

Final

# Site Management Plan

## Fiscal Years 2008 through 2012

Naval Amphibious Base Little Creek  
Virginia Beach, Virginia



Prepared for

### Department of the Navy

Naval Facilities Engineering Command  
Mid-Atlantic Division

Contract No. N62470-02-D-3052  
CTO-0158

September 2007

Prepared by  
**CH2MHILL**

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# Acronyms and Abbreviations

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ABM	abrasive blast material
AOC	Area of Concern
AST	aboveground storage tank
Baker	Baker Environmental, Inc.
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
CCR	Construction Closeout Report
CD	cyclodextrin
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action—Navy
COC	constituent of concern
DCE	dichloroethene
DD	Decision Document
DNAPL	dense nonaqueous phase liquid
DPT	direct push technology
DoD	Department of Defense
Ebasco	Ebasco Environmental Consultants
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
ERA	ecological risk assessment
ERD	enhanced reductive dechlorination
ESTCP	Environmental Security Technology Certification Program
FFA	Federal Facilities Agreement
FS	Feasibility Study
Ft	feet
FWES	Foster Wheeler Environmental Services
FY	fiscal year
GIS	geographic information system
HHRA	human health risk assessment
HRS	Hazard Ranking System
HRSD	Hampton Roads Sanitation District
IAS	Initial Assessment Study
IEUBK	Integrated Exposure Uptake Biokinetic
IRACR	Interim Remedial Action Completion Report
IR	Installation Restoration
IRA	Interim Removal Action
IRI	Interim Remedial Investigation
ISCO	<i>in situ</i> chemical oxidation

LCAC	landing craft air cushion
LTM	long-term monitoring
LUC	land use control
µg/L	micrograms per liter
MC	munitions constituent
MCL	maximum contaminant level
MDL	method detection limit
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MIP	Membrane Interface Probe
MMRP	Military Munitions Response Program
MWR	Morale, Welfare, and Recreation
NAB	Naval Amphibious Base
NACIP	Navy Assessment and Control of Installation Pollutants
NAVFAC	Naval Facilities Engineering Command Atlantic Division
NCP	National Contingency Plan
NEX	Navy Exchange
NFA	no further action
NPL	National Priorities List
ORC	oxygen-releasing compound
OWS	oil/water separator
PA	preliminary assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCP	pentachlorophenol
pH	hydrogen (ion) concentration
PP	Proposed Plan
ppb	parts per billion
ppm	parts per million
PSI	Preliminary Site Inspection/Site Investigation
PWC	Public Works Center
RA	remedial action
RAB	Restoration Advisory Board
RAO	remedial action objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RGH	Rogers, Golden, and Halpern
RI	Remedial Investigation
ROD	Record of Decision

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RRRS	Relative Risk Ranking System
RVS	Round 1 Verification Step
SARA	Superfund Amendments and Reauthorization Act
SCR	Site Characterization Report
SDZ	surface danger zone
SERA	Screening Ecological Risk Assessment
SI	Site Investigation
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAL	target analyte list
TCA	trichloroethane
TCE	trichloroethylene
TCL	target compound list
TCLP	toxicity characteristic leachate procedure
TOC	total organic carbon
UST	underground storage tank
UTL	upper tolerance limit
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compound
VSI	visual site inspection
XRF	x-ray fluorescence
yd <sup>3</sup>	cubic yard

# Introduction

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This document presents the fiscal years (FYs) 2008 through 2012 Site Management Plan (SMP) for Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia. The SMP meets the requirements of the final Federal Facilities Agreement (FFA) between the Naval Facilities Engineering Command Mid-Atlantic Division (NAVFAC Mid-Atlantic), Virginia Department of Environmental Quality (VDEQ), and Region III of the Environmental Protection Agency (EPA) under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) to address environmental contamination at applicable NAB Little Creek sites (DON, 2003). The SMP is being submitted for use by the NAB Little Creek Installation Restoration (IR) Partnering Team and their respective organizations – NAVFAC, NAB Little Creek, EPA, and VDEQ. [Figure 1-1](#) illustrates the location of NAB Little Creek.

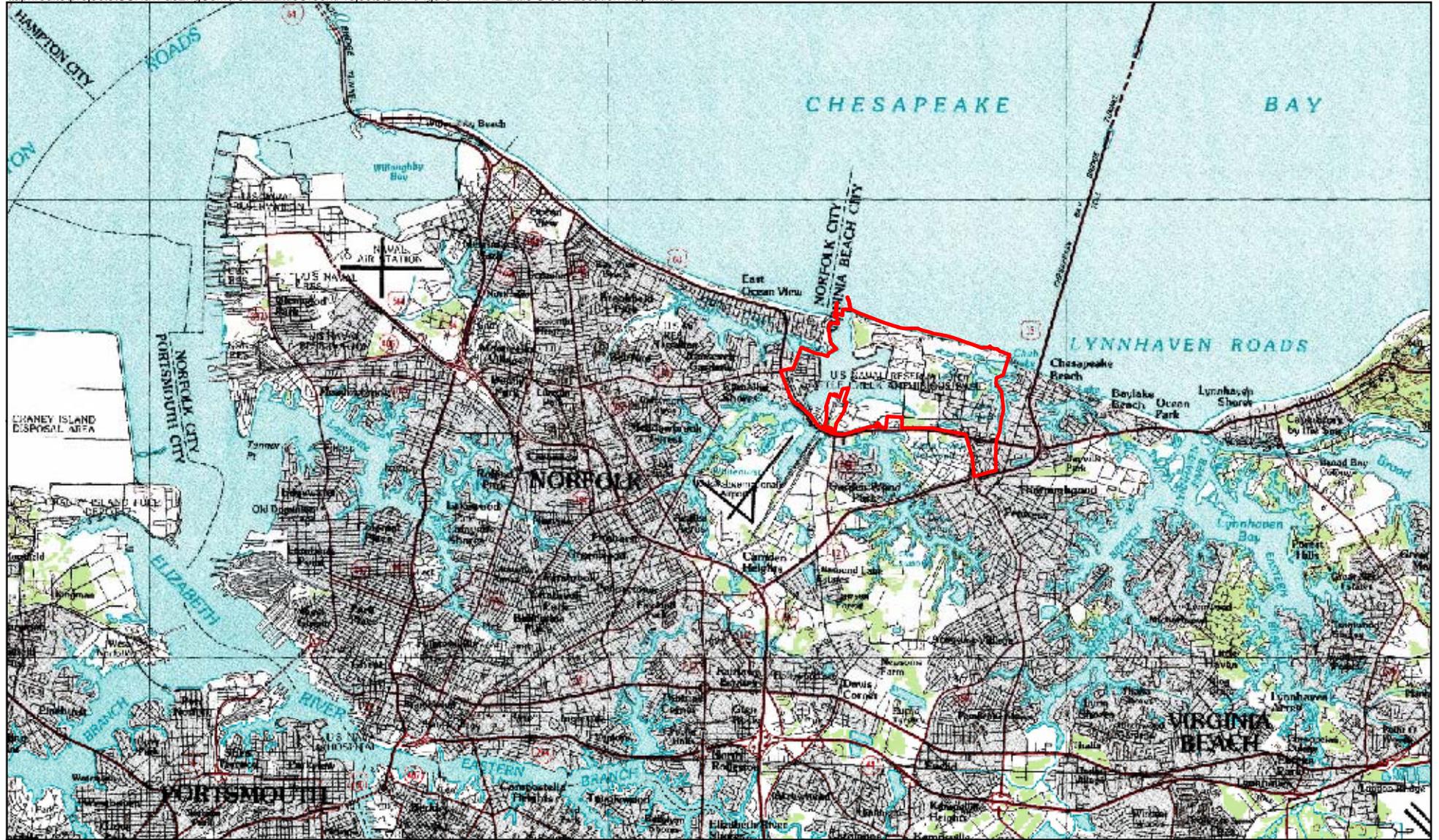
The purpose of the SMP is to provide a management tool for NAVFAC, NAB Little Creek, VDEQ, EPA, and consultants to be used in planning, scheduling, and setting priorities for environmental remedial response activities to be conducted at NAB Little Creek. The SMP establishes schedules and conceptual approaches for continued CERCLA activities at NAB Little Creek IR sites. The schedules and work descriptions consist of:

- Site descriptions and proposed activities for the current FY
- Conceptual schedules and general work approaches for activities planned for the 5-year period FY 2008 through FY 2012

The prioritization of activities and the proposed schedules were developed by the NAB Little Creek Partnering Team, represented by the Navy, EPA, and VDEQ, and are based on several factors:

- The Partnering Team’s relative ranking of the sites with regard to the potential risks that they may pose to human health and the environment
- NAVFAC’s internal funding goal of having remedies in place at all “high-priority” sites by FY 2007
- Goals set by the Partnering Team to meet requirements of EPA, VDEQ, NAVFAC, and the public

The SMP is a working document that is updated yearly to maintain an up-to-date documentation and summary of environmental actions at NAB Little Creek. This SMP updates and supersedes the 2007 SMP finalized in August 2006.



**Legend**

 Installation Area



Figure 1-1  
Location Map  
Five-Year Site Management Plan For FY 2008  
Naval Amphibious Base Little Creek  
Virginia Beach, Virginia

# Background and Site Descriptions

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NAB Little Creek is primarily an industrial facility located in the northwest corner of Virginia Beach, Virginia. The western boundary of NAB Little Creek borders the City of Norfolk, Virginia ([Figure 1-1](#)). The area surrounding this 2,215-acre base is low lying and relatively flat with several freshwater lakes (Chubb Lake, Lake Bradford, Little Creek Reservoir/Lake Smith, and Lake Whitehurst) located on or adjacent to the base. NAB Little Creek centers around four saltwater bodies: Little Creek Harbor, Little Creek Cove, Desert Cove, and Little Creek Channel that connects the coves and harbor with the Chesapeake Bay.

In addition to industrial land use, NAB Little Creek is also used for recreational, commercial, and residential purposes. Specifically, the southeast corner of the base has been developed for residential use. Land development surrounding the base is residential, commercial, and industrial. Little Creek Reservoir/Lake Smith, located north of the base, serves as a secondary drinking-water supply for parts of the City of Norfolk.

NAB Little Creek grew out of four bases constructed during World War II: the Amphibious Training Base, the Naval Frontier Base, and Camps Bradford and Shelton. It consisted of three annexes named for the former owners of the property – Shelton on the east, Bradford in the center, and Whitehurst to the west. A Secretary of the Navy letter in July 1945 disestablished the separate bases and established NAB Little Creek on August 10, 1945. In 1946, NAB Little Creek was designated a permanent base. The base's mission was the training of landing craft personnel for operational assignments.

During the last 50 years, NAB Little Creek has expanded in both area and the complexity of its mission. NAB Little Creek personnel provide logistic facilities and support services to 27 homeported ships and more than 80 tenant commands. The combination of operational support and training facilities is geared predominantly to meet the amphibious warfare training requirements of the Armed Forces of the United States. Operations that have occurred at the NAB Little Creek include: vehicle and boat maintenance, boat painting and sandblasting, construction and repair of buildings and piers, mixing and application of pesticides, electroplating of musical instruments, laundry and dry cleaning, medical and dental treatment, and the generation of steam for heat.

## 2.1 Environmental History

Comprehensive environmental restoration activities at NAB Little Creek began in 1984 under the Navy Assessment and Control of Installation Pollutants (NACIP) and IR Programs. The purpose of the NACIP and IR programs was to identify, assess, characterize, and clean up or control contamination from past waste management activities at Navy and Marine Corps facilities. Given the nature and extent of its operations, the Navy has been involved with toxic and hazardous materials for several decades. The Department of Defense (DoD), as well as general industry, has realized that previously acceptable methods of disposal are no longer sufficient, and actions are being taken, through these programs, to

clean up Navy sites that pose a threat to human health or the environment. Current Navy waste management operations are in compliance with all federal, state, and Navy regulations to ensure safe operation and disposal of hazardous substances.

The NACIP program used a three-phased approach to study and clean up sites. NAB Little Creek initiated its environmental study investigation and restoration efforts under the NACIP program by conducting an Initial Assessment Study (IAS) in 1984. The NACIP program was changed in 1986 to reflect the requirements of CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA). This revised program is referred to as the IR program.

On July 28, 1998, EPA proposed that NAB Little Creek be added to the National Priorities List (NPL). EPA evaluates industrial sites using the Hazard Ranking System (HRS), and those facilities with HRS scores exceeding 28.5 are proposed for the NPL. The HRS score of 50, assigned by the EPA to NAB Little Creek, is mainly attributed to the surface water component at Site 7 (Amphibious Base Landfill). The proposed listing was followed by a minimum 60-day review and comment period prior to the inclusion of NAB Little Creek on the NPL. On May 10, 1999, NAB Little Creek was placed on the NPL.

The FFA, negotiated between the Navy, EPA, and VDEQ, was finalized in November 2003. In accordance with the FFA, all past and future work at IR sites and solid waste management units (SWMUs) will be reviewed, and a course of action for future work requirements at each site will be developed. The FFA includes specific requirements for the preparation and contents of this SMP.

The following sections provide an overview of the CERCLA process and a summary of the major multi-site studies completed to date at NAB Little Creek. [Table 2-1](#) lists the status of each of the sites at NAB Little Creek. [Table 2-2](#) lists each of the studies conducted at the sites identified in the FFA as requiring additional investigation.

## 2.2 CERCLA Process

The objectives of the CERCLA process are to evaluate the nature and extent of contamination at a site, and to identify, develop, and implement appropriate remedial actions in order to protect human health and the environment. The major elements of the CERCLA process are identified and described in [Table 2-3](#).

The documents prepared for the CERCLA program are maintained in information repositories for review by the public. The index of NAB Little Creek Administrative Records is available at <http://public.lantops-ir.org/sites/public/nablcr>. Documents are available to the public in the information repository for the Administrative Record maintained at:

Public Affairs Officer  
Naval Facilities Engineering Command  
6506 Hampton Boulevard  
Norfolk, Virginia 23508-1278  
Phone: (757) 322-8005  
[NFECL\\_PMO@navy.mil](mailto:NFECL_PMO@navy.mil)

Public participation is an element of the CERCLA process. NAB Little Creek has developed a Community Relations Plan and established a Restoration Advisory Board (RAB) comprised of members of the community, local environment group members, and state and

federal officials, who meet semiannually to keep the community informed on environmental issues at NAB Little Creek.

## 2.3 Facility-Wide Investigations

Various facility-wide studies and investigations, including preliminary studies and detailed site investigations, have been completed at NAB Little Creek since 1984 in response to the Navy's IR program. Preliminary studies conducted to identify and assess sites posing a potential threat to human health or the environment resulting from past or current operations or waste management activities include:

- IAS
- Resource Conservation and Recovery Act (RCRA) Round I Verification Step (RVS)
- Phase I Interim RCRA Facility Assessment (RFA)

A total of 132 potential contaminated sites, areas, or SWMUs at NAB Little Creek were identified for evaluation in the IAS, RVS, RFA, and other NAB Little Creek assessments. [Table 2-1](#) provides the correlated listing of NAB Little Creek sites, SWMUs, and areas of concern (AOCs).

Some of the site investigations included multiple sites specifically identified in the IAS for further evaluation and were not focused on a specific site assessment. These major investigations include:

- Interim Remedial Investigation (IRI)
- Preliminary Site Inspection (PSI)
- Remedial Investigation/Feasibility Study and Site Investigation (RI/FS and SI)
- Relative Risk Ranking System (RRRS)
- Base-wide Background Investigation
- SWMU/IR Summary

The details and results of the investigations identified in this section are summarized below.

### 2.3.1 Initial Assessment Study (IAS)

The IAS at NAB Little Creek was completed in December 1984 by Rogers, Golden, and Halpern (RGH). Its purpose was to identify and assess sites posing a potential threat to human health or the environment because of contamination from prior hazardous waste management activities. The study entailed the collection and evaluation of activity records relating to waste generation, handling and disposal; characterization of physical conditions at the site such as hydrogeology; and identification of migration pathways and potential receptors. The results of these data evaluation efforts were used to develop recommendations concerning the need for a confirmation study at a given site, the goal of which was to verify the presence of contamination and determine the need for further characterization and/or remediation.

The IAS examined 17 sites at NAB Little Creek (IR Sites 1 through 17). Six sites were recommended for confirmation studies: Sites 7, 9, 10, 11, 12, and 13. Of the remaining 11 sites, mitigation measures were recommended for four of the sites (Sites 4, 5, 15, and 16), and no further action (NFA) was recommended for six of the sites (Sites 1, 2, 6, 8, 14, and

17). Site 3, the West Annex Fuel Spill, was addressed under a separate action to recover free-floating oil from the water table. Site 17, the Building 1256 Motor Oil Disposal Area, was later added to the PSI by the Navy.

The IAS recommendations to conduct confirmation studies were based largely on the finding that contaminants from disposal areas may migrate toward surface water bodies with little attenuation, owing to a lack of clays and organic material in the subsurface soil, and in a relatively short time because of high hydraulic conductivities in the water table aquifer. The potentially affected surface waters included Little Creek Cove, Lake Bradford, and Lake Smith. Delineation of an actual threat or risk was not possible because of the lack of site-specific hydrogeologic and groundwater quality data. Lake Bradford and Lake Smith are used for recreational purposes, and Lake Smith serves as the secondary municipal water supply for the City of Norfolk.

The IAS presented a number of detailed recommendations concerning the installation and sampling of monitoring wells; the sampling of surface soil, surface water, and sediment; and the types of laboratory analyses to be completed. The recommendations also addressed well completion depths and water-level monitoring requirements. Many of the recommendations were aimed at resolving the data gaps identified in the IAS. These recommendations became the scope of work for the RVS.

### **2.3.2 Round 1 Verification Step**

The RVS at NAB Little Creek was completed in October 1986 by CH2M HILL and was the first step in the confirmation study process. The purpose of the study was to verify the presence and/or absence of contamination at the six sites recommended in the IAS for a confirmation study (Sites 7, 9, 10, 11, 12, and 13). The scope of work of the RVS activities at each site was established by the recommendations presented in the IAS, with notable deviations concerning the number of monitoring wells completed and samples collected.

As part of the work conducted for the RVS, 31 monitoring wells were installed for the collection of groundwater samples and groundwater elevation data to determine groundwater flow directions. Surface water and sediment samples were collected to investigate potential impacts on nearby surface water bodies. Subsurface soil samples were collected to delineate the vertical extent of contamination in probable source areas.

As stated in the RVS, the results of the Round 1 sampling and analysis activities indicated that little or no contamination was leaving any of the three landfill sites addressed in the RVS (Sites 7, 9, and 10). Contamination was detected in one or more environmental media at Sites 11, 12, and 13. These results indicated that contamination was being released from these three sites, but the magnitude and distribution of this contamination could not be determined on the basis of the RVS findings alone. The results of the sampling and analysis activities were used to develop recommendations for additional investigations at all six sites. These recommendations were generally limited to continued or expanded sampling conducted during the IRI to confirm the RVS results.

### **2.3.3 RCRA Facility Assessment (RFA) Report**

An RFA was conducted at NAB Little Creek in 1989 by A. T. Kearney. The RFA identified 147 SWMUs and several AOCs. SWMUs and AOCs are areas where wastes have been stored and/or where contaminants may have been released to the environment. Twenty-

two of these SWMUs and two AOCs are associated with the 17 sites identified in the IAS (e.g., SWMUs 123–126 are located within the bounds of Site 7).

NAB Little Creek decided not to renew their Part B permit; therefore, a RCRA Facility Investigation (RFI) was not conducted, and the base dropped out of the RCRA corrective action program. NAB Little Creek decided, however, to investigate 17 of the SWMUs by including them in the Navy's RRRS sampling program. The 17 SWMUs investigated were chosen because EPA had identified them as the sites of highest concern.

### 2.3.4 Interim Remedial Investigation

The IRI was conducted in 1991 by Ebasco Environmental Consultants (Ebasco) to determine whether or not further characterization activities or remedial actions (RAs) were warranted at Sites 7, 9, 10, 11, 12, or 13. The objectives of this investigation were to conduct a second round of sampling at the six sites sampled for the RVS, and to integrate the historical and newly acquired data, along with site-specific recommendations, for further action into a single document. The data were used to develop a recommended response action, a human health risk assessment (HHRA), and site-specific recommendations concerning additional characterization.

### 2.3.5 Preliminary Site Inspection

A PSI was conducted in 1991 by Ebasco to assess the threat to human health and the environment from five sites (Sites 4, 5, 15, 16, and 17) at NAB Little Creek. Chemical constituents of concern (COCs) were detected in the groundwater at Site 5, and further sampling was recommended. At Site 16, elevated levels of polychlorinated biphenyls (PCBs) were detected in soil, and additional sampling was recommended to delineate contamination. Remediation was also recommended for Site 16. NFA was proposed for Sites 4, 15, and 17.

### 2.3.6 Remedial Investigation/Feasibility Study and Site Investigation

From 1993 through 1994, Foster Wheeler Environmental Services (FWES) conducted a RI/FS at Sites 7, 9, 10, 11, 12, and 13 (FWES, 1994c). The RI/FS included a Phase 1 Baseline HHRA and ecological risk assessment (ERA). At this same time, FWES conducted an SI at Sites 5 and 16. The investigations included soil, groundwater, sediment, surface water, and soil-gas sampling. Additional groundwater monitoring wells were also installed. The FS recommended long-term groundwater monitoring for Sites 9 and 10, a source removal action and post-removal monitoring for Site 11, and additional evaluations at Sites 7, 12, and 13. The SI recommended semiannual groundwater monitoring at Site 5 and a soil removal action at Site 16.

### 2.3.7 Relative Risk Ranking System Report

A RRRS and a revised RRRS analysis were completed by Baker Environmental, Inc. (Baker) in 1996. The purpose of the analysis was to gather contaminant, pathway, and receptor information for 17 SWMUs. The SWMUs addressed were originally identified in the RFA as being potential sites affected by contamination. Data were collected for each of the 17 SWMUs through a field investigation in October 1995. The field investigation was aimed at identification of contaminants in surface soil, subsurface soil, and groundwater. The results of the investigation were used to identify the relative risk posed by each SWMU

according to the contaminants present, the migration pathway, and the potential receptors for each media at the SWMU. Both human health and ecological receptors were considered.

Based on the RRRS, three of the SWMUs were identified as posing a high risk, and six SWMUs were identified as presenting a medium risk. The high- and medium-risk SWMUs are listed below. The SWMUs were consolidated and renumbered as indicated.

High-risk SWMUs:

- **SWMU 84** – Demolition Debris Landfill (also referred to as IR Site 8)
- **SWMU 105** – Steam Plant Flyash Silo (“new” SWMU 2)
- **SWMU 111** – Pier 10 Sandblast Yard (“new” SWMU 3)

Medium-risk SWMUs:

- **SWMU 17** – Small Transformer Storage Area (redesignated as “new” SWMU 1 and also referred to as IR Site 14)
- **SWMU 117** – Special Boat Squadron 2 Battery Storage Area (redesignated as “new” SWMU 4 and also referred to as IR Site 4)
- **SWMU 130** – Building 3896 Boat Painting Area (redesignated as “new” SWMU 5)
- **SWMU 131-133** – Seabee Area (consolidated and redesignated as “new” SWMU 6)

### 2.3.8 Background Investigations

A background groundwater quality study was conducted during three rounds of groundwater sampling completed at NAB Little Creek on November 31, 1991, September 15, 1992, and June 30, 1993 (Allied Environmental, 1992; FWES, 1994c). The purpose of this study was to collect, organize, and present data on background groundwater quality and conditions.

The groundwater quality information was obtained from a network of eight monitoring wells installed in locations throughout the base to avoid areas of known or suspected contamination. The analyses performed on the groundwater samples used relatively high detection limits and did not include all target analyte list (TAL) total or dissolved metals analyses. Neither surface soil nor shallow subsurface soil samples were collected. The subsurface soil samples collected were from below the water table adjacent to the screened interval of each well. None of the data were validated.

CH2M HILL completed an additional background investigation for NAB Little Creek in December 2000. The objective of the investigation was to establish background concentrations of metals, pesticides, and polycyclic aromatic hydrocarbons (PAHs) in surface and subsurface soil and groundwater for use in comparison to IR program site data to better identify release-related COCs. The statistical calculations for both soil and groundwater constituent concentrations included upper tolerance limits (UTLs) and 95 percent confidence intervals, which are used for comparison in the risk screening process.

Background soil samples were collected at non-impacted areas that represent underlying hydrogeologic conditions at NAB Little Creek and areas indicative of anthropogenic background conditions. These areas included fill areas comprised of dredged sediments and past agricultural land use areas where pesticides may have been used. A total of 29 surface and 29 subsurface soil samples were collected during the investigation. Analytical data from

background soils represent surface and subsurface soils in fill, urban, and native soil areas. Background water quality samples were collected in January 2000 at six existing background wells, one newly installed well, and three wells located upgradient of base IR sites.

In September 2000, a technical memorandum was prepared, in response to an EPA comment pertaining to evaluating potential seasonal fluctuations in groundwater quality. In the summer of 2001, background monitoring wells were sampled. The analytical data from the winter 2000 and summer 2001 sampling events were compared and no significant differences were identified. It was noted that substantial differences in groundwater concentrations were noted for specific parameters in specific locations. Background UTLs were reassessed as part of the 2001 technical memorandum, and more conservative UTLs were presented for arsenic (4 micrograms per liter [ $\mu\text{g}/\text{L}$ ]) and iron (17,100  $\mu\text{g}/\text{L}$ ).

### 2.3.9 SWMU/IR Summary

In June 2000, NAB Little Creek summarized all available information on the 147 SWMUs, 8 AOCs, and 17 IR sites at NAB Little Creek. The report included information obtained from the RFA and RRRS, including photographs.

## 2.4 Site Specific Investigations and Remediation Activities

The SMP is updated annually to revise project schedules and provide current site investigation information for the NAB Little Creek CERCLA IR program. The review and comment periods are based on FFA guidelines; flow charts depicting the FFA process are included as [Tables 2-4, 2-5, and 2-6](#). The schedules derived from these guidelines assume informal dispute resolution.

The base Master Project Plan will be updated as CERCLA investigations continue. The Navy will conduct CERCLA Five-Year Reviews for sites with remedial actions documented in a Record of Decision (ROD). The first Five-Year Review is scheduled for December 2008 and will include all sites with a remedy in place at that time. The schedule for basewide activities is provided on [Table 2-7](#).

The sites currently under investigation in the IR program at NAB Little Creek include Site 7, Site 8, Site 11a, SWMU 3, and SWMU 7b. The remedy for each of these sites will be documented in a ROD. RODs requiring remedial action have been issued for Sites 9, 10, 11, 12, and 13. The site descriptions and remediation activities scheduled for these sites are detailed below. The location of each site is shown on [Figure 2-1](#).

### 2.4.1 RI/FS Sites

#### Site 7—Amphibious Base Landfill

The Amphibious Base Landfill is located in the south-central portion of the Base. The area is bounded on the north by the southeast shoreline of Little Creek Cove, on the east by Helicopter Road, on the south by Amphibious Drive and the Hampton Roads Sanitation District (HRSD) sewage treatment plant, and on the west by an undeveloped area and an ordnance magazine. The site is also referred to as SWMUs 123–126 in the RFA. Site 7 was originally an arm of Little Creek Cove that was filled with dredge spoils before its use as a

landfill. According to the IAS, the landfill operated from 1962 to 1979; some of the original dikes built to contain the dredging spoils are still visible in the northeast corner of the landfill. The landfill was initially operated as a trench-type landfill with open burning of refuse in the trenches. The trenches were excavated to the depth at which groundwater filled the trench. Cover was applied as necessary to maintain traction for the vehicles involved in the operations. Site 7 is approximately 38 acres, and is bordered by a chain-link fence to the east and south, and Little Creek Cove to the north. Two entrances with locked gates and a gravel road control access to the site. Restricted access signs are in place around the perimeter of the site. The landfill was constructed so that the central portion is comprised of a broad flat area bounded by gentle slopes on all sides. Erosion-prone areas of the site have been reinforced on each side of the canal crossing the west side of the site.

The IAS estimated the volume of waste (excluding dredge spoils) in the landfill to be approximately 500,000 cubic yards (yd<sup>3</sup>). Most of the waste is presumed to be composed of nonhazardous solid waste from base housing and other residential and commercial activities at the Base. Specific records documenting the types and quantities of waste placed in the Amphibious Base Landfill are not available. Because the landfill received all wastes generated by NAB Little Creek during its operation, it most likely received potentially hazardous materials.

Until 1979, the landfill was operated under a Virginia solid waste permit (No. 276). The permit was terminated in 1982 and the landfill was considered closed by the state. After closure, the landfill area continued to be used as a metal collection and transfer site, temporary storage for wastes, and burn area for scrap wood and trees. Open burning was halted in 1984, and waste storage activities were moved in 1994. In 1994, the landfill was reportedly covered with approximately 24 inches of compacted soil and 2 to 3 inches of topsoil cover. A vegetative cover was also established to mitigate contact with surface soil in 1994. The thickness of the soil cover was confirmed by soil borings constructed in preparation for the soil cover constructed in 1998.

The RVS concluded that the landfill was not releasing contaminants to the groundwater but recommended additional groundwater, surface water, and sediment sampling. This additional sampling was performed as part of the IRI, and the results confirmed the conclusions of the RVS that the landfill was not releasing contaminants to the groundwater.

An RI/FS was conducted at six sites, including Site 7, by FWES in November 1994. Eight surface soil, five subsurface soil, nine groundwater, six surface water, and six sediment samples were collected at Site 7. Groundwater in the Columbia Aquifer beneath Site 7 flows predominantly north toward the low-lying marsh and Little Creek Cove. A tidal study was conducted as part of the RI, and the results indicated that groundwater may flow toward the tidally influenced western canal in localized areas and that the rate of groundwater to surface water discharge increases in response to a low tide. A Final FS was also completed for Site 7 by FWES in October 1997. The FS identified remedial alternatives to reduce potential human health and environmental risks associated with the various COCs identified at Site 7. The preferred alternative was identified in the October 1997 Proposed Plan (PP). The preferred alternative was institutional controls that consisted of removing visible debris from the landfill and placing topsoil in selected areas of the landfill where the existing cover was insufficient, construction of a new perimeter fence, and semiannual monitoring.

The Navy signed the Final Decision Document (DD) in January 1998. Subsequently a remedial design (RD) and RA were completed in June 1998. The remedy included the removal of 610 yd<sup>3</sup> of debris along the landfill shoreline. Approximately 8,640 yd<sup>3</sup> of clean fill and 11,260 yd<sup>3</sup> of topsoil were placed on the landfill during the RA. A 12- to 18-inch-thick fill layer was placed over some areas of the landfill where cover was inadequate, and a 6- to 8-inch topsoil cover was placed over the entire landfill area (OHM, 1999a). The landfill waste is currently located an average of 30 inches below the ground surface. The current appearance of the landfill ranges from small stands of mature trees on the western portion of the site to tall, thick grasses in the central and eastern portions of the site. The area bordering Little Creek Cove is well vegetated, with numerous trees, dense brush, and tall grasses.

Long-term monitoring (LTM) of groundwater, surface water, and sediment was initiated in June 1998. A LTM letter report was submitted to the Navy, EPA, and VDEQ after each round of monitoring. The first 11 rounds of data between 1998 and 2004 were similar to results reported in the FWES RI/FS. The Navy, EPA, and VDEQ agreed that LTM would be discontinued until a ROD is complete for the site.

As part of the RI/HHRA/ERA, sediment samples were collected to assess potential unacceptable ecological risk in canal sediments located in the western portion of Site 7. The ERA, with agreement from EPA and VDEQ, concluded that if canal sediments were removed, then remaining sediment at Site 7 presents no unacceptable ecological risk. The HHRA concluded that Site 7 poses no unacceptable risks or hazards to human health based on current site use, but that the potable use of groundwater would pose potential unacceptable human health risk. The RI/HHRA/ERA was finalized in November 2004. An Engineering Evaluation/Cost Analysis (EE/CA) was completed in March 2005 to evaluate removal action alternatives for canal sediment at Site 7.

A debris survey was conducted in July 2005 to delineate the extent of surface debris at the site and assess the need for maintenance actions to maintain integrity of the existing soil cover. Based on debris delineation findings, the Navy, EPA, and VDEQ agreed that soil cover maintenance actions at Site 7 are warranted and surface debris should be removed where practicable. Other recommended actions include moving the southern site fence farther south towards Amphibious Drive and removing surface debris found outside of the existing soil cover area, as feasible.

The Interim Removal Action (IRA) for canal sediment at Site 7 was completed February-March 2007. Additionally, the soil cover maintenance activities along the canal recommended as part of the July 2005 debris delineation survey were completed in conjunction with the sediment removal action (Agviq/CH2M HILL JV I, 2007).

The 5-year schedule for Site 7 is presented in [Table 2-8](#). Planned activities at Site 7 consist of:

- Construction Closeout Report
- Focused FS
- PP and ROD
- LUC RD
- LTM

## Site 8—Demolition Debris Landfill

Site 8, the Demolition Debris Landfill (formerly identified as SWMU 84 in the RFA) is located at the northeast corner of the intersection of Amphibious Drive and Helicopter Road. Landfilling operations occurred from 1971 to 1979. Approximately 4,840 yd<sup>3</sup> of inert waste was reportedly contained in the landfill. Waste disposal occurred to a depth of 3 feet (ft) over an approximately 2-acre area. The landfill was constructed in a pit where the Public Works Center (PWC) Transportation Division excavated material to surface parking lots. Landfill waste included debris from buildings destroyed by fire, concrete piping, debris removed from the bar screen in the base sewage pump stations, and potentially mercury-contaminated carpeting from the demolition of a dental clinic. No release controls were in place at the site and no waste inventory is available.

Site 8 is situated adjacent to wetlands fed by a drainage canal from Lake Bradford, runoff from surrounding onsite and offsite areas, tidal inflow from Little Creek Cove, and discharge from the surficial aquifer. Groundwater flow in the Columbia Aquifer at Site 8 appears to be in the northeast direction, following topography, and discharges to Little Creek Cove, adjacent wetlands draining into the cove, and two ponds. Access to the area is unrestricted, although heavy vegetation is believed to minimize access by Base personnel.

The Demolition Debris Landfill was included in the Navy's RRRS. Five surface soil, four subsurface soil, and three groundwater samples were collected at Site 8. A high risk ranking was determined for Site 8 because of the presence of semivolatile organic compounds (SVOCs), pesticides, PCBs, volatile organic compounds (VOCs), and metals in site media.

The landfill was the subject of an SI in 1998. Groundwater, soil, and sediment sampling were conducted. The Final SI report, dated December 1999, also included a qualitative HHRA.

A site reconnaissance was conducted in December 2000 to quantify the amount of surface demolition debris present at the site. An EE/CA was completed in December 2000 whereby complete removal of surface debris was the selected alternative. Removal of 675 yd<sup>3</sup> of miscellaneous wooden, concrete, and metal debris took place in January 2002. All materials were stockpiled, separated, and disposed of in appropriate facilities as documented in the Closeout Report (CH2M HILL, 2002c).

To fill data gaps identified in the 1998 SI, RI sampling was conducted in January and February 2002. The RI at the site consisted of a soil cover survey, trenching, and sampling of soil, groundwater, surface water, and sediment. The RI/HHRA/ERA was finalized in November 2004. The HHRA concluded that Site 8 poses no unacceptable risks or hazards to human health based on current site use. However, waste remaining in place poses potential unacceptable risk and requires land use restrictions. The ERA concluded that potential unacceptable ecological risks may be present in the area of Site 8 referred to as DP13 and Pond 2. An EE/CA was developed in 2005 and identified complete removal of the demolition debris landfill, removal of debris and surface sediment at DP13 and Pond 2, and the creation of tidal wetlands at the site as the preferred alternative. An IRA was completed September 2005 through August 2006 which consisted of existing wetland improvement through the replacement of .19 acres of a *Phragmites*-dominated marsh in the area of DP13 to one dominated by *Spartina*, creation of a 1.56 acre tidal wetland in the area of the former landfill and Pond 2, and the construction of a nature trail and wildlife observation platforms (Agviq/CH2M HILL JV I, 2006).

An addendum to the Site 8 Construction Closeout Report (CCR) was prepared to document the mitigation of all potential unacceptable risk to human health and the environment through completion of the IRA and evaluate risk management options for arsenic and vanadium in groundwater (CH2M HILL, 2007a).

The 5-year schedule for Site 8 is presented in [Table 2-9](#). Planned activities at Site 8 consist of:

- NFA PP and ROD

#### Site 11a—Building 3033 Former Waste Oil Tank

Site 11a, located north of Site 11, was identified during the 1998 SRI at Site 11 when TCE (100 µg/L) was found in the upgradient monitoring well sample from LS11-MW16D. Direct-push groundwater samples collected in 2001 confirmed elevated TCE in this area. Based on these results, the area north of Site 11 was identified as AOC Site 11a. Research of historical land use of this area indicates the presence of a former underground waste oil tank associated with former Building 3033. The tank was identified as SWMU 60 in the FFA and SWMU/IR Summary report and was closed out with no further action following a desktop audit prior to the NAB Little Creek's placement on the National Priorities List (NPL). Contents of the tank were not documented in these reports. However, groundwater analytical data and membrane interface probe (MIP) results show VOC concentrations are high in the shallow portion of the aquifer near the area of the former waste oil tank.

A soil and groundwater investigation was conducted as part of a SI in July 2002 that included field screening for TCE, confirmation sampling, monitoring well installation, and groundwater sampling. The investigation results confirmed a TCE groundwater plume with higher concentrations at the bottom of the Columbia Aquifer and that TCE does not appear to be exceeding regulatory risk-based screening criteria in the soils. Groundwater flow in the Columbia Aquifer at Site 11a appears to be influenced by seepage into a system of sanitary sewer lines that border the site on the east and south (CH2M HILL, 2002f).

A MIP investigation was conducted in September 2003 to delineate the chlorinated VOC plume. In addition to TCE, a potential source area was identified where tetrachloroethene (PCE) concentrations were elevated in soil. Subsequent direct push technology (DPT) samples were collected to confirm MIP results. Monitoring wells were installed and sampled using passive diffusion bags in February 2004 at various depths within the Columbia Aquifer to determine both the horizontal and vertical stratification of the plume (CH2M HILL, 2004e). Results of the MIP investigation and groundwater sampling were used to develop a Treatability Study Work Plan (CH2M HILL, 2005a). The Treatability Study consisted of reagent injection to effect *in situ* chemical oxidation (ISCO) and post-injection groundwater monitoring. Implementation of the Treatability Study for ISCO was completed in March 2005 and was followed by groundwater LTM in April 2005, July 2005, and November 2005. Groundwater monitoring data indicate mixed results on the effectiveness of ISCO in reducing VOC concentrations. Incomplete distribution of reagent in the aquifer likely contributed to the lack of significant VOC reduction across the site. The Treatability Study Report was finalized in July 2006. The Tier I Partnering Team agreed that an RI is warranted for the site.

The 5-year schedule for Site 11a is presented in [Table 2-10](#). Planned activities consist of:

- RI Work Plan

- RI
- FS
- PP and ROD
- LUC RD
- RA Work Plan
- RA

### **New SWMU 3 (SWMU 111)—Pier 10 Sandblast Yard**

“New” SWMU 3 (formerly classified as SWMU 111) is the Pier 10 Sandblast Yard. This area was used for sandblasting boats from 1962 to 1984. After 1984, anchors and anchor chains were sandblasted at the site. Up until 1995, sandblasting took place on a concrete pad located on the west side of Building 1263. The sandblast material was periodically removed from the site for disposal following EPA toxicity testing indicating the residue was not hazardous. Paint chips and grit covered the unpaved ground south of the pad to the water’s edge and the nearshore bottom of Little Creek Channel. In 1982, a fence was installed around the sandblasting area to limit access to the site. The fence also prevented windblown sandblast materials from migrating outside the fenced area. This fence is generally closed and locked outside working hours. Also, in 1993, photos indicated that the area had been covered with asphalt, except for a small area to the west of the sandblasting pad. Little or no vegetation covers this unpaved area. In approximately 1995, a new sandblasting area was constructed in the northwest corner of the compound. This new area consisted of a concrete pad surrounded by a 4-to-5-ft concrete wall; the old area was no longer used after 1995. All sandblasting operations at SWMU 3 ceased in 1996 when the new indoor sandblasting facility, CB125, was completed.

Within the sandblasting area, surface water drainage flows toward a catch basin. Some runoff from other areas of the site may flow into Little Creek Channel, located on the east side of SWMU 3. Little Creek Channel is not used for recreational purposes, but NAB Little Creek boat traffic and maneuvers are practiced in the area. A picnic area located in the southwest portion of SWMU 3 is used by personnel from Building 1265. The picnic area was covered by 3 inches of soil and sod in April 1999 to prevent soil contact.

SWMU 3 was originally identified in the RFA as being a potential site affected by contamination and was one of the SWMUs included in the Navy’s RRRS. Soil and groundwater sampling was conducted at SWMU 3. The results from the soil sampling conducted at SWMU 3 resulted in a high relative risk ranking as defined by the Navy’s RRRS. Arsenic, barium, beryllium, cadmium, chromium, lead, manganese, mercury, nickel, and zinc were detected in soils. Relatively high concentrations of metals have been observed in the groundwater; however, these results were for total (unfiltered) metals from temporary wells, which typically yield high levels of metals.

In September 1998, as part of the SI, four monitoring wells were installed at SWMU 3. Groundwater sampling of the four newly installed wells and one existing upgradient well, the collection of surface and subsurface soil samples at 10 locations, and the collection of sediment samples at four locations also occurred. The Final SI report, dated December 1999, also included a qualitative HHRA. Groundwater in the Columbia Aquifer flows generally in a southeast direction and follows the topography of the site. Groundwater discharges to Little Creek Channel to the east and south of SWMU 3. The low groundwater gradient and

shallow groundwater table at SWMU 3 indicate the Columbia Aquifer is directly connected to the surface water in Little Creek Channel.

RI field investigation activities were conducted for SWMU 3 in August and September of 2002. During the investigation, an additional three monitoring wells were installed at SWMU 3, and surface, subsurface, groundwater, and sediment sampling was conducted in order to fill data gaps and confirm results of previous investigations. The RI/HHRA/ERA Report was finalized in September 2005 and recommended further investigation for soil, groundwater, and sediment to evaluate potential human health and ecological risk.

A supplemental investigation was conducted during February and March 2007 to delineate the extent to VOCs in groundwater, reevaluate human health risk associated with VOCs and metals in groundwater, and delineate the lateral and vertical extent of abrasive blast material (ABM) in sediment. MIP technology was used to delineate the extent of VOCs in groundwater at SWMU 3 and DPT groundwater samples were collected to verify the MIP results. Seven new monitoring wells were installed (five boundary wells and two high concentrations wells) according to DPT results. Groundwater samples were collected from new and existing monitoring wells and analyzed for VOCs and metals; additionally, subsurface soil samples were collected to aid in the evaluation of remedial alternatives. Following receipt of monitoring well data, inconsistencies were noted between MIP/DPT and monitoring well sample results. During the June 2007 Partnering Meeting, the Navy, in partnership with the EPA and VDEQ agreed an additional round of groundwater monitoring well sampling was necessary to fully characterize the extent of VOCs in groundwater. The lateral and vertical extent of ABM in sediment was delineated. Select sediment samples were collected and analyzed for metals in order to conduct a comparative analysis of percent ABM and metals concentrations.

The 5-year schedule for SWMU 3 is presented on [Table 2-11](#). Planned activities at SWMU 3 consist of:

- SRI Report
- FS
- PP and ROD
- LUC RD
- RA Work Plan
- RA

#### **SWMU 7b—Small Boats Sandblast Yard (Desert Cove Sediment portion of SWMU 7)**

“New” SWMU 7, the Small Boats Sandblast Yard, is located along piers 44 through 55 at Desert Cove and includes an area surrounding the northern portions of CB-125. This SWMU is also referred to as SWMU 137 in the RFA and has also previously been identified as part of IR Site 2 during the IAS. The area of SWMU 7 was used to sandblast and paint ships before 1996, when sandblasting activities were moved to an indoor facility. The Small Boats Sandblast Yard was used to store spent ABM while awaiting characterization (EPA toxicity) test results. Approximately 4,000 yd<sup>3</sup> of ABM from sandblasting generated from 1960 to 1982 were stored in the yard.

No release controls have been identified for this unit. Based on visual site inspections (VSIs) conducted by Earth Technology Corporation in 1988, releases of spent grit and oily

substances to the soil and Desert Cove have occurred in the Small Boats Sandblast Yard. According to the Navy's responses to the RFA, oil-stained soil in the area has been removed. ABM is currently present in the compound near CB125 and near CB317 and CB318. A small amount of ABM was also found west of Building 3869.

The southwestern portion of the area indicated as SWMU 7 is the site of the new paint blast facility, CB125. Before construction of the building, NAVFAC Atlantic contracted with ATEC Environmental to conduct a soil and groundwater investigation. Five soil locations were sampled. The samples were analyzed for total metals and EPA toxicity metals. ATEC noted in their summary report that the only metal detected above the method detection limit (MDL) in the EPA toxicity analysis was zinc at 3.4 milligrams per liter (mg/L). This is below the hazardous waste criteria. In January 1993, three soil and three groundwater samples were collected from wells installed at the site. Soil samples were analyzed for toxicity characteristic leachate procedure (TCLP) metals, and groundwater was analyzed for total metals. These samples were taken in the immediate area of the new sand blasting facility CB125. The soil was found to be non-hazardous. A site reconnaissance was conducted in 1999 for the visual presence of ABM. The presence of ABM was noted in the area of CB125, and trace amounts were observed in the area along small boat piers 51 through 44.

A Final SI report for SWMU 7 was submitted in August 2001 with a corresponding Screening Ecological Risk Assessment (SERA) completed in January 2001. The SI field activities were conducted in May 2000 and included the collection and analysis of the surface and subsurface soil, sediment, and groundwater samples. Three monitoring wells were installed at SWMU 7, and 28 co-located surface and subsurface samples were collected. Five sediment samples were collected along the boat piers in Desert Cove. Co-located surface and subsurface samples were analyzed for TAL metals and PAHs. Soil samples collected during monitoring well installation were analyzed for target compound list (TCL) organic compounds and TAL metals. All sediment samples were analyzed for TAL metals, PAHs, grain size, pH, and total organic carbon (TOC). One sediment sample was also analyzed for TCL organics. All groundwater samples were analyzed for TCL organic compounds and TAL metals. Analytical results were qualitatively evaluated through a comparison with EPA Region III RBCs, VDEQ standards, MCLs, and to background levels established for NAB Little Creek. Groundwater in the Columbia Aquifer flows toward Desert Cove at SWMU 7, ultimately discharging to the cove. Because of the shallow nature of the groundwater table and the low groundwater gradient, Desert Cove is likely in direct contact with the water table.

An RI was conducted for SWMU 7 in August and September 2002. During the investigation, three additional monitoring wells were installed at the site. Groundwater, surface soil, subsurface soil, and sediment samples were collected for analysis. A Draft RI/HHRA/ERA Report was submitted for regulatory review in November 2003. The Draft RI conclusions indicated that there were no overall human health or ecological risks in soil or groundwater at the SWMU. However, the presence of ABM residues in the northern portion of the site is a potential continuing source of contaminants to sediment in Desert Cove. The RI/HHRA/ERA Report was finalized in December 2004. A military construction project was considered in 2004-2005 to replace the piers in the vicinity of SWMU 7 and may include dredging Desert Cove. If this activity takes place, it is likely that the contaminated sediment

will be removed to acceptable levels. However, if the cove is not dredged for upcoming pier replacement activities, the sediment should be further evaluated for removal.

Although there was no overall human health risk in surface soil at SWMU 7, one surface soil result (LW07-SS24) indicated lead at concentrations above the EPA Region III residential child soil screening value (400 milligrams per kilograms [mg/kg]) as determined by the Integrated Exposure Uptake Biokinetic (IEUBK) model. To eliminate the potential human health exposure risk, the area surrounding the lead “hot spot” was delineated for removal and recorded in a technical memorandum in February 2004. The results of the delineation activities were incorporated into the EE/CA for SWMU 7 (and SWMU 8) which was finalized in June 2004.

The IRA for surface soil at SWMU 7 was completed in September of 2004, resulting in no further action to for terrestrial media at SWMU 7. Therefore, the Navy, EPA, and VDEQ agreed to separate the terrestrial and aquatic portions of the site to best manage the remediation process. A CCR was completed for SWMU 7 in December 2004. The proposed plan for SWMU 7a was finalized in April 2005 and a NFA ROD was signed in June 2005. Future documentation and remedial activities beyond the Final RI/HHRA/ERA will address SWMU 7b as the aquatic portion of the site (sediment and surface water of Desert Cove).

In January 2007, the Navy Military Construction (MILCON) project team notified Base Environmental regarding project plans for demolition of existing piers 44-51 and the construction of six new piers along the eastern edge of Desert Cove (SWMU 7b). In addition, a new quaywall is to be constructed along the eastern and southern edges of the cove and will include sheet metal piling installed to 24 ft below sediment surface approximately 32 ft outboard of the existing knee wall. All material between the sheet pile and knee wall will remain in-place and the existing roadway will be demolished and allowed to fall into this area. The current and reasonably anticipated future land use is not expected to change and installation of the metal sheet pile removes the exposure pathway for ecological receptors, therefore no remedial action was necessary to protect ecological risk prior to MILCON construction activities. Design of the new quaywall leaves ABM in place, thus institutional controls will need to be considered when moving forward with the site. Sediment remaining outboard of the new quaywall contains ABM and will be further evaluated.

The schedule for SWMU 7b is presented in [Table 2-12](#). Planned activities at SWMU 7b consist of:

- Baseline Ecological Risk Assessment (BERA) (as necessary)
- FS
- PP and ROD

## 2.4.2 Record of Decision Sites Requiring Action

### Site 11—School of Music Plating Shop

The School of Music Plating Shop was located in Building 3651. This building is located in the eastern portion of the base, near the intersection of 7th and E Streets. The School of Music, located in Building 3602, is 10 ft southwest of the former plating shop. The site consisted of the plating shop building and an in-ground concrete tank used to neutralize plating solutions, its associated piping, and potentially contaminated soil surrounding the

tank and piping. This site is also referred to as SWMU 27 (plating shop) and SWMU 28 (neutralization tank) in the RFA. Surrounding areas, apart from buildings and paved areas, are covered with grass and are generally level between manmade drainage ditches.

The neutralization tank for the plating shop had a diameter of 5 ft and a depth of 11 ft. Approximately 2.5 yd<sup>3</sup> of crushed limestone were placed in the pit to neutralize the acidic plating bath wastes. Wastewater entered the tank via an acid-resistant drainpipe that originated in a sink in Building 3651. According to the IRI, neutralized wastewater was discharged from the unit into the storm sewer via an outlet and drain from the northwest side of the tank. Flow through the unit was controlled by the standpipe and drain elevations, so that all wastewater had to pass through the limestone before it could enter the discharge pipe connecting with the storm sewer.

The IAS reported that plating wastes were discharged into the neutralization tank during a 10-year period beginning in 1964. In 1974, the plating operations were transferred to a separate facility and discharges into the neutralization tank were discontinued. During its period of operation, the plating shop reportedly used silver cyanide, copper cyanide, chromic acid (brite dip), nickel plating baths, and various acids. In addition, lacquer strippers and lacquer were also used. Small quantities of these plating baths, acids, and lacquer strippers were disposed of down the sink in the plating shop, which drains into the neutralization tank and eventually into the storm sewer system. The IAS reported that approximately 10 gallons of each plating chemical and lacquer stripper were disposed of in the shop sinks each year.

As part of the 1986 RVS, three monitoring wells were installed at Site 11. Subsurface soil samples also were collected to delineate the vertical extent of contamination in probable source areas. The results of the RVS sampling and analysis activities indicated that contamination was being released from Site 11, but the magnitude and distribution of this contamination could not be determined on the basis of the RVS findings alone. As part of the 1991 IRI, a second round of groundwater sampling was conducted.

Site 11 was the subject of a RI/FS performed by FWES in 1993. Sampling efforts associated with the RI/FS included the collection of groundwater samples from the three monitoring wells installed during the 1986 RVS and 10 surface soil samples. The findings were summarized in the RI/FS report dated November 1994. The surface soil, the neutralization tank and its contents, and groundwater at Site 11 were determined to be affected by contamination. Arsenic, beryllium, and manganese were detected above screening criteria in the surface soil, and trichloroethene (TCE) and 1,1-dichloroethene (DCE) were detected in the groundwater above maximum contaminant level (MCL) drinking water standards in one of the three wells at the site. The maximum concentrations of TCE and 1,1-DCE detected in three rounds of groundwater sampling were 340 parts per billion (ppb) and 34 ppb, respectively.

A DD was issued by the Navy in November 1994, proposing the removal of the neutralization tank, associated piping, and neighboring surface and subsurface soil. The neutralization tank, piping, and surrounding soil were excavated in November 1995. An interim removal action Final Closeout Report was issued in May 1996.

A short-term, post-removal groundwater monitoring program was proposed (FWES, 1996a) to verify the effectiveness of the source and contaminated-soil removal action. Sampling

results for Site 11 were scheduled to be assessed and the program reevaluated after 1 year (two rounds) of sampling. The first round of post-removal monitoring was conducted in May 1996 by FWES, and the second round of monitoring was completed by CH2M HILL in December 1996 (CH2M HILL, 1998b).

During the post-removal groundwater monitoring, no metals were detected above MCLs or RBCs, indicating the removal action removed the source of metal contamination and the metal contamination. Historically, chlorinated hydrocarbons had only been detected in one well, LC11-GW01S, at Site 11. During the last round of the post-removal groundwater monitoring program, however, low levels of TCE were detected in LC11-GW03S at concentrations below the MCL for TCE. A decrease in the concentration of all chlorinated hydrocarbon groundwater contaminants was observed during the post-removal groundwater monitoring in well LC11-GW01S. Significant fluctuations in concentrations of contaminants have been observed in the past in this well. Therefore, additional groundwater sampling was recommended to define the extent of the contamination in the groundwater and to evaluate if the contamination in LC11-GW01S is on a permanent and irreversible downward trend.

Supplemental Remedial Investigation (SRI) field activities at Site 11 were initiated in June 1998. As part of the SRI, additional groundwater samples were collected with a Geoprobe<sup>®</sup> to define the source area and extent of contamination at Site 11. Concentrations of chlorinated VOCs collected from 8 to 12 ft below ground surface (bgs) in the shallow portion of the surficial aquifer did not exceed MCLs. Concentrations of 1,1-DCE, cis-1,2-DCE, and TCE exceeded MCLs in groundwater samples collected from the deep portion of the surficial aquifer; generally from 17 to 21 ft bgs. Total chlorinated VOCs in the lower portion of the aquifer were found at greater concentrations and were more extensive than in the upper portion of the aquifer at Site 11. Groundwater flow in the Columbia Aquifer at Site 11 appears to be controlled both by the overall base-wide groundwater flow direction (east to west near Site 11) as well as by seepage into a system of sanitary sewer pipes that border the site on the east and south (CH2M HILL, 2002e). Groundwater flow in the Yorktown Aquifer is to the northwest.

As a result of the Geoprobe<sup>®</sup> groundwater sampling, 15 additional monitoring wells and two piezometers were installed. These monitoring wells serve to monitor the source area and extent of the plume. All the new and existing monitoring wells were sampled in September 1998 and again in July 1999.

A Draft SRI Report for Site 11 was submitted for regulatory review during February 2001. This report summarized all new data obtained since the 1994 RI/FS report by FWES in 1994. Data evaluation included surface and subsurface soil, and groundwater (Geoprobe<sup>®</sup> and monitoring well) samples. A qualitative HHRA was also conducted for the site as part of the SRI. Subsequent to the SRI, four subsurface soil samples were obtained at the site near the location of the former neutralization tank and its associated piping in February 2001, to provide additional data to be used in the amended HHRA. Previous subsurface soil data (from the 1995 removal action) were not validated per CERCLA criteria, and this newly obtained data was added to the SRI as an addendum.

Conclusions drawn in the SRI regarding the nature and extent of contamination at Site 11 included three inorganic constituents in surface soil samples (arsenic, lead, and iron), chlorinated VOCs, and one SVOC, pentachlorophenol (PCP), in groundwater. The

concentrations of inorganics in surface soil exceeded both EPA Region III RBCs and NAB Little Creek background concentrations in one or more samples. There were two chlorinated VOCs that exceeded EPA Region III tap water RBCs: 1,1-DCE and TCE. These compounds, along with 1,1,1-trichloroethane (TCA), also exceeded drinking water MCLs in at least one monitoring well. Groundwater contamination appeared to be limited to the lower portion of the water table aquifer in the area immediately around the location of the former plating shop neutralization tank extending south to Gator Boulevard. The area of greatest chlorinated VOC concentration was directly south and southeast of the former tank.

Recommendations made in the SRI Report included additional follow-up investigation activities including a groundwater investigation north of monitoring well LS11-MW16D (which has subsequently been reclassified as AOC Site 11a) to determine if TCE contamination is associated with Site 11 or another source, and a groundwater investigation to delineate the area of elevated concentrations between the former location of the neutralization tank and monitoring wells LS11-MW05D and LS11-MW04D at the bottom of the aquifer to identify maximum concentrations, mass of contaminants, and, if feasible, the presence of dense nonaqueous phase liquid (DNAPL). Also, further investigation of the sanitary sewer line adjacent to the site was recommended.

As a result of regulatory comments received on the Draft SRI, three monitoring wells were installed into the Yorktown Aquifer and sampled at Site 11 to determine if site contaminants had potentially entered the lower aquifer in September and October 2001. A Draft Final SRI Report was completed in October 2002 and Finalized in June 2004.

A Membrane Interface Probe (MIP) investigation was conducted during the summer of 2001 to better identify the areas where DNAPL may be present around LS11-MW04D and LS11-MW05D and to quantify the extent of contamination in the northern portion of the site around LS11-MW16D. Direct-push samples were collected to confirm the MIP results. The results indicated there had not been significant degradation of TCE (CH2M HILL, 2003j).

An Environmental Security Technology Certification Program (ESTCP) funded pilot test was conducted at Site 11 from June to October of 2002. The project was led by a consortium of four universities: University of Rhode Island, Colorado School of Mines, University of Texas at San Antonio, and University of Arizona. The goal of this pilot test was to evaluate the *in situ* removal of organic contaminants from groundwater through the injection and extraction of a cyclodextrin (CD) solution. The pilot study was completed during the summer of 2002. The results and conclusions are presented in the *Cyclodextrin Enhanced In-situ Removal of Organic Contaminants from Groundwater at Department of Defense Sites* completed by T. B. Boving, J. E. McCray, W. J. Blanford, M. L. Brusseau of University of Rhode Island, Colorado School of Mines, University of Texas at San Antonio, and University of Arizona, respectively. A follow-up groundwater sampling event was completed by CH2M HILL in January 2003 to evaluate organic compounds remaining in the groundwater at the site. Additionally, an MIP investigation at Site 11 was conducted in September 2003 to further assess the impact the CD solution had on the groundwater at the site.

Additional investigation activities were completed in 2005 to assess remedial alternatives for consideration in the FS. In March 2005, two directional wells were installed and all site monitoring wells were sampled to provide a complete round of groundwater data. Additional groundwater and soil sampling was completed in October 2005 to evaluate site characteristics associated with *in situ* remedial design technologies. Additionally, these data

were used to develop an SRI Addendum to update and re-evaluate potential human health risks associated with exposure to VOCs in groundwater (CH2M HILL, 2006a). A FS was developed for Site 11 to address VOCs in groundwater. The remedial alternatives evaluated were no action, electrical resistance heating with enhanced reductive dechlorination, and enhanced reductive dechlorination. The FS identified enhanced reductive dechlorination accompanied by land use controls (LUCs) as the preferred alternative and a PP was developed for public comment. The ROD was submitted for legal review in November 2006 and was signed in July 2007.

The 5-year schedule for Site 11 is presented in [Table 2-13](#). Planned activities at Site 11 consist of:

- LUC RD
- RAWP
- RA

### Site 12—Exchange Laundry Waste Disposal Area

The Exchange Laundry/Dry Cleaning Facility, referred to as SWMU 77 in the RFA, was located in Building 3323, near the intersection of 3rd and B Streets, in the eastern portion of NAB Little Creek. Building 3323 was torn down in 1987 for the construction of the existing commissary (Building 3445). A catch basin and a major portion of a stormwater line were removed during construction of the new building in 1992. The stormwater line received dry cleaning wastes from the former Navy Exchange (NEX) laundry and drained to a canal that flows between Lake Bradford and Little Creek Cove.

As reported in the IAS, wastes were dumped into the stormwater line and thought to flow into the drainage canal via an outfall located immediately west of the former laundry building. However, review of the stormwater configuration, conducted by Little Creek personnel in the summer of 1991, revealed that drainage from the catch basin reportedly used for the dumping actually flows north along B Street and then west along the north side of Building 3329, before flowing into the canal. Based on this information, the outfall for wastes dumped into the catch basin was approximately 350 ft north of the outfall sampled during the IRI investigation and the 1986 RVS. Drainage into the outfall pipe sampled during the IRI comes from a relatively small area of the parking lot around Building 3432. Based on recommendations made in the Site Characterization Report for the commissary construction project, the stormwater line was removed and the area regraded.

The ground surface at the site was mostly an asphalt-paved parking area associated with the car wash and former Buildings 3432, 3433, 3434, and 3435 (replaced by Building 3445). The former Building 3323 parking lot was graded for the parking area for the new commissary building in 1993. The outfall immediately west of the car wash consists of a 12-inch galvanized iron pipe located approximately 3 ft below grade. This outfall is referred to as the “southern” outfall or discharge pipe. The outfall located north of Building 3445, the “northern” outfall, which is connected to the catch basin used for disposal, was not inspected during the IRI field program, but probably had a configuration similar to the southern outfall. The catch basin used for disposal, located southwest of the intersection of 4th and B Streets, has since been removed.

The drainage canal is approximately 20 ft wide and 9 ft deep from the top of the bank. The sides of the canal are steep and covered with a relatively thick growth of vegetation. At the time of the April 1991 IRI site visit, the canal contained approximately 2 to 3 ft of water, i.e., the water level was 6 to 7 ft below the top of the bank. The canal is bordered by a 20- to 30-ft-wide strip of vegetation on either side containing abundant trees, bushes, and weeds. The flow direction in the canal is to the south and is controlled by a weir at Little Creek Cove that prevents the tides in the cove from backing up into Lake Bradford. Miscellaneous trash and refuse were observed in many places along the banks of the canal and the wooded areas (Ebasco, 1991a).

The IAS reported that wastes dumped into the stormwater line included PCE sludges, soap, sizing, and dyes. The period of operation and disposal lasted from 1973 until 1978, during which an estimated 1,320 gallons of waste were dumped into the stormwater drain. Of this total, approximately 200 gallons were PCE sludges. In addition to the dumping, smaller quantities of PCE and other wastes may have entered the stormwater line through runoff from spills or overflow of waste containers (Ebasco, 1991a).

As part of the RVS, six surface water and six shallow sediment samples were collected at Site 12 to verify the presence or absence of contamination as recommended in the IAS. Contamination was detected in one or more media at Site 12 and recommendations were made to continue investigating the site to confirm RVS activities.

A TEC Environmental completed a two-phase environmental assessment of Site 12. The Phase I analysis, conducted in 1990, included monitoring well installation, groundwater sampling, soil sampling, and sediment sampling. The second phase of the ATEC assessment was conducted in 1991 to verify the Phase I findings and provide a more detailed delineation of the extent of groundwater contamination at Site 12. The specific activities completed for Phase II included the drilling, installation, and sampling of two additional monitoring wells, collection of a second round of samples from the eight existing wells, and the establishment of vertical well elevation data to determine the direction of groundwater flow. Following the Phase II action, a Site Characterization Report (SCR) was completed in June 1992.

The Site 12 RI/FS (FWES, 1994c) included monitoring well installation, and groundwater, surface water, and sediment sampling. Groundwater samples were collected from the four monitoring wells and were analyzed for VOCs. Total 1,2-DCE, TCE, and PCE were among the VOCs detected in groundwater samples. The highest total VOCs was 18,200 ppb. Four surface water samples and four sediment samples were collected from the canal adjacent to Site 12. These samples were analyzed for VOCs and TAL metals. No chlorinated solvents were detected in the canal surface water or sediment.

FWES (Phase I) and CH2M HILL (Phase II) completed the SRI for Site 12. Groundwater flow in the Columbia Aquifer is to the west and was intercepted by a leaking sanitary sewer manhole and pipe located below the water table, which created a localized sink that impacted groundwater flow throughout the entire site. A surface water drainage canal borders the site to the west of the sewer. Surface water in the canal appeared to infiltrate to the groundwater and flow east toward the sewer. A weir artificially controls the water level in the canal.

Three monitoring wells were installed in the Yorktown Aquifer below the Yorktown Confining Unit to monitor the presence of contamination in the Yorktown Aquifer. Groundwater flow in the Yorktown Aquifer is north, toward the Chesapeake Bay (CH2M HILL, 2000c).

Groundwater sampling for natural attenuation parameters as well as for chlorinated VOCs was conducted in July and September of 1998. Biodegradation is occurring at the site, based on the reduction in concentrations of chlorinated VOCs over time and the presence of PCE breakdown products (TCE and cis-1,2-DCE) in the groundwater collected from selected wells. The purpose of this sampling was to determine the extent of contamination and if biodegradation is occurring at a rate that would make it a viable remedial alternative. The Draft SRI Report was submitted in January 2000. The Final SRI was approved by VDEQ and EPA in December 2000.

A MIP investigation was conducted at Site 12 during the summer of 2001 to better identify the location of the source plume. The study revealed that there are two PCE plumes at Site 12. The concentrations of PCE seemed to be going down when compared to previous sampling events. The decrease in concentrations is attributed to dilution and a biological breakdown to TCE.

A Draft FS for Site 12 was submitted for regulatory review in April 2003. The Draft FS results indicate that pump and treat, biostimulation, and pump and treat with biostimulation are very similar in effectiveness when ranked in a comparative analysis. Biostimulation and pump and treat with biostimulation were predicted to provide aquifer restoration in significantly shorter timeframes than the other remedial alternatives. Comments were received by EPA and VDEQ and incorporated into the Final Site 12 FS submitted in March 2004.

In September 2004, an FS Addendum was submitted as part of the revised final FS to include ISCO as an additional treatment alternative for groundwater contamination at the site. ISCO followed by enhance reductive dechlorination was initially determined to be the preferred alternative, with the Proposed Plan in June 2005 and the ROD signed in September 2005. A LUC RD and the RA Work Plan (RAWP) were distributed for regulatory review in March 2006. In April 2006 it was determined, given the likelihood for increased metals concentrations in groundwater as a result of ISCO (permanganate) implementation, the remedy would be enhance reductive dechlorination and monitoring. The remedy modification was documented in an Explanation of Significant Difference finalized in October 2006. The remedial action work plan for implementation of enhanced reductive dechlorination (ERD) using Emulsified Oil Substrate (EOS®) at Site 12 was finalized in February 2007. RA construction was completed in March-April 2007. Baseline sampling results indicated potential movement of contaminants west following repair of the storm sewer. Additional DPT sampling was conducted to verify the western and southwestern plume boundary. Sampling results were documented in an addendum to the RA Work Plan and indicated the southwestern plume boundary was adequately defined and recommended installation of one additional well pair outside of the western boundary to monitoring for contaminant migration towards the drainage canal. Remedial action monitoring is scheduled to continue through FY 2012.

The 5-year schedule for Site 12 is provided on [Table 2-14](#). Planned activities consist of:

- RA CCR
- RA Monitoring

### Site 13—Public Works PCP Dip Tank and Wash Rack

The PCP Dip Tank and Wash Rack is located near the intersection of 7th and F Streets in the eastern portion of NAB Little Creek, approximately one block west of Site 11. The site consisted of the dip tank formerly used to treat wood with a mixture of PCP, diesel, and kerosene, an adjacent area that contained drying racks for the PCP-treated wood, an open area formerly used by the PWC for storage of supplies and equipment, and a concrete wash rack at the southwestern end of that area. This site is also referred to in the RFA as SWMUs 14 (wash rack) and 15 (dip tank).

The PCP dip tank was located in the southwest corner of the fenced compound west of Building 3165E. The tank was in operation from the early 1960s until 1974. According to a former Public Works Supervisor, the tank was constructed of metal, was 20 ft in length and 5 ft in diameter. The top third of the tank was cut off and replaced with a metal lid. The bottom half of the tank was buried in the ground. A tank of this size and specifications would hold approximately 1,500 gallons.

The contents of the tank were a mixture of one part PCP to ten parts diesel and kerosene. Wood was dipped into the tank and either set on racks for drying or placed directly on trucks for delivery to where it was to be used on base. The drying racks were located immediately east of the dip tank between the tank and Building 3165E. A pump was located at the south end of the tank, outside the fenced compound. This pump was used to keep the contents of the tank mixed and to empty the contents of the tank into 55-gallon drums when it became spent. According to the former PWC supervisor, there had only been one PCP tank throughout the history of this area and it was always in this location. The dip tank was cleaned out approximately every 6 months, at which time the approximately 55 gallons of PCP sludge generated are believed to have been disposed of in the Amphibious Base Landfill (RGH, 1984). All remaining PCP solution and associated sludges were removed from the tank in 1975. The tank itself was dismantled in 1982. The area formerly containing the PCP dip tank and drying racks has since been paved with asphalt and converted to a PWC storage area.

The wash rack and associated storage area, both of which were immediately south of the dip tank and west of Building 3165D, continue to be used by the PWC. The wash rack, located at the southwestern corner of the storage area, is a concrete pad with bermed sides and centrally located deck drain. The rack was installed in 1945 and is used by the PWC to clean vehicles, equipment, and miscellaneous objects with steam and biodegradable chemical cleaners. Wash water and other runoff from the rack drains through the central deck drain into an oil/water separator (OWS) located under the paved driveway between the wash rack and Building 3165. The OWS is accessible via a rectangular steel manhole located in the driveway. The contents of the separator, as observed in April 1991, included both oily sludge and oil. The oily discharge from the OWS is removed and taken to Craney Island Fuel Facility, and the water is routed to the sanitary sewers.

The unpaved storage area immediately north of the wash rack, between the wash rack and the former location of the PCP dip tank, was used for the storage of various materials and equipment. The IAS reported readily observable solvents, paint, fuel, and tar staining the

surface in this area. During the IRI, the gravel area was free of surface staining, indicating that although the area continued to be used as a storage yard by Public Works, the occurrence of spillage and other releases has been significantly reduced (Ebasco, 1991).

As part of the RVS, five groundwater monitoring wells were installed at Site 13 to facilitate the collection of groundwater samples and hydraulic head data to determine groundwater flow directions. Three surface soil and three subsurface soil samples were collected to help define the nature of contamination in probable source areas. A second round of groundwater monitoring was conducted during the IRI.

Site 13 was the subject of an RI/FS performed by FWES in 1993. The findings were summarized in the RI/FS report dated November 1994. Groundwater, surface soil, and subsurface soil samples were collected and analyzed during this investigation. The highest total VOCs detected in surface soil was 19 ppb, and the total SVOCs detected ranged from 1,210 ppb to 95,800 ppb. VOC concentrations in the subsurface soil were as high as 250 ppb while SVOCs, primarily PCP, were detected in subsurface soil at concentrations ranging from 11,000 ppb to 890,000 ppb. The maximum total VOCs concentration detected in groundwater was 262 ppb. Vinyl chloride was detected in groundwater at 200 ppb. SVOCs were detected at four of the six groundwater sampling locations. PCP was detected at three of the six groundwater sampling locations; the highest concentration detected was 1,700 ppb near the former dip tank.

Additional site data were obtained during the Phase I SRI. VOCs were detected in 10 of the 12 groundwater samples collected from monitoring wells at the site. The highest concentration of a VOC was PCE at 1,200 ppb. Several SVOCs were detected in groundwater samples. PCP was detected at the greatest concentrations, with a maximum concentration of 2,300 ppb observed near the former dip tank.

Additional soil and groundwater sampling was conducted, as part of a Phase II SRI, to fully delineate the contamination in these media. Results of this portion of the Phase II SRI are reported in the EE/CA for Site 13 (CH2M HILL, 1999a). The EE/CA was prepared to address the PCP soil contamination in the area of the former dip tank. The EE/CA recommended excavation of approximately 150 yd<sup>3</sup> of soil. The PCP dip tank and associated soil were removed during an IRA completed in the spring of 1999 and recorded in a Closeout Report (OHM, 1999b). The Final SRI was submitted in May 2002.

Groundwater flow in the Columbia Aquifer at Site 13 appears to be controlled both by the overall basewide groundwater flow direct (northeast to southwest near Site 13) as well as by seepage into a system of sanitary sewer pipes that border the site on the west. Flow direction at the site has been observed to flow west to southwest.

In March 2000, an oxygen-releasing compound (ORC) pilot study was performed to reduce PCP concentrations in the groundwater. Six rounds of post-injection monitoring were conducted for a period of 60 weeks (through January 2002). Results indicated a significant decrease in PCP concentrations over the duration of the pilot study (CH2M HILL, 2003f).

A Site 13 FS, finalized in June 2004, evaluated options to address VOCs and PCP contaminants in groundwater. The FS indicated that enhanced anaerobic bioremediation and enhanced aerobic bioremediation rank relatively higher than the other alternatives for short-term effectiveness. A treatability study using chemical oxidation and bioremediation (EOS®) began in November 2004. Six rounds of post-injection monitoring were completed in

2005, and the results were documented in the Treatability Study Report. Results indicated that both chemical oxidation and bioremediation were effective in reducing concentrations, however further treatment was necessary because the remediation goals (MCLs) were not met. The TS concluded anaerobic bioremediation as the most favorable alternative for continued treatment of site COCs. Additionally, because the groundwater plume extends beneath Building 3165 a vapor intrusion assessment was warranted prior to development of the PP and ROD.

A vapor intrusion assessment was initiated in September 2006 and included a building inspection and collection of five shallow groundwater samples for VOC analysis. Results of the investigation indicate no human health risks associated with vapor intrusion at Site 13 (CH2M HILL, 2007a). Enhanced reductive bioremediation was determined to be the preferred alternative, with the Proposed Plan in July 2007 and the ROD signed in September 2007.

The 5-year schedule for Site 13 is presented in [Table 2-15](#). Planned activities at Site 13 consist of:

- LUC RD
- RA Work Plan
- RA

### 2.4.3 Response Complete Sites

#### Response Complete—Site Screening Process

One hundred and twenty-one (121) sites warranted no further action following desktop audits by the Navy, EPA, and VDEQ, and/or SIs ([Table 2-1](#)). Currently, there are no sites or AOCs proposed for a screening assessment. If a potential CERCLA release is discovered, documentation will be provided in subsequent SMP updates. The locations of the NFA sites are shown on [Figure 2-2](#).

During FY 2002, a closeout report was prepared for Sites 5, 15, 16 and SWMU 2. The analytical results from samples collected at Site 5 and SWMU 2 indicated concentrations below human health screening criteria and low-to-negligible ecological risk because of the lack of direct exposure pathways. Removal actions were conducted at Sites 15 and 16 in 1995 that consisted of excavation and disposal of PCB-contaminated soil, vegetation, and the utility pole at Site 16. Additional sampling indicated that Sites 15 and 16 were not expected to pose unacceptable risks to human health and the environment. Based on the findings, the NAB Little Creek Partnering Team determined that NFA was required at these sites. Land use at these sites is unrestricted.

In June 2003, the Navy, EPA, and VDEQ agreed to close out SWMU 30 with NFA and inform the Navy program managing underground storage tanks (USTs) and above-ground storage tank (ASTs) staff of their responsibility for any “needed” action. Any further assessment or remediation will be covered under the SPCC Plan/ AST Program.

AOCs H, I, J, and Site 14 were evaluated in August of 2003, and the analytical results from samples collected indicated no human health or ecological risk at any of the sites. Based on the findings, the Navy, EPA, and VDEQ determined that NFA was appropriate for these

sites and the Final Closeout Report was signed in March 2004. Land use at these sites is unrestricted.

SWMUs 96, 97, 98 and 119 were evaluated in June 2004. Desktop audits as well as site visits showed no additional sampling was required to close out SWMUs 96, 97, and 98. The analytical results from samples collected at SWMU 119 indicated no human health or ecological risk at this site. Based on the findings, the Navy, EPA, and VDEQ determined that NFA was appropriate for these sites and the Final Closeout Report was signed in September 2004. Land use at these sites is unrestricted.

SWMUs 5, 6, 13, 18, 116, Site 6, and AOC D were evaluated in FY2005. Desktop audits showed no additional sampling was required for SWMUs 18, 116 and AOC D. The analytical results from samples collected at SWMUs 5, 6, 13, and Site 6 indicated no human health or ecological risks at the site. Based on the findings, the Navy, EPA, and VDEQ agreed that NFA was appropriate for these sites and the Final Closeout Report was signed in January 2006. Land use at these sites is unrestricted.

### Response Complete—Record of Decision

NFA RODs were signed for SWMU 8 and SWMU 7a following quantitative assessment of human health and ecological risks (Figure 2-2). An action ROD was required for Sites 9 and 10 because waste was left in place (Figure 2-1). LTM and LUC inspections are ongoing to ensure the remedy continues to be protective of human health and the environment. Site descriptions for Sites 9 and 10 and SWMU 8 are provided below. Although SWMU 7a has been closed with NFA, SWMU 7b activities are ongoing in the CERCLA process and the site details are provided in Section 2.5.1 of this report.

**Site 9 (Driving Range Landfill) and Site 10 (Sewage Treatment Plant Landfill).** Site 9, the Driving Range Landfill, is a 6-acre landfill located in the northeast portion of the installation, northwest of the golf course, directly east of the Sewage Treatment Plant Landfill (Site 10) and Hewitt Drive, and approximately 500 ft south of the Chesapeake Bay shoreline. Landfilling operations occurred from 1950 to 1956. The northern perimeter of the landfill is bounded by a network of sand dunes that parallels the Chesapeake Bay shoreline. Before 1950, the area was a marsh environment adjoining the easternmost arm of Little Creek Cove (Ebasco, 1991a). An incinerator, located on Hewitt Drive opposite the western perimeter of the Driving Range Landfill, was active during the landfill operating period and reportedly burned combustible materials generated by NAB Little Creek. The resulting ash and bypassed materials were disposed of in the Driving Range Landfill. After the incinerator was decommissioned, solid waste from the base was disposed of directly in the landfill. The estimated land disposal volume was 40,000 yd<sup>3</sup> of waste. After landfill operations at the site were terminated, the installation converted the area into a driving range. A berm was constructed using clean fill along the east side of Hewitt Drive, and sewage sludge was brought in along the southern site boundary to enhance growth of the grass. Although precise boundaries for the fill area have not been delineated, the boundary of the landfill generally coincides with that of the currently operating driving range (Ebasco, 1991a). The IAS indicated that the Site 9 landfill contents include various hazardous wastes such as PCBs, pesticides, and used motor oil (RGH, 1984). The landfilling methods reportedly entailed the excavation of trenches with a dragline or other heavy equipment. The trenches were filled with waste and backfilled. The depth was likely limited by the depth to the water table, typically within 5 ft of the ground surface. Groundwater in both the Columbia

Aquifer and the Yorktown Aquifer at Site 9 flows to the north and discharges into Chesapeake Bay.

Site 10, the Sewage Treatment Plant Landfill, is located in the northeast portion of NAB Little Creek, approximately 500 ft south of the Chesapeake Bay shoreline and due west of the Site 9 Driving Range Landfill. The landfill is bounded on the north and the west by sand dunes, on the south by 11th Street and recreational facilities that extend onto the landfill area, and on the east by Hewitt Drive. The landfill comprises approximately 18 acres and operated from 1941 until 1968. Existing surface features include a well-vegetated soil cover that has been partially reclaimed for use as baseball diamonds and vegetated sand dunes. Groundwater in both the Columbia Aquifer and the Yorktown Aquifer at Site 10 generally flows to the northwest and discharges into Chesapeake Bay.

The estimated depth to fill at Site 10 disposal volume was approximately 46,500 yd<sup>3</sup> of waste. The IAS indicated that potentially hazardous constituents and a large quantity of demolition debris were likely disposed of in the landfill. It is likely that the volume of hazardous waste disposed of in the landfill is small relative to the volume of nonhazardous waste. Disposal of sewage sludge from the on-site sewage treatment plant, formerly located in the southeast portion of the fill area, continued until 1968 when the treatment plant closed. Landfilling operations began in the southern portion of the area, which included an extension of Desert Cove and then moved northward to the associated marshy lowlands. The bulk of the sewage sludge was disposed of along the northwest perimeter of the landfill, near the base of the sand dunes.

The RVS was completed for Sites 9 and 10 in October 1986 by CH2M HILL. During the RVS, six monitoring wells were installed around the perimeter of Site 9 and eight monitoring wells were installed around the perimeter of Site 10 to facilitate the collection of groundwater samples and hydraulic head data to determine groundwater flow directions. Surface water and sediment samples were collected to investigate impacts on nearby surface water bodies and determine whether contaminated runoff was migrating from the IRP sites. Subsurface soil samples were collected to delineate the vertical extent of contamination in probable source areas. The results of the RVS sampling activities indicated that little or no contamination was migrating from the Site 9 and Site 10 landfills. However, because the quantity, nature, and extent of contaminants disposed in the landfill are uncertain, there may be unrecognized pathways from the site, and a second round of groundwater sampling was recommended (CH2M HILL, 1986).

Site 9 (referred to as SWMU 24) and Site 10 (referred as SWMUs 25 and 26) were included in the RCRA RFA, conducted by A. T. Kearney in 1989. The RFA recommended no additional action other than the IRI activities planned at Sites 9 and 10.

During the IRI, completed by Ebasco in 1991, a second round of groundwater sampling was conducted at Sites 9 and 10. The data were used to develop a recommended response action, an HHRA, and site-specific recommendations concerning additional characterization. The IRI determined that Site 9 was not releasing detectable levels of contamination to the underlying groundwater and that the absence of contamination in any downgradient wells and the similarity in chemical composition between upgradient and downgradient wells indicated that the landfill does not impact groundwater quality in this area. The IRI concluded that the overall trend at Site 10 is toward an improvement in groundwater quality, and that the Sewage Treatment Plant Landfill is having little or no measurable

impact on shallow groundwater quality in the water table aquifer beneath it. The IRI recommended that no additional characterization or remediation were warranted for Sites 9 and 10 based on the results of the sampling during the RVS and IRI. A groundwater monitoring program was recommended to ensure that any post-closure releases of contamination were addressed as needed (Ebasco, 1991b).

Sites 9 and 10 were the subject of an RI/FS performed by FWES in 1993. The investigations included soil and groundwater sampling, and the RI/FS, including a baseline HHRA, concluded that no current risk was posed by exposure to soil and groundwater at Site 9 (FWES, 1994c).

A PP and a DD for both Sites 9 and 10 were prepared by Baker in January 1997. The documents called for long-term groundwater monitoring because of the contents of the landfill and its proximity to the Chesapeake Bay and other surface water bodies. It is important to note that the RI/FS, PP, and DD were conducted under the IRP before NAB Little Creek was placed on the NPL and have not been reviewed or accepted by EPA or VDEQ.

An LTM program was prepared by FWES in 1996. Groundwater monitoring was proposed to be conducted semiannually for a period of 5 years (10 rounds of sampling). Following the first 3 years of monitoring (six rounds), a 3-year summary report was completed (CH2M HILL, 2000a) recommending further sampling rounds be conducted on an annual basis because of the lack of seasonal variation and low-level contamination, and also recommending that VOC analysis be dropped because of the lack of contamination. Groundwater LTM has since continued on an annual basis. Groundwater monitoring results are presented in periodic letter reports submitted to the Navy, EPA, and VDEQ following each round of sampling. The Draft Round 12 LTM Report submitted in December 2003 included recommendations to discontinue the analysis of SVOCs and PEST/PCBs in post-ROD groundwater LTM at the site based on infrequent low-level detections as shown in a statistical analysis of rounds 1 through 12 analytical results.

A soil cover survey was conducted at Sites 9 and 10 by CH2M HILL in February 2000. Results demonstrated the majority of the landfills contain 2 or more ft of soil cover.

A SERA was completed for Sites 9 and 10 in June 2000 by CH2M HILL. The SERA was conducted to determine if potential risks to ecological receptors warrant additional assessment and identify potential data gaps. The SERA concluded that sufficient data were available for Sites 9 and 10 and recommended that these sites continue on to Step 3 of the ERA process because one or more chemicals of potential concern and complete exposure pathways were identified at the sites (CH2M HILL, 2000b).

A Revised RI/HHRA/FFS was completed for Sites 9 and 10 in February 2001 by CH2M HILL. The HHRA identified potential RME risks from the potable use of groundwater at the sites, based on cadmium, manganese, thallium, and zinc concentrations. Because potable use of groundwater is an unlikely scenario, the FS recommended LUCs and LTM at the sites.

A BERA through Step 3A was conducted at Sites 9 and 10 in 2001 by CH2M HILL to determine if risks to ecological receptors from site-related chemicals are likely. No further action was recommended in the terrestrial habitats and for groundwater unless LTM

indicates significant increases at Sites 9 and 10. Continuing to Step 3B was not warranted (CH2M HILL, 2001e).

The PP for Sites 9 and Site 10 was submitted for public review and comment during March 2001 for a 30-day period. A public meeting was held on March 28, 2001, to provide further information on the PP for the remedial actions at the sites to the general public. The PP consisted of three alternatives to address the contamination at the sites. The alternatives were: (1) no action; (2) LUCs with LTM; and (3) low-permeability cap with institutional controls and LTM. The preferred alternative presented in the PP is LUCs and LTM. The selected remedy presented in the Final Sites 9 and 10 ROD is LUCs with LTM (CH2M HILL, 2003l). A LUC RD was completed in March 2004 to implement the remedial action objectives (RAOs) outlined in the ROD and was followed by an Interim Remedial Action Completion Report (IRACR) to document completion of the RA and the remedy is in place, operational, and functional in accordance with CERCLA (CH2M HILL, 2005b)..

Post-ROD Project Plans were developed in 2004 and consisted of annual groundwater LTM and quarterly landfill integrity inspections. Analytical results and landfill inspections are summarized in LTM Reports submitted annually. The first two rounds of groundwater samples collected during LTM were analyzed for site-specific COCs, the third round of LTM was analyzed for full suite. Groundwater samples from the final round of LTM prior to the Five-Year Review will be analyzed for site-specific COCs in addition to supplemental parameters as agreed to the Tier I Partnering Team in January 2007.

The 5-year schedule for Sites 9 and 10 is provided on [Table 2-16](#).

### **SWMU 8—West Annex Sandblast Area**

“New” SWMU 8, the West Annex Sandblast Area, is also referred to as SWMU 144 in the RFA, and has also previously been identified as part of IR Site 2 in the IAS. SWMU 8 consists of three discontinuous parcels of land near the northwest corner of the base. An area at the northeast corner of the intersection of Guadalcanal Road and Amphibious Drive was previously used for sandblasting activities to remove paint from boats. As boats were hauled into the area for sandblasting, residue accumulated on the ground. Between 1949 and 1954, spent sandblasting residue was stored in areas north of Midway Road, south of Guadalcanal Road, and east of Amphibious Drive. An estimated 5,125 yd<sup>3</sup> of residue was generated and stored in the area between 1949 and 1954, and an additional 3,525 yd<sup>3</sup> were generated between 1954 and 1971. A reconnaissance of the area in 1999 noted ABM in the area surrounding Water Tower 1553 from the surface to a depth of 5 inches. No other investigations have been conducted at SWMU 8.

A Final SWMU 8 SI Report was submitted in August 2001 with a corresponding SERA in January 2001. The SI field activities were conducted in May 2000 and included the collection and analysis of the surface and subsurface soil, sediment, and groundwater samples. Four monitoring wells were installed at SWMU 8, and 38 co-located surface and subsurface samples were collected. Six sediment samples were collected at SWMU 8. Co-located surface and subsurface samples were analyzed for TAL metals and PAHs. Soil samples collected during the installation of the monitoring wells were analyzed for TCL organic compounds and TAL metals. All sediment samples were analyzed for TAL metals, PAHs, grain size, pH, and TOC. One sediment sample was also analyzed for TCL organics. All groundwater samples were analyzed for TCL organic compounds and TAL metals. Analytical results

were qualitatively evaluated through a comparison with EPA Region III RBCs, VDEQ standards, MCLs, and to background levels established for NAB Little Creek. Groundwater in the Columbia Aquifer generally flows toward the small boat piers (Piers 11 through 19) and Little Creek Channel. An EE/CA was also prepared for SWMU 8 during FY 2000. The EE/CA presented the findings of the soil boring survey conducted to delineate the horizontal extent of ABM present in the surface and shallow subsurface soils at the site. Three recommendations for removing the ABM were presented in the EE/CA. The third alternative, excavation of contaminated material to residential land use criteria, was the preferred alternative of the three. Based on calculations in the EE/CA, this called for the excavation of approximately 2,200 yd<sup>3</sup> (3,600 tons at 120 pounds/yd<sup>3</sup>) of soil in the vicinity of Water Tower 1553.

In November 2000, an interim removal action was initiated at SWMU 8 to remove the surface and subsurface soil contaminated with ABM. The removal action consisted of excavating between 2 and 10 inches of soil in the vicinity of the water tower for offsite disposal at a Navy-approved disposal facility. Confirmation samples were taken on the floor of the excavation during the removal action to ensure screening criteria were being met. In situ samples were field-screened for lead using an X-ray fluorescence (XRF) scanner. Fifteen confirmation samples were also obtained over the approximate 3-acre area and analyzed for TAL metals and PAHs. Three additional samples were collected for full suite analysis including TCL organics. Upon completion of the removal action, approximately 4,600 tons of soil were excavated and removed from the site (OHM, 2001). An RI was conducted for SWMUs 3, 7, and 8 in August and September 2002. During the investigation, six additional monitoring wells were installed at the site. Groundwater, surface soil, subsurface soil, and sediment samples were collected for analysis. A Draft RI/HHRA/ERA Report was submitted for regulatory review in November 2003. Conclusions indicated that there are no overall human health or ecological risks for soil, groundwater, and surface water. The highest ecological site-related potential risks are associated with metals in outfall sediments. No further action was recommended for soil, groundwater, and surface water, and further sediment and confirmatory soil samples were recommended to delineate the contaminated area for removal.

Additional subsurface soil and sediment sampling was conducted in January 2004 to delineate elevated PAH concentrations detected in the soil near Water Tower 1553 during the SI conducted in May 2000 (LW08-DP23), and metals in sediment detected during the recent RI activities conducted in August 2002 (CH2M HILL, 2004b). Based on the results of the additional soil samples collected in the vicinity of Water Tower 1553, the Tier I Partnering Team agreed not to pursue an interim removal action to address the subsurface soil PAH contamination at SWMU 8 based on the absence of human health risk. In addition, the PAH contamination was not likely a result of CERCLA site activities because the water tower is still operational. The additional subsurface soil results from samples collected in January 2004 were incorporated into the HHRA as part of the Final RI/HHRA/ERA (CH2M HILL, 2004k). The results from the sediment delineation activities were used in development of an EE/CA to remove sediment south of Outfalls 16 and 17 at the SWMU (CH2M HILL, 2004f). The sediment south of Outfalls 16 and 17 were removed as part of an IRA conducted in September 2004. An SCR was completed for SWMU 8 in December 2004. Because there is no overall human health or ecological risk in groundwater, a NFA PP was submitted for SWMU 8 in March 2005 and a NFA ROD was signed in June 2005.

## 2.5 Military Munitions Response Program

The DoD has established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program to address munitions and explosives of concern and munitions constituents at other than operational ranges. The DoD and the Navy are establishing policy and guidance for munitions and response actions under the MMRP; however, the key program drivers developed to date conclude that munitions response action will be conducted under the process outlined in the National Contingency Plan (NCP) as authorized by CERCLA.

Six other than operational ranges, the A-A Target Range, Chemical Defense Area, Depth Charge Testing Area, 1942 Pistol Range, 1944 Pistol Range, 1953 Pistol Range, and the Morale, Welfare, and Recreation (MWR) Skeet Range have been identified and associated with NAB Little Creek. A preliminary assessment (PA) was completed for the MWR Skeet Range and recommended further investigations (Malcom Pirnie, 2006). Additionally, a five site PA was finalized in September 2007 for the remaining areas identified as potentially impacted by MMRP activities (Malcom Pirnie, 2007). Any additional investigations warranted as a result of the five site PAs will be documented in subsequent SMP updates.

### 2.5.1 MMRP Sites

#### Skeet Range

The former MWR Skeet range comprises approximately 31 acres in the northwestern portion of the installation, adjacent to Desert Cove and Little Creek Channel ([Figure 2-1](#)). According to installation personnel, the range was used solely for recreational skeet shooting from 1962 to 1985. During range operation, three buildings were present on site, the high house, low house, and storage Building 3092. A 900-ft surface danger zone (SDZ) extended north of the range overlapping a portion of Desert Cove and Little Creek Channel. Following range closure in 1985, the buildings were demolished, and approximately 75% of the range area was graded for construction of a concrete landing pad for landing craft air cushions (LCACs). A steep, man-made, earthen berm and concrete wall were constructed around the LCAC pad and cover a majority of the former firing area.

A PA was conducted to assess the potential for munitions and explosives of concern (MEC) and munitions constituents (MC) from a site release (Malcom Pirnie, 2006). The PA concluded there is no potential for MEC at the former range, however potential MC may include lead, antimony, copper, zinc, and arsenic from bullets and fragments, and PAHs resulting from clay targets. No further action was recommended for MEC at the Site. Soil and sediment sampling from the areas outside the LCAC pad and along the shoreline surrounding the site was recommended to further investigate the potential for MC (metals and PAHs) at the Skeet Range.

The 5-year schedule will be prepared when a path forward for the site has been developed.

**Table 2-1  
Site Status Summary Table  
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Site ID	Other ID	Name/Description	Location	Env. Program	Status	Status	Comments/Notes
IR Site 7	SWMUs 123-126	Amphibious Base Landfill	NW corner of the intersection of Helicopter Road and Amphibious Drive	CERCLA IRP	IR Site (RI / FS / EE/CA / PRAP / ROD / RD / RA)	RI/FS	A Final RI/HHRA/ERA was completed under the CERCLA IR Program. Eleven rounds of long-term monitoring of groundwater, sediment, and surface water was completed. LTM was discontinued in 2004 until the ROD. LTM will continue in accordance with the Post ROD LTM Plan. An IRA for canal sediment was completed in January - April 2007.
IR Site 8	SWMU 84	Demolition Debris Landfill	NE corner of the intersection of Amphibious Drive and Helicopter Road	CERCLA IRP	IR Site (RI / PRAP / ROD )	RI/FS	A final RI/HHRA/ERA was completed under the CERCLA IR Program. An IRA and wetlands creation was completed in FY06 and is the final remedy for the Site. A NFA ROD will be prepared for documentation.
IR Site 13	SWMU 14 and SWMU 15	PWC Wash Rack (SWMU 14); PWC PCP Dip Tank (SWMU 15)	Bldg 3165, in the vicinity of the Public Works Compound; Paved Yard in the Public Works Center compound west of Bldg 3175, East-Central Portion of Base	CERCLA IRP	IR Site (FS / TS / PRAP / ROD / RD / RA)	RI/FS	A Final RI/HHRA/ERA and a Final FS have been completed. A TS was conducted in November 2004; injection of ISCO and anaerobic bio-remediation was completed and documented in Nov 06 TS report. PP and ROD will be completed for anaerobic bioremediation of VOCs in GW.
New SWMU 3	Formerly SWMU 111, was part of IR Site 2, IR Site 2 (sandblast areas) no longer used as each sandblast area now identified as separate SWMUs	Pier 10 Sandblasting Yard	West of Little Creek Channel	CERCLA / IRP	IR Site (RI / Phase II RI / EE/CA / PRAP / ROD / RD / RA)	RI/FS	A RI/HHRA/ERA was finalized in September 2005. Supplemental investigation for VOCs/metals in GW and ABM delineation in sediment was conducted in FY07. Reporting will be completed in 2007 to determine path forward
New SWMU 7	SWMU 137, formerly part of IR Site 2, IR Site 2 (sandblast areas) no longer used as each sandblast area now identified as separate SWMUs	Small Boats Sandblast Yard - Piers 51-59. In June 2004, The Tier I Partnering Team agreed to separate the terrestrial portion of SWMU 7 from the aquatic portion (Desert Cove). SWMU 7a includes the soil and groundwater of SWMU 7, and SWMU 7b includes the sediment and surface water of desert cove.	Piers 51-59	CERCLA / IRP	IR Site (RI / EE/CA / PRAP / ROD / RD / RA)	RI/FS	IRA for lead in surface soil was completed in September 2004. Final RI/HHRA/ERA submitted in December 2004. Conclusions and Recommendations indicated that there is no overall human health or ecological risk in GW or Soil (SWMU 7a). Further investigations are necessary to further assess Ecological risk in Desert Cove (SWMU 7b) sediment. SWMU 7a NFA ROD was Signed in June 2005. Further Investigations are warranted for SWMU 7b.
IR Site 11a			North of Site 11			RI/FS	Upgradient groundwater results at Site 11 indicated cVOC contamination. ISCO was used to treat cVOCs in groundwater in March 2004, and was not successful in reducing VOC concentrations below the MCL. An RI is scheduled for FY07.
IR Site 9	SWMU 24	Driving Range Landfill	Near Bldg 3699, NNE Portion of Base, East of Desert Cove	CERCLA IRP	IR Site (ROD)	ROD with LUCs (RIP)	Final ROD is in place. Selected Remedy is Land Use Restrictions (LUCs) and continued Long-term monitoring of groundwater. A Five Year Review is scheduled for FY08/09.
IR Site 10	SWMU 25 and SWMU 26	Sewage Treatment Plant Landfill - Desert Cove Landfill (SWMU 25); Sewage Treatment Plant Landfill - South of Desert Cove Landfill (SWMU 26)	Desert Cove Area, just west of former base sewage treatment plant	CERCLA IRP	IR Site (ROD)	ROD with LUCs (RIP)	Final ROD is in place. Selected Remedy is Land Use Restrictions (LUCs) and continued Long-term monitoring of groundwater. A Five Year Review is scheduled for FY08/09.
IR Site 11	SWMU 27 and SWMU 28	Former School of Music Plating Shop (SWMU 27); Former School of Music Neutralization Tank (SWMU 28);	School of Music Area, East Central Portion of Base	CERCLA IRP	IR Site (SRI / FS / TS / PRAP / ROD / RD / RA)	RI/FS	A final SRI, SRI addendum for HHRA, FS, and Proposed Plan have been completed under the CERCLA IR Program. A ROD was signed in July 2007 and remedy is bio-remediation with LTM. RAWP is scheduled for FY08.
IR Site 12	SWMU 77	NEX Laundry Disposal Area	Bldg 3323 in SE corner of base	CERCLA IRP	IR Site (FS / PRAP / ROD)	ROD with LUCs	A Final RI/HHRA/ERA and a Final FS has been completed. A ROD was finalized in September 2005. An ESD to the ROD was signed in October 2006 and the remedy is bio-remediation with LTM. RA was completed in FY07.
New SWMU 8	SWMU 144, formerly part of IR Site 2, IR Site 2 (sandblast areas) no longer used as each sandblast area now identified as separate SWMUs	West Annex Sandblasting Area	Vacant Lot west of the ACU 2 Area in the West Annex	CERCLA / IRP	IR Site (RI / EE/CA / PRAP / ROD )	Response Complete (NFA)	An IRA was completed in September 2004 to removal Outfall sediment posing potential unacceptable ecological risk. Final RI/HHRA/ERA submitted in December 2004. Conclusions and recommendations indicated that there was no overall human health or ecological risk in soil, groundwater, surface water, and sediment, and recommended no further action for the site. NFA PP/ROD Signed in June 2005.
IR Site 6	SWMU 117/ 4	Special Boat Unit 2 Battery Storage Area / Battery Acid Disposal Area	On the SE corner of Bldg 103, in the SW Area of the Base	CERCLA IRP	IR Site (SSA)	Response Complete (NFA)	On January 27, 1999, EPA, DEQ, and the Navy discussed this site. It was agreed that further investigation was required. Existing information suggests potential problem. One GW sample was collected for lead during 2005 SSA. NFA Closeout report was signed in January 2006.
SWMU 13		Former Pesticide Shop	Building 3170 near Building 3166 and intersection of 6th and F Streets (Off Gator Blvd)	CERCLA	SSA	Response Complete (NFA)	On January 27, 1999, EPA, DEQ, and the Navy discussed this site. It was agreed that further investigation was required. Existing information suggests potential problem. Soil and GW samples collected in 2005 SSA did not pose risk. NFA Close out report was signed in January 2006
New SWMU 5	SWMU 130	Port Ops Boat Painting Area	Port Ops Building 3896, west of piers 56-59	CERCLA	SSA	Response Complete (NFA)	On May 10, 1999, EPA, DEQ, and the Navy discussed the demolition of all buildings in this area. After comparing sampling results to industrial soil RBCs, it was concluded that no special precautions needed to be taken for demolition. One monitoring well GW sample collected in 2005 SSA. No unacceptable risk, and NFA Closeout report was signed in January 2006.

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New SWMU 6	SWMUs 131-133	Seabee Area - CB124	East of Pier 47: South of Desert Cove	CERCLA, SI Process	SSA	Response Complete (NFA)	EPA, DEQ, and the Navy discussed this site on April 19 and May 10, 1999. Based on comparison of the chemical concentrations found in the soil to Industrial RBCs, EPA and DEQ agreed that NFA was required for the soil. However, due to elevated metals in groundwater recommend the collection of three filtered groundwater samples near the previous locations W1, S2, and W4 using geoprobe or other direct push technology. SSA was conducted in 2005. There was no unacceptable risk, and NFA close out report was signed in January 2006.
SWMU 18		PWC Trans. Garage Spent Battery Shop, Collection Area	North of Public Works Facility Area in Building 3661	CERCLA	Preliminary Screening	Response Complete (NFA)	Two grab samples will be collected in the grassy area behind the old batteries, composited, and tested for lead and zinc. A picture from '93 indicated another battery storage area. Desktop audit indicated no potential risk. NFA consensus in May 2005.
SWMU 116		MWR Recreation Boat Maintenance Facility	Bldg 3021 in the northeast corner of the base	CERCLA	Preliminary Screening	Response Complete (NFA)	Site was sampled during RRRs, soil samples were collected along the fence line in 1995 and analyzed for VOCs and Metals. SSA will be conducted in FY05. EPA has considered analysis for SVOCs may be required. Sample results show lead was not found to be significant, and no significant volatiles were found. Desktop audit was conducted in 2005 and indicated site did not pose risk. NFA consensus signed in May 2005.
AOC D		PCB Transformer Leak	Bldg 3530 Between 5th and 3rd Streets in the SE Corner of the Base	CERCLA	Preliminary Screening	Response Complete (NFA)	Desktop audit conducted in May 2005 did not indicate potential release, therefore NFA consensus was signed in May 2005.
SWMU 30		Leaking Above Ground Diesel Tank	Bldg 3400, in the SE portion of the Base	SPCC/AST	NFA	Response Complete (NFA)	The 150 gallon diesel tank rests on four steel legs atop an asphalt surface. A concrete berm has been placed around the tank. The tank and the berm are currently in good condition. Any further assessment or remediation will be covered under the SPCC Plan/AST Program. SPCC/AST Site. In June 2003, the team agrees to closeout SWMU 30 with NFA. The CNRMA IR staff will inform CNRMA UST/AST staff of responsibility for any "needed" action.
SWMU 96		CB301 Seabee Vehicle Maintenance Facility Scrap Storage Area	Bldg CB301, South of Desert Cove	CERCLA	Preliminary Screening	Response Complete (NFA)	Desk top audit was completed in April 2004. NFA due to Seabee activity. This area is an active industrial facility and will be covered under RCRA. A close out report was signed in September 2004.
SWMU 97		CB301 Seabee Vehicle Maintenance Facility Storm Drain	Bldg CB301, South of Desert Cove	VPDES	Preliminary Screening	Response Complete (NFA)	Drain located immediately west of the northwest corner of CB301. Further assessment and remediation will be covered under the VPDES Program. Desk top audit was completed in April 2004. NFA due to Seabee activity. This area is an active industrial facility and will be covered under RCRA. A close out report was signed in September 2004.
SWMU 98		CB210 Elevated Causeways Mechanic Shop Material Dispensing Area	Bldg CB210, South of Desert Cove	CERCLA	Preliminary Screening	Response Complete (NFA)	Desk top audit was completed in April 2004. NFA due to Seabee activity. This area is an active industrial facility and will be covered under RCRA. A close out report was signed in September 2004.
SWMU 119		Former Special Warfare Group 2 Electronics Shop	South of Little Creek Channel, Bldg W112	CERCLA	Preliminary Screening	Response Complete (NFA)	In March 2004, the Navy, DEQ, and USEPA joint scoped the collection of three groundwater samples from 10-15' bgs for the analysis of TCL VOCs, and TCL SVOCs. Results showed no unacceptable human health or ecological risk. Closeout report was signed in September 2004.
IR Site 14	SWMU 16 and SWMU 17/1	Transformer Storage Area - Old Pole Yard (SWMU 16); Small Transformer Storage Area (SWMU 17/1)	Bldg 3664 across 7th Street from the Public Works Compound, East-Central Portion of Base	CERCLA IRP	IR Site / Preliminary Screening/NFA	Response Complete (NFA)	NFA was recomd. in IAS; consensus August 2002 Partnering for desktop audit of site and review of historical data and clarification of regulatory standards or action levels for PCBs; some additional sampling may be required in the drum storage area. Following desktop audit, the site became FoF per EPA and DEQ review (3/00). Preliminary Site Screening was conducted in August 2003. Surface and subsurface soil samples were collected in the former drum storage area. Results indicated no human health or ecological risk and the site was recommended for NFA. A Final Close-Out Report was issued and signed in March 2004.
AOC H		Pesticide Mixing Area	Buildings 3109 and 3630, near golf course	CERCLA	Preliminary Screening/NFA	Response Complete (NFA)	On January 27, 1999, EPA, DEQ, and the Navy discussed the site. It was agreed that further action was required, although no specific priority or timeline was assigned. Limited soil sampling for pesticides. Consensus for Appendix B status due to absence of existing data (3/00). Preliminary Screening was conducted in August 2004. Soil (surface and subsurface) were collected. Results indicated no human health or ecological risks at the AOC. USEPA, DEQ, and Navy agreed that NFA was required at the Site. A Final Close-Out report was issued and signed in March 2004. Land use is unrestricted at the site.

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AOC I		Golf Course Pond Area	Golf course Hole 9	CERCLA	Preliminary Screening/NFA	Response Complete (NFA)	During the December 2000 partnering meeting, EPA, DEQ and the Navy discussed this site. It was agreed that further action was required, although no specific priority or timeline was assigned. Preliminary Screening was conducted in August 2004. Soil (surface and subsurface) samples were collected and analyzed for Site 9 COCs and results indicated no human health or ecological risk at the site. Additionally one sediment sample was collected in the golf course pond for Site 9 COCs to assess the potential for ecological risk at the site. Results indicated no ecological risk from site runoff in sediment. The Navy, USEPA, and DEQ agreed that NFA was required and a Final Close-Out Report was issued and signed in March 2004. Land use is unrestricted at the site.
AOC J		Burn Area	Across Hewitt Drive from driving range	CERCLA	Preliminary Screening/NFA	Response Complete (NFA)	During the December 2000 partnering meeting, EPA, DEQ and the Navy discussed this site. It was agreed that further action was required, although no specific priority or timeline was assigned. Preliminary Screening was conducted in August 2004. Soil (surface and subsurface) samples and one groundwater sample were collected. The results indicated no human health or ecological risk at the site. The USEPA, Navy, and DEQ agreed NFA was required for the site and a Final Close-Out Report was issued and signed in March 2004. Land use is unrestricted at the site.
SWMU 31		Pier 10 Leaking Above Ground Fuel Tanks	On Pier 10 near Bldg 1263	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	The three fuel tanks holding JP-5, gasoline, and diesel, were removed in 1995. Drums containing waste oil are still present at the site. However, the drums are resting on a steel platform above a concrete pad in good repair. The pad is bermed by a 4-inch high concrete curb containing a valve that allows release to outside of the bermed area. The area is in compliance with the SPCC Plan, and on June 30, 1999, the site was approved for NFA by the EPA, DEQ, and the Navy. Any further assessment or remediation will be covered under the SPCC Plan/AST Program.
SWMU 32		NEX (East Annex) Gas Station - Battery Storage Area	East end of Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On March 10, 1999, EPA, DEQ, and the Navy visited the site. Due to the lack of release or stains reported in the RFA, the very small area potentially affected, and the lack of significant contamination detected in 1995, EPA and DEQ agreed that NFA was required for this SWMU.
SWMU 33		NEX (East Annex) Gas Station - Satellite Accum. Area	East end of Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On March 10, 1999, EPA, DEQ, and the Navy visited the site. Due to the lack of release or stains reported in the RFA, the very small area potentially affected, and the lack of significant contamination detected in 1995, EPA and DEQ agreed that NFA was required for this SWMU.
SWMU 34		NEX Vending Office Used Oil UST	Bldg 3319, Southeast Corner of the Base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The tank was removed in 1990. A Site Characterization was submitted to the DEQ. The Navy received notification from DEQ on August 27, 1991 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 35		PWC Transportation Garage Used Oil UST	Bldg 3661 in East/Central Portion of Site, north of Public Works Facility	UST	NFA via FFA desktop audit	Response Complete (NFA)	The tank was removed in 1989. Site Characterization was submitted to the DEQ. No closure letter was received by the Navy. However, per telephone conversation with Tom Madigan on April 13, 1999, the unit is defined as closed in the DEQ database. The draft RFA stated that the stained soils surrounding the tank fill pipes were removed and disposed. Consensus at June 1999 Partnering NFA since site is under UST program
SWMU 36		Auto Hobby Shop Used Oil UST	Bldg 3530 Between 5th and 3rd Streets in the SE Corner of the Base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The tank was closed in place in 1991. Two Site Characterization Reports have been submitted to DEQ. A Corrective Action Plan was also submitted and approved by the DEQ. Implementation of the CAP began March 1998. Free product is being recovered at the site. The site is monitored weekly Quarterly progress reports are submitted to DEQ. In June 1999, consensus for NFA since site is under UST program.
SWMU 37		CB301-3 Seabee Maintenance Used Oil Tank	CB301-3 South of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	The tank was removed under Phase IV of the UST Program. It was replaced with double wall Fiberglass tanks and piping with interstitial monitoring on the tanks and piping. The Navy received notification from the DEQ on September 20, 1994 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 38		ACU-4 Used Oil Tanks	Bldg 3817, slightly west of Desert Cove Area in the north/central portion of the base	UST	NFA via FFA desktop audit	Response Complete (NFA)	Two 2550 gallon USTs were removed in 1992. Navy had no closure letter on file. Status in DEQ database identified tanks as "currently in use." Navy will continue to coordinate with DEQ on these tanks. In June 1999, consensus for NFA since site is under UST program.
SWMU 39		East Annex Gas Station Used Oil Tank	Bldg 3615 in the far eastern portion of the base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST installed in 1961 was removed in 1991. The Site Characterization was submitted to the DEQ. The Navy received notification from the DEQ on August 17, 1994 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 40		BMU-2 Used Oil Tank	Bldg 3142, south of the baseball fields in the North/Central portion of the Base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic was installed in 1985 and removed in 1991. A Site Characterization was sent to the DEQ. The Navy received notification from the DEQ on August 16, 1994 that no further assessment or remedial action was necessary at the site.

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SWMU 41		MWR Equipment Rental Used Oil Tank	Bldg 3108, NW of the Public Work Facility	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic was installed in 1985 and removed in 1990. A Site Characterization was sent to the DEQ. The Navy received notification from the DEQ on October 18, 1991 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 42		ACU-2 Used Oil Tank 3	Bldg 1231 west of the Little Creek Channel	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic was installed in 1981 and removed in 1991. A Site Characterization was sent to the DEQ. The Navy received notification from the DEQ on August 16, 1994 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 43		ACU-2 Used Oil Tank 4	Bldg 1231 west of the Little Creek Channel	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic was installed in 1981 and removed in 1991. A Site Characterization was sent to the DEQ. The Navy received notification from the DEQ on August 16, 1994 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 44		NSWG-2 Used Oil Tank	Between Bldgs T-9 and T-11 in the SW Area of the Base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic was installed in 1985 and removed in 1991. A Site Characterization was sent to the DEQ. The Navy received notification from the DEQ on August 16, 1994 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 45	cross-reference with SWMU 139	Naval Special Warfare Group 2 Solvent Tank	Bldg 3806 in the central region of the base, just north of Pier 59	UST	NFA via FFA desktop audit	Response Complete (NFA)	Within the NSWG command are the SEAL Teams. NAB Little Creek is resident command for four SEAL Teams. All four occupy one large compound, of which Bldg 3806 is a part. Only one solvent tank existed in this compound, although three different SWMU numbers were assigned. This is a duplicate of SWMU 139. In June 1999, consensus for NFA since site is under UST program.
SWMU 46		NAMS Used Oil Tank 4	Bldg 3872, in the proximity of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 500 gallon UST was constructed of stainless steel and installed in 1985. The tank was removed by 1994. The Navy received notification from the DEQ on June 8, 1994 that no further assessment or remediation was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 47		SURTASS-3 Used Oil Tank	Bldg 1558 west of Little Creek Channel	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 4000 gallon UST constructed of fiberglass reinforced plastic was installed in 1985 and used for storage of NORPAR 12. The tank was removed in 1995. The Navy received notification from DEQ on August 15, 1995 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 48		Oil/Water Separator	Bldg 3896, Port Ops, west of piers 56-59	HRSD	NFA via FFA desktop audit	Response Complete (NFA)	All of the Base Oil/Water Separators discharge to the sanitary sewer system and are therefore covered under the HRSD Permit. The Oil/Water Separators are inspected and cleaned as necessary to prevent releases to the sanitary sewer system. The EPA, DEQ, and Navy discussed these SWMUs on June 30, 1999 and NFA was recommended for these SWMUs.
SWMU 49		Used Oil Tank 1	Bldg 3860, west of Desert Cove in the North/Central portion of the base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 10,000 gallon UST constructed of fiberglass reinforced plastic and installed in 1976 was removed in 1992. It was replaced with a new double walled 10,000 gallon tank. If additional contamination is discovered, it will be investigated through the UST Program.
SWMU 50		Used Oil Tank 2	Bldg 3860, west of Desert Cove in the North/Central portion of the base	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 500 gallon UST, constructed of steel was removed in 1989. A closure letter was not sent to the Navy and could not be located. The site is listed as "closed" in the DEQ database. It was reiterated by Tom Madigan on April 1, 1999 that the tanks are closed therefore NFA. In June 1999, consensus for NFA since site is under UST program.
SWMU 51		Used Oil Tank 6	Bldg 3530, south of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 500 gallon UST constructed of stainless steel was installed in 1954 and removed in 1990. A closure letter was not sent to the Navy and could not be located. The site is listed as "closed" in the DEQ database. It was reiterated by Tom Madigan on April 1, 1999 that the tanks are closed therefore NFA. Consensus at June 1999 Partnering NFA since site is under UST program.
SWMU 52		CB208 Used Oil Tank	South of Building CB-210, slightly south of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic and installed in 1983 was removed in 1994. The Navy received notification from DEQ on May 27, 1994 that no further assessment or remedial action was necessary at the site. If additional contamination is discovered, it will be investigated through the UST Program.
SWMU 53		CB214 Used Oil Tank	Bldg CB214, directly south of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic and installed in 1983 was removed in 1994. The Navy received notification from DEQ on May 27, 1994 that no further assessment or remedial action was necessary at the site. Consensus at June 1999 Partnering NFA since site is under UST program.

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Site ID	Other ID	Name/Description	Location	Env. Program	Status	Status	Comments/Notes
SWMU 54		CB301-4 Seabee Maintenance Used Oil Tank	Bldg CB301-4	UST	NFA via FFA desktop audit	Response Complete (NFA)	The tank was removed under Phase IV of the UST Program. It was replaced with double wall Fiberglass tanks and piping with interstitial monitoring on the tanks and piping. The Navy received notification from the DEQ on September 20, 1994 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 55		CB315 Used Oil Tank	South of Desert Cove Area	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass and reinforced plastic was installed in 1983 and removed in 1991. The Navy received notification from DEQ on August 16, 1994 that no further assessment or remedial action was necessary at the site. Consensus at June 1999 Partnering NFA since site is under UST program.
SWMUs 56-58		SIMA Used Oil Tanks 2-4	Building 1265 west of Little Creek Channel	UST	NFA via FFA desktop audit	Response Complete (NFA)	All three tanks were 1000 gallon USTs constructed of steel and installed in 1984. SWMU 56 was removed by 1994. SWMUs 57 and 58 were removed in 1991 and replaced with oil/water separators. A Site Characterization was sent to DEQ. The Navy received notification from DEQ on August 16, 1994 that no further assessment or remedial action was necessary. In June 1999, consensus for NFA since site is under UST program.
SWMU 59		Naval/Marine Reserve Center Used Oil Tank 1	SW portion of the base, west of Little Creek Channel	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 550 gallon UST constructed of fiberglass reinforced plastic and installed in 1983 was removed in 1991. The Navy received notification from DEQ on October 18, 1991 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 60		Used Oil Tank	Bldg 3033, north of the Music School	UST	NFA via FFA desktop audit	Response Complete (NFA)	The Navy has closure letter on file. Tom Madigan of TRO-DEQ identified this unit as "closed" in the DEQ database and reiterated that the tanks are closed and NFA is required. In June 1999, consensus for NFA since site is under UST program. If additional contamination is discovered, it will be investigated through the UST Program.
SWMU 61		Harbormaster's Office Above Ground Used Oil Tanks	Building 3894, East/Central Portion of Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Tank has been drained and removed (Draft RFA Navy comment). Because the unit is in good condition and is located in a contained area, the Revised RFA recommended NFA. Consensus for NFA (June 30, 1999).
SWMU 62		CB210 ELCS Mechanic Shop Above Ground Used Oil Tank	CB210 ELCS	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Because the unit is in good condition and is located in a contained area, the Revised RFA recommended NFA (June 30, 1999). No releases identified, SWMU managed under SPCC Plan as AST, tank no longer in service.
SWMU 63		Fuel Farm Platform Above Ground Waste Oil Tanks	Bldg 3867, West of Desert Cove	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	These tanks will be replaced with convault tanks as part of the SPCC upgrade. The EPA, DEQ, and Navy discussed this SWMU on June 30, 1999. EPA and DEQ agreed that as long as the tanks are registered, NFA was required for this SWMU. All tanks over 660 gal are registered at Little Creek. If additional contamination is discovered, it will be investigated through the SPCC Program.
SWMU 64		BMU-2 Maintenance Above Ground Waste Oil Tank	Bldg 3142	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Tank replaced with convault AST 10/98, soil sampling during replacement, managed under SPCC Program. Because the unit is in good condition and is located in a contained area, the revised RFA recommended NFA (June 30, 1999).
SWMUs 65-75		Facility Oil/Water Separators	Facility Wide	HRSD	NFA via FFA desktop audit	Response Complete (NFA)	The EPA, DEQ, and Navy discussed these SWMUs on June 30, 1999 and NFA was recommended for these SWMUs. All of the Base Oil/Water Separators discharge to the sanitary sewer system and are therefore covered under the HRSD Permit. The Oil/Water Separator are inspected and cleaned as necessary to prevent releases to the sanitary sewer system.
SWMU 76		Hazardous Waste Storage Pad	North of Gates 4 and 5 in the Southeast corner of the Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Clean closure DEQ letter April 1997. Consensus for NFA.
SWMU 78		Navy Exchange Vending Office Drum Area	Exact location could not be determined after visit to building 3319	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Sept, '93, the site was visited, and no drums were present. As part of the UST Program, a Site Characterization has been performed near the SWMU. No contamination was detected. The Navy, EPA, and DEQ visited the site on March 10, 1999 and could not find the drums, or any staining. Consensus for NFA.
SWMU 79		Navy Exchange Vending Office Scrap Yard	SE Portion of Base, Bldg 3319	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Site has been vending office since 1954, all items removed, no longer scrap yard. No release noted during VSI, since there is no hazardous waste or hazardous constituents managed, the RFA recommended NFA for this SWMU (June 30, 1999).
SWMU 80		MWR Auto Hobby Shop Paint Booth Filters	Bldg 3530 Between 5th and 3rd Streets	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999). Painting operations ceased 1996.
SWMU 81		MWR Auto Hobby Shop Stain in Parking Lot Area	Southeast portion of base between 5th and 3rd Streets	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On March 10, 1999, EPA, DEQ, and the Navy visited the site. The oil stains and stressed vegetation around the edges of the parking lot could not be located. The locations of the dumpsters and stains on the picture from the VSI were located. A Site Characterization has been performed near this site as part of the UST Program. No soil or groundwater contamination was detected at the site with the exception of the area immediately surrounding the UST.

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SWMU 82		Boone Clinic Medical X-Ray Silver Recovery Unit	Bldg 3505, Medical Clinic Building	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 83		Boone Clinic Dental Clinic	Bldg 3505, Medical Clinic Building	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 85		SIMA Machine Shop	Bldg 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	In 1998, SIMA vacated the building. No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 86		SIMA Grind Shop	Bldg 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	In 1998, SIMA vacated the building. No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 87		SIMA Rewind Shop	Bldg 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999). In 1998, SIMA vacated the building.
SWMU 88		SIMA Mechanical Calibration Laboratory	Bldg 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999). In 1998, SIMA vacated the building.
SWMU 89		SIMA Carpentry Shop	Bldg 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999). In 1998, SIMA vacated the building.
SWMU 90		SIMA Boat Shop Storage Yard Satellite Accum. Area	Exact location could not be determined after visit to building 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor. In June 1999, consensus for NFA (June 30, 1999).
SWMU 91		SIMA Cable Rigger Shop Storage Satellite Accum. Area	Bldg 1265	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999). In 1998, SIMA vacated the building.
SWMUs 92-95		CB301 Seabee Vehicle Maintenance Facility	Bldg CB301, South of Desert Cove	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No release identified during VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 99		Solid Waste Incinerator Site	Bounded by Helicopter Road to the west, 10th Street to the South, and Hewitt Drive to the East	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Operation of unit ended in 1957. The revised RFA recommended NFA for this site because the unit has been removed and there is no evidence of release (June 30, 1999).
SWMU 100		Fuel Farm Loading Platform Underground Storage Tank	Adjacent to Desert Cove near Bldg 3867	CERCLA/UST	NFA via FFA desktop audit	Response Complete (NFA)	Above ground oil tanks (SWMU 63) are associated with this SWMU, this SWMU is also managed under the UST program.
SWMU 101		Beachmaster Unit 2 Satellite Accumulation Area	Southeast of Site 10	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On May 11, 1999, the EPA, DEQ, and the Navy visited the site and could not determine its exact location. They resolved that NFA was required.
SWMU 103		Stationary Crane Area	Between Piers 10 and 11 located along Little Creek Cove	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Unit removed and no evidence of release and was subsequently recommended for NFA in the revised RFA (June 30, 1999).
SWMU 104		Steam Plant Baghouses	In Building 757 between Murray Road and Amphibious Drive	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The unit is in good condition and was recommended for NFA by the revised RFA (June 30, 1999).
SWMU 106		Steam Plant French Drain	In Building 757 between Murray Road and Amphibious Drive	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Associated with SWMU 105 and 107, operation began 1956, SWMU also covered under HRSD Permit. The unit is in good condition and was recommended for NFA by the revised RFA (June 30, 1999).
SWMU 107		Steam Plant Coal Pile Leachate Collection System	In Building 757 between Murray Road and Amphibious Drive	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Associated with SWMU 105 and 106, operation began 1956, SWMU also covered under HRSD Permit. The unit is in good condition and was recommended for NFA by the revised RFA (June 30, 1999).
SWMU 108		Steam Plant Fuel Tanks and Associated Pipes	In Building 757 between Murray Road and Amphibious Drive	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	The steam plant fuel tanks were inspected in 1995, and no evidence of leaks was detected. Monitoring was also completed and no evidence of contamination or free product was found. The EPA, DEQ, and the Navy discussed this SWMU on June 30, 1999 and agreed that as long as the tanks were registered, NFA was necessary for this SWMU. Any further assessment or remediation will be covered under the SPCC/AST Program
SWMU 109		Steam Plant Floor Drains	In Building 757 between Murray Road and Amphibious Drive	HRSD	NFA via FFA desktop audit	Response Complete (NFA)	Drains from the steam plant enter the sanitary sewer system and are covered by the HRSD Permit. Therefore, NFA has been recommended for this SWMU. Status pending verification drains off-line (3/00). Bob confirmed back drains have been sealed, front drains uncertain (3/00).
SWMU 110		90-Day Accumulation Area	Two bays in Bldg 106 and an outdoor storage yard adjacent to Bldg 106	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Because the unit is in good condition and is located in a contained area, the Revised RFA recommended NFA (June 30, 1999).
SWMU 112		Pier 10 Sandblasting Area Satellite Accumulation Area	Location cannot be determined	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On March 10, 1999, EPA, DEQ, and the Navy visited this SWMU. The best estimate of its former location was determined to be in the middle of the parking lot. Since it is covered, it poses no likely risk to health, EPA and DEQ agreed NFA was required.

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SWMU 114		ACU-2 Drum Rack and Tank Area	Building 1522, west of Little Creek Channel	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	SPCC/AST Site. The ACU 2 drum rack and tank area consists of 100 square foot concrete area surrounded by a berm. The berm will be demolished and removed as part of the SPCC upgrades. All stained soil will be excavated. TPH soil samples to be collected under SPCC and results provided to EPA/DEQ. PWC to provide information.
SWMU 115		ACU-2 Fuel Dispensing Area	Building 1522, west of Little Creek Channel	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	SPCC/AST Site. Two metal tanks rest on a concrete slab surrounded by a 6-inch concrete berm. This area will be addressed as part of the SPCC upgrades. The existing tanks will be replaced with convaults. The berm will be partially demolished and the rest filled in to form a raised platform for the new tanks. PWC will collect 3 grab samples into one composite for TPH on each log side of berm, 2 grab samples into one composite for TPH; total of 4 composite samples to be collected. PWC to provide information. DEQ close out letter March 15, 2000 received. One composite sample comprised of 7 grabs from the bottom of the excavation Sept 99 for TPH diesel with a result of 422 mg/Kg, excavation backfilled and prefab slab and convault.
SWMU 120		VC-6 Satellite Accumulation Area	Directly South of Pier 6, Bldg 2074	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On October 4, 1993, the site was visited, and there was no evidence of stains or releases. On April 19, 1999, EPA and DEQ agreed that NFA was required for this SWMU.
SWMU 121		Landing Force Trng Cmnd Satellite Accumulation Area	Bldg 3532	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No releases identified during the VSI, the revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
IR Site 1		Building 1231 Oil Disposal Area	West of Little Creek Channel	CERCLA IRP	NFA via FFA desktop audit/ IR Site	Response Complete (NFA)	This site was investigated within the UST program. Because the unit is in good condition and is located in a contained area, the Revised RFA recommended NFA. DEQ approved closure of the site in August 1994.
IR Site 3	SWMU 102	West Annex Fuel Leak - Piers 11-19	Piers 11-19 along the west side of Little Creek Channel	CERCLA IRP	NFA via FFA desktop audit/ UST/VPDES	Response Complete (NFA)	This SWMU was included in the IR Program (Site 3). However, NFA was recommended because the site will be monitored and regulated under the UST and VPDES Programs and permits. On August 10, 1999, EPA and DEQ recommended NFA due to coverage under other programs.
IR Site 4		Reserve Center Motor Oil Disposal Area	Naval Marine Reserve Center West of Little Creek Channel	CERCLA IRP	NFA via FFA desktop audit/ UST	Response Complete (NFA)	This site was investigated through the UST and IR Program (SWMU 59). DEQ has granted closure of the Site in October 1991. The Navy does not own this land, and did not own it during disposal activities. The Naval Marine Reserve Center is responsible for this area. Site was sampled under IR program as PSI, NFA recomd. in PSI report; April 2003 Consensus for NFA based on UST site.
IR Site 5	SWMU 118	Motor Oil Disposal Area Special Boat Unit Yard	Between Bldgs T-9 and T-11 in the SW Area of the Base	CERCLA IRP	NFA via FFA desktop audit/ IR Site	Response Complete (NFA)	On August 10, 1999, the EPA and DEQ agreed that NFA for site screening was required for this SWMU based on its status as a CERCLA IR Site. DD preparation under CTO 25 in 99 and a risk and FS was needed (March 00). In June 2002, two groundwater samples were collected and no human health risk identified and low to negligible ecological impacts and NFA was recommended. Closeout of Site in September 2002.
IR Site 15	AOC A	PBC Capacitor Spill - Fire Station Number 1	Electric Utility Pole on E Street	CERCLA IRP	NFA via FFA desktop audit/ IR Site	Response Complete (NFA)	In June 2002, four soil samples were collected and no human health or ecological risks were identified, NFA was recommended. Closeout of Site in September 2002.
IR Site 16	AOC B	PCB Capacitor Spill - Pole Number 425	PCB Capacitor Pole located 300 ft east of the intersection of Amphibious Dr. and Helicopter Rd.	CERCLA IRP	NFA via FFA desktop audit/ IR Site	Response Complete (NFA)	In June 2002, six soil samples were collected and no human health or ecological risks were identified, NFA was recommended. Closeout of Site in September 2002.
IR Site 17	SWMU 113	Motor Disposal Area	Bldg 1256, between piers 11 and 12	CERCLA IRP	NFA via FFA desktop audit/ IR Site	Response Complete (NFA)	Oil stained soil removed in 1986; PSI sampling Pb range 7 to 57 ppm; one TPH 2750 in oil stained area. Four surface soil and four subsurface soil samples were collected in 2002 and no stained soil evident. NFA by DEQ in April 2003.
Old SWMU 1		Paint Shop Waterwall-Building 3165	Along Gator Blvd in Bldg 3165 D, two blocks from the baseball diamond	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No releases identified 1988 VSI. The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor. (June 30, 1999)
Old SWMUs 2-5		Wood dust/chip collection bins	Bldgs 3165, 3227, 3334, and 3530	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Old SWMU 2 - PWC Carpentry Shop; Old SWMU 3 - Training Service Carpentry Shop; SWMU 4 - Maintenance Carpentry Shop; SWMU 5 - MWR Carpentry Shop. No releases identified 1988 VSI Since there are no hazardous waste or hazardous constituents managed, the revised RFA recommended NFA (June 30, 1999)
New SWMU 2	SWMU 105	Steam Plant Flyash Silo	In Building 757 between Murray Road and Amphibious Drive	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	In June 2002, two soil samples and one groundwater sample were collected and no human health or ecological risks were identified, NFA was recommended. Closeout of Site in September 2002.
Old SWMU 6		NEX Maintenance Shop Spent Battery AA	Building 3334, NW of the 5th and B St intersection	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No releases identified 1988 VSI. The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
Old SWMU 7		NEX Maintenance Shop Satellite Accumulation Area	Building 3334, NW of the 5th and B St intersection	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	No releases identified 1988 VSI. The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).

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Old SWMU 8		Base Exchange (East Annex) Gas Station Dumpster	Building 3615 in the eastern portion of the base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Oily stains were present on the dumpster, the concrete surface, and over the curbed surface and into a grassy area during the VSI. However, On September 20, 1993, photos were taken to compare with the VSI photo. The dumpster was not present. No stains were observed on the grass area behind the curb. On March 9, 1999 EPA and DEQ agreed that NFA was required for this SWMU.
SWMU 9		PWC Training Center Scrap Metal Dumpster	Adjacent to Building 3614	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Since there are no hazardous waste or hazardous constituents managed, the revised RFA recommended NFA (June 30, 1999).
SWMU 10		PWC Sheet Metal Shop Scrap Metal Dumpster	Adjacent to Building 3165	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Since there are no hazardous waste or hazardous constituents managed, the revised RFA recommended NFA (June 30, 1999).
SWMU 11		Harbormaster Shop Scrap Metal Dumpster	Building 3894 near Port Ops, west of piers 56-59	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	In the Navy's comments on the draft RFA in August, 1988, it was reported that the dumpster had been removed, oil contaminated soil had been removed, and the area had been covered with asphalt. On March 9, 1999, EPA and DEQ agreed that NFA was required at this site.
SWMU 12		The Former Wharf Building Shop	Near Building 3165 in the proximity of the Public Works Facility	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Recommended for NFA for the following reasons: 1) No releases or staining were identified during the VSI. 2) There is no evidence that PCP was ever used in this area. 3) As part of the IRP, sampling has been completed in the area and no PCP contamination was detected in the soil. 4) The area is part of CERCLA IR Site 13. It was determined through the IRP that NFA was required in this area due to lack of contamination. On March 9, 1999, EPA and DEQ agreed to NFA for this site.
SWMU 19		PWC Transportation Garage - Paint Booth Filters	Near Bldg 3661 in East/Central Portion of Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 20		PWC Transportation Garage - Salvage Parts Storage Area	Building 3661 North of the Public Works Facility	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The revised RFA suggested that soil sampling be conducted in order to determine if hazardous constituents have been released. Two surface soil and one groundwater sample were taken in 1995. They were analyzed for VOCs, SVOCs, and TAL Metals. Due to lack of contamination detected in this study, and lack of staining observed in subsequent visits, on March 10, 1999, the Navy, EPA, and DEQ recommended NFA for this site.
SWMU 21		PWC Transportation Garage - Lubricating Oil Storage Area	Building 3661 North of the Public Works Facility	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The Revised RFA suggested that soil sampling be conducted and that samples be analyzed for SVOCs, metals, and PCBs. However, on March 10, 1999, when the Navy, EPA, and DEQ visited the site, it was confirmed that the 3-inch high curb did have a concrete base. The area the drums were stored in was a berm. Due to the integrity of the berm, release to the environment was unlikely. EPA and DEQ agreed NFA was required.
SWMU 22		PWC Transportation Garage - Wash Rack	Bldg 3661 in East/Central Portion of Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	Because the unit is in good condition, the revised RFA recommended NFA (June 30, 1999).
SWMU 23		Rifle Range	NE Corner of Base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	NFA recommended for this SWMU due to the approved closure of the Lead Waste Pile by DEQ in July 1995, the EPA definition that munitions are not solid wastes as described above, and the closure requirements under the range rule, independent of RCRA and CERCLA. Consensus during May 1999 partnering meeting the site is regulated under the Munitiona Rule. TBD status (3/00) for further consideration of Rule on active ranges, Navy policy is no action on active range.
SWMU 29		Harbormaster's Office Area Paint/Thinner Residue Tank	Bldg 3894; East/Central Portion of base	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The draft RFA stated the tank had been drained and removed. Because the unit is in good condition, the revised RFA recommended NFA (June 30, 1999).
SWMU 122		Gymnasium Emergency Generator	Bldg 3147, Southeast of the Public Works Facility	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On May 6, 1999, the location of the generator was identified. No staining or evidence of release was present. EPA, DEQ, and Navy, visited the site on May 11, 1999.
SWMU 127		Amphibious Base Landfill Transfer Station	South of the intersection of Amphibious Drive and Murray Rd.	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On April 19, 1999 EPA and DEQ agreed NFA was required for this site.
SWMU 128		Port Ops Lube Oil Dispensing Area Storm Water Drain	Building 3896, near port ops, west of piers 56-59	VPDES	NFA via FFA desktop audit	Response Complete (NFA)	VPDES Site, Sediment samples directly under the outfall may be required (detailed in August 99 minutes), but the EPA, DEQ, and the Navy have agreed that NFA is necessary for the soil or groundwater near the site.
SWMU 129		Port Ops Satellite Accumulation Area	Port Ops Building 3896, west of piers 56-59	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On March 10, 1999, EPA, DEQ, and the navy visited this SWMU. The compound was in good condition, and there was no evidence that releases could have occurred to soil in the area. EPA and DEQ agreed that NFA was required for the soil or groundwater near the site. However, due to reported releases to the storm drain, sediment samples were proposed but due to Navy policy they were not collected.
SWMU 134		Portable Waste Oil Tanks Piers 51-59	Piers 51-59	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	New portable waste oil tanks with the proper secondary containment are now in use at the piers. In June 1999, consensus for NFA. Any further assessment or remediation will be covered under the SPCC Plan/AST Program

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SWMU 135		Hydraulic Fuel Leak	Piers 51-59; dog leg of the pier near building 3882	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The leak described in the Revised RFA cannot be located. No evidence of staining or release was present at the estimated location of the site. On May 11, 1999, the EPA and DEQ visited the site and determined that NFA was necessary.
SWMU 136		Mobile Diving Salvage Unit II Salvage Area - Piers 51-59	Piers 51-59	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On May 11, 1999, EPA, DEQ, and the Navy visited the area described. No staining was found. A new building has been built on top of the site. Thus, the EPA and DEQ determined that NFA was necessary.
SWMU 138		SEAL Team 4 Satellite Accumulation Area	Building 3806 South of Desert Cove	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On April 19, 1999, EPA, DEQ, and the Navy visited this SWMU. EPA and DEQ agreed that NFA was required for the soil or groundwater near the site. However, due to reported releases to the storm drain, sediment samples under the outfall NR-26A, 33, and 34. For each outfall, 6 samples from 3 locations at 0-4" and 12-18" depth for metals and SVOCs were proposed but not collected due to Navy policy.
SWMU 139	Cross-referenced with SWMU 45	SEAL Team 4 Waste PD 680 Tank	Bldg 3806 South of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	The 200 gallon tank constructed of fiberglass reinforced plastic and installed in 1983 was removed in 1990. The Navy received notification from the DEQ on October 18, 1991 that no further assessment or remedial action was necessary at the site. In June 1999, consensus for NFA since site is under UST program.
SWMU 140		SEAL Team 4 Spent Battery Staging Area	Bldg 3806 South of Desert Cove	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The revised RFA stated that this site is recommended for NFA because it is located inside a building or under a roof with a concrete floor (June 30, 1999).
SWMU 141		SEAL Delivery Vehicle 4 Satellite Accumulation Area	Building 3806 South of Desert Cove	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On April 19, 1999, EPA, DEQ, and the Navy visited this SWMU. EPA and DEQ agreed that NFA was required for the soil or groundwater near the site. However, due to reported releases to the storm drain, sediment samples under the outfall NR-26A, 33, and 34. For each outfall, 6 samples from 3 locations at 0-4" and 12-18" depth for metals and SVOCs were proposed but not collected due to Navy policy.
SWMU 142	Cross-referenced with SWMU 139 and SWMU 45	SEAL Delivery Vehicle 4 Waste PD 680 Tank	Bldg 3806 South of Desert Cove	UST	NFA via FFA desktop audit	Response Complete (NFA)	Within the NSWG command are the SEAL Teams. NAB Little Creek is resident command for four SEAL Teams. All four occupy one large compound, or which Bldg 3806 is a part. Only one solvent tank existed in this compound, although three different SWMU numbers were assigned. This is a duplicate of SWMU 139.
SWMU 143		Former Seabee Vehicle Maintenance Facility - CB201	Bldg CB201: South of Desert Cove	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	EPA and DEQ agreed that NFA was required for soil or groundwater near the site as long as it could be confirmed that the tanks for the gas station had been properly closed. Since there is no storm sewer or catch basin to sample sediments, EPA and DEQ decided on NFA for this site on June 30, 1999.
SWMU 145		Fuel Oil Tank	Bldg 3029, Fire Station 1, near the golf course	SPCC/AST	NFA via FFA desktop audit	Response Complete (NFA)	This SWMU no longer exists. The area where Bldg 3029 (Fire Station #1) was located is now an open field. The tank has been removed, and there is no evidence of oil staining. NFA consensus at June 1999 Partnering pending a site visit. Any further assessment or remediation will be covered under the SPCC Plan/AST Program.
SWMU 146		SEAL Team 2 Material Storage Area	Bldg 3813: North of Pier 59	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On April 19, 1999, EPA, DEQ, and the Navy visited this SWMU. EPA and DEQ agreed that NFA was required for the soil or groundwater near the site. However, due to reported releases to the storm drain, sediment samples under the outfall NR-26A, 33, and 34. For each outfall, 6 samples from 3 locations at 0-4" and 12-18" depth for metals and SVOCs were proposed but not collected due to Navy policy.
SWMU 147		Facility Storm Sewers/Drains	Throughout Facility	VPDES	NFA via FFA desktop audit	Response Complete (NFA)	The storm water system is covered by a VPDES permit. Both the draft Subpart S and the RFA guidance state that it is not the EPA's position to include releases permitted under other environmental laws in the corrective action program. Therefore, NFA is recommended (June 1999).
AOC C		Non-PCB Transformer Leak	Building 366, north of Public Works Facility	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	After confirming that the transformer did not contain PCBs, the DEQ, EPA, and Navy discussed this AOC and agreed that NFA was required on May 11, 1999.
AOC E		Non-PCB Transformer Leak	Adjacent to Port Ops, Building 3896	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	After confirming that the transformer did not contain PCBs, the DEQ, EPA, and Navy discussed this AOC and agreed that NFA was required on May 11, 1999.
AOC F		Emergency Generator Leak - Pier 59	Pier 59	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	On April 19, 1999, EPA and DEQ agree that NFA is required for the AOC.
AOC G		Emergency Generator Leak - Fire Station Number 1	Fire Station #1; Building 3029	CERCLA	NFA via FFA desktop audit	Response Complete (NFA)	The area where Bldg 3029 (Fire Station #1) was located is now an open field. The generator has been removed and there is no evidence of any oil staining. On April 19, 1999, EPA and DEQ agreed that NFA was required for this AOC.

**Table 2-2  
Environmental Studies, Investigations, and Actions Conducted to Date  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

IR Site or SWMU	Pre-NPL Investigations/Actions					Post-NPL Investigations/Actions								
	Preliminary Studies/Investigations					Site Investigation	Remedial Investigation	Feasibility Studies	EE/CAs and IRAs	Pilot/Treatability Studies	Additional Investigations	Proposed Plan Record of Decision	Remedial Designs/Actions	Site Closeout
	1984 IAS	1989 RFA	1986 RVS	1991 IRI	1996 RRRS									
IR Site 7	X	X	X	X		Landfill Cover - 1994 RI/FS - Nov 1994 FS - Oct 1997 PP - Oct 1997 DD - Jan 1998 RD - Mar 1998 RA - Jun 1998 - Soil cover and debris removal	RI/HHRA/ERA - November 2004		EE/CA for canal sediment- March 2005 IRA for canal sediment removal and landfill maintenance - January 2007 - April 2007		6-YR LTM - 1998 to 2004 - Sediment, Surface Water, and Groundwater Debris Delineation - July 2005			
IR Site 8	X	X			X		SI - December 1999	RI/HHRA/ERA - November 2004	EE/CA for surface debris removal- December 2000 IRA for surface debris removal- Jan 2002 Construction Closeout Report - June 2002 EE/CA for landfill removal and wetland construction- Jan 2005 IRA for landfill removal and wetland construction - September 2005 - August 2006 Construction Closeout Report - April 2007					
IR Site 9	X	X	X	X		RI/FS - Nov 1994 Draft PP/DD - 1996 5-YR LTM - 1996 to 2000 3-YR Report - Jul 1999	RI/HHHA - Feb 2001 SERA - June 2000 BERA - January 2001	FFS - Feb 2001			Draft Round 12 LTM Report and Data Trend Analysis of Rounds 1-12 - Dec 2003 Final Round 12 LTM Report and Data Trend Analysis of Rounds 1-12 - Sept 2004 FY05 LTM - September 2005 FY06 LTM - January 2007	PP - Mar 2001 Final ROD - Dec 2003	LUC RD - March 2004	IRACR - January 2005
IR Site 10	X	X	X	X		RI/FS - Nov 1994 Draft PP/DD - 1996 5-YR LTM - 1996 to 2000 3-YR Report - Jul 1999	RI/HHRA - Feb 2001 SERA - June 2000 BERA - January 2001	FFS - Feb 2001			Draft Round 12 LTM Report and Data Trend Analysis of Rounds 1-12 - Dec 2003 Final Round 12 LTM Report and Data Trend Analysis of Rounds 1-12 - Sept 2004 FY05 LTM - September 2005 FY06 LTM - January 2007	PP - Mar 2001 Final ROD - Dec 2003	LUC RD - March 2004	IRACR - January 2005
IR Site 11	X	X	X	X		RI/FS - Nov 1994 DD - Nov 1994 RA (removal of plating shop tank, associated piping and surrounding soil) - Nov 1995 SCR - May 1996 1-Yr GWM - 1996 (Report, February 1998)	SRI - June 2004 SRI Addendum - March 2006	FS - June 2006		CD Pilot Study - 2002	MIP Investigation - Summer 2001, September 2003 Pre- FS Sampling - March 2005, October 2005	Proposed Plan- October 2006 ROD - July 2007		
IR Site 12	X	X	X	X		EA Phase I - Aug 1990 EA Phase II - Apr 1991 SCR - Jun 1992 RI/PFS - Nov 1994	SRI - Dec 2000	Final FS - March 2004 Revised Final FS - September 2004			MIP Investigation - Summer 2001	PP - June 2005 ROD - September 2005 ESD - October 2006	RAWP - February 2007 RA - March -April 2007	
IR Site 13	X	X	X	X		RI/FS - Nov 1994 EE/CA (PCP dip tank and associated soil) - March 1999 IRA (removal of the PCP dip tank and associated soil) - April- May 1999 Closeout Report (soil) - Jul 1999	SRI - May 2002	Final FS - June 2004		ORC Pilot Study - 2001 Final ORC Groundwater Remediation Report - Mar 2003 GW Treatability Study (ISCO and EOS)- November 2004 - January 2006 ISCO and EOS Treatability Study Report - November 2006				
"New" SWMU 3 (SWMU 111)		X			X	Soil Cover at the Picnic Area - April 1999	SI - December 1999	RI/HHRA/ERA Report - September 2005						
"New" SWMU 7 (SWMU 137)		X					SERA - January 2001 SI - August 2001	RI/HHRA/ERA - Dec 2004	EE/CA (SMWU 7a) - June 2004 IRA for Lead in Soil - September 2004 CCR - December 2004		Soil sampling to delineate lead contamination - February 2004	PP (SWMU 7a) - March 2005 NFA ROD (SWMU 7a) - June 2005		NFA ROD - June 2005
"New" SWMU 8 (SWMU 144)		X					SERA - January 2001 SI - August 2001	RI/HHRA/ERA Report - Dec 2004	EE/CA (soil) - Nov 2000 IRA for ABM in soil - November 2000 Construction Completion - February 2001 EE/CA for outfall sediment - June 2004 IRA for outfall sediment - September 2004 CCR - December 2004		Sediment and Subsurface Soil Sampling for EE/CA development - February 2004	PP - March 2005 NFA ROD - June 2005		NFA ROD - June 2005
Site 11a							SI - Nov 2002 Supplemental Site investigation - Sept 2003 and Feb 2004				Treatability Study Jan 2005 - January 2006 Treatability Study Report - July 2006	MIP Investigation - September 2003 PDB Sampling - February 2004		

BERA: Baseline Ecological Risk Assessment  
CD: Cyclodextrin  
CCR - Construction Completion Report  
DD: Decision Document  
EA: Environmental Assessment  
EE/CA: Engineering Evaluation and Cost Analysis  
ERA: Ecological Risk Assessment  
FFA: Federal Facility Agreement  
FFS: Focused Feasibility Study  
FS: Feasibility Study  
GWM: Groundwater Monitoring  
HHRA: Human Health Risk Assessment

IAS: Initial Assessment Study  
IRA: Interim Removal Action  
IRACR: Interim Remedial Action Completion Report  
IRI: Interim Remedial Investigation  
LTM: Long Term Monitoring  
LUC: Land Use Controls  
MIP: Membrane Interface Probe  
NFA: No Further Action

ORC: Oxygen Release Compound - TM  
PDB: Passive Diffusion Bags  
PFS: Preliminary Feasibility Study  
PP: Proposed Plan  
PSI: Preliminary Site Inspection  
RA: Remedial Action  
RI: Remedial Investigation

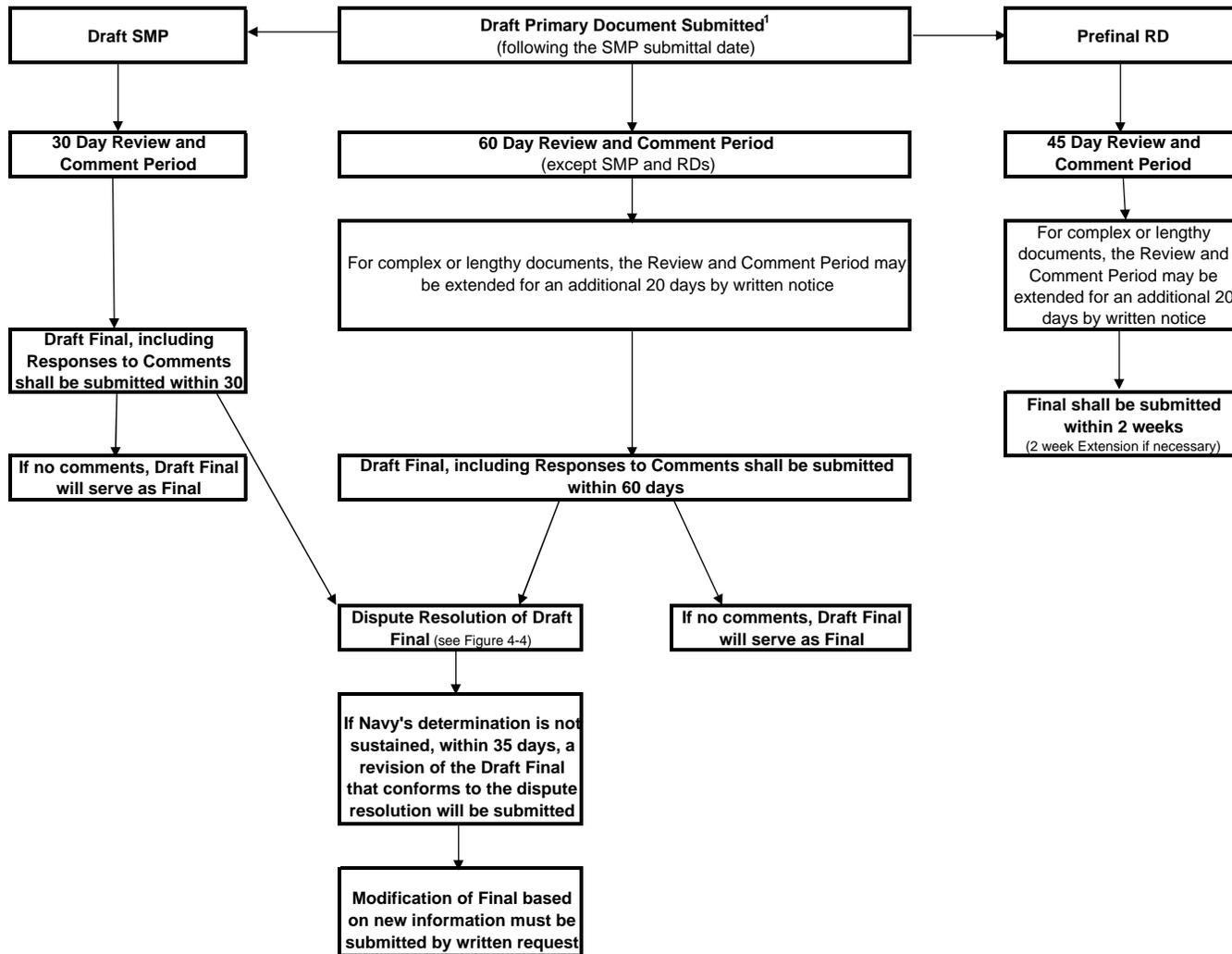
RD: Remedial Design  
RFA: RCRA Facility Assessment  
ROD: Record of Decision  
RRRS: Relative Risk Ranking System  
RVS: Round 1 Verification Step  
SCR: Site Closeout Report  
SERA: Screening Ecological Risk Assessment  
SI: Site Investigation  
SRI: Supplemental Remedial Investigation  
WP: Work Plan

**Table 2-3  
CERCLA Process  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

**Table 2-3  
CERCLA Process**

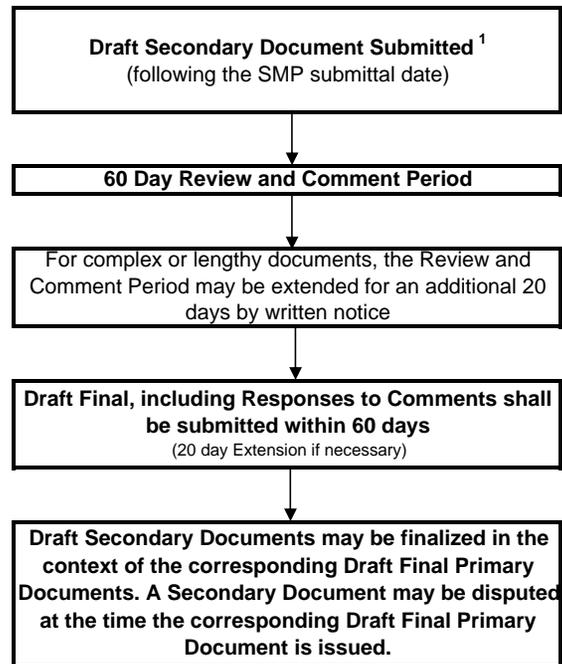
<b>Preliminary Assessment (PA)</b>	Initiation of concern about a site, area, or potential contaminant source. The PA is a limited-scope assessment designed to distinguish between sites that clearly pose little or no threat to human health or the environment and sites that may pose a threat and require further investigation. Environmental samples are rarely collected during a PA. The PA also identifies sites requiring assessment for possible response actions. If the PA results in a recommendation for further investigation, an SI is conducted.
<b>Site Investigation (SI)</b>	Some sites warrant preliminary or interim investigations, studies, or removal/remedial actions. If it is unclear as to whether a site should be included in the CERCLA RI/FS process, an SI is sometimes conducted to make a general determination if activities at the site have impacted environmental media. SIs typically include the collection of environmental and waste samples to determine which hazardous substances are present at a site and to determine if these substances have been released to the environment.
<b>Remedial Investigation (RI)</b>	During an RI, data is collected to characterize site conditions, determine the nature of the waste, assess risk to human health and the environment, and, if necessary, conduct treatability testing to evaluate the potential performance and cost of the treatment technologies being considered.
<b>Treatability Study (TS)</b>	Treatability studies may be conducted at any time during the CERCLA process. The need for a treatability study generally is identified during the FS. Treatability studies may be classified as either bench-scale (laboratory study) or pilot-scale (field studies). For technologies that are well-developed and tested, bench-scale studies are often sufficient to evaluate performance. For innovative technologies, pilot tests may be required to obtain the desired information. Pilot tests simulate the physical and chemical parameters of the full-scale process, and are designed to bridge the gap between bench-scale and full-scale operations. Treatability studies are performed to assist in the evaluation of a potentially promising remedial technology. The primary objectives of treatability testing are to provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the FS and support the remedial design of a selected alternative.
<b>Engineering Evaluation/Cost Analysis (EE/CA) and Interim Removal Action (IRA)</b>	Removal actions are implemented to clean up or remove hazardous substances from the environment at a specific site in order to mitigate the spread of contamination. Removal actions may be implemented at any time during the CERCLA process. Removal actions are classified as either time-critical or non-time-critical actions. Actions taken immediately to mitigate an imminent threat to human health or the environment, such as the removal of corroded or leaking drums, are classified as time-critical removal actions. Removal actions that may be delayed for 6 months or more without significant additional harm to human health or the environment are classified as non-time-critical removal actions (NTCRA). For an NTCRA, an EE/CA is prepared rather than the more extensive FS. An EE/CA focuses only on the substances to be removed rather than on all contaminated substances at the site. It is possible for a removal action to become the final remedial action if the risk assessment results indicate that no further remedial action is required in order to protect human health and the environment.
<b>Feasibility Study (FS)</b>	The FS is the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The RI and FS can be conducted concurrently; data collected in the RI influences the development of remedial alternatives in the FS, which in turn affect the data needs and scope of treatability studies and additional field investigations. This phased approach encourages the continual scoping of the site characterization effort, which minimizes the collection of unnecessary data and maximizes data quality.
<b>Proposed Plan (PP)</b>	A PP presents the remedial alternatives developed in the FS and recommends a preferred remedial alternative. The public has an opportunity to comment on the PP during an announced formal public comment period. Site information is compiled in an administrative record and placed in the general IR program information repositories established at local libraries for public review. The public comments are reviewed and the responses are recorded in a document called a Responsiveness Summary. At the end of the public comment period, an appropriate remedial alternative is chosen to protect human health and the environment. All parties directly involved in the restoration program (Navy, EPA, and VDEQ) must agree on the selected alternative.
<b>Record of Decision (ROD)</b>	The ROD document is issued to explain the selected remedial action. Public comments received during the PP are addressed as part of the responsiveness summary in the ROD. A notice to the public is issued when the ROD is signed by Navy and EPA following State concurrence.
<b>Remedial Design/Remedial Action (RD/RA)</b>	The final stage in the process is the RD/RA. The technical specifications for cleanup remedies and technologies are designed in the RD phase. If land use controls are a component of the remedy, the Land Use Control Remedial Design is generated during this phase. The RA is the actual construction or implementation phase of the cleanup process.
<b>Remedy In Place</b>	For long-term remedies where it is anticipated that remedial action objectives will be achieved over a long period, the RIP milestone signifies the completion of the remedial action construction phase, and that the remedy has been implemented and has been demonstrated to be functioning as designed (i.e., all testing has been accomplished and the remedy will function properly). Once all RCs and RIPs have been documented for every site at the facility and the terms of the FFA have been met, site closeout and NPL deletion is completed.
<b>Response Complete</b>	Within the CERCLA process there are multiple points at which a decision can be made that no further response action is required; properly documented (necessary regulatory notification or application for concurrence has occurred) these decisions constitute response complete and/or site closeout. RC is the point at which the remedy has achieved the required reduction in risk to human health and the environment (cleanup goals have been met). Response complete is followed by site closeout.
<b>Five Year Review</b>	Five-year reviews generally are required by CERCLA or program policy when hazardous substances remain on site above levels that permit unrestricted use and unlimited exposure. Five-year reviews provide an opportunity to evaluate the implementation and performance of a remedy to determine whether it remains protective of human health and the environment. Generally, reviews are performed 5 years after the initiation of a CERCLA response action, and are conducted every 5 years as long as future uses remain restricted. Five-year reviews for NAB Little Creek are performed by the Navy, the lead agency for the site, but EPA retains responsibility for determining the protectiveness of the remedy.

**Table 2-4  
Primary Document Submittal Flow Chart  
FFA Process  
NAB Little Creek  
Virginia Beach, Virginia**



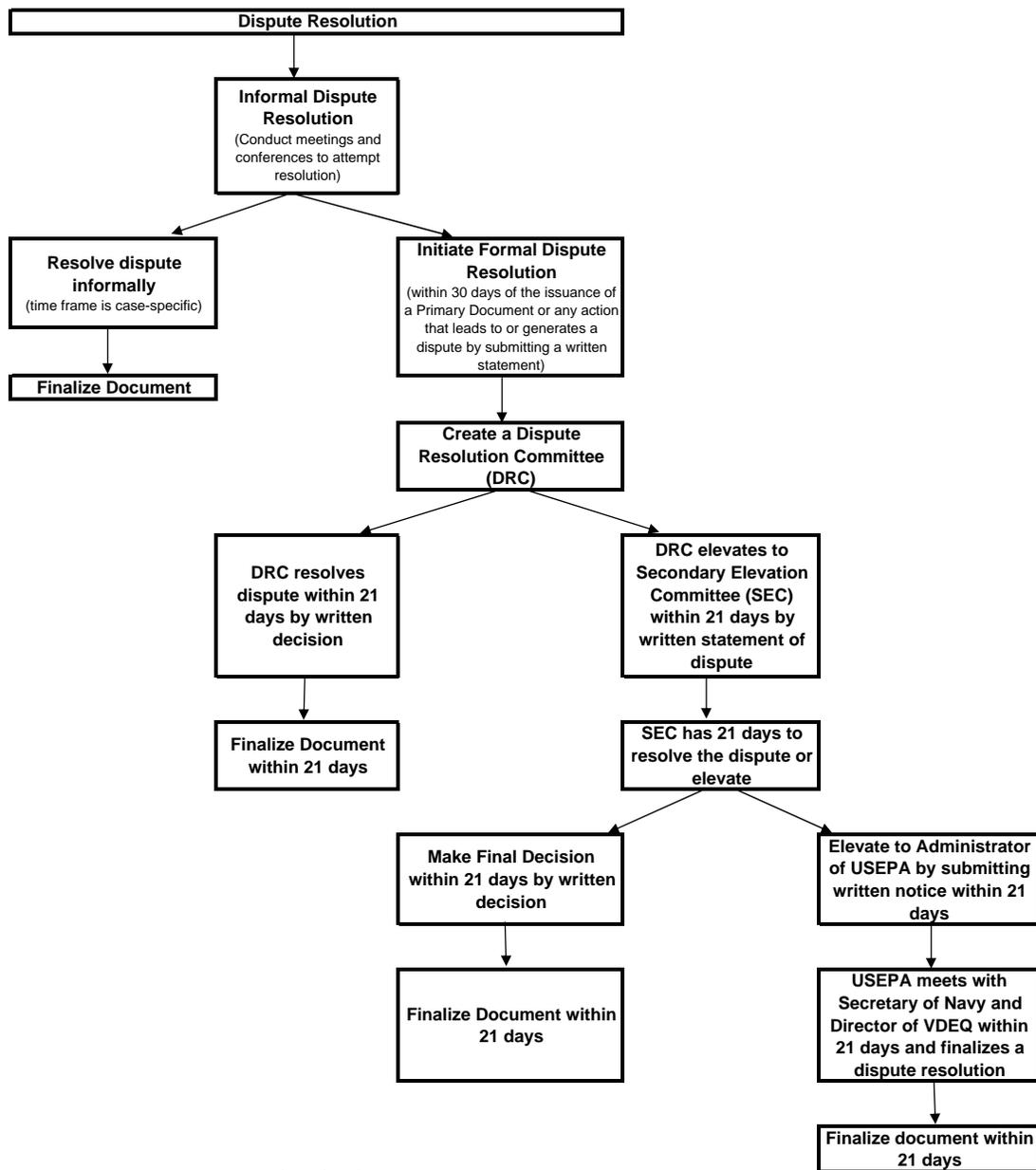
<sup>1</sup>Little Creek Primary Documents Include: Remedial Investigation (RI)/Feasibility Study (FS)/Focused Feasibility Study (FFS) Work Plans, RI Reports, FS and FFS Reports, Proposed Remedial Action Plans (PRAPs), Records of Decision (RODs), Final Remedial Designs (RDs), Remedial Action Work Plans, Remedial Action Completion Reports (RACRs), and Site Management Plans (SMPs)

**Table 2-5  
Secondary Document Submittal Flow Chart  
FFA Process  
NAB Little Creek  
Virginia Beach, Virginia**



<sup>1</sup>Little Creek Secondary Documents Include: Health and Safety Plans (HSPs), Non-Time-Critical Removal Action (NTCRA) Plans, Pilot/Treatability Study Work Plans and Reports, Engineering Evaluation/Cost Analysis (EE/CA) Reports, Well Closure Methods and Procedures, Preliminary/Conceptual Designs or equivalents, Prefinal Remedial Designs (RDs), Periodic Reviews/5-Year Review Assessment Reports, Removal Action Memorandums, Preliminary Closeout Reports (PCORs)/Final Closeout Reports (FCORs)

**Table 2-6  
Dispute Resolution Flow Chart  
FFA Process  
NAB Little Creek  
Virginia Beach, Virginia**



**Table 2-7  
Schedule for Base Wide Activities  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	Duration	Start	Finish	2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012	
					tr	tr																				
1	<b>BASE WIDE ACTIVITIES</b>	1827 days	Mon 10/1/07	Sun 9/30/12																						
2	<b>Master Project Plans</b>	<b>1825 days</b>	<b>Mon 10/1/07</b>	<b>Fri 9/28/12</b>																						
3	Update MPP on an as needed basis	1825 days	Mon 10/1/07	Fri 9/28/12																						
4	<b>5-Year Site Management Plan</b>	<b>2100 days</b>	<b>Mon 1/1/07</b>	<b>Sun 9/30/12</b>																						
5	Site Management Plan Update	1827 days	Mon 10/1/07	Sun 9/30/12																						
6	Annual Update	182 days	Mon 1/1/07	Sun 7/1/07																						
7	<b>CERCLA Five Year Review</b>	<b>643 days</b>	<b>Fri 3/30/07</b>	<b>Wed 12/31/08</b>																						
8	Draft Five Year Review	433 days	Fri 3/30/07	Wed 6/4/08																						
9	Regulatory Review	60 days	Thu 6/5/08	Sun 8/3/08																						
10	Legal Review	60 days	Mon 8/4/08	Thu 10/2/08																						
11	Comment Resolution	60 days	Fri 10/3/08	Mon 12/1/08																						
12	Final Five Year Review	30 days	Tue 12/2/08	Wed 12/31/08																						

Project: BaseWide_05 Date: Mon 10/1/07	Task		Summary		Rolled Up Progress		Split		External Milestone	
	Progress		Rolled Up Task		External Tasks		Rolled Up Split		Deadline	
	Milestone		Rolled Up Milestone		Project Summary		External Milestone			

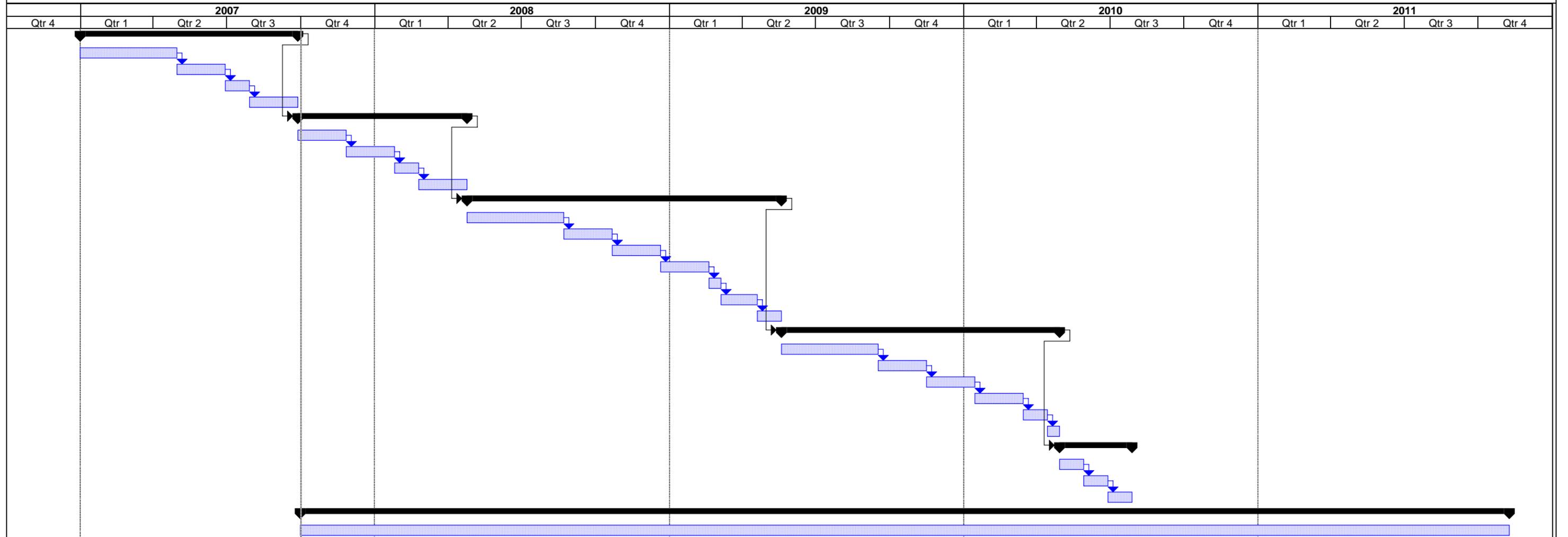
**Table 2-8  
Schedule for Site 7 - Amphibious Base Landfill  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	DUR	Start	Finish	2004					2005				2006			
					Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	
1	<b>Site 7 Construction Closeout Report</b>	270 days	Mon 1/1/07	Thu 9/27/07													
2	Draft Construction Closeout Report	120 days	Mon 1/1/07	Mon 4/30/07													
3	Partnering Team Review	60 days	Tue 5/1/07	Fri 6/29/07													
4	Comment Resolution	30 days	Sat 6/30/07	Sun 7/29/07													
5	Final Construction Closeout Report	60 days	Mon 7/30/07	Thu 9/27/07													
6	<b>Site 7 Focused Feasibility Study</b>	<b>210 days</b>	<b>Fri 9/28/07</b>	<b>Thu 4/24/08</b>													
7	Draft FFS	60 days	Fri 9/28/07	Mon 11/26/07													
8	Partnering Team Review	60 days	Tue 11/27/07	Fri 1/25/08													
9	Comment Resolution	30 days	Sat 1/26/08	Sun 2/24/08													
10	Final FFS	60 days	Mon 2/25/08	Thu 4/24/08													
11	<b>Site 7 Proposed Plan</b>	<b>390 days</b>	<b>Fri 4/25/08</b>	<b>Tue 5/19/09</b>													
12	Draft PP	120 days	Fri 4/25/08	Fri 8/22/08													
13	Partnering Team Review	60 days	Sat 8/23/08	Tue 10/21/08													
14	Legal Review	60 days	Wed 10/22/08	Sat 12/20/08													
15	Comment Resolution	60 days	Sun 12/21/08	Wed 2/18/09													
16	Draft Final PP	15 days	Thu 2/19/09	Thu 3/5/09													
17	Public Comment and Meeting	45 days	Fri 3/6/09	Sun 4/19/09													
18	Final PP	30 days	Mon 4/20/09	Tue 5/19/09													
19	<b>Site 7 Record of Decision</b>	<b>345 days</b>	<b>Wed 5/20/09</b>	<b>Thu 4/29/10</b>													
20	Draft ROD	120 days	Wed 5/20/09	Wed 9/16/09													
21	Partnering Team Review	60 days	Thu 9/17/09	Sun 11/15/09													
22	Legal Review	60 days	Mon 11/16/09	Thu 1/14/10													
23	Comment Resolution	60 days	Fri 1/15/10	Mon 3/15/10													
24	Final ROD	30 days	Tue 3/16/10	Wed 4/14/10													
25	ROD Approval and Public Notification	15 days	Thu 4/15/10	Thu 4/29/10													
26	<b>Site 7 LUC Remedial Design</b>	90 days	Fri 4/30/10	Wed 7/28/10													
27	Draft LUC Remedial Design	30 days	Fri 4/30/10	Sat 5/29/10													
28	Legal Review	30 days	Sun 5/30/10	Mon 6/28/10													
29	Final LUC Remedial Design	30 days	Tue 6/29/10	Wed 7/28/10													
30	<b>Site 7 Maintenance Action</b>	<b>1500 days</b>	<b>Mon 10/1/07</b>	<b>Tue 11/8/11</b>													
31	Site 7 Maintenance Action	1500 days	Mon 10/1/07	Tue 11/8/11													

Date: Mon 10/1/07  
Revised: Mon 10/1/07

Task  Summary  Project Summary  Rolled Up Split  External Milestone   
 Milestone  External Tasks  Split  External Milestone  Deadline 

**Table 2-8  
 Schedule for Site 7 - Amphibious Base Landfill  
 FY 2008 Site Management Plan  
 NAB Little Creek, Virginia Beach, Virginia**



Date: Mon 10/1/07  
 Revised: Mon 10/1/07

- Task
- Milestone
- Summary
- External Tasks
- Project Summary
- Split
- Rolled Up Split
- External Milestone
- External Milestone
- Deadline

Note: The review and submittal dates are based on the FFA Process Flow Charts (Figures 4-13 through 4-15) or dates previously agreed upon and assume informal dispute resolution of Draft Final Documents within a reasonable number of days.





**Table 2-10  
Schedule for Site 11a-Building 3033 Former Waste Oil Tank  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	DUR	Start	2007				2008				2009				2010				2011				2012							
				Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4					
1	<b>Site 11a Remedial Investigation Work Plan</b>	<b>255 days</b>	<b>Thu 11/30/06</b>																												
2	Draft Remedial Investigation Work Plan	120 days	Thu 11/30/06																												
3	Partnering Team Review	45 days	Fri 3/30/07																												
4	Comment Resolution	30 days	Mon 5/14/07																												
5	Final Remedial Investigation Work Plan	60 days	Wed 6/13/07																												
6	<b>Site 11a Remedial Investigation Report</b>	<b>255 days</b>	<b>Sun 8/12/07</b>																												
7	Draft Remedial Investigation Report	120 days	Sun 8/12/07																												
8	Partnering Team Review	45 days	Mon 12/10/07																												
9	Comment Resolution	30 days	Thu 1/24/08																												
10	Final Remedial Investigation Report	60 days	Sat 2/23/08																												
11	<b>Site 11a Feasibility Study</b>	<b>255 days</b>	<b>Wed 4/23/08</b>																												
12	Draft Feasibility Study Report	120 days	Wed 4/23/08																												
13	Partnering Team Review	45 days	Thu 8/21/08																												
14	Comment Resolution	30 days	Sun 10/5/08																												
15	Final Treatability Study Report	60 days	Tue 11/4/08																												
16	<b>Site 11a Proposed Plan</b>	<b>315 days</b>	<b>Sat 1/3/09</b>																												
17	Draft PP	60 days	Sat 1/3/09																												
18	Partnering Team and Legal Review	60 days	Wed 3/4/09																												
19	Comment Resolution	30 days	Sun 5/3/09																												
20	Draft Final PP	60 days	Tue 6/2/09																												
21	Public Comment and Meeting	45 days	Sat 8/1/09																												
22	Final PP	60 days	Tue 9/15/09																												
23	<b>Site 11a Record of Decision</b>	<b>195 days</b>	<b>Sat 11/14/09</b>																												
24	Draft ROD	60 days	Sat 11/14/09																												
25	Partnering Team Review	30 days	Wed 1/13/10																												
26	Legal Review	30 days	Fri 2/12/10																												
27	Comment Resolution	15 days	Sun 3/14/10																												
28	Final ROD	30 days	Mon 3/29/10																												
29	ROD Approval and Public Notification	30 days	Wed 4/28/10																												
30	<b>Site 11a LUC Remedial Design</b>	<b>120 days</b>	<b>Fri 5/28/10</b>																												
31	Draft Remedial Design	40 days	Fri 5/28/10																												
32	Legal Review	40 days	Wed 7/7/10																												
33	Final Remedial Design	40 days	Mon 8/16/10																												
34	<b>Site 11a Remedial Action Work Plan</b>	<b>288 days</b>	<b>Sat 9/25/10</b>																												
35	Draft Remedial Action Work Plan	166 days	Sat 9/25/10																												
36	Regulatory Review	82 days	Thu 3/10/11																												
37	Final Remedial Action Work Plan	40 days	Tue 5/31/11																												
38	<b>Site 11a Remedial Action</b>	<b>455 days</b>	<b>Sun 7/10/11</b>																												
39	Remedial Action Construction	90 days	Sun 7/10/11																												
40	Remedial Action	365 days	Sat 10/8/11																												

Date: Mon 10/1/07  
REVISED: Mon 10/1/07

Task		Summary		Rolled Up Progress		Split		External Milestone	
Progress		Rolled Up Task		External Tasks		Rolled Up Split		Deadline	
Milestone		Rolled Up Milestone		Project Summary		External Milestone			

Note: The review and submittal dates are based on the FFA Process Flow Charts (Figures 4-13 through 4-15) or dates previously agreed upon and assume informal dispute resolution of Draft Final Documents within a reasonable number of days.



**Table 2-11  
Schedule for SWMU 3 (111) - Pier 10 Sandblast Yard  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	Duration	Start	Finish	2007				2008				2009				2010				2011			2012				
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	
1	<b>SWMU 3 SRI Report</b>	<b>240 days</b>	<b>Thu 3/1/07</b>	<b>Fri 10/26/07</b>																								
2	Draft SRI Report	120 days	Thu 3/1/07	Thu 6/28/07																								
3	Partnering Team Review	45 days	Fri 6/29/07	Sun 8/12/07																								
4	Comment Resolution	30 days	Mon 8/13/07	Tue 9/11/07																								
5	Final SRI Report	45 days	Wed 9/12/07	Fri 10/26/07																								
6	<b>SWMU 3 Feasibility Study</b>	<b>180 days</b>	<b>Sat 10/27/07</b>	<b>Wed 4/23/08</b>																								
7	Draft Feasibility Study	60 days	Sat 10/27/07	Tue 12/25/07																								
8	Partnering Team Review	60 days	Wed 12/26/07	Sat 2/23/08																								
9	Final Feasibility Study	60 days	Sun 2/24/08	Wed 4/23/08																								
10	<b>SWMU 3 Proposed Plan</b>	<b>315 days</b>	<b>Thu 4/24/08</b>	<b>Wed 3/4/09</b>																								
11	Draft PP	60 days	Thu 4/24/08	Sun 6/22/08																								
12	Partnering Team and Legal Review	60 days	Mon 6/23/08	Thu 8/21/08																								
13	Comment Resolution	30 days	Fri 8/22/08	Sat 9/20/08																								
14	Draft Final PP	60 days	Sun 9/21/08	Wed 11/19/08																								
15	Public Comment and Meeting	45 days	Thu 11/20/08	Sat 1/3/09																								
16	Final PP	60 days	Sun 1/4/09	Wed 3/4/09																								
17	<b>SWMU 3 Record of Decision</b>	<b>165 days</b>	<b>Thu 3/5/09</b>	<b>Sun 8/16/09</b>																								
18	Draft ROD	60 days	Thu 3/5/09	Sun 5/3/09																								
19	Partnering Team Review	30 days	Mon 5/4/09	Tue 6/2/09																								
20	Legal Review	30 days	Wed 6/3/09	Thu 7/2/09																								
21	Comment Resolution	15 days	Fri 7/3/09	Fri 7/17/09																								
22	Final ROD	15 days	Sat 7/18/09	Sat 8/1/09																								
23	ROD Approval and Public Notification	15 days	Sun 8/2/09	Sun 8/16/09																								
24	<b>SWMU 3 LAC Remedial Design</b>	<b>90 days</b>	<b>Mon 8/17/09</b>	<b>Sat 11/14/09</b>																								
25	Draft Remedial Design	30 days	Mon 8/17/09	Tue 9/15/09																								
26	Legal Review	30 days	Wed 9/16/09	Thu 10/15/09																								
27	Final Remedial Design	30 days	Fri 10/16/09	Sat 11/14/09																								
28	<b>SWMU 3 Remedial Action Work Plan</b>	<b>120 days</b>	<b>Sun 11/15/09</b>	<b>Sun 3/14/10</b>																								
29	Draft Remedial Action Work Plan	120 days	Sun 11/15/09	Sun 3/14/10																								
30	Regulatory Review	60 days	Sun 11/15/09	Wed 1/13/10																								
31	Final Remedial Action Work Plan	30 days	Sun 11/15/09	Mon 12/14/09																								
32	<b>SWMU 3 Remedial Action</b>	<b>929 days</b>	<b>Mon 3/15/10</b>	<b>Fri 9/28/12</b>																								
33	Remedial Action	929 days	Mon 3/15/10	Fri 9/28/12																								

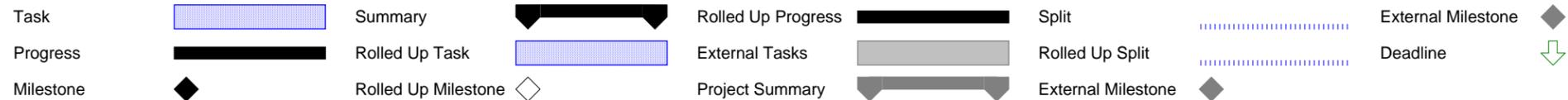
Project: CTO74_99 Date: Mon 10/1/07	Task		Summary		Rolled Up Progress		Split		External Milestone	
	Progress		Rolled Up Task		External Tasks		Rolled Up Split		Deadline	
	Milestone		Rolled Up Milestone		Project Summary		External Milestone			



**Table 2-12**  
**Schedule for SWMU 7b (137) - Small Boat Sandblast Yard Piers 51-59 (Aquatic Portion)**  
**FY 2008 Site Management Plan**  
**NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	Duration	Start	Finish	2008				2009				2010				2011				2012				
					Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	
1	<b>SWMU 7b BERA</b>	<b>315 days</b>	<b>Tue 1/1/08</b>	<b>Mon 11/10/08</b>																					
2	Draft Work Plan	120 days	Tue 1/1/08	Tue 4/29/08																					
3	Final Work Plan	45 days	Wed 4/30/08	Fri 6/13/08																					
4	Draft BERA	120 days	Sat 6/14/08	Sat 10/11/08																					
5	Final BERA	30 days	Sun 10/12/08	Mon 11/10/08																					
6	<b>SWMU 7b Feasibility Study</b>	<b>210 days</b>	<b>Tue 11/11/08</b>	<b>Mon 6/8/09</b>																					
7	Draft SWMU 7b Feasibility Study	120 days	Tue 11/11/08	Tue 3/10/09																					
8	Partnering Team Review	45 days	Wed 3/11/09	Fri 4/24/09																					
9	Comment Resolution	30 days	Sat 4/25/09	Sun 5/24/09																					
10	Final SWMU 7b Feasibility Study	15 days	Mon 5/25/09	Mon 6/8/09																					
11	<b>SWMU 7b Proposed Plan</b>	<b>465 days</b>	<b>Tue 6/9/09</b>	<b>Thu 9/16/10</b>																					
12	Draft PP	120 days	Tue 6/9/09	Tue 10/6/09																					
13	Partnering Team Review	60 days	Wed 10/7/09	Sat 12/5/09																					
14	Legal Review	60 days	Sun 12/6/09	Wed 2/3/10																					
15	Comment Resolution	60 days	Thu 2/4/10	Sun 4/4/10																					
16	Draft Final PP	60 days	Mon 4/5/10	Thu 6/3/10																					
17	Public Comment and Meeting	45 days	Fri 6/4/10	Sun 7/18/10																					
18	Final PP	60 days	Mon 7/19/10	Thu 9/16/10																					
19	<b>SWMU 7b Record of Decision</b>	<b>345 days</b>	<b>Fri 9/17/10</b>	<b>Sat 8/27/11</b>																					
20	Draft ROD	120 days	Fri 9/17/10	Fri 1/14/11																					
21	Partnering Team Review	60 days	Sat 1/15/11	Tue 3/15/11																					
22	Legal Review	60 days	Wed 3/16/11	Sat 5/14/11																					
23	Comment Resolution	60 days	Sun 5/15/11	Wed 7/13/11																					
24	Final ROD	30 days	Thu 7/14/11	Fri 8/12/11																					
25	ROD Approval and Public Notification	15 days	Sat 8/13/11	Sat 8/27/11																					
26	<b>SWMU 7b Remedial Action</b>	<b>398 days</b>	<b>Sun 8/28/11</b>	<b>Fri 9/28/12</b>																					
27	Remedial Action	398 days	Sun 8/28/11	Fri 9/28/12																					

Project: CTO74\_99  
Date: Mon 10/1/07

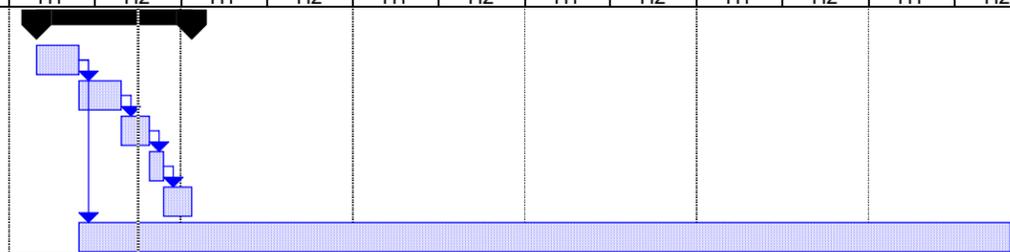


Note: The review and submittal dates are based on the FFA Process Flow Charts (Figures 4-13 through 4-15) or dates previously agreed upon and assume informal dispute resolution of Draft Final Documents within a reasonable number of days.



**Table 2-14  
 Schedule for Site 12 - Exchange Laundry Waste Disposal Area  
 FY 2008 Site Management Plan  
 NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	Duration	Start	Finish	02	2003		2004		2005		2006		2007		2008		2009		2010		2011		2012	
					H2	H1	H2																		
1	<b>Site 12 Remedial Action</b>	<b>330 days</b>	<b>Thu 3/1/07</b>	<b>Thu 1/24/08</b>																					
2	Remedial Action Construction	90 days	Thu 3/1/07	Tue 5/29/07																					
3	Draft Construction Completion Report	90 days	Wed 5/30/07	Mon 8/27/07																					
4	Partnering Team Review	60 days	Tue 8/28/07	Fri 10/26/07																					
5	Comment Resolution	30 days	Sat 10/27/07	Sun 11/25/07																					
6	Final Construction Completion Report	60 days	Mon 11/26/07	Thu 1/24/08																					
7	<b>Remedial Action Monitoring</b>	1979 days	Wed 5/30/07	Sun 10/28/12																					



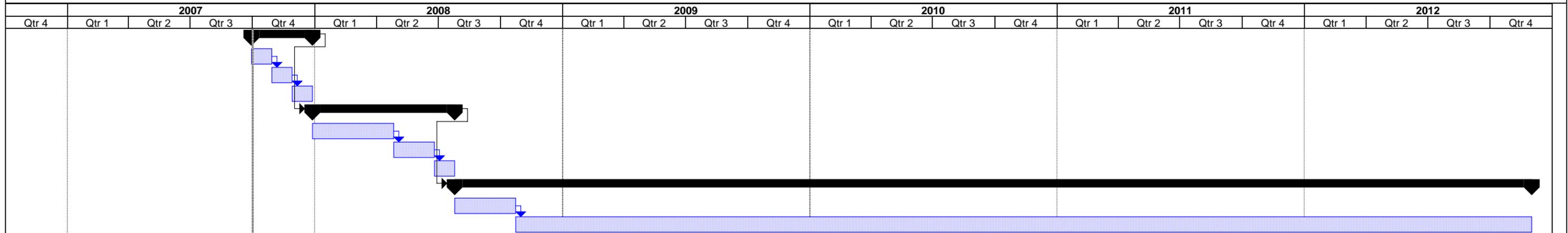
Project: STE12_00 Date: Mon 10/1/07	Task		Summary		Rolled Up Progress		Split		External Milestone	
	Progress		Rolled Up Task		External Tasks		Rolled Up Split		Deadline	
	Milestone		Rolled Up Milestone		Project Summary		External Milestone			

**Table 2-15  
Schedule for Site 13 - Public Works PCP Dip Tank and Wash Rack  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	Duration	Start	Finish	2003				2004				2005				2006		
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
1	<b>Site 13 LUC Remedial Design</b>	<b>90 days</b>	<b>Sun 9/30/07</b>	<b>Fri 12/28/07</b>															
2	Draft Remedial Design	30 days	Sun 9/30/07	Mon 10/29/07															
3	Legal Review	30 days	Tue 10/30/07	Wed 11/28/07															
4	Final Remedial Design	30 days	Thu 11/29/07	Fri 12/28/07															
5	<b>Site 13 Remedial Action Work Plan</b>	<b>210 days</b>	<b>Sat 12/29/07</b>	<b>Fri 7/25/08</b>															
6	Draft Remedial Action Work Plan	120 days	Sat 12/29/07	Sat 4/26/08															
7	Regulatory Review	60 days	Sun 4/27/08	Wed 6/25/08															
8	Final Remedial Action Work Plan	30 days	Thu 6/26/08	Fri 7/25/08															
9	<b>Site 13 Remedial Action</b>	<b>1590 days</b>	<b>Sat 7/26/08</b>	<b>Sat 12/1/12</b>															
10	Remedial Action Construction	90 days	Sat 7/26/08	Thu 10/23/08															
11	Remedial Action	1500 days	Fri 10/24/08	Sat 12/1/12															

Project: STE13_00 Date: Mon 10/1/07	Task		Summary		Rolled Up Progress		Split		External Milestone	
	Progress		Rolled Up Task		External Tasks		Rolled Up Split		Deadline	
	Milestone		Rolled Up Milestone		Project Summary		External Milestone			

**Table 2-15  
 Schedule for Site 13 - Public Works PCP Dip Tank and Wash Rack  
 FY 2008 Site Management Plan  
 NAB Little Creek, Virginia Beach, Virginia**



Project: STE13\_00  
 Date: Mon 10/1/07

Task		Summary		Rolled Up Progress		Split		External Milestone	
Progress		Rolled Up Task		External Tasks		Rolled Up Split		Deadline	
Milestone		Rolled Up Milestone		Project Summary		External Milestone			

**Table 2-16  
 Schedule for Sites 9 and 10  
 FY 2008 Site Management Plan  
 NAB Little Creek, Virginia Beach, Virginia**

ID	Task Name	DUR	Start	Finish	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	Sites 9 and 10 Remedy in Place	2190 days	Sun 10/1/06	Fri 9/28/12											
2	Sites 9 and 10 LTM/ O&M	2190 days	Sun 10/1/06	Fri 9/28/12											

Date: Mon 10/1/07  
 Revised: Mon 10/1/07

Task	Summary	Project Summary	Rolled Up Split	External Milestone
Milestone	External Tasks	Split	External Milestone	Deadline

Note: The review and submittal dates are based on the FFA Process Flow Charts and assume informal dispute resolution of Draft Final Documents within a reasonable number of days.  
 Note: Statutory Five Year Review is scheduled in basewide project planning.



**Legend**  
 [Green outline] Site with a Final ROD and LUC  
 [Yellow outline] Site in the CERCLA RI/FS Process  
 [Blue outline] MMRP Site  
 [White outline] Installation Area

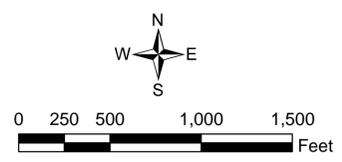


Figure 2-1  
 Locations of IR Further Action Sites  
 Five-Year Site Management Plan For FY 2008  
 Naval Amphibious Base Little Creek  
 Virginia Beach, Virginia



**Legend**  
 FFA No Further Action Sites  
 Installation Area

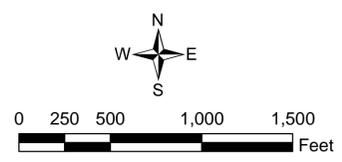


Figure 2-2  
 Locations of IR Sites, SWMUs and AOCs Requiring No Further Action  
 Five-Year Site Management Plan For FY 2008  
 Naval Amphibious Base Little Creek  
 Virginia Beach, Virginia

## SECTION 3

# Navy Land Use Planning

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The NAB Little Creek IRP has developed a geographic information system (GIS) that identifies all areas of past or present environmental concern. Attachment A identifies the IR sites and identifies the boundaries of potential environmental impact areas, including the extent of groundwater and soil contamination. Sites with LUCs in place are identified on [Table 3-1](#). A CD is provided with the GIS layers in Arcview® as displayed on Attachment A. This information is available to Base Planning personnel for environmental considerations during Base operational planning and decision making. This GIS information will also be used by Base Planning personnel to ensure that LUCs are maintained at IR sites where the ROD identifies LUCs as part of the remedy.

If in the event DoD activities will influence the areas outlined or highlighted in Attachment A, the Navy Regional Project Manager should be consulted. Contact information is listed below:

Mr. Scott Park  
Naval Facilities Engineering Command, Mid Atlantic  
9742 Maryland Ave. Bldg N-26, Rm 3208  
Norfolk, VA 23511-3095

**Table 3-1  
Land Use Controls at NAB Little Creek  
FY 2008 Site Management Plan  
NAB Little Creek, Virginia Beach, Virginia**

IR Site or SWMU	Site Name	Date of Final ROD	Location on NAB Little Creek	Area of LUC Boundary	Land Use Controls
<b>Site 9</b>	Driving Range Landfill	15-Dec-03	Near Bldg 3699, NNE Portion of Base, East of Desert Cove	360,671 sq ft	1) Prohibit digging into or disturbing the existing soil cover or contents of the landfill 2) Prohibit residential development on the site 3) Prohibit use of the shallow aquifer groundwater beneath the sites other than for environmental monitoring and testing
<b>Site 10</b>	Demolition Debris Landfill	15-Dec-03	Desert Cove Area, just west of former base sewage treatment plant	713,472 sq ft	1) Prohibit digging into or disturbing the existing soil cover or contents of the landfill 2) Prohibit residential development on the site 3) Prohibit use of the shallow aquifer groundwater beneath the sites other than for environmental monitoring and testing
<b>Site 11</b>	Former School of Music Plating Shop	9-Jul-07	Behind the School of Music	107,510 sq ft	1) Prohibit the withdrawal of groundwater except for environmental monitoring and testing 2) Prohibit the use of the site for residential, child care, elementary or secondary schools, or playground facilities 3) Maintain the integrity of any current or future remedial or monitoring system
<b>Site 12</b>	Former Exchange Dry Cleaning Facility	30-Sep-05	Parking Lot of NAB Little Creek Commissary	192,111 sq ft	1) Prohibit the withdrawal of groundwater except for environmental monitoring and testing 2) Prohibit the use of the site for residential, child care, elementary or secondary schools, or playground facilities 3) Maintain the integrity of any current or future remedial or monitoring system

## SECTION 4

# References

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Attachment A  
Land Use Planning Potentially Impacted Areas

