasses approximately 5,000 square feet and is immediately southeast of Building 658, a jet-engine testing facility, which is within Navy Sale Parcel II (see Figure 2-1). The site is bounded by 9th Street to the south, Building 658 to the north and west, and Tank Farm No. 5 to the east. The site consists of two units: Unit 1 is an oil-stained area southeast of Building 658, which overlaps a concrete transformer pad, and Unit 2 is a drainage ditch, which received runoff from a ferrocene spill.

The contamination at Unit 2 originates from an August 1983 spill, when the contents of a 500-gallon tank (wash water and residual jet fuel) reportedly overflowed during washing and spilled onto the ground, draining into a ditch adjacent to 9th Street. The spilled liquid reportedly contained approximately 5 gallons of ferrocene and a hydrocarbon carrier solution. Ferrocene is an organic compound used as an anti-knock additive and catalyst in gasoline and jet fuel. The staining at Unit 1 was the result of oily discharges from Building 658, which were observed over an approximate 2-year period. Based on the jet-engine testing activities at Building 658, the discharges may have consisted of heavy oils, solvents, or fuels.

Investigations conducted at Site 4 include a Phase I RI and aerial photograph surveys in 1993. VOCs and semivolatile organic compounds (SVOCs) were below residential PRGs in both units. PCBs were not detected in soil samples collected in Unit 1, which included a former transformer pad. Arsenic was detected in concentrations exceeding industrial PRGs to a depth of up to 215 feet bgs. Diesel was detected in Unit 2 at concentrations up to 16,400 milligrams per kilogram (mg/kg) at the surface. In 1996, the RI for the site was completed using only Phase I RI data; no Phase II sampling was conducted. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. The ROD for no further action was signed in September 1997 (30 September 1997). Site 4 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.3 Site 5 – Perimeter Road Landfill

IRP Site 5 is situated adjacent to Perimeter Road and encompasses approximately 1.8 acres within Navy Sale Parcel II (see Figure 2-1). The landfill, which was active from approximately 1955 until the late 1960s, operated as a trench disposal facility where waste was typically burned to reduce volume prior to burial. Typical of municipal and military landfills, Site 5 contains a variety of materials disposed at various locations within the landfill. The waste is likely to have included burnable trash, municipal solid waste, cleaning fluids, scrap metals, paint residues, and unspecified fuels, oils, and solvents.

Investigations conducted at Site 5 include an IAS in 1985, a Phase I RI in 1992-1993, a Phase II RI in 1995-1996, and an FS for landfill sites in 1997. Soil samples collected during boring operations were analyzed for VOCs and SVOCs; however, none of the analytes detected exceeded residential PRGs. Groundwater samples collected from five monitoring wells during the Phase II RI were analyzed for VOCs, SVOCs, pesticides, metals, and gross alpha- and beta-emitting radionuclides. None of the compounds detected exceeded MCLs, with the exception of gross alpha concentrations, which exceeded MCLs in two wells situated downgradient of the landfill. A Proposed Plan was prepared in 1998, and the draft ROD for Sites 3 and 5, which details the selected remedy, was issued in 1999. The final ROD will be issued after results of the radiological survey are incorporated into the remedy selection process.

A pre-design investigation is currently underway at Site 5. This investigation will also evaluate APHO 46 and MSCR 2 for possible inclusion in the selected response for IRP Site 5. The selected remedy described in the draft ROD consists of a single-barrier cap with 2-foot-thick foundation layer, an FML barrier, and a 2-foot-thick soil layer to support vegetation. The cap also includes erosion control features to regulate surface water flow and protect the integrity of the cap. Environmental monitoring at the site includes landfill gas, leachate, and groundwater. Site 5 has been assigned an ECP Area Type of Category 6 because releases of hazardous substances have been identified and response actions are required. However, response actions have not been implemented to date, and further action is required at the site.

4.1.3.4 Site 6 – Drop Tank Drainage Area No. 1

IRP Site 6 encompasses approximately 123,000 square feet and is bounded by taxiways to the north and west, a concrete aircraft parking apron to the east, and East Marine Way to the south. The site is within Navy Sale Parcel II (see Figure 2-1). The site consists of three units:

- Unit 1 is an area along the edge of a concrete parking apron where aircraft drop tanks were formerly drained of residual jet fuel and then cleaned prior to reuse.

- Unit 2 is a shallow drainage swale that extends from the north side of Building 727, west to a catch basin that eventually discharges into Agua Chinon Wash. The catch basin receives surface runoff and sediment from the site.
- Unit 3 is a flat, grass-covered area south of the drainage swale where drop tanks were stored.

From 1969 to 1983, aircraft drop tanks were transported to the site where the fuel remaining in the tanks was drained. Residual JP-5 fuel in the tanks was drained to the concrete apron, and the combined fuel/rinse water ran onto the adjacent grassy area. In addition to fuels, waste lubricant oils from maintenance operations were also reportedly stored in drums and staged in the area.

Approximately 1,400 gallons of JP-5 fuel were reportedly drained from the drop tanks onto the concrete apron and washed onto the adjacent area. Portions of the unpaved areas at the site were also reportedly used for storing oil drums. It has been estimated that approximately 300 gallons of waste oil leaked from these storage drums at the site.

Investigations conducted at Site 6 include a Phase I RI and aerial photograph surveys in 1993, employee interviews in 1994, and a Phase II RI in 1996. During the investigations, VOCs, SVOCs, and polynuclear aromatic hydrocarbons (PAHs) were detected at concentrations below residential PRGs. Arsenic was detected at concentrations above industrial PRGs from the soil surface to 140 feet bgs. The maximum arsenic concentration was detected at a depth of 8-10 feet bgs and was above the former MCAS El Toro background concentration for arsenic. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed on 30 September 1997. Site 6 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.5 Site 7 – Drop Tank Drainage Area No. 2

IRP Site 7, which is approximately 11 acres in size, was reportedly used for aircraft drop tank storage and drainage from approximately 1969 to 1983. The site is situated within Navy Sale Parcel III (see Figure 2-1). Aircraft drop tanks were drained and washed on a concrete apron. The mixture of residual fuel and washwater drained off the edge of a concrete apron onto the adjacent unpaved areas. In addition, it is suspected that soil areas near Buildings 296 and 297 (aircraft hangars) have been sprayed with lubrication oil and JP-5 jet fuel for dust control.

The site was identified during the Phase I RI. Additional sampling of soils to depths of 10 feet bgs was performed as part of the Phase II RI in early 2000. PAHs and hydrocarbons were above screening levels; however, due to the CERCLA petroleum exclusion, hydrocarbon concentrations were not considered. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. The ROD for no further action was signed on 26 June 2001. Site 7 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.6 Site 8 – DRMO Storage Yard

IRP Site 8, which is approximately 7 acres in size, was used as a storage area for containerized liquids, scrap, and salvage material from MCAS El Toro and MCAS Tustin. The site is situated within Navy Sale Parcel III (see Figure 2-1). Transformer oil containing PCBs was reportedly spilled in a specific area of Site 8. Approximately 230 cubic yards of PCB-impacted soil was excavated and

used as fill at Site 19 in 1994. Site 8 consists of two distinct but adjacent areas bisected by R Street: an old salvage yard and a main storage yard. These two areas were subdivided into five separate units:

- Unit 1 is known as the East Storage Yard.
- Unit 2 is known as the West Storage Yard.
- Unit 3 is the Refuse Pile Area (situated within Unit 2).
- Unit 4 is the PCB Spill Area (situated within Unit 1).
- Unit 5 is the Old Salvage Yard.

Investigations conducted at Site 8 include a Phase I RI and a Phase II RI, where shallow soil samples were collected. High levels of total residual petroleum hydrocarbons (TRPH) were detected at the surface; moderate levels were detected at 15-20 feet bgs. PCBs greater than industrial PRGs were detected in one surficial sample; several samples had PCB concentrations above residential PRGs in the upper 4 feet. PAHs were detected in the upper foot of soil. Results of the sampling were used to perform risk calculations. Based on the results of risk calculations, a Draft ROD was issued that recommended no further action for Units 1, 2, and 4. Further action was recommended for Units 3 and 5, due to excess risk caused by PCB and PAH concentrations. Pursuant to comments received on the Draft ROD, risk calculations based on toxicity and exposure values that were updated by the EPA and the California EPA were conducted, and the Navy issued a Final Technical Memorandum Risk Reevaluation for Sites 8, 11, and 12. Based on the incorporation of additional sample analytical results, Unit 5 of IRP Site 8 has been determined to require no further action. A draft Final ROD is in development. As a result, significant pre-final ROD changes will require documentation such as a discussion in the ROD or a revised Proposed Plan. In addition, the finalized ROD will incorporate the results of the radiological survey. Site 8 has been assigned an ECP Area Type of Category 6 because releases of hazardous substances have been identified and response actions are required; however, response actions have not been implemented to date. Further actions are required at the site.

4.1.3.7 SITE 9 – CRASH CREW PIT NO. 1

IRP Site 9 encompasses approximately 50,000 square feet and is situated south of a taxiway for the east-west runway. The site, which is situated within Navy Sale Parcel III (see Figure 2-1), consists of two units:

- Unit 1 contains the former locations of two unlined earthen pits used for fire-fighter training from 1965 to 1971.
- Unit 2 consists of the area between the pits, the area surrounding the pits, and a broad, low-drainage swale extending north and east of the pits to a storm drain inlet. Unit 2 was added during the planning stages for the Phase II RI.

Both units include areas covered with grass and low vegetation, as well as unvegetated soil. The terrain is relatively flat. During training exercises, the two pits were reportedly filled with water and covered with various mixtures of residual fuels and other combustible fluids (i.e., JP-5, aviation gasoline [AVGAS], crankcase oil, and other waste). The mixtures were then ignited and extinguished by firefighters, primarily using water.

An estimated 123,700 gallons of waste liquids were used in the training exercises conducted in the west pit. Although only the west pit operational history was identified, the east pit operations are

assumed to have been similar. Based on the types of waste reported to have been burned at Site 16 (Crash Crew Burn Pit No. 2), small quantities of napalm, white phosphorus, and magnesium phosphate may also have been used in the burn pits at Site 9.

Investigations conducted at Site 9 included a Phase I RI on Unit 1 and aerial photograph surveys in 1993, employee interviews and a soil gas survey in 1994, and a Phase II RI in 1996. VOCs, SVOCs, and PAHs were detected at concentrations below residential PRGs. TPH was detected in shallow soil during the Phase I RI at concentrations of up to 249 mg/kg. Arsenic was detected at concentrations above industrial PRGs from the soil surface to a depth of 25 feet bgs. The maximum arsenic concentration was identified at a depth of 0-1 feet bgs, and was above the former MCAS El Toro background concentration. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed on 30 September 1997. Site 9 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.8 Site 10 – Petroleum Disposal Area

IRP Site 10 encompasses approximately 27 acres and is situated south of Building 435 and east of Building 369. The site is within Navy Sale Parcel III (see Figure 2-1). The site consists of four units (Units 3 and 4 were added after the Phase I RI):

- Unit 1 is an aircraft matting area immediately south and west of Building 435; the aircraft matting is 3 feet by 6 feet of interlocking metal slats that are joined end-to-end and side-to-side.
- Unit 2 is a 24-inch-thick concrete aircraft parking apron that covers the entire unit.
- Unit 3 is an asphalt-paved area previously used by the 14th Combat Equipment Support Unit for military vehicle maintenance and parking. The paving in this area ranges from 6 to 12 inches thick.
- Unit 4 is approximately 1,000 feet west of Unit 3 and consists of a 6-inch-thick asphalt-paved area used in part for hazardous materials storage on the northwest side and as a parking area for Building 1589 on the northeast side.

Prior to 1971, the site was an open-ground area used for aircraft parking and materials storage. From 1952 to 1970, an estimated 52,000 gallons of liquid waste, including crankcase oil, antifreeze, hydraulic and transmission fluids, motor oil, and solvents were sprayed over the site for dust control. The liquid waste was accumulated in 500-gallon trailer-mounted tanks parked adjacent to a heavy equipment maintenance shop at Building 1589.

In 1971, the top 2 feet of soil were excavated and removed from the concrete apron area, and the first lift of concrete was placed. The excavated soil was transported to the land farm area northwest of Bee Canyon Wash and eventually to the Magazine Road Landfill (Site 2). In 1973, metal aircraft matting was installed in the area immediately north of the concrete apron by mixing topsoil with dry cement, wetting the mixture, placing the matting on top of the soil, and allowing it to solidify in place. In 1985, a second lift of concrete was placed over the first in the concrete apron area.

Investigations conducted at the site included a Phase I RI on Units 1 and 2 and aerial photograph surveys in 1993, a soil gas survey and employee interviews in 1994, and a Phase II RI in 1996. The maximum petroleum hydrocarbon concentration detected was 532 mg/kg for TRPH, detected in Unit 2. VOCs, SVOCs, and PAHs were detected in all units at concentrations below residential

PRGs. Arsenic was detected at concentrations above industrial PRGs from the soil surface to a depth of 123 feet bgs. The maximum arsenic concentration was collected at a depth of 9-10 feet bgs and was above the former MCAS El Toro background concentration. The RI of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed on 30 September 1997. Site 10 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.9 SITE 11 – TRANSFORMER STORAGE AREA

IRP Site 11, which is approximately an acre in size, is situated on the northeast side of Building 369 in the southwest portion of MCAS El Toro. The site is within Navy Sale Parcel III (see Figure 2-1). The site is fenced and is comprised of 3 units:

- Unit 1 is a concrete pad (approximately 30 feet by 30 feet) and a 3-foot-wide strip of ground adjacent to it.
- Unit 2 is an asphalt-lined drainage ditch parallel to the northeast side of Building 369 and extending from the loading dock at the southern boundary to N Street at the northern boundary.
- Unit 3 is the remainder of the fenced, unpaved storage yard behind Building 369.

Site 11 was used as a maintenance and storage yard for transformers. Most of the storage area is relatively flat and covered with gravel, concrete, or asphalt pavement. A wide, shallow depression is located in the center of the Site. Staining was evident in the depression during the Phase I RI.

Investigations conducted at Site 11 include an IAS in 1985, a Phase I RI in 1992-1993, a Phase II RI in 1995-1996, and an FS in 1998. Aroclor 1260 and pesticides were detected in shallow soils (primarily between 0 and 4.5 feet bgs) at Units 1 and 2. An ROD was issued for Site 11 in September 1999. No further action was recommended for Unit 3. Further action was recommended at Units 1 and 2, due to excess risk caused by PCB concentrations. The remedy chosen for Units 1 and 2 is excavation with off-station disposal of contaminated soil. In December 1999, the Navy issued a remedial action strategy that proposed the use of updated PRGs as alternate remedial goals. Following this, risk calculations based on toxicity and exposure values that were updated by the EPA and the California EPA were conducted. The Navy issued a Final Technical Memorandum Risk Reevaluation for Sites 8, 11, and 12 in February 2003. Following issuance of the Technical Memorandum, in May 2003 the Navy issued an Explanation of Significant Differences describing changes to the risk-based cleanup goals presented in the ROD, calculated based on the results of the risk reevaluation. Site 11 has been assigned an ECP ranking of Category 6 because releases of hazardous substances have been identified and response actions are required; however, response actions have not been implemented to date. Further actions are required at the site.

4.1.3.10 SITE 12 – SLUDGE DRYING BEDS

IRP Site 12, which is approximately 5 acres in size, is situated at the former location of a WWTP, which operated from 1943 to 1972. The site is within Navy Sale Parcel III (see Figure 2-1). The sludge produced at this facility was deposited in two areas to dry (drying beds). The sludge remaining in the drying beds was reportedly abandoned in place; earthen berms surrounding the sludge drying beds were combined with imported fill material and graded in place. The area was later redeveloped into a grassy picnic area and park. Site 12 consists of four units:

- Unit 1 is the former location of the west sludge-drying beds.

- Unit 2 is the former location of the east sludge-drying beds.
- Unit 3 is a drainage ditch that discharges into Bee Canyon Wash.
- Unit 4 is the location of the former WWTP and IWTP.

Investigations conducted at the site include a Phase I RI and a Phase II RI; shallow soil samples were collected. High levels of TRPH and low levels of PAHs were detected in the upper 10 feet of soils. High levels of diesel fuel were detected within the top 2 feet of soil. Several PCBs were detected at concentrations between residential and industrial PRGs. Arsenic was detected at a concentration above the industrial PRG but below the former MCAS El Toro background concentration.

Based on the results of risk calculations, a draft ROD was issued that recommended no further action for Units 1, 2, and 4. Further action was recommended for Unit 3, to remove the potentially contaminated soil that migrates off site (and off station, since Unit 3 discharges into Bee Canyon Wash) during storm events. Following comments received on the Draft ROD, risk calculations based on toxicity and exposure values that were updated by the EPA and the California EPA were conducted. The Navy has issued a Final Technical Memorandum Risk Reevaluation for Sites 8, 11, and 12 in February 2003. A draft Final ROD is in development. As a result, significant pre-Final ROD changes will require documentation such as discussion in the ROD or a revised Proposed Plan. In addition, the finalized ROD will incorporate the results of the radiological survey. Site 12 has been assigned an ECP Area Type of Category 6 because releases of hazardous substances have been identified and response actions may be required at the site; however, response actions have not been implemented to date. Further actions are required at the site.

4.1.3.11 SITE 13 – OIL CHANGE AREA

IRP Site 13 encompasses approximately 34,000 square feet and is bounded on the north by Former Tank Farm No. 2 and on the south by the storage yard for Building 242. The site is situated within Navy Sale Parcel III (see Figure 2-1). The site is relatively flat, unpaved, and generally unvegetated. Site 13 consists of two units: Unit 1 comprises the area southeast of Tank Farm No. 2 and Unit 2 comprises the area southwest of Tank Farm No. 2. Trucks were driven to the area southeast of the tank farm (Unit 1) for oil changes, and crank case oil was frequently drained onto the ground. From 1977 to 1983, approximately 7,000 gallons of waste oil were drained onto the ground. The oily soil was subsequently removed, and no visible evidence of the oily soil remains. A review of aerial photographs indicated heavy staining throughout the area between the tank farm and Building 242 (Unit 2), which persisted over the years of photographic record. It is likely that oil changes were also conducted in that area.

Investigations conducted at the site included an RFA, a Phase I RI and aerial photographic surveys in 1993, and employee interviews in 1994. VOCs, SVOCs, PAHs, and pesticides were detected at concentrations below residential PRGs. Arsenic was detected at concentrations above the industrial PRG from the surface to a depth of 80 feet bgs. The maximum arsenic concentration was below the former MCAS El Toro background concentration. TRPH was detected at the soil surface and at a depth of 5 feet bgs. Based on the results of the Phase I RI investigation, a Phase II RI was not recommended. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed in 30 September 1997. Site 13 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.12 SITE 14 – BATTERY ACID DISPOSAL AREA

IRP Site 14, which encompasses approximately 2 acres, comprises a former battery acid disposal area associated with Building 245 and a separate catch basin. The site is situated within Navy Sale Parcel III (see Figure 2-1). Building 245 was used as a heavy equipment maintenance shop. An asphalt parking area extends from Building 245 south to the edge of Site 14. From 1977 through 1983, fluids from vehicle batteries, paints, and associated paint waste were drained onto the unpaved areas beyond the edge of the parking lot. Suspected contaminants included lead, other metals, waste oils, and solvents from paints and paint strippers. When the asphalt parking area was washed down, contaminated surface water runoff drained over the edge of the pavement to the unpaved area.

Site 14 was identified during the Phase I RI. Sampling of soils was performed as part of the Phase I RI in early 2000. High levels of TRPH and diesel were detected in the catch basin area. Hydrocarbon results for other areas of the site were relatively low. Several PAHs were detected in samples collected within the top 2 feet of soil at concentrations between residential and industrial PRGs. Fourteen separate metals were detected above the former MCAS El Toro background concentrations. Based on the Phase I RI data, no Phase II sampling was conducted. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed on 26 June 2001. Site 14 has been assigned an ECP Area Type of Category 3.

4.1.3.13 SITE 15 – SUSPENDED FUEL TANKS

IRP Site 15 encompasses approximately 11,000 square feet and is part of a fenced storage yard behind Building 31 and north of Marine Way within Navy Sale Parcel III (see Figure 2-1). One-half of the site is covered by a concrete pad and metal aircraft matting; the remainder of the site is bare soil. The site originally consisted of two units:

- Unit 1 is the location of former aboveground diesel fuel tanks (later removed under the CERCLA petroleum exclusion and placed under the Petroleum Corrective Action Program).
- Unit 2 is the equipment wash rack and storage area situated immediately behind Building 31.

From 1979 to 1984, two 500-gallon ASTs containing diesel fuel were situated near the entrance gate north of Building 31 (Unit 1). During this time, approximately 500 gallons of diesel fuel spilled onto the bare ground from the fueling nozzles and hoses. The tanks were removed in 1984. Operations in Building 31 included equipment maintenance and cleaning on the concrete pad as well as equipment storage in adjacent areas (Unit 2). Waste generated included waste oil, waste fuel, and paint thinner.

Investigations conducted at Site 15 include an RFA that investigated SWMUs 272 and 273 (within the boundaries of Site 15), a Phase I RI, and an aerial photograph survey, all conducted during 1993. Employee interviews were conducted in 1994. In 1995, Unit 1 (the diesel tank area) was removed from Site 15 under the CERCLA petroleum exclusion and moved to the Petroleum Corrective Action Program. In 1996, a site verification of Unit 1 was conducted and included investigative sampling, excavation, and verification sampling. During this excavation, the top 18 inches of soil in an area approximately 20 feet by 60 feet were removed and transported to a landfill. A Phase II RI was conducted for Unit 2 only during 1996.

Unit 1 was characterized by high concentrations of TPH as diesel and TRPH. Following the removal of the diesel tank and associated soil, verification sampling identified TPH concentrations up to 610 mg/kg. Unit 2 was sampled during the Phase II RI. PAH, PCB, and pesticide concentrations

were below residential PRGs. Motor oil was detected at concentrations of up to 530 mg/kg. Arsenic was detected above the industrial PRG from the surface to a depth of 10 feet bgs. The maximum arsenic concentration detected was above the former MCAS El Toro background concentration. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed on 30 September of 1997. Site 15 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.14 SITE 16 – CRASH CREW PIT NO. 2

IRP Site 16, which is approximately 44 acres in size, including the associated groundwater plume, is a former crash crew training pit area that was used from 1972 through 1985. The site is within Navy Sale Parcel I (see Figure 2-1). Fires were set and crews trained in methods to extinguish them; water was the primary substance used to extinguish the fires. Mixtures of residual fuels and other combustible fluids such as JP-5, AVGAS, and crankcase oil were used to ignite the fires. Three unlined pits were used: the main pit, the residual fluids pit, and the hand-held fire extinguisher pit. The residual fluids pit was connected to the main pit via underground pipelines. The residual fluids pit was used as a storage reservoir for water applied to the main pit during exercises. The main pit still exists while the other two pits have been backfilled with soil and graded to match the surrounding topography.

Investigations conducted at the Site include an IAS in 1985, a Phase I RI in 1992-1993, a Phase II RI in 1997, and FS sampling in 1999. A draft FS report was produced in 2000 and a pilot study was conducted during 2000-2001. VOCs, SVOCs, PAHs, and petroleum hydrocarbons were identified in soil at concentrations above detection limits. Some metals were detected at concentrations above former MCAS El Toro background values. The contaminants were detected primarily beneath the main pit, with TCE being the most prevalent and persistent. Contaminants are present throughout the vadose zone, from the surface to near groundwater, which is approximately 165 feet bgs. Groundwater analyses indicated the presence of VOCs. TCE, chloroform, methylene, and 1,2-dichloroethane concentrations exceeded MCLs. The groundwater plume is estimated to be 525 feet long, 200 feet wide, and 30 feet thick. A focused feasibility study was completed in 2002 and the proposed plan recommended a final remedy of monitored natural attenuation and institutional controls. The Final ROD was issued in July 2003 and monitored natural attenuation and institutional controls was selected as the final remedy. Site 16 has been assigned an ECP Area Type of Category 6 because investigations have been conducted at the site; however, all actions have not been completed, and further action is required.

4.1.3.15 SITE 18 – VOLATILE ORGANIC COMPOUND CONTAMINATED GROUNDWATER

IRP Site 18 is the regional groundwater plume. The site is situated to the west of Navy Sale Parcel III (see Figure 2-1). Contamination in the soil emanating from the Site 24-Vadose Zone has migrated into the shallow groundwater unit beneath (Site 24-Shallow Groundwater Unit [SGU]) and the principal aquifer. The plume in the principal aquifer is designated as IRP Site 18-regional groundwater plume and extends off the property to approximately 3 miles from the west boundary of the station.

Primary contamination is due to VOCs, primarily TCE. In order to eliminate further contamination, soil vapor extraction (SVE) has been conducted at Site 24. The selected remedy for the regional groundwater plume is a downgradient pump-and-treat system with an appropriate system that will remediate both VOC impacts (caused by former MCAS El Toro activities) and concentrations of

nitrate and TDSs (caused by natural conditions and regional agricultural practices). The combined treatment system has been designated as the Irvine Desalter Project.

The Irvine Desalter Project is a proposed single treatment system that will treat both the VOCs emanating from former MCAS El Toro and nitrates and TDS from other sources. A cost-sharing agreement was signed in 2001 between the Navy, OCWD, and the Irvine Ranch Water District (IRWD). A Proposed Plan was submitted in November 2001, and final design is currently underway. The ROD for OU-2A and OU-1, which finalizes the remedial decision for both IRP Site 24-SGU plume and IRP Site 18-regional groundwater plume, was issued in June 2002. Site 18 has been assigned an ECP Area Type of Category 5 because releases of hazardous substances have been identified and response actions may be required at the site; however, response actions have not been implemented to date. Further actions are required at the site.

4.1.3.16 SITE 19 – AIRCRAFT EXPEDITIONARY REFUELING SITE

IRP Site 19 encompasses approximately 4.1 acres southwest of Buildings 404 and 414 within Navy Sale Parcel II (see Figure 2-1). Between 1964 and 1986, the site operated as a fuel-storage and fuel-dispensing area. The site consisted of six 20,000-gallon JP-5 fuel bladders in 4-foot-high earthen revetments and associated piping and fuel-dispensing equipment. The site originally consisted of four units:

- Unit 1, Northeast Stained Area (later removed under the CERCLA petroleum exclusion)
- Unit 2, Excavated Areas
- Unit 3, Stained Area Around Excavations
- Unit 4, Pump Station (this area was added for the Phase II RI and then was removed under the CERCLA petroleum exclusion)

Various spills and leaks reportedly occurred during operation of the site. In one instance, an estimated 20,000 gallons of JP-5 were reportedly released after a bladder rupture. Petroleum hydrocarbons were detected in the soil beneath the ruptured bladder.

The fuel bladders were removed in 1986, and the soil was excavated to a maximum depth of 15 feet bgs in a 30-square-foot area beneath the location of the bladder rupture. The excavation was partially backfilled to a depth of approximately 11 feet in 1994. The backfill material consisted of soil containing PCBs that originated from Unit 3 of Site 8. Prior to the backfill, soil samples were collected within the excavated area of Site 19. No chemicals of potential concern were detected at concentrations greater than U.S. EPA industrial PRGs (BNI 1996a). In 1996, the remaining excavation was backfilled to grade the surrounding area with clean fill material. An additional 19,000-square-foot area beneath the locations of the other bladders was also excavated in 1986 to a depth of approximately 2.5 feet. This area has yet to be backfilled and is now heavily vegetated. All of the facilities at the site were removed following site closure and were replaced by a pump station and UST complex situated adjacent to the east side of the site.

Investigations conducted at the site included a Phase I RI and aerial photograph surveys in 1993, employee interviews in 1994, and a Phase II RI in 1996. Unit 1 was excluded from the IRP under the CERCLA petroleum exclusion in 1995, and Unit 4 was excluded from the IRP under the CERCLA petroleum exclusion in 1997. The investigations indicated SVOCs at concentrations below residential PRGs, with the exception of benzo(a)pyrene, which was above the industrial PRG value. VOCs were detected at concentrations below residential PRGs. Petroleum hydrocarbons were detected at concentrations up to 200 mg/kg. Arsenic was detected at concentrations above the industrial PRG value, and the maximum arsenic value was above the former MCAS El Toro

background concentration. During temporary placement of Bee Canyon Wash, the backfill material originating from Site 8, Unit 3 was sampled for PCB concentrations. Ten soil samples had PCB concentrations greater than industrial PRGs with one sample at a maximum of 20.0 mg/kg (BNI 1996a). The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD was signed for no further action on 30 September 1997. Site 19 has been assigned an ECP Area Type of Category 4 because all required response actions have been completed, and no further action is required.

4.1.3.17 SITE 20 – HOBBY SHOP

IRP Site 20 encompasses approximately 1/2 acre immediately northwest of the intersection of North 9th Street and West Marine Way and includes Building 626. The site is situated within Navy Sale Parcel I (see Figure 2-1). Beginning in 1967, the site was used as an auto shop for military personnel to service and repair privately owned vehicles. Prior to 1976, kerosene was reportedly used to wash down the paved area at the site. The wash runoff drained into a catch basin situated in the entry driveway and finally drained into an OWS. After 1976, a biodegradable soap was used in place of the kerosene.

Site 20 originally consisted of four units:

- Unit 1 – Shallow Drainage Swale (1-2 feet below grade), adjacent to the east side of Building 626.
- Unit 2 – South Drainage Ditch, runs along North 9th Street (this unit was later removed under the CERCLA petroleum exclusion).
- Unit 3 – Stained Area, small area adjacent to the northwest side of Building 626 (this unit was later removed under the CERCLA petroleum exclusion).
- Unit 4 – Inner Courtyard of Building 626, an entry driveway and a front-sloping area adjacent to the drainage ditch along North 9th Street. The inner portion is paved with asphalt. The entry driveway is concrete and crosses over the drainage ditch. The front area is covered with grass with some bare spots and various trees.

Investigations at the Site include an RFA, a Phase I RI, and aerial photograph surveys in 1993, and a Phase II RI in 1996. In 1997, Units 2 and 3 were excluded from the site based on the CERCLA petroleum exemption. Soil sampling identified VOCs, SVOCs, PCBs, and pesticides at the site, all below residential PRGs. Arsenic was detected at concentrations above industrial PRGs, and the maximum arsenic concentration was above the former MCAS El Toro background value. TRPH was detected at concentrations of up to 4,186 mg/kg, and diesel was detected at concentrations of up to 16,700 mg/kg. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD was signed for Units 1 and 4 for no further action on 30 September 1997. Site 20 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.18 SITE 21 – MATERIALS MANAGEMENT GROUP, BUILDING 320

IRP Site 21 encompasses approximately 1/3 of an acre on the northwest side of Building 320 within Navy Sale Parcel III (see Figure 2-1). The site is a former chemical storage area and consists of an unpaved fenced enclosure covered by dirt, gravel, and small portions of concrete. A 20-foot by

25-foot bermed and covered concrete pad, used for storage of hazardous chemicals, is situated in the southwest corner of the site. A catch basin was situated within the site. From 1946 to 1995, the site was used to store drums of chemicals. No leaks or spills have been documented.

Investigations conducted at Site 21 include an RFA, a Phase I RI, and aerial photograph surveys in 1993, employee interviews in 1994, and a Phase II RI in 1996. Soil sampling results indicate SVOCs and PAHs detected at concentrations below residential PRGs. Herbicides were detected at concentrations up to 16,000 micrograms per kilogram (µg/kg). VOCs were detected in shallow soil at concentrations up to 1,000 µg/kg. TPH was detected at concentrations below 1 mg/kg in all samples. Arsenic was detected at concentrations above the industrial PRG value, and the maximum arsenic concentration was detected at a concentration above the former MCAS El Toro background value. Sediment samples indicated PAHs at levels below residential PRGs, with the exception of benzo(a)pyrene, which was above the residential PRG. All other analytes were below residential PRGs. The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An ROD for no further action was signed on 30 September 1997. Site 21 has been assigned an ECP Area Type of Category 3. No further action is required.

4.1.3.19 SITE 22 – TACTICAL AIR FUEL DISPENSING SYSTEM

IRP Site 22 encompasses approximately 1.8 acres and is a former aircraft fuel and storage and dispensing facility, called the Tactile Air Fuel Dispensing System (TAFDS). The site, which is situated within Navy Sale Parcel III (see Figure 2-1), is divided into two noncontiguous units:

- Unit 1, the Western Fuel Dispensing Area, was used from 1971 until the mid-1980s. This area consists of an unmaintained vacant lot northwest of Building 369 and is adjacent to a concrete parking apron.
- Unit 2, the Eastern Fuel Dispensing Area, was used from 1952 to 1971. This area is south of Building 435 and extends into a concrete parking apron. The area is currently covered by a concrete parking apron and steel aircraft matting.

While in operation, the site included multiple configurations of aboveground storage bladders in earthen revetments and associated piping and dispensing equipment. A maximum of seven fuel bladders were situated at each TAFDS location during the period of operation. There is currently no evidence of the bladders' former location, nor is there evidence of the revetments. During an aerial photograph review, heavy staining was observed. Fuel bladders were checked for leaks daily, but spills were reported once or twice per year during the years of operation. Several large spills were reported over the years, with up to several thousand gallons of JP-5 spilling from ruptured fuel bladders and running along the ground and into storm drains at the site. It was also common practice for personnel to wash jet fuel tanks at the site and allow the runoff to flow into the storm drains.

Investigations conducted at the site included a Phase I RI and aerial photograph surveys in 1996, employee interviews and a soil gas survey (conducted for Site 24) in 1994, and a Phase II RI in 1996. In both units, VOCs, SVOCs, pesticides, and PAHs were detected at concentrations below residential PRGs. Arsenic was detected at concentrations above the industrial PRG, but the maximum arsenic concentration was below the former MCAS El Toro background value. Within Unit 2, TRPH concentrations were detected up to 4,666 mg/kg (at 4 feet bgs). The remedial investigation of the site indicated that the site-related contamination is limited to the shallow soil interval. The human health and ecological risk assessments showed that the contaminants present in the soil do not present an unacceptable risk to human health or the environment. Therefore, no remedial action is required. An