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DRAFT PRELIMINARY ASSESSMENT/SITE INSPECTION WORK PLAN SITE 40 MCB CAMP  
LEJEUNE NC (DRAFT ACTING AS FINAL)  
12/1/2007  
CH2M HILL

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# **Preliminary Assessment / Site Inspection Work Plan Site 40**

**Marine Corps Base Camp Lejeune  
Jacksonville, North Carolina**

Prepared for

**Department of the Navy  
Naval Facilities Engineering Command  
Mid-Atlantic Division**

Under the

**Multi-Media Program  
Contract N62470-07-D-0501  
TO-09**

Prepared by



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Charlotte, North Carolina

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# Acronyms and Abbreviations

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ASTM	American Society for Testing and Materials
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DPT	Direct Push Technology
DRMO	Defense Reutilization and Marketing Office
FID	Flame-ionization Detector
FTL	Field Team Leader
FSP	Field Sampling Plan
HRS	Hazard Ranking System
IAS	Initial Assessment Study
ID	Inner Diameter
IDW	Investigation Derived Waste
IR	Installation Restoration
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
NAIP	Natural Attenuation Indicator Parameters
NCDENR	North Carolina Department of Environment and Natural Resources
NFA	No Further Action
NPL	National Priorities List
PA	Preliminary Assessment
PCBs	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
PRGs	Preliminary Remediation Goals
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SI	Site Inspection
SOP	Standard Operating Procedures
SVOCs	Semi-volatile Organic Compounds
TAL	Target Analyte List
UFP-SAP	Uniform Federal Policy for Sampling and Analysis Plans
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey

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UTM	Universal Transverse Mercator
VOCs	Volatile Organic Compounds
WTP	Wastewater Treatment Plant

# 1.0 Project Overview

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The United States Marine Corps has expressed the intent to develop a portion of Marine Corps Air Station (MCAS) New River with the construction of residential housing. The proposed location of this development is Installation Restoration (IR) Site 40, the former Camp Geiger 'Borrow Pit Dump', Marine Corps Base (MCB) Camp Lejeune, Jacksonville, North Carolina. The MCB Camp Lejeune complex consists of six geographical locations under the jurisdiction of the Base command. These areas include Camp Geiger, Montford Point, Courthouse Bay, Mainside, the Greater Sandy Run Area, and the Rifle Range Area. Camp Geiger is located within the MCAS located on the northwestern side of Camp Lejeune.

In order to evaluate the potential risks to human health and the environment posed by historical land use practices at Site 40, CH2M HILL has prepared this Preliminary Assessment/Site Inspection (PA/SI) Work Plan document under contract N62470-07-D-0501, Task Order 09. The following sections describe the objectives, scope, and schedule for the proposed activities.

## 1.1 Purpose of Preliminary Assessment/Site Inspection

The purpose of a PA is to evaluate whether a site poses a potential risk to human health and the environment, and if further investigation may be warranted. PA investigations collect readily available information about a site and its surrounding area. The PA is designed to distinguish, based on limited data, between sites that present little or no risk to human health and the environment and sites that may pose a risk and require further investigation. The PA also identifies sites requiring assessment for possible emergency response actions. If the PA results in a recommendation for further investigation, a SI is performed.

SI investigations typically involve the collection of environmental and waste samples to determine whether hazardous substances are present at a site; to determine if these substances are being released to the environment; and to assess if the substances have reached nearby targets. SIs provide the data needed for Hazard Ranking System (HRS) score and determine whether the site should be recommended for the National Priorities List (NPL).

This work plan describes the proposed activities to be conducted during the PA/SI investigation of Site 40.

## 1.2 Preliminary Assessment/Site Inspection Objective

The objective of the Site 40 PA/SI investigation is to assess the potential risk to human health and the environment under a residential land use scenario, and determine whether additional investigation is necessary.

## 1.3 Work Plan Organization

This Work Plan is organized as follows:

- **Introduction (Section 1)** – Presents an overview of the project, objectives, and work plan organization.

- 
- **Site Background and Setting (Section 2)** – Presents the site location, description, environmental setting, operational history, and previous investigations.
  - **Field Activities (Section 3)** – Presents an overview of proposed field activities, including site reconnaissance; site clearing; buried utility locating; soil, groundwater, surface water, and sediment sampling; test pits; and survey activities.
  - **Investigation Derived Waste (IDW) Management (Section 4)** – Discusses how IDW generated during field activities will be managed and disposed.
  - **Data Management (Section 5)** - Outlines how data will be managed, validated, and evaluated.
  - **PA/SI Report (Section 6)** – Provides the reporting that will occur for the project.
  - **Project Management (Section 7)** – Presents an overview of the project management and staffing
  - **Schedule (Section 8)** - Provides the project schedule.
  - **References (Section 9)** - Provides the references used in this document.

Tables and figures accompanying the main text of this plan are included at the end of each section. The site-specific Field Sampling Plan (FSP) and Uniform Federal Policy for Sampling and Analysis Plans (UFP-SAP) are included as appendices. These documents are supported by the MCB Camp Lejeune Master Project Plans (CH2M HILL, 2005) (herein referred to as Master Project Plans), which are referenced throughout.

## 2.0 Site Background and Setting

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General background information for the Base, including location, topography, geology, and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)-related history, is presented in the Master Project Plans and is not repeated herein. Site-specific background information for Site 40 is presented below.

### 2.1 Site Location

**Figure 2-1** illustrates the location of Site 40 within MCAS New River. The site is bounded by Hicks Run Road on the west, by Douglass Road to the south, and by dense woodland to the north and east (**Figure 2-2**).

### 2.2 Site Description and Environmental Setting

The site encompasses approximately 22 acres of undeveloped and wooded land, situated at an elevation of approximately 22 feet above mean sea level. **Figure 2-3** shows that the site slopes gently from east to west, causing storm water run-off to tend to drain toward an unnamed tributary of Southwest Creek; however, no surface water was observed during the November 2007 site visit. **Figure 2-2** shows the vegetative cover within Site 40 to be significantly younger than that of the surrounding land. This consistent site-wide age difference in vegetation suggests that the entire site was once cleared. **Figures 2-2** and **2-3** indicate the historical presence of an unpaved north-south trending roadway that traversed the western portion of the Site, leading southward from Hicks Run Road. The former roadway appears to have ended south of the site's southern boundary. During the November 2007 site visit, no visible signs of roadways, paths or past dumping activities were observed. Thick vegetation prevented entry into the site and obstructed the view into Site 40.

### 2.3 Site History

#### 2.3.1 Operational Use

Site 40 was used as a waste disposal location for auto parts and metals beginning in 1969. It is unknown when the site was abandoned and if any removal of wastes was ever completed. The borrow pit dump was reported to be four to five acres (Water and Air Research, 1983).

#### 2.3.2 Previous Investigations

The site was identified in the Base-wide Initial Assessment Study (IAS) as being a waste disposal site for automobile parts and metal. Site 40 was recommended for no further action (NFA) because there was insufficient evidence that hazardous substances were associated with the site; however, no confirmatory samples were collected (Water and Air Research, 1983).

## 3.0 Field Activities

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Based upon the available information for Site 40, CH2M HILL has developed an approach to investigate the potential environmental impacts to soil, groundwater, and if present, surface water, and sediment. The field activities for the Site 40 PA/SI investigation will include the following tasks:

- Site reconnaissance
- Vegetation clearing
- Buried utility locating
- Soil sampling using direct push technology (DPT)
- Temporary monitoring well installation
- Groundwater sampling
- Sediment and surface water sampling, if surface water present
- Test pit excavation
- Surveying

The following sections present a discussion of the proposed field activities. All field activities will be conducted in accordance with the Standard Operating Procedures (SOPs) provided in the Master Project Plans (CH2M HILL, 2005).

### 3.1 Site Reconnaissance and Records Review

In preparation for development of the PA/SI field investigation approach at Site 40, a site visit and historical records review were completed in November 2007. Physical features of the site and surrounding area were noted however heavy vegetation prevented much of the site from being observed. During the site visit there were no visible signs of roadways, paths or past dumping activities. A record review was also completed including all available National Archive, Base, County, and/or City records. No information was found identifying current or historical site operations, waste types and quantities, regulatory history, past environmental violations, and citizen complaints.

A more thorough site reconnaissance will be performed after vegetation clearing has been completed.

### 3.2 Site Preparation

Vegetation less than three inches in diameter will be removed from an estimated six acres of the site. Vegetation will be cleared in narrow corridors (transects) to permit personnel and vehicular access. Based upon the discovery of a former roadway at Site 40, the transects are biased to the western portion of the site where waste disposal activities are anticipated to be more likely. Whenever possible, trees larger than approximately three inches in diameter will be left undisturbed.

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A CH2M HILL representative will accompany the subcontractor during vegetation clearing to help identify site features that may influence the PA/SI investigation approach (e.g. surface water body, debris pile, drums, or mounds, etc.).

The CH2M HILL representative will locate and stake the proposed locations of the 50 soil borings and 10 temporary monitoring wells, as shown on **Figure 3-1**. The proposed sampling locations are subject to change due to accessibility or encountering site features of interest during the vegetation clearing activities. Proposed sampling nomenclature is discussed in the FSP.

### 3.3 Buried Utility Locating

CH2M HILL will coordinate with the North Carolina One Call Center, Base personnel, and a professional underground utility locator to identify all subsurface structures that might be impacted by intrusive activities implemented during the investigation of Site 40. **Figure 3-3** depicts known utilities near Site 40.

Based on findings once transects have been cleared, it may be determined that geophysical surveying is needed. If so, the geophysical surveying would be conducted along the cleared transects to identify anomalies where test pit activities may be focused.

### 3.4 DPT Soil Sampling

The investigation of Site 40 will include soil sampling using DPT. Approximately 50 DPT borings will be advanced at Site 40 to evaluate site-specific lithology, presence of buried wastes, and assess potential impacts relating to historical land use practices. Based upon the discovery of a former roadway at Site 40, the majority of the borings will be concentrated in the western portion of the site where waste disposal activities are anticipated to be more likely. Consequently, the DPT sampling locations are more widely spaced in the eastern portion of the site, as shown on **Figure 3-1**. The DPT Soil Sampling and lithologic characterization will be conducted as described in the Master Project Plans (CH2M HILL, 2005).

Continuous soil cores will be collected in disposable acetate sleeves using a DPT macro-core soil sampler, and screened for the presence of volatile organic compounds (VOCs) using a flame-ionization detector (FID). The soil cores will be inspected by a CH2M HILL geologist, and described using the Unified Soil Classification System.

At each boring location, surface soil samples will be collected from ground surface to one foot below ground surface (bgs). Subsurface soil samples will be collected from 10 of the 50 borings, as shown on **Figure 3-1**. Subsurface soil samples will be collected from the one to five foot interval, and from the two foot interval just above the water table. All soil samples submitted to the fixed base laboratory will be analyzed for VOCs, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), target analyte list (TAL) metals, and pesticides in accordance with **Table 3-1**. All samples except the VOC will be collected from a homogenized soil sample collected at each sample location. A grab sample will be collected for VOC analysis prior to compositing soil for collection of the remaining analytes.

Once the target depth of each borehole has been reached and all soil samples have been collected, the boreholes will be abandoned per the Master Project Plans (CH2M HILL, 2005).

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## 3.5 Temporary Monitoring Well Installation

Temporary monitoring wells will be installed in each of the ten boreholes used for subsurface soil sample collection, as shown on **Figure 3-2**.

### 3.5.1 Basis for Proposed Well Locations and Depths

The proposed temporary monitoring well locations are distributed throughout the Site, so as to cover upgradient, potential source area, and downgradient portions of the site. Review of **Figure 2-2** suggests that shallow groundwater should flow from the northeast to the southwest. As with the DPT soil borings, the proposed locations of the temporary monitoring wells are more concentrated in the western portion of the Site, to coincide with the area of the former roadway and increased likelihood of historical waste disposal activities. The screened interval of each temporary monitoring well will be set to bracket the water table, anticipated to be approximately 10 to 15 feet bgs.

### 3.5.2 Installation Procedures

Ten temporary monitoring wells (designated IR40-TW01 through IR40-TW10) will be installed at Site 40 as shown on **Figure 3-1**. The temporary wells will be constructed using one-inch inner diameter (ID) polyvinyl chloride (PVC) casing with ten feet of 0.010-inch factory slotted well screen, and equipped with a pre-packed sand filter. A bentonite seal with a minimum thickness of five feet will be constructed to seal the temporary filter pack.

Due the temporary nature of the monitoring wells, a cement-bentonite grout annular seal will not be used to complete the well. If the temporary monitoring wells are to be left installed for any period of time, the wells are to have a locking cap. Within 5 days of construction, the temporary wells be sampled and surveyed, then removed and the boreholes abandoned using a grout mixture with Portland cement conforming to NCDENR guidelines.

### 3.5.3 Monitoring Well Gauging

Water level measurements will be collected from the ten temporary monitoring wells. These measurements will be used to develop a site-wide potentiometric map.

## 3.6 Groundwater Sampling

The temporary monitoring wells will be allowed to equilibrate for one to two days prior to sampling. The wells will be purged and sampled using peristaltic pumps and low-flow purging/sampling methods presented in the Master SAP, Section 3.11 "Groundwater Sample Collection" (CH2M HILL, 2005).

Groundwater samples will be collected from each monitoring well and analyzed for VOCs, SVOCs, PCBs, natural attenuation indicator parameters (NAIPs), TAL metals, and pesticides as summarized in **Table 3-1**. NAIPs include alkalinity, chloride, nitrate, nitrite, sulfate, sulfide, methane, ethane, ethene, total organic carbon, and ferrous and ferric iron.

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## 3.7 Surface Water/Sediment Sampling

At this time, there are no known surface water bodies within Site 40. In the event that surface water bodies are encountered during this investigation, up to ten surface water and sediment samples will be collected as described below as well as in Section 3.8 “Surface and Sediment Sampling” of the Master SAP (CH2M HILL, 2005).

At each surface water sample location, field parameters, including dissolved oxygen, temperature, specific conductance, and pH, will be measured prior to sample collection. Surface water samples will be submitted for laboratory analysis of VOCs, SVOCs, PCBs, NAIPs, TAL metals, and pesticides, as summarized in **Table 3-1**.

Sediment samples will be submitted for laboratory analysis of VOCs, SVOCs, PCBs, TAL metals, and pesticides, as summarized in **Table 3-1**.

## 3.8 Test Pits

Up to 20 test pits will be excavated to assess the contents of debris piles and areas of disturbed ground, or anomalies identified during geophysical surveying, if performed. The test pit locations will be determined following site reconnaissance and clearing. Test pits will be completed per Section 3.15 “Test Pits/ Trenching” of the Master SAP (CH2M HILL, 2005).

The test pits will measure approximately one to two feet wide (the width of a backhoe bucket) by 10 feet long with a maximum depth of 10 feet bgs. Excavation equipment will be decontaminated prior to and following the completion of each test pit in accordance with Section 3.16.1, “Decontamination: Drilling Equipment and Well Construction Material” of the Master SAP. The excavation will proceed by removing lifts of no more than 12 inches at a time, until an assessment of the material can be made. The material removed from each pit will be screened with a FID and temporarily staged on 10-mil plastic sheeting. The CH2M HILL representative will inspect and describe the excavated materials, and document the characteristics of the excavation using digital photography and field sketches. The final length, width, and depth of each test pit will be measured. Test pits will not be entered by any member of the sampling team, including the subcontractor. The test pits will be backfilled with the material removed from the excavation immediately after completed to reduce site hazards and minimize the potential for rainwater accumulation and subsequent contaminant migration. Contaminated excavated soil will be segregated, sampled, and disposed of accordingly. Any metal debris excavated during the test pitting will be disposed of in coordination with the Base at the Defense Reutilization and Marketing Office (DRMO).

## 3.9 Survey

All soil borings, temporary monitoring wells, and test pit locations will be referenced both horizontally and vertically. Each will be surveyed relative to permanent land monuments and the Universal Transverse Mercator (UTM) coordinate system and will be referenced to a US Geological Survey (USGS) datum/benchmark. Elevation will be surveyed to the nearest 0.01 foot, while horizontal location will be established to the nearest 0.1 foot. Surveying procedures are presented in the Master SAP Section 3.3 “Land Surveying.”

## 4.0 IDW Management

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Wastes generated during the investigation of potentially contaminated sites are classified as IDW and will be managed to protect the public and the environment. Section 3.17, "Investigation Derived Waste Handling" of the Master SAP provides general information for the characterization, handling, and disposal of contaminated wastes expected to be encountered or generated during this work (CH2M HILL, 2005).

### 4.1 Waste Streams

The waste streams associated with this scope of work may include:

- Development water from the monitoring wells
- Decontamination fluids
- Soil cuttings from installation of monitoring wells and soil borings
- Personal Protective Equipment (PPE)
- Used sampling supplies
- Uncontaminated general construction debris

### 4.2 Waste Management

All IDW management actions should be documented in the field notes. Specific waste management procedures are documented in the IDW SOP.

#### 4.2.1 Decontamination Fluids/Development Water

Decontamination fluids and development water from temporary monitoring wells will be contained either in drums or in bulk containers that will be handled by the driller. The driller is responsible for transporting all IDW fluids to the wastewater treatment plant (WTP) located at Lot 203 and transferring them to the wet well. The CH2M HILL Field Team Leader (FTL) will coordinate liquid disposal activities with the WTP operator, Rhea. A CH2M HILL representative will accompany the drillers and provide oversight when transferring IDW fluids to the WTP. Adequate time will be allotted to allow for any solids to settle from the fluids prior to discharging to the WTP.

#### 4.2.2 Soil Cuttings

Soil cuttings will be contained in DOT approved 55-gallon steel drums.

Following completion of the intrusive sampling activities, the drilling subcontractor will move the drums to a temporary storage area located approximately one mile southeast of Site 40 at Building AS-4225 near the intersection of Douglass Road and Canal Street. The containers will be stored there until disposal. The FTL will coordinate and oversee this move.

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### 4.2.3 PPE and Trash

PPE associated with the generation of non-hazardous waste will be collected in black, non-translucent trash bags and disposed of in a dumpster aboard MCB Camp Lejeune. PPE associated with the generation of hazardous waste will be properly contained and disposed of at an offsite, permitted, Resource Conservation and Recovery Act (RCRA) Subtitle C treatment, storage, or disposal facility.

## 5.0 Data Management and Evaluation

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It is anticipated that data management activities will consist primarily of entering field and laboratory data onto computerized spreadsheets using database software, and tabulating field and analytical results for preparation of the report.

An independent data validator will be subcontracted to validate laboratory analytical data. The analytical results will be evaluated to assess the technical adequacy and usability of the data. Data will be technically reviewed as described in the Master QAPP (CH2M HILL, 2005).

Once the data is received from the laboratory and is validated an evaluation of the data will be completed. In addition, this task involves the evaluation of field-generated data including laboratory analytical data, water level measurements, boring log and well construction records, water quality measurements, and other field notes. Efforts under this task will include the tabulation of validated analytical data and field data; generation of well construction records; and generation of diagrams/figures/tables associated with field notes or data received from the laboratory (e.g., sampling location maps).

The laboratory analytical results will be compared to the North Carolina Groundwater Quality Standards, NCDENR Soil to Groundwater screening criteria, United States Environmental Protection (USEPA) Region IX Preliminary Remediation Goals (PRGs), and the established background/secondary criteria (for metals only).

## 6.0 Preliminary Assessment/Site Inspection Report

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A PA/SI Report will be prepared following the general format as presented in EPA's Guidance for Performing Preliminary Assessments Under CERCLA (1991) and EPA's Guidance for Performing Site Inspections Under CERCLA, Interim Final (1992) and will include:

- A summary of the site-specific environmental setting, including topography, hydrology, geology, and hydrogeology
- A description of the field investigation activities
- Assessment of the significance, nature, and extent of hazardous substances
- Conclusions and recommendations

A draft report will be issued to allow for a comment period. Any comments received will be addressed in the final version.

# 7.0 Project Management

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CH2M HILL's primary participants for this project are as follows:

- Mr. Matt Louth - Activity Manager
- Ms. Jessica Skeeane - Project Manager
- Ms. Monica Tiburzi - Task Manager
- Mr. Tegwyn Williams - Senior Reviewer

Ms. Skeeane and Ms. Tiburzi will have the overall responsibility for conducting the field activities and completing the reports associated with this PA/SI. Mr. Williams will review the technical aspects of the work from project scoping to project completion. They will be supported by geologists, engineers, scientists, and risk assessors, as needed. Ms. Tiburzi will report to Ms. Skeeane and Mr. Louth who will then relay pertinent issues and maintain close contact with NAVFAC Mid-Atlantic and the Base.

# 8.0 Schedule

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The proposed schedule for conducting the PA/SI at Site 40 is presented in **Figure 8-1**. The tasks presented in the PA/SI schedule correspond to the tasks identified in this work plan.

## 9.0 References

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CH2M HILL. 2005. *Draft Final Master Project Plans, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina*, 2005.

United States Environmental Protection Agency. 1991. *Guidance for Performing Preliminary Assessments Under CERCLA*, 1991.

United States Environmental Protection Agency. 1992. *Guidance for Performing Site Inspections Under CERCLA, Interim Final*, 1992.

Water and Air Research. 1983. Water and Air Research, Inc. *Initial Assessment Study of Marine Corps Base, Camp Lejeune. North Carolina*. Prepared for Naval Energy and Environmental Support Activity.

## **Tables**

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## Figures

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**Legend**

-  Highway
-  Local Roads
-  IR Site 40
-  Installation Area



Figure 2-1  
Location Map  
Site 40  
MCB Camp Lejeune, North Carolina

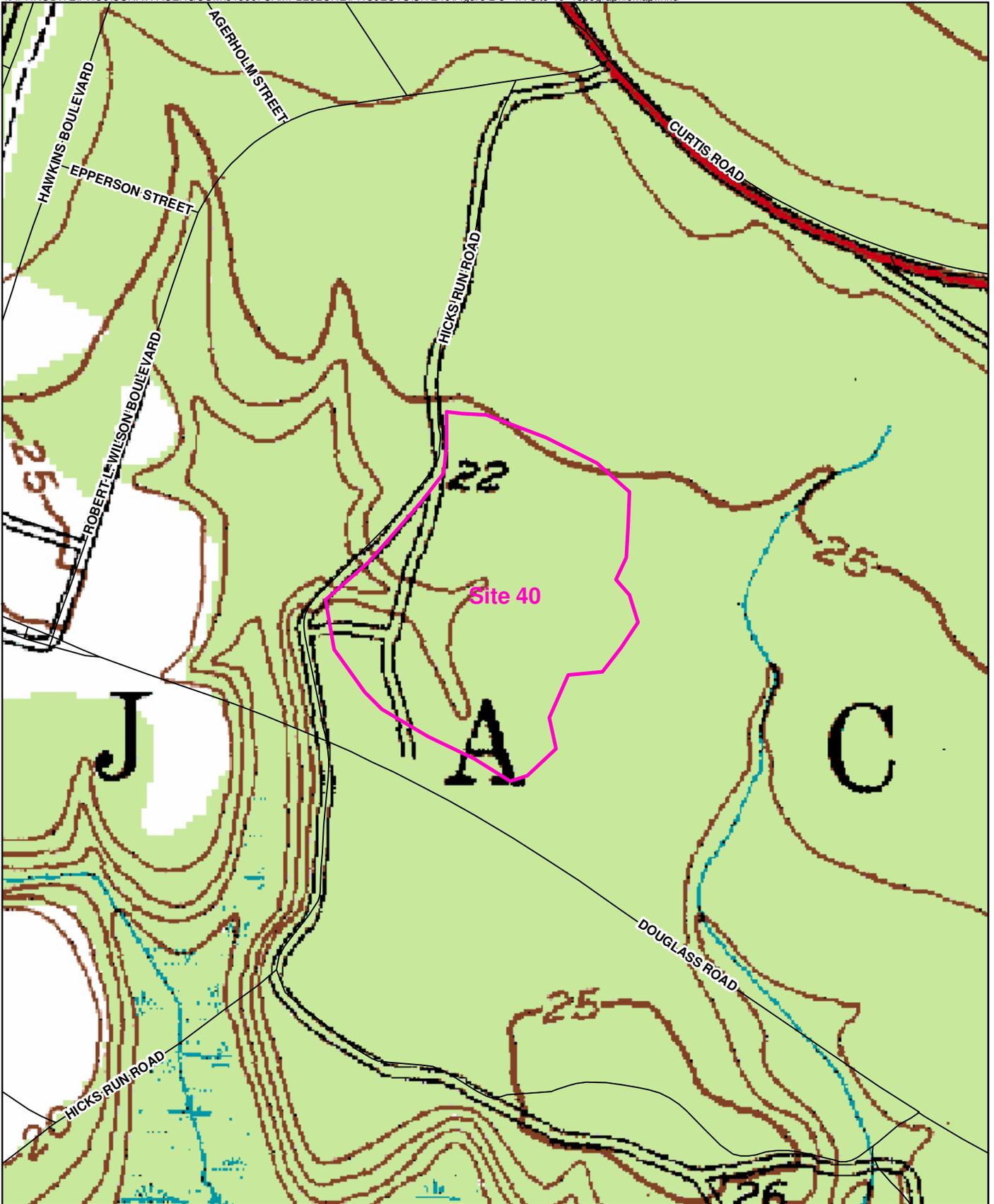


**Legend**

 IR Site 40



Figure 2-2  
Site Map  
Site 40  
MCB Camp Lejeune, North Carolina



**Legend**

-  Topographic Contour Lines
-  Surface Water
-  Road Centerline
-  IR Site 40
-  Wetlands



Figure 2-3  
Topographic Map  
Site 40

MCB Camp Lejeune, North Carolina



**Legend**

-  Surface Soil Samples
-  Subsurface Soil Samples
-  Cleared Transects
-  IR Site 40



Figure 3-1  
Proposed Soil Sample Locations  
Site 40  
MCB Camp Lejeune, North Carolina



**Legend**

- Temporary Wells
- Cleared Transects
- IR Site 40



Figure 3-2  
Proposed Temporary Well Locations  
Site 40  
MCB Camp Lejeune, North Carolina



**Legend**

-  Electrical Cable (underground)
-  Water Line
-  Storm Sewer Line
-  IR Site 40

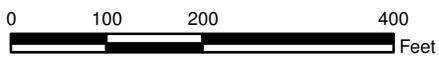
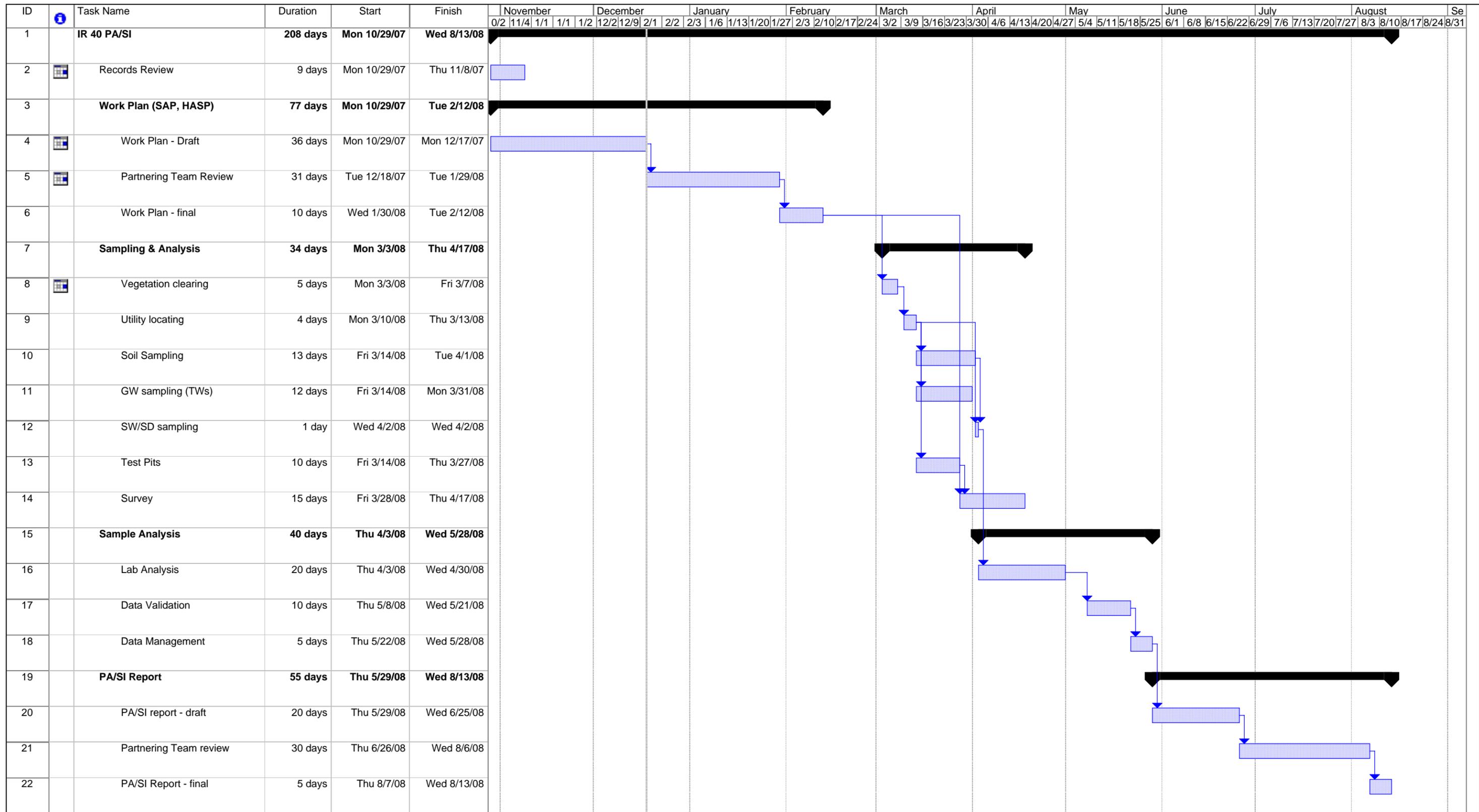


Figure 3-3  
Site Utilities  
Site 40

MCB Camp Lejeune, North Carolina



## **Appendix A**

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DRAFT

# Field Sampling Plan Site 40

**Marine Corps Base  
Camp Lejeune, North Carolina**

Prepared for

**Department of the Navy  
Naval Facilities Engineering Command  
Mid-Atlantic Division**

Under the

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Contract N62470-07-D-0501  
TO-009**

Prepared by



**December 2007  
Charlotte, North Carolina**

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# Acronyms and Abbreviations

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DPT	Direct Push Technology
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
HSP	Health and Safety Plan
IR	Installation Restoration
MCB	Marine Corps Base
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAIP	Natural Attenuation Indicator Parameters
ORP	Oxidation/Reduction Potential
PA	Preliminary Assessment
PCBs	Polychlorinated Biphenyls
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
SI	Site Inspection
SVOCs	Semivolatile Organic Compounds
TAL	Target Analyte List
VOC	Volatile Organic Compound

# A.1. Introduction

---

This document has been prepared to serve as a Field Sampling Plan (FSP) for the Preliminary Assessment/Site Inspection (PA/SI) at Site 40 at the Marine Corps Base (MCB) Camp Lejeune in Onslow County, North Carolina. This FSP sets forth site specific procedures for field activities and for the analysis of soil, groundwater, and surface water and sediment samples.

All field activities will be conducted by CH2M HILL or subcontractors under the direct supervision of CH2M HILL. Field activities unless otherwise noted in the FSP will follow the procedures described in the Master Project Plans.

## A.2. Field Activities

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The PA/ SI at Site 40 will include the following field activities:

- Site reconnaissance
- Site Clearing
- Buried utility locating
- Surface and subsurface soil sampling using direct push technology (DPT)
- Installation and development of temporary groundwater monitoring wells
- Collection and analysis of groundwater samples
- Collection and analysis of surface water and sediment samples, if applicable
- Excavation of test pits
- Surveying

Each activity is described in detail in the Site 40 Work Plan and Master Project Plans. **Table A-1** summarizes the proposed field activities, including the number and type of samples that will be collected at each location. Proposed sampling locations are shown in **Figure 3-1** in the Work Plan.

TABLE A-1  
Summary of Samples

Field Activity	No. of Samples	Media	Analysis
Surface Soil Sampling	50	Soil	<ul style="list-style-type: none"> <li>- Lithology</li> <li>- Volatile Organic Compounds (VOCs),</li> <li>- Semivolatile Organic Compounds (SVOCs),</li> <li>- polychlorinated biphenyls (PCBs),</li> <li>- Pesticides, and</li> <li>- Target analyte list (TAL) Metals</li> </ul>
Subsurface soil sampling using DPT	20	Soil	<ul style="list-style-type: none"> <li>- Lithology</li> <li>- VOCs,</li> <li>- SVOCs,</li> <li>- PCBs,</li> <li>- Pesticides, and</li> <li>- TAL Metals</li> </ul>
Groundwater Sampling	10	GW	<ul style="list-style-type: none"> <li>- VOCs,</li> <li>- SVOCs,</li> <li>- PCBs,</li> <li>- Pesticides,</li> <li>- TAL Metals</li> <li>- Natural Attenuation Indicator Parameters (NAIPs),* and</li> <li>- Field Parameters</li> </ul>
Surface Water Sampling, if applicable	10	SW	<ul style="list-style-type: none"> <li>- VOCs,</li> <li>- SVOCs,</li> <li>- PCBs,</li> <li>- Pesticides,</li> <li>- TAL Metals</li> <li>- Natural Attenuation Indicator Parameters (NAIPs),* and</li> <li>- Field Parameters</li> </ul>
Sediment Sampling, if applicable	10	Soil	<ul style="list-style-type: none"> <li>- VOCs,</li> <li>- SVOCs,</li> <li>- PCBs,</li> <li>- Pesticides, and</li> <li>- TAL Metals</li> </ul>
Test Pit Excavation	NA	Soil	<ul style="list-style-type: none"> <li>- Visual observations</li> </ul>

\* NAIP include alkalinity, chloride, nitrate, nitrite, sulfate, ferrous iron, ferric iron, methane, ethane, ethane, sulfide and total organic carbon (TOC)

## A.3. Sample Designation

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In order to identify and accurately track the various samples, all samples collected during this investigation, including quality assurance/quality control (QA/QC) samples, will be designated with a unique number. The number will serve to identify the investigation, the site, the sample media, sampling location, the depth (soil and groundwater collected from soil boring) or round (groundwater) of sample, and QA/QC qualifiers.

The sample designation format is as follows:

*Site#-Media/Station# or QA/QC-Year/Round or Depth Interval*

An explanation of each of these identifiers is given below.

**Site#:** This investigation includes Site 40 under the Installation Restoration (IR) Program. Therefore, the prefix "IR40" will be used.

**Media:**

TW = Groundwater from temporary wells

SS = Surface soil

IS = Subsurface soil

SW = Surface water

SD = Sediment

**Station#:** Each monitoring well will be identified with a unique identification number. Existing monitoring well numbers will be used. Soil borings (SB) will be numbered consecutively.

**QA/QC:**

D = Duplicate Sample (following sample type/number)

FB = Field Blank

ER = Equipment Rinsate

TB = Trip Blank

For QA/QC samples the date and year will be in a MMDDYY format, such as February 28, 2008 would be referred to as 022808.

All matrix spike/matrix spike duplicate (MS/MSD) samples will be entered in the same line as the field sample on the chain of custody. The total number of sample containers submitted will be entered on the chain of custody and "MS/MSD" will be indicated in the comments section.

**Year/Round#:** Year/Round indicators will be used for samples collected from monitoring wells. Each round of sampling will have a distinct identification number.

"08" = year 2008

"A" = sampling during the first quarter at the site

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Depth Interval: Depth indicators will be used for soil samples collected using DPT. The number will reference the depth interval (in feet) of the sample.

2-3 = 2 to 3 feet bgs

Under this sample designation format, the sample designation IR40-TW01-08A refers to:

<u>IR40-TW01-08A</u>	IR Site 40
IR40- <u>TW01-08A</u>	Groundwater sample from temporary well #1
IR40-TW01- <u>08A</u>	Sampled in the first quarter of 2008

The sample designation format for QA/QC IR40-TB1-110208 refers to:

<u>IR40-TB1-110208</u>	IR Site 40
IR40- <u>TB1-110208</u>	Trip Blank #1
IR40-TB1- <u>110208</u>	Date sampled

This sample designation format will be followed throughout the project. Required deviations to this format in response to field conditions will be documented.

# A.4. Sample Handling and Analysis

## A.4.1 Sample Preservation and Handling

Sample preservation and handling are described in depth in Section 5 of the Master QAPP. QA/QC samples, with the exception of trip blanks, will be collected in the same containers with preservatives as the field samples. The preservative and holding time for analysis is shown in **Table A-2**.

Table A-2  
Sample Containers, Preservation, and Holding Times  
*Field Sampling and Analysis Plan, Site 40, MCB Camp Lejeune*

Analysis	Matrix	Method	Container	Preservation	Maximum Hold Time
VOC	Aqueous	SOW OLM 04.3	3 x 40 mL G	Cool to 4°C, HCl to pH<2	10 days after receipt
VOC	Solid	SOW OLM 04.3	3.5 g Encore	Cool to 4°C (no headspace)	10 days after receipt
SVOC, Pesticides and PCBs	Aqueous	SOW OLM 04.3	2 x 1000 mL G amber	Cool to 4°C, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Extraction 5 days after receipt
SVOC, Pesticides and PCBs	Solid	SOW OLM 04.3	8 oz G	Cool to 4°C	Extraction 10 days after receipt
TAL Metals	Aqueous	ILM 05.2	1000 mL P	Cool to 4°C, HNO <sub>3</sub> to pH<2	6 months
TAL Metals	Solid	ILM 05.2	100 g G	Cool to 4°C	12 days after receipt
Alkalinity	Aqueous	SM 20 2320B	500 ml G	Cool to 4°C	14 days
Chloride, Nitrate, Nitrite, and Sulfate	Aqueous	U.S. EPA Method 300.0	500 mL P/G	Cool to 4°C	28 days
Ferrous and Ferric Iron	Aqueous	SM20 3500-Fe D	250 mL G amber	Cool to 4°C, HCl to pH<2	Analyze Immediately
Methane, Ethane, and Ethene	Aqueous	RSK175 or equivalent	2 x 40 mL G	Cool to 4°C	14 days
Sulfide	Aqueous	EPA 376.1	500 ml G	Cool to 4°C, NaOH, ZnAc (no headspace)	7 days
Total Organic Carbon	Aqueous	SW846 9060	2 x 40 mL G	H <sub>2</sub> SO <sub>4</sub> to pH<2, Cool to 4°C, store in dark	28 days

G = Clear glass container P/G = Plastic or Glass

## **A.4.2 Chain-of-Custody and Field Logbook**

Chain of Custody and field logbook requirements are described in the Master QAPP Section 6.

## **Appendix B**

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Draft  
QUALITY ASSURANCE PROJECT PLAN ATTACHMENT  
December 2007

# Preliminary Assessment / Site Investigation Site 40

Prepared for:  
Department of the Navy  
Naval Facilities Engineering Command  
Mid-Atlantic Division

Prepared by:



4824 Parkway Plaza Blvd, Suite 200  
Charlotte, North Carolina  
(704) 329-0073

Prepared under the  
Multi-Media Program  
Contract N62470-07-D-0501  
TO-09

REVIEW SIGNATURES: \_\_\_\_\_

Contractor QAM Signature  
Printed Name/Title/Date  
Approval Authority

APPROVAL SIGNATURES: \_\_\_\_\_

NAVFAC QAO/Chemist Signature  
Printed Name/Title/Date  
Approval Authority

**Project-Specific SAP**

Site Name/Project Name: TO-09 Site 40 Preliminary Assessment / Site Investigation  
 Site Location: MCB Camp Lejeune, North Carolina

<b>UFP-QAPP Worksheet #</b>	<b>Required Information</b>	<b>Crosswalk to Related Information</b>
<b>A. Project Management</b>		
<i>Documentation</i>		
<b>1</b>	Title and Approval Page	<b>See attached</b>
<b>2</b>	Table of Contents SAP Identifying Information	<b>See attached</b> <b>Table of Contents not applicable</b>
<b>3</b>	Distribution List	<b>See attached</b>
<b>4</b>	Project Personnel Sign-Off Sheet	<b>See attached</b>
<i>Project Organization</i>		
<b>5</b>	Project Organizational Chart	<b>Figure 3-1 of Draft Master QAPP</b> <b>See attached</b>
<b>6</b>	Communication Pathways	<b>Section 7 of Work Plan</b> <b>Section 3.2 of Draft Master QAPP</b>
<b>7</b>	Personnel Responsibilities and Qualifications Table	<b>Section 7 of Work Plan</b> <b>Section 3.1 of Draft Master QAPP</b>
<b>8</b>	Special Personnel Training Requirements Table	<b>Field personnel will meet requirements specified in Section 4.1 of Final Master HSP</b>
<i>Project Planning/ Problem Definition</i>		
<b>9</b>	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	<b>Not applicable</b>
<b>10</b>	Problem Definition, Site History, and Background. Site Maps (historical and present)	<b>Section 1 of Work Plan</b> <b>Site Map – Figure 2-2 of Work Plan</b>
<b>11</b>	Site-Specific Project Quality Objectives	<b>Section 1.2 of Work Plan</b> <b>Section 4 of Draft Master QAPP</b>
<b>12</b>	Measurement Performance Criteria Table	<b>Worksheet in progress. Will be submitted when lab is identified.</b>
<b>13</b>	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	<b>Not applicable</b>
<b>14</b>	Summary of Project Tasks	<b>Sections 1.1 and 3 of Work Plan</b>
<b>15</b>	Reference Limits and Evaluation Table	<b>Section 4 of Draft Master QAPP</b> <b>Worksheet in progress. Will be submitted when lab is identified.</b>
<b>16</b>	Project Schedule/Timeline Table	<b>Figure 8-1 of Work Plan</b>
<b>B. Measurement Data Acquisition</b>		
<i>Sampling Tasks</i>		
<b>17</b>	Sampling Design and Rationale	<b>Sections 3.4 through 3.7 of Work Plan</b>
<b>18</b>	Sampling Locations and Methods/ SOP Requirements Table Sample Location Map(s)	<b>Figures 3-1 and 3-2 of Work Plan</b> <b>Sections 3.4 through 3.7 of Work Plan</b>

**Project-Specific SAP**

Site Name/Project Name: TO-09 Site 40 Preliminary Assessment / Site Investigation  
 Site Location: MCB Camp Lejeune, North Carolina

<b>UFP-QAPP Worksheet #</b>	<b>Required Information</b>	<b>Crosswalk to Related Information</b>
		<b>Sections 3.8 through 3.11 of Draft Master SAP</b>
<b>19</b>	Analytical Methods/SOP Requirements Table	<b>Table 3-1 of Work Plan, Table 6-1 of FSP Worksheet in progress. Will be submitted when lab is identified.</b>
<b>20</b>	Field Quality Control Sample Summary Table	<b>Table 3-1 of Work Plan</b>
<b>21</b>	Project Sampling SOP References Table Sampling SOPs	<b>Section 3 of Work Plan Section A.4 of FSP Section 3 of Draft Master SAP Sections 7 and 12 of Draft Master QAPP</b>
<b>22</b>	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	<b>Sections 7 and 12 of Draft Master QAPP</b>
<i>Analytical Tasks</i>		
<b>23</b>	Analytical SOPs Analytical SOP References Table	<b>Worksheet in progress. Will be submitted when lab is identified.</b>
<b>24</b>	Analytical Instrument Calibration Table	<b>Worksheet in progress. Will be submitted when lab is identified.</b>
<b>25</b>	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	<b>Worksheet in progress. Will be submitted when lab is identified.</b>
<i>Sample Collection</i>		
<b>26</b>	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	<b>Section 6 of the Draft Master QAPP Section A.4 of FSP Worksheet in progress. Will be submitted when lab is identified.</b>
<b>27</b>	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	<b>Section A.3 of FSP Section 6 of Draft Master QAPP Section 4.2 of Draft Master SAP Attachment 6 of Draft Master SAP</b>
<i>Quality Control Samples</i>		
<b>28</b>	QC Samples Table Screening/Confirmatory Analysis Decision Tree	<b>Table 3-1 of Work Plan Worksheet in progress. Will be submitted when lab is identified.</b>
<i>Data Management Tasks</i>		
<b>29</b>	Project Documents and Records Table	<b>Section 6 of Work Plan Sections 6 and 9 of Draft Master QAPP</b>
<b>30</b>	Analytical Services Table Analytical and Data Management SOPs	<b>Worksheet in progress. Will be submitted when lab is identified.</b>
<b>C. Assessment Oversight</b>		
<b>31</b>	Planned Project Assessments Table Audit Checklists	<b>Section 11 of Draft Master QAPP</b>
<b>32</b>	Assessment Findings and Corrective Action Responses Table	<b>Section 14 of Draft Master QAPP</b>
<b>33</b>	QA Management Reports Table	<b>Section 11 of Draft Master</b>

**Project-Specific SAP**

Site Name/Project Name: TO-09 Site 40 Preliminary Assessment / Site Investigation  
Site Location: MCB Camp Lejeune, North Carolina

<b>UFP-QAPP Worksheet #</b>	<b>Required Information</b>	<b>Crosswalk to Related Information</b>
		<b>QAPP</b> Data will be validated externally and reviewed by the chemist prior to loading to database.
<b>D. Data Review</b>		
<b>34</b>	Verification (Step I) Process Table	<b>Section 5 of Work Plan</b> <b>Section 9 of Draft Master QAPP</b>
<b>35</b>	Validation (Steps IIa and IIb) Process Table	<b>Section 5 of Work Plan</b> <b>Section 9 of Draft Master QAPP</b>
<b>36</b>	Validation (Steps IIa and IIb) Summary Table	<b>Section 5 of Work Plan</b> <b>Section 9 of Draft Master QAPP</b>
<b>37</b>	Usability Assessment	<b>Section 5 of Work Plan</b> <b>Section 9 of Draft Master QAPP</b>

Worksheet #2: SAP Identifying Information

**Site Name/Number: Former Camp Geiger Borrow Pit Dump/IR Site 40**

**Operable Unit: To be determined**  
**Contractor Name: CH2M HILL**  
**Contract Number: N62470-D-0501**  
**Contract Title: Multi-Media Task Order- 09**  
**Work Assignment Number (optional):**

1. This SAP was prepared in accordance with the requirements of the *Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP)* (U.S. EPA 2005) and *EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (U.S. EPA 2002)* .

2. Identify regulatory program: CERCLA

3. This SAP is a project-specific SAP.

4. List dates of scoping sessions that were held: Scoping Session

Date	Scoping Session
NAVFAC Scope Issued _____	9/26/07 _____
_____	_____
_____	_____

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
N/A _____	_____
_____	_____

6. List organizational partners (stakeholders) and connection with lead organization:  
USEPA Region IV, NC DENR, NAVFAC Mid-Atlantic, MCB Camp Lejeune

7. Lead organization NAVFAC Mid-Atlantic

8. If any required SAP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

Worksheet #2 – Not applicable. A complete SAP was not developed because the work is activity-funded. A table of contents is not necessary.

Worksheet #9 – Not applicable. Scope was issued by NAVFAC.

Worksheet #13 – Not applicable. No secondary data used in developing this SAP.

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Worksheet #3: Distribution List

Name	Role/Title	Organization	Email Address
Gena Townsend	EPA Regulator	US EPA	Townsend.Gena@epa.gov
Randy McElveen	NC DENR Regulator	NC DENR	Randy.McElveen@ncmail.net
Bryan Beck	Navy Environmental Technical Representative (Activity)	NAVFAC	Bryan.Beck@navy.mil
Bob Lowder	Environmental Management Department/Installation Restoration	MCB Camp Lejeune	Robert.A.Lowder@usmc.mil
Matt Louth	Activity Manager	CH2M HILL	Matt.Louth@ch2m.com
Jessica Skeeane	Project Manager	CH2M HILL	Jessica.Skeeane@ch2m.com

Worksheet #4 Project Personnel Sign-Off

Name	Role/Title	Signature/Email Receipt	SAP Section Reviewed	Date Read
Gena Townsend	EPA Regulator			
Randy McElveen	NC DENR Regulator			
Bryan Beck	Navy Environmental Technical Representative (Activity)			
Bob Lowder	Environmental Management Department/Installation Restoration			
Matt Louth	Activity Manager			
Jessica Skeeane	Project Manager			

Worksheet #5 Project Organization

Lines of Authority —————

Lines of Communication ···········

