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Final  
**Site Screening Process Work Plan  
for Site 85  
Marine Corps Air Station  
Cherry Point, North Carolina**

**Contract Task Order 0085**

**April 2001**

Prepared for

**Department of the Navy  
Atlantic Division  
Naval Facilities Engineering Command  
Norfolk, Virginia**

Under the:

**LANTDIV CLEAN Program  
Contract N62470-95-D-6007**

Prepared by



**CH2MHILL**

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# 1.0 Introduction

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This Work Plan describes the proposed Site Screening Process (SSP) investigation activities to be conducted at Site 85 at the Marine Corps Air Station (MCAS) Cherry Point, North Carolina. The Work Plan has been prepared by CH2M HILL under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62470-95-D-6007, Contract Task Order (CTO) 085.

The Work Plan describes the environmental sampling activities proposed as part of the SSP at Site 85. The analytical results of the sampling will be evaluated to determine if a release has occurred from the site and to assess whether further investigation is warranted to characterize environmental conditions at the site.

The remainder of this Work Plan is divided into four sections, numbered 2 through 5. Section 2 is a description and site history of Site 85. The site description and history was obtained from information from previous activities at Site 85 and from a site visit performed by CH2M HILL on June 28, 2000 that included an interview with Mr. Ken Cobb, an MCAS Cherry Point employee knowledgeable about the past activities conducted at Site 85. Section 3 is the SSP Work Plan that presents the proposed investigation activities, including the sampling objectives, strategy, field investigation procedures and overall approach; proposed sampling locations; analytical methods; and data quality assurance protocols. Section 4 is the Quality Assurance Project Plan (QAPP), which addresses project-specific quality assurance requirements. Finally, Section 5 lists the references cited in this document.

Both the Work Plan and QAPP in Sections 3 and 4 are limited to project-specific information. These sections reference master documents that detail most of the requirements and procedures to be employed in the execution of this Work Plan. The master documents include the *Master Quality Assurance Plan for Marine Corps Air Station, Cherry Point, North Carolina* (Brown & Root Environmental, April 1998a) and the *Master Field Sampling Plan for Marine Corps Air Station, Cherry Point, North Carolina* (Brown & Root Environmental, April 1998b).

## 2.0 Site 85 Description and History

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### 2.1 MCAS Cherry Point Description

Marine Corps Air Station (MCAS) Cherry Point is located in southeastern Craven County, North Carolina, just north of the town of Havelock. The Air Station encompasses approximately 11,485 acres and is situated on a peninsula north of Core and Bogue Sounds and south of the Neuse River. It is bounded on the east by Hancock Creek, on the south by North Carolina Highway 101, on the west by an irregular boundary line approximately three-quarters of a mile west of Slocum Creek, and on the north by the Neuse River. The location of MCAS Cherry Point is shown on Figure 2-1.

The Air Station was commissioned in 1942 to maintain and support facilities, services, and materiel of a Marine Aircraft Wing and other activities and units as designated by the Commandant of the Marine Corps. Occupants of the Air Station include the Second Marine Aircraft Wing (2nd MAW), the Naval Aviation Depot (NADEP), the combat Service Support Detachment 21 of the Second Force Service Support Group (2nd FSSG), the Naval Hospital, the Dental Clinic, the Naval Air Maintenance Training Group Detachment, and the Defense Reutilization and Marketing Office (DRMO). The Air Station has facilities for training and support of the Fleet Marine Force (FMF) Atlantic aviation units and is also designated as a primary aviation supply point.

### 2.2 Site 85 Description and History

Site 85 is a triangular-shaped area located on the east shore of Slocum Creek (see Figure 2-2). It measures approximately 240 feet by 140 feet by 140 feet along the three sides (OHM Remediation Services Corp., 1998). Site 85 is situated immediately west of a group of military family residences and an auto hobby shop (Site 76), and is a short distance south and west of Operable Unit (OU2), which includes a 40-acre covered landfill that formerly served as the principal sanitary landfill for the Air Station. The site is accessed through a gate at the western terminus of Onslow Road.

Much of Site 85 consists of a relatively flat forested area bordering the tidal open waters of Slocum Creek to the west. In the eastern part of the site, a short slope leads eastward toward the adjoining developed areas.

Prior to removal activities conducted in 1998, Site 85 contained a significant amount of exposed debris that had been disposed of at the site (see Figure 2-2 for the approximate area containing debris). No records indicating the quantities or types of wastes disposed of at the site are known to exist, nor is it known specifically when the disposal activities occurred. The exposed debris included empty 55-gallon steel drums, empty five to 15 gallon steel pails, automobiles, concrete, office equipment, rubber tires, fire hoses, steel matting, pipes, a set of spectator bleachers, and various other items (OHM Remediation Services, Corp., 1998). Figure 2-3 indicates the approximate locations of the major types of debris that were found at Site 85 during a site visit conducted by OHM Remediation

Services, Corp. in March 1998. Most of the debris was exposed and visible, either as surface debris or as protrusions from the ground.

## **2.3 Previous Investigation and Remedial Activities at Site 85**

### **2.3.1 Wetlands Delineation**

A wetlands delineation was completed at Site 85 in November 1997 by Brown & Root Environmental, Inc. The delineation was performed because a potential debris removal action had been proposed for Site 85. The wetlands delineation was intended to allow remediation engineers to minimize wetlands impacts during debris removal activities, to assist in the preparation of any necessary permit applications for unavoidable wetlands impacts, and to provide baseline data for use in the preparation of a wetlands mitigation plan (if necessary).

The wetlands delineation at Site 85 is documented in the "Wetland Delineation Report for Site 85", dated February 1998, prepared by Brown & Root Environmental. The results of the delineation were that wetlands existed at the site westward from the toe of the slope in the northern part of the site to the open waters of Slocum Creek, and northward close to the edge of the OU2 landfill cover. The wetlands were characterized as Palustrine Forested wetland, needle-leaved evergreen (Brown & Root Environmental, February 1998). It was concluded from the results of the delineation that if equipment was staged and operated from the gravel road at the site, the proposed debris removal action could be accomplished without wetlands encroachment. Figure 2-4 is a copy of the wetlands delineation map presented in the Brown & Root Environmental Wetland Delineation Report.

### **2.3.2 Debris Removal Action**

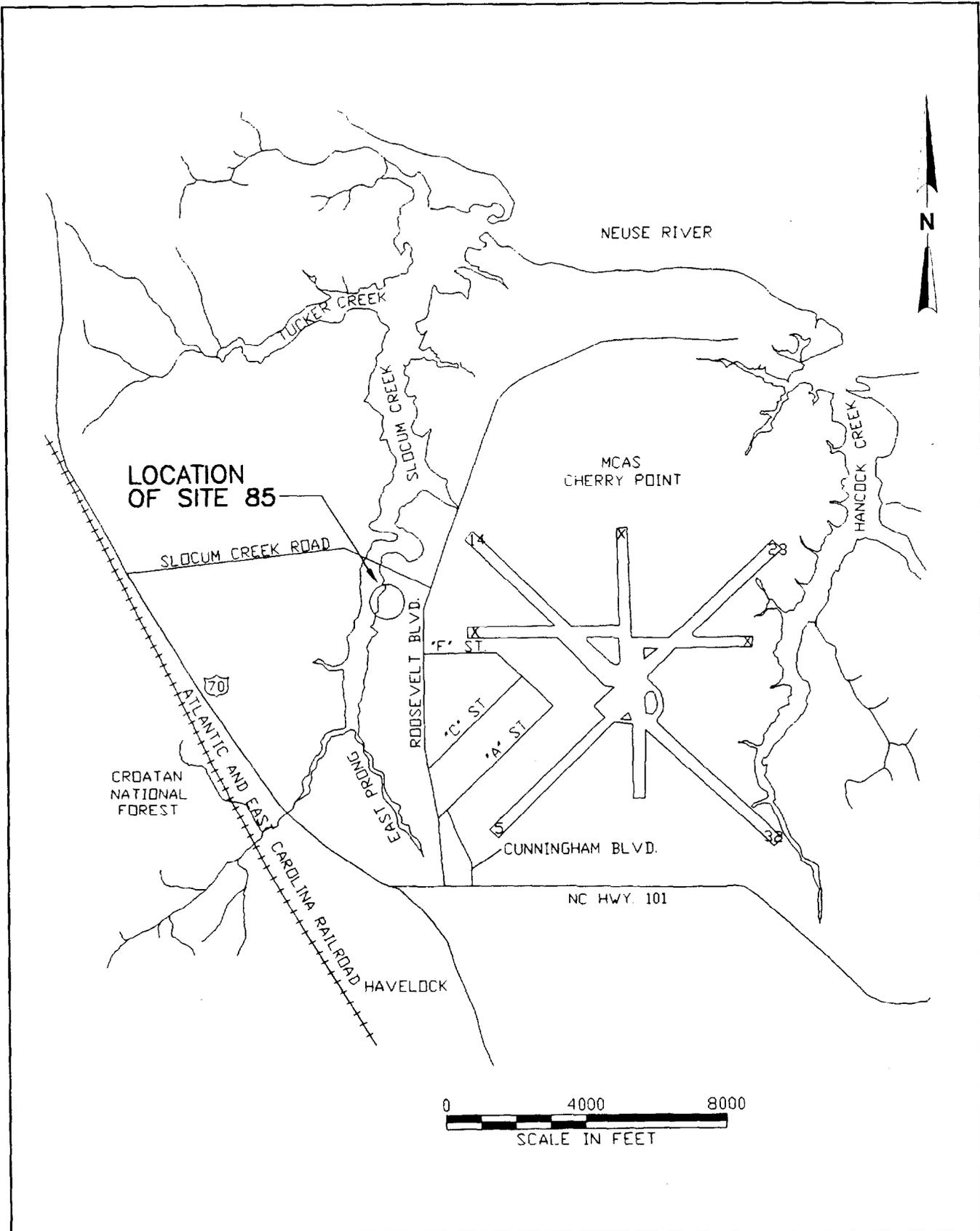
By 1997, site inspections at Site 85 had revealed evidence that Air Station residents, particularly children, were trespassing into the Site 85 area and were using the area for play activities. For example, a rope swing was found hanging from a tree at the site. Consequently, an emergency response action was subsequently taken to secure the site with fencing. This emergency response to eliminate access to the site and to prevent potential human exposure to releases from exposed drums and other debris was completed in October 1997.

In addition, preparation began to remove and dispose of the exposed surficial debris at the site that could pose a physical hazard and to remove and dispose of drums in an environmentally sound manner. The debris removal activities were completed in August 1998 by OHM Remediation Services Corp., and are documented in their report "Action Memorandum, Debris Removal, Site 85, MCAS Cherry Point, North Carolina", dated November 1998.

Approximately 30 to 40 cubic yards of metal and debris were removed from the site. A forklift was employed to extract the larger pieces of debris, which were subsequently shaken to remove loose soil. A trackhoe was employed for drum removal activities. No residual materials were found inside any of the drums and all debris material was found to be free of any hazardous waste based on visual inspection and field screening

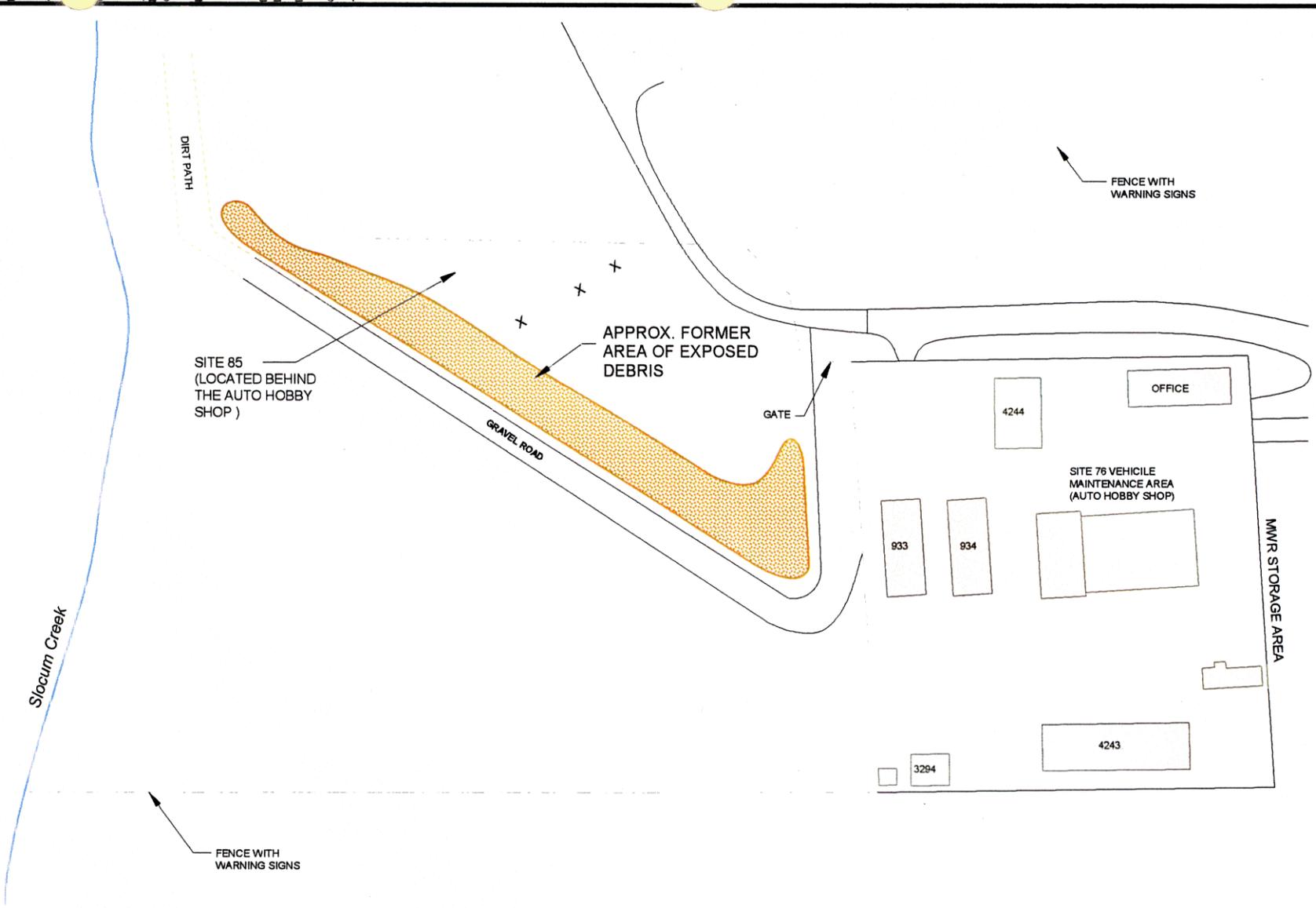
for organic vapors. Only exposed debris was removed during remediation activities. No excavation was performed in an attempt to locate completely buried debris.

Following debris removal activities, site restoration was performed, including placing and compacting soils around exposed tree root systems and reseeded. No site characterization (soil or groundwater sampling) was performed following the debris removal and no analytical samples were collected from the debris transported offsite for disposal. For additional details of the debris removal activities, see OHM Remediation Services Corp., November 1998 as referenced in Section 5.0.



Source: OHM Remediation Services Corp., 1998

Figure 2-1  
Site 85 Location Map  
MCAS Cherry Point, North Carolina



Source: OHM Remediation Services Corp. (1998)

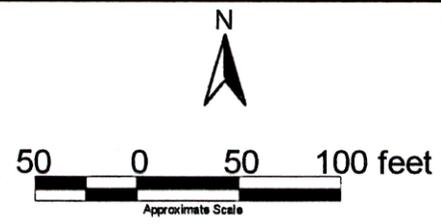


Figure 2-2  
Site Plan  
Site 85  
MCAS Cherry Point, NC

DIRT PATH

SITE 85  
(LOCATED BEHIND  
THE AUTO HOBBY  
SHOP )

APPROX. FORMER  
AREA OF EXPOSED  
DEBRIS

GRAVEL ROAD

GATE

933

Source: OHM Remediation Services Corp. (1998)

Description of Debris Markers (all marker locations are approximate)

- 🚗 Automobiles
- ★ Bleachers
- 🚰 Drums
- Tires
- ☐ Scrap Metal and Office Equipment



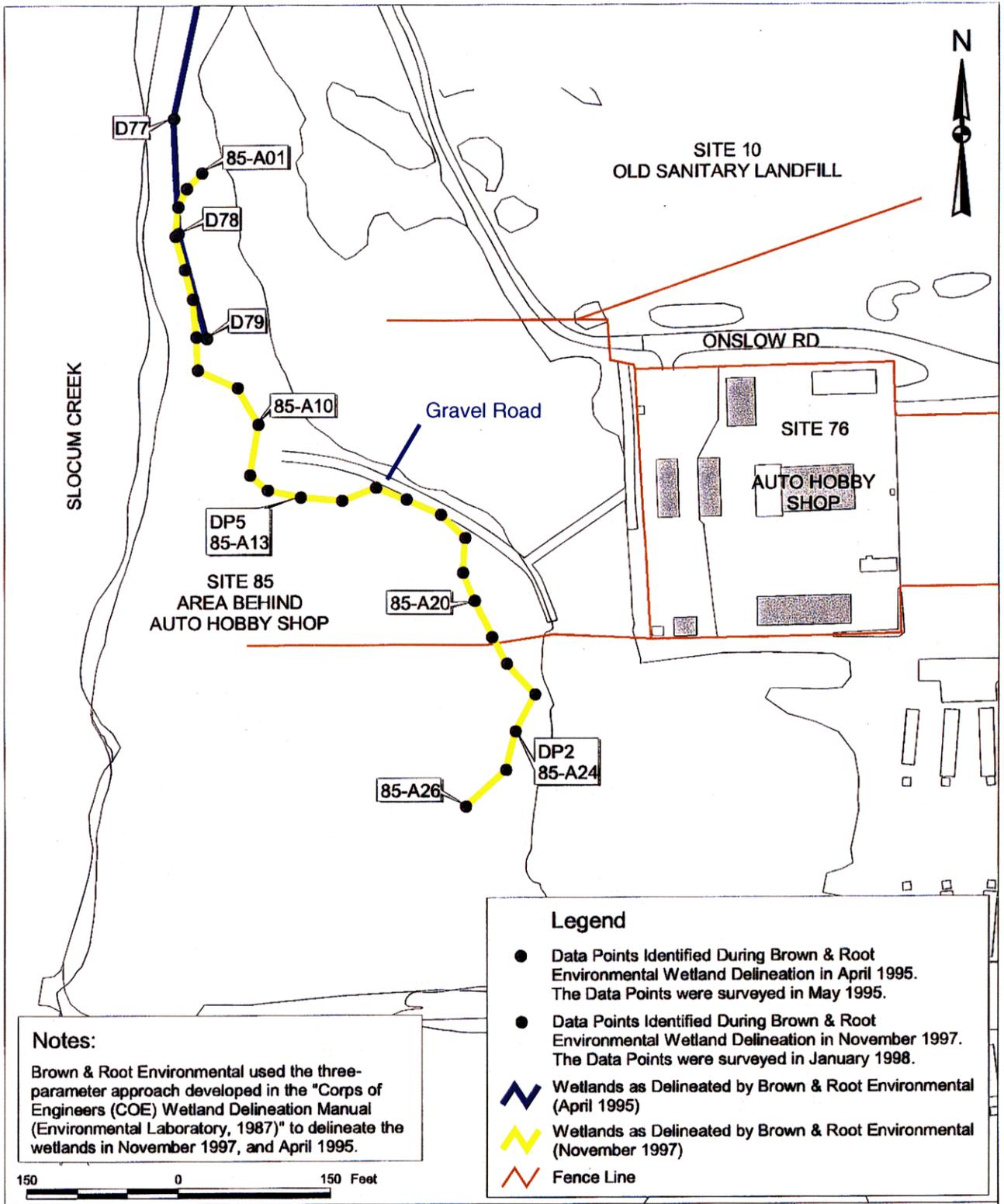
25 0 25 50 feet



Approximate Scale

Figure 2-3  
Detail of Former Debris Area  
Site 85  
MCAS Cherry Point, NC

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**Notes:**  
 Brown & Root Environmental used the three-parameter approach developed in the "Corps of Engineers (COE) Wetland Delineation Manual (Environmental Laboratory, 1987)" to delineate the wetlands in November 1997, and April 1995.

- Legend**
- Data Points Identified During Brown & Root Environmental Wetland Delineation in April 1995. The Data Points were surveyed in May 1995.
  - Data Points Identified During Brown & Root Environmental Wetland Delineation in November 1997. The Data Points were surveyed in January 1998.
  - Wetlands as Delineated by Brown & Root Environmental (April 1995)
  - Wetlands as Delineated by Brown & Root Environmental (November 1997)
  - Fence Line

**Figure 2-4**  
**Wetland Delineation Map**  
**Site 85, MCAS Cherry Point**

Source: Brown & Root Environmental Wetland Delineation Report, Feb. 1998

## 3.0 Site Screening Process Work Plan

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This section outlines the specific activities proposed for the SSP at Site 85. All field activities will be conducted in accordance with the Master FSP for MCAS Cherry Point (Brown and Root Environmental, April 1998b) unless stated otherwise in this project-specific Work Plan.

The analytical results of the sampling conducted during this SSP will be evaluated to determine if a release has occurred at the site and to assess whether further investigation is warranted to characterize environmental conditions.

### 3.1 Site Screening Process Objectives

The specific objective of this SSP is to conduct a field investigation to collect environmental data (soil and groundwater samples) to:

- Determine if there has been a release of contamination from the former debris removed from Site 85 or from any waste materials potentially remaining at the site
- Assess whether further investigation or characterization of contamination is warranted

The soil and groundwater analytical results of the field investigation will be compared to various regulatory screening criteria, including the most recent EPA Region IX Preliminary Remediation Goals (PRGs), North Carolina Draft Soil Screening Levels (SSLs) for the protection of groundwater, Federal Maximum Contaminant Levels (MCLs), and North Carolina Subchapter 2L Groundwater Quality Standards, as applicable. Based on these comparisons and a discussion of potential contaminant migration pathways, potentially affected receptors, site-specific conditions, and applicable clean-up levels, conclusions and recommendations will be made regarding Site 85.

The SSP described in this Work Plan is intended to address potential contamination at Site 85. The site activities proposed as part of this Plan include advancement of soil borings, installation of temporary monitoring wells, and the collection of groundwater and soil samples. The remediation of soil and/or groundwater contamination at these sites and any performance monitoring or long-term monitoring associated with soil and/or groundwater remediation are not addressed in this Work Plan.

### 3.2 Proposed SSP Activities

This section outlines the general sampling approach to SSP field activities and presents the proposed sampling locations. The principal sampling technique will be the utilization of a direct-push sampling tool operated by a subcontractor. Due to wooded conditions, uneven terrain, and difficult vehicle access issues over much of Site 85, it is anticipated that a hydraulic direct-push tool mounted on a small all-terrain tractor or

four-wheel-drive vehicle will be used. The direct-push tool will be used to collect samples of surface and subsurface soil using a coring tool and to install temporary monitoring wells.

### **3.2.1 Mobilization/Demobilization**

Following approval of the final Work Plan, CH2M HILL will begin mobilization activities. Prior to mobilization, all field team members will review the appropriate master planning documents (including the Master FSP and Master QAP) along with the final Work Plan and site-specific Health and Safety Plan (HASP). In addition, a field team kickoff meeting will be held prior to mobilization to ensure that personnel are familiar with the scope of field activities and safety issues.

Field mobilization/demobilization will be performed in accordance with the Master FSP for MCAS Cherry Point. Mobilization/demobilization activities specific to the SSP include obtaining utility clearance for proposed soil borings and monitoring well installation locations with air station personnel, coordination with air station personnel and subcontractors, and preparation of field equipment.

### **3.2.2 Soil Borings and Soil Sampling**

Surface and subsurface soil samples will be collected at four locations within the former debris area at Site 85 as shown in Figure 3-1. The former debris area consists of a relatively flat area located immediately north of the gravel road at Site 85 that transitions rapidly to a steep embankment of about five feet in height. Most of the debris that was removed was located along the slope and toe of this embankment. Sample locations are generally located along the toe of the embankment, distributed relatively evenly along the extent of the debris area, but biased towards the locations of reported drums. At least one soil sample location is along the top of the embankment at Site 85.

Direct-push equipment will be employed to collect the samples of surface and subsurface soils using a three-foot sampling device. At each soil sampling location, continuous three-foot sample cores will be collected from the ground surface to the water table and classified for distinguishing soil characteristics, including grain size. The entire length of each soil core will also be screened for organic vapors using a photo-ionization detector (PID).

At each sampling location, a surface soil sample will be collected from a depth interval of zero inches to one foot below ground surface (bgs). In addition, one subsurface soil sample will be collected at each sampling location from the unsaturated zone approximately one foot above the observed water table, or from another depth interval if potential contamination is observed in the soil cores based on visual or olfactory evidence, or if PID readings indicate elevated levels of organic vapors. More than one subsurface soil sample may be collected at a particular sampling location if significant potential contamination is observed at multiple depth intervals.

To prevent the loss of VOCs during soil sample collection, all soil samples for VOC analysis will be collected using an Encore™ sampling tool immediately after the acetate liner containing each soil core is cut open. The surface soil VOC sample and the subsurface soil VOC sample collected from a depth of one foot above the water table will be collected prior to PID screening of the remaining length of soil cores. If the

subsequent PID screening of the rest of the soil cores indicates potential VOC contamination at another depth, a second soil core will be collected from the same depth at a location approximately one foot laterally from the original soil cores for the collection of any additional soil samples. This will minimize the potential for VOC loss during the handling of soil cores.

Additional details of soil boring advancement and soil sampling procedures can be found in Sections 2.2.1, 2.3.3, 2.9.3, 2.9.4 and 2.9.5 of the Master FSP for MCAS Cherry Point (Brown & Root Environmental, April 1998a).

All soil samples will be submitted to a laboratory for the following analyses:

- Target compound list (TCL) VOCs by EPA Method CLP OLM04 (Note: an Encore® sampling tool will be used in the field and methanol or sodium bicarbonate sample preservation will be performed in the laboratory prior to analysis)
- TCL SVOCs by EPA Method CLP OLM04
- TCL Pesticides/PCBs by EPA Method CLP OLM04
- Target analyte list (TAL) Metals, including Cyanide by EPA Method CLP ILM04 via Trace ICP (Cyanide and Mercury via ILM04.0)

Along with the soil samples, a number of quality analysis/quality control (QA/QC) soil samples (field duplicates, equipment blanks, field blanks, trip blanks and MS/MSD samples) will be collected to ensure sample integrity. A listing of these proposed QA/QC samples is provided in Section 4.0, Tables 4-2 and 4-3. The complete soil analytical protocol has been summarized in Table 3-1. All of the analytical data generated during the field program will be validated by an independent data validation subcontractor in accordance with EPA standard procedures.

### **3.2.3 Installation of Temporary Monitoring Wells**

Temporary monitoring wells will be installed at four locations at Site 85 as shown in Figure 3-1. Three of the locations are within the former debris area and one location is just downgradient of the western terminus of the former debris area.

The temporary groundwater monitoring wells will be installed using a direct-push sampling tool. Each of the temporary monitoring wells will be constructed in accordance with the monitoring well construction and installation procedures outlined in Section 2.4 of the MCAS Cherry Point Master FSP (Brown and Root Environmental, April 1998a). However, specific to this Work Plan, small diameter (3/4-inch or 1-inch inner diameter (I.D.) temporary wells with 10-foot long screens containing pre-packed sand filter jackets will be installed to collect groundwater samples that should be as representative of groundwater conditions as samples from permanently installed wells. The temporary monitoring well screens will be installed to straddle the water table.

Temporary monitoring well boring logs and well construction logs will be completed by the field geologist during each well installation. Following installation, each temporary well will be developed by surging and pumping to remove fine-grained materials entrained during installation activities.

Details of monitoring well installation and groundwater sampling procedures can be found in Sections 2.4.2 and 2.9.1 of the Master FSP for MCAS Cherry Point (Brown & Root Environmental, April 1998a).

### 3.2.4 Groundwater Sampling

Upon installation of the temporary monitoring wells, groundwater samples will be collected from all wells in accordance with Section 2.9.1 of the Master FSP for MCAS Cherry Point (Brown & Root Environmental, April 1998a). Specifically, groundwater samples will be collected with the low-flow purging technique using a peristaltic pump, as outlined in the Master FSP.

Dissolved oxygen (DO), pH, specific conductance, temperature, oxidation/reduction potential, and turbidity will be measured in the field prior to each sample collection using the procedures described in the Master FSP. Samples will be collected as described above and labeled in accordance with the nomenclature procedures outlined in the Master FSP. Water level measurements will be collected from each temporary monitoring well prior to sampling and each well will be checked for the presence of light non-aqueous phase liquids (LNAPL).

All groundwater samples will be submitted to a laboratory for the following analyses:

- TCL low-concentration VOCs by EPA Method CLP OLC02.1
- TCL low-concentration SVOCs by EPA Method CLP OLC02.1
- Pesticides/PCBs by EPA Method 8081A/8082
- Target analyte list (TAL) Metals, including Cyanide by EPA Method CLP ILM04 via Trace ICP (Cyanide and Mercury via ILM04)

The complete groundwater analytical protocol has been summarized in Table 3-1. The use of low-concentration VOCs and low-concentration SVOCs for aqueous analyses, as well as metals analyses by trace ICP are deviations from the Master QAP (Brown & Root Environmental, April 1998b). The low-concentration organic analyses are recommended in order to provide lower detection limits. Similarly, the recommendation for trace ICP analysis is based on the ability of this analysis to achieve lower detection limits than non-trace ICP analysis for all of the analytes except calcium and sodium.

Samples collected for pesticides/PCBs will be analyzed in accordance with the Master QAP by EPA Methods SW-846 8081A/8082.

Samples collected for TAL Metals analyses will not be filtered, either in the field or by the laboratory.

Along with the regular groundwater samples, a number of quality analysis/quality control (QA/QC) groundwater samples (field duplicates, equipment blanks, field blanks, trip blanks and MS/MSD samples) will be collected to ensure sample integrity. A listing of these proposed QA/QC samples is provided in Section 4.0. All of the analytical data generated during the field program will be validated by an independent data validation subcontractor in accordance with EPA standard procedures.

### **3.2.5 Data Evaluation and Review**

When the analytical data from the SSP field activities have been received, data review and evaluation will begin. The results of the SSP field investigation will be used to prepare a SSP Report. The objective of the SSP Report will be to determine if a release has occurred at Site 85, and to assess whether further investigation or characterization of contamination is warranted.

### **3.2.6 Surveying**

CH2M HILL will survey to the nearest one meter, soil boring and temporary monitoring well locations, and any other relevant site markers for horizontal control using a portable Global Positioning System (GPS) unit. The survey coordinates will be used to properly locate the sampling locations in a Geographic Information System (GIS).

### **3.2.7 IDW Handling and Disposal**

The SSP field activities will produce only limited quantities of investigation-derived waste (IDW) that must be contained for offsite disposal. It is assumed that all disposable sampling equipment and personal protective equipment can be disposed of as ordinary trash. Any excess soils from the sampling activities will be returned to the borehole from which they were obtained. In addition, the minimal amount of groundwater purged during sampling activities (low-flow purging) and decontamination rinse water will be containerized and transported to MCAS Cherry Point for disposal at the MCAS Cherry Point IWTP.

### **3.2.8 Decontamination**

All equipment involved in field investigation activities will be decontaminated upon arrival at the site, between sampling or borehole locations, and at the conclusion of investigation activities. Details on procedures for decontamination can be found in Section 2.14 of the Master FSP for MCAS Cherry Point.

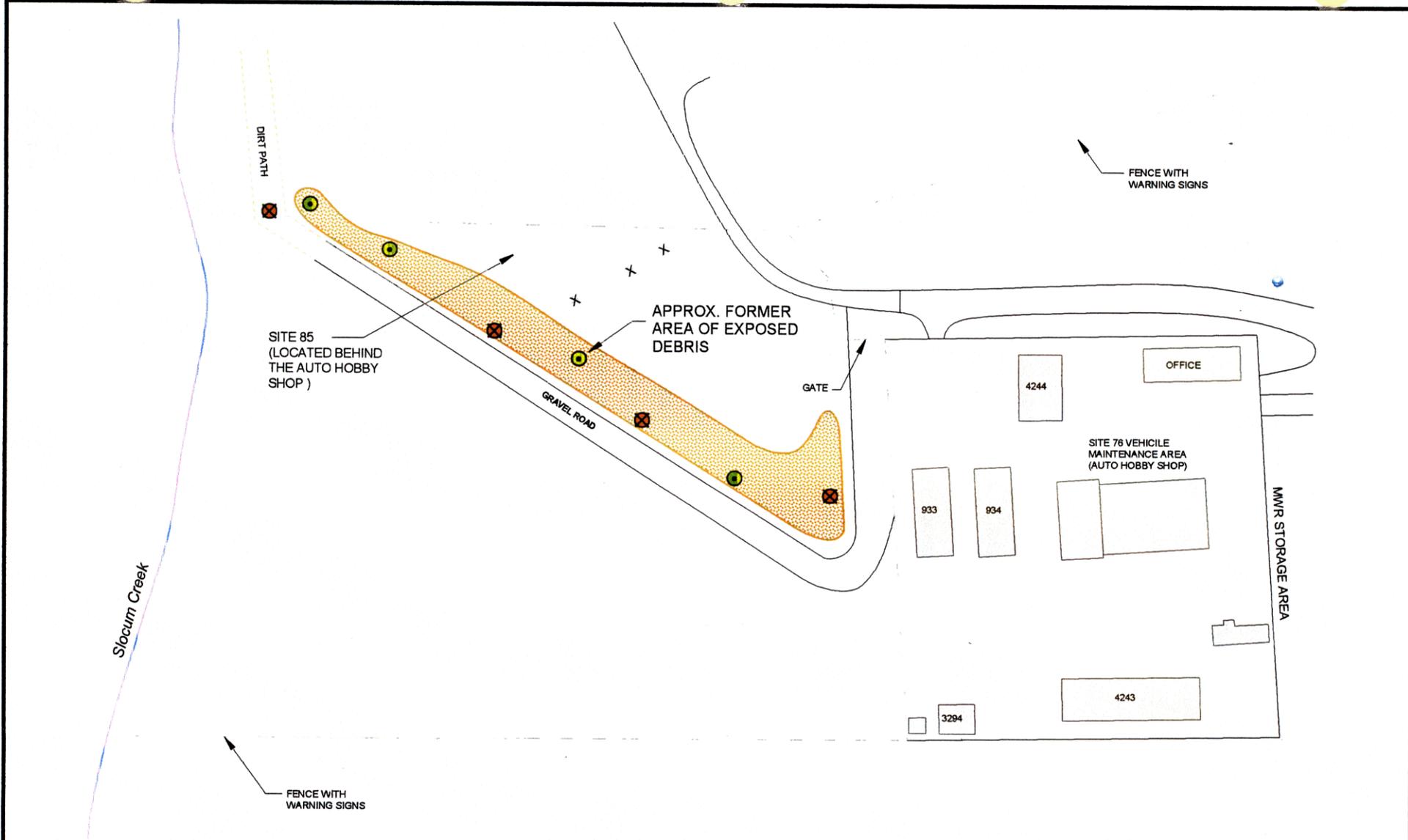
### **3.2.9 Sample Handling**

Sample handling includes the field-related considerations regarding field sample documentation, nomenclature, packaging, shipping and custody. Sample handling and custody procedures are described in Sections 2.10 and 2.11 respectively, of the Master FSP for MCAS Cherry Point and Section 4.0 of the Master QAP for MCAS Cherry Point.

### **3.2.10 Well Abandonment**

Upon receipt of the validated data, the temporary wells will be abandoned. The temporary wells will be abandoned by removing the well and placing bentonite chips down the hole until flush with the ground surface. The bentonite will then be hydrated. The well material will be disposed of as regular trash.

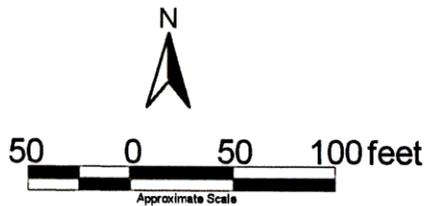
<b>Table 3-1 SSP Sampling Analytical Protocol Site 85 MCAS Cherry Point</b>			
<b>Analysis</b>	<b>Laboratory Analytical Method</b>	<b>Soil Samples<sup>*,1</sup></b>	<b>Groundwater Samples*</b>
VOCs	CLP Low-concentration OLC02.1 (aqueous)/CLP OLM04 (solid)	8	4
SVOCs	CLP Low-concentration OLC02.1 (aqueous)/CLP OLM04 (solid)	8	4
Pesticides/ PCBs	SW-846 8081A/8082 (aqueous)/CLP OLM04 (solid)	8	4
Metals	CLP ILM04 via Trace ICP (Cyanide and Mercury via ILM04) (aqueous and solid)	8	4
*Does not include QC samples.			
1. Each of the four locations will have a surface and subsurface soil sample collected.			



Source: OHM Remediation Services Corp. (1998)

**Proposed Sample Locations and Media Types**

- Groundwater Samples
- Surface Soil and Subsurface Soil Samples



**Figure 3-1**  
**Proposed Sample Locations**  
**Site 85**  
**MCAS Cherry Point, NC**

## 4.0 Quality Assurance Project Plan

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### 4.1 Introduction

This Quality Assurance Project Plan (QAPP) addresses the quality assurance/quality control (QA/QC) issues that are specific to the SSP at Site 85. The QA/QC protocols used at MCAS Cherry Point are detailed in the Master Quality Assurance Plan (QAP) for MCAS Cherry Point (Brown and Root Environmental, April 1998b).

### 4.2 Management Organization and Responsibilities

Details of the Program Management at MCAS Cherry Point are included in Section 2.0 of the Master QAP for MCAS Cherry Point. Additional information specific to this project is provided below.

The Navy, working with MCAS Cherry Point, is the lead agency responsible for all environmental activities performed under CERCLA and RCRA at the Air Station. CH2M HILL is the Navy's contractor that will be responsible for performing this SSP.

The key organizations and personnel are as follows:

- Navy Technical Representative (NTR):

Glenn Markwith  
LANTNAVFACENGCOM  
Bldg. A, Room 2400  
Code EV23GM  
6506 Hampton Boulevard  
Norfolk, VA 23508-1212  
Phone: 757-322-4735  
Fax: 757-322-4805

- MCAS Cherry Point Points of Contact:

Environmental Affairs Department  
Marine Corps Air Station  
4223 Rifle Range Road  
Cherry Point, NC 28533-0006

Mr. Dale McFarland:  
Phone: 252-466-3663  
Fax: 252-466-2000

Bill Powers:  
Phone: 252-466-4598  
Fax: 252-466-2000

- CH2M HILL Personnel:

CH2M HILL, Inc.  
13921 Park Center Road, Suite 600  
Herndon, VA 20171  
Phone: 703-471-1441  
Fax: 703-471-9134

Activity Manager: Doug Bitterman

CH2M HILL, Inc.  
5700 Thurston Avenue  
Suite 116A  
Virginia Beach, VA 23455  
Phone: 757-460-3734 ext. 19  
Fax: 757-460-4592

Project Manager: Bill Friedmann

Additional details on organization and responsibilities are provided in Section 2.0 of the Master QAP for MCAS Cherry Point.

## 4.3 Data Quality Requirements

Section 3.0 of the Master QAP for MCAS Cherry Point describes the overall data quality requirements for MCAS Cherry Point. This section describes specific data quality requirements for the SSP at Site 85.

### 4.3.1 Data Quality Objectives

The objectives of the SSP at Site 85 are to establish a platform of current environmental data to:

- Determine if a release has occurred at Site 85; and to
- Assess whether further investigation or characterization of contamination is warranted.

The SSP at Site 85 includes the advancement of soil borings, the installation of temporary monitoring wells, and the collection of groundwater samples.

Table 4-1 lists the analytical methods that will be used for laboratory analysis of environmental samples collected at Site 85. The detection limits achieved by these analytical methods are adequate to meet these objectives. This conclusion is supported by a number of detailed data quality objective (DQO) analyses that have already been performed at MCAS Cherry Point for investigation activities with similar objectives. For example, the DQO evaluation in TetraTech NUS (August 1998) contains detailed comparisons of method detection limits to risk-based standards and regulatory criteria.

The recommendations in Table 4-1 for low-concentration aqueous analyses for VOCs and SVOCs, as well as metals analyses by trace ICP, are deviations from the Master QAP. The low-concentration analyses are recommended in order to provide lower detection limits. Similarly, the recommendation for trace ICP analysis is based on the ability of this analysis

to achieve lower detection limits than non-trace ICP analysis for all of the analytes except calcium and sodium.

### **4.3.2 Field-Related Quality Control Samples**

In addition to regular calibration of field equipment and appropriate documentation, quality control (QC) samples will be collected during environmental sampling activities in accordance with EPA Region IV guidance, specifically "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual," EPA Region IV, May 1996. These QC samples include field duplicates, trip blanks, equipment rinsate blanks, matrix spike/matrix spike duplicates, and field blanks.

The general type and collection frequency of QC samples is presented in Table 4-2. A summary of project-specific QC samples to be collected is provided in Table 4-3. Details on field-related QC samples are provided in Section 3.3 of the Master QAP for MCAS Cherry Point.

## **4.4 Sample Custody and Shipment**

Sample custody and shipment procedures have been developed for the preparation, handling, storage, and shipping of collected samples. Samples will be processed and shipped in accordance with Section 4.0 of the Master QAP for MCAS Cherry Point.

## **4.5 Sample Analyses**

The information in this section varies from Section 5.0 of the Master QAP for MCAS Cherry Point, and is specific to this project. Samples collected for chemical analysis during this investigation will be analyzed using the analytical procedures identified in Table 4-1. Table 4-3 summarizes the number of samples to be collected for laboratory analysis during this SSP, including QC samples, organized by analytical parameter and sample media.

## **4.6 Internal Quality Control Checks**

Field-related (i.e., external) QC checks are discussed in Section 3.0 of the Master QAP for MCAS Cherry Point and detailed in Section 4.3.2 and Table 4-3. Section 6.0 of the Master QAP details internal QC checks and other laboratory QA/QC considerations.

## **4.7 Project Records**

Project records are important to support the defensibility of collected data. Details regarding project records are included in Section 7.0 of the Master QAP for MCAS Cherry Point.

## **4.8 Data Reduction, Validation and Reporting**

All of the analytical data generated during the field program will be validated by an independent data validation subcontractor in accordance with EPA standard procedures.

Details regarding data reduction, validation and reporting procedures are provided in Section 8.0 of the Master QAP for MCAS Cherry Point.

## **4.9 Performance and System Audits**

Performance and system audits will be performed periodically to ensure that project work is being conducted in accordance with approved Project Plans and in an overall satisfactory manner. Audit procedures can be found in Section 9.0 of the Master QAP for MCAS Cherry Point.

## **4.10 Corrective Actions**

Details regarding corrective actions for field, laboratory, data evaluation and administrative activities are included in Section 10.0 of the Master QAP for MCAS Cherry Point.

## **4.11 Training**

Training will comply with the requirements detailed in Section 11.0 of the Master QAP for MCAS Cherry Point.

<b>Table 4-1 Laboratory Analytical Methods</b>		
<b>Matrix</b>	<b>Parameter</b>	<b>Analytical Method</b>
Groundwater	TCL Low-concentration Volatile Organic Compounds	CLP OLC02.1
Groundwater	TCL Low-concentration Semi-volatile Organic Compounds (SVOCs)	CLP OLC02.1
Groundwater	Pesticides/PCBs	SW-846 Methods 8081A/8082
Groundwater	TAL Metals	CLP ILM04 via Trace ICP
Groundwater	Cyanide and Mercury	CLP ILM04
Soil	Volatile Organic Compounds	CLP OLM04
Soil	TCL Semi-volatile Organic Compounds (SVOCs)	CLP OLM04
Soil	TCL Pesticides/PCBs	CLP OLM04
Soil	TAL Metals	CLP ILM04 via Trace ICP
Soil	Cyanide and Mercury	CLP ILM04

**Table 4-2**  
**General Requirements for QC Sample Collection**

QC Samples	QC specified collection frequency
Field Duplicates	One duplicate per 10 samples of similar matrix or one duplicate per day per sampling event, whichever is more frequent
Trip Blanks	One set of trip blanks per cooler containing samples collected for VOC analysis
Equipment Rinseate Blanks	One rinseate blank per day per matrix per sampling event
Field Blanks	One per site per sampling event
Matrix Spike/Duplicate Samples	One set per 20 samples of similar matrix
<b>Notes:</b> The QC sample collection requirements listed are in accordance with EPA Region IV guidance, specifically "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual; EPA Region IV, May 1996.	

**Table 4-3  
Laboratory Samples  
Site 85 Site Screening Process  
MCAS Cherry Point, North Carolina**

Parameter	Method	Sample Type	No. of Samples	Trip Blanks	Equipment Rinseate Blanks	Field Blanks	Field Duplicates	Matrix Spike/Duplicate	Total Number of Samples
TCL Volatile Organics	CLP Low-concentration OLC02.1	Aqueous	4	3	2	1	1	NA	11
	CLP OLM04	Soil	8	NA	NA	NA	1	1	10
TCL Semi-volatile Organics	CLP Low-concentration OLC02.1	Aqueous	4	NA	2	1	1	NA	8
	CLP OLM04	Soil	8	NA	NA	NA	1	1	10
TCL Pesticides/PCBs	SW846 8081A/8082	Aqueous	4	NA	2	1	1	1	9
	CLP OLM04	Soil	8	NA	NA	NA	1	1	10
TAL Metals	CLP ILM04 via Trace ICP	Aqueous	4	NA	2	1	1	1	9
	(Cyanide and Mercury via ILM04.0)	Soil	8	NA	NA	NA	1	1	10

**Notes:**

The QC sample collection requirements listed are in accordance with EPA Region IV guidance, specifically "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual; EPA Region IV, May 1996.

NA = Not Applicable

TCL = Target Compound List

TAL = Target Analyte List

Assumptions regarding rate of sample collection:

1. One day is required to collect groundwater samples at Site 85
2. One day is required to collect soil samples at Site 85. Thus, total estimated field days for sample collection = two days

Trip blanks – one per cooler containing VOC samples per day

Equipment Rinseate blanks – one per matrix per day

Field Blanks – one per site per sampling event

Field Duplicates – one per every ten samples per matrix/medium

Matrix Spike/Matrix Spike Duplicates – One per 20 samples per matrix (not required for aqueous low-concentration analyses by CLP OLC02.1)

## 5.0 References

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Brown & Root Environmental (February 1998), *Wetland Delineation Report for Site 85, Marine Corps Air Station (MCAS) Cherry Point, Cherry Point, North Carolina, Contract Number N62472-90-D-1298, Contract Task Order 0239.*

Brown & Root Environmental (April 1988a), *Master Field Sampling Plan for Marine Corps Air Station Cherry Point, North Carolina, Contract Number N62472-90-D-1298, Contract Task Order 0266.*

Brown & Root Environmental (April 1998b), *Master Quality Assurance Plan for Marine Corps Air Station Cherry Point, North Carolina, Contract Number N62472-90-D-1298, Contract Task Order 0266.*

OHM Remediation Services Corp. (November 1998), *Action Memorandum Debris Removal Site 85, MCAS Cherry Point, North Carolina, Contract Number N62470-93-D-3032, Delivery Order No. 176.*