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**Work Plan**  
**Supplemental Investigation at**  
**Camp Allen Landfill & Q-Area**

**Naval Station Norfolk**  
**Norfolk, Virginia**

**CONTRACT TASK ORDER 0156**

**January, 2002**

*Prepared for*

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

*Under the*

**LANTDIV Clean II Program**  
**Contract No. N62470-95-D-6007**

*Prepared by*



**CH2MHILL**

**Virginia Beach, Virginia**

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# 1.0 Introduction

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This work plan describes the supplemental investigation to be completed at the Camp Allen Landfill (CALF) and Q-Area, at Naval Station Norfolk, Norfolk, Virginia. This work plan is based on previous investigations at the site and presents scope recommendations for an additional investigation as part of Navy Contract N62470-95-D-6007, Navy Comprehensive Long-Term Environmental Action Navy (CLEAN), District III, Contract Task Order - 156.

The general background and physical setting of Naval Station Norfolk (NSN) is described in Sections 3 and 4 of the Master Project Plan, prepared by CH2M HILL in October, 1997. The location of the CALF and Q-Area, relative to NSN, is presented in Figure 1-1. An evaluation of previous investigations and the rationale that supports the sampling tasks is presented in Section 2 of this work plan. The technical approach to sampling tasks is described in Section 3. Section 4 presents general information regarding project management and staff organization. Section 5 documents the anticipated subcontract services required for completion of tasks documented in this work plan.

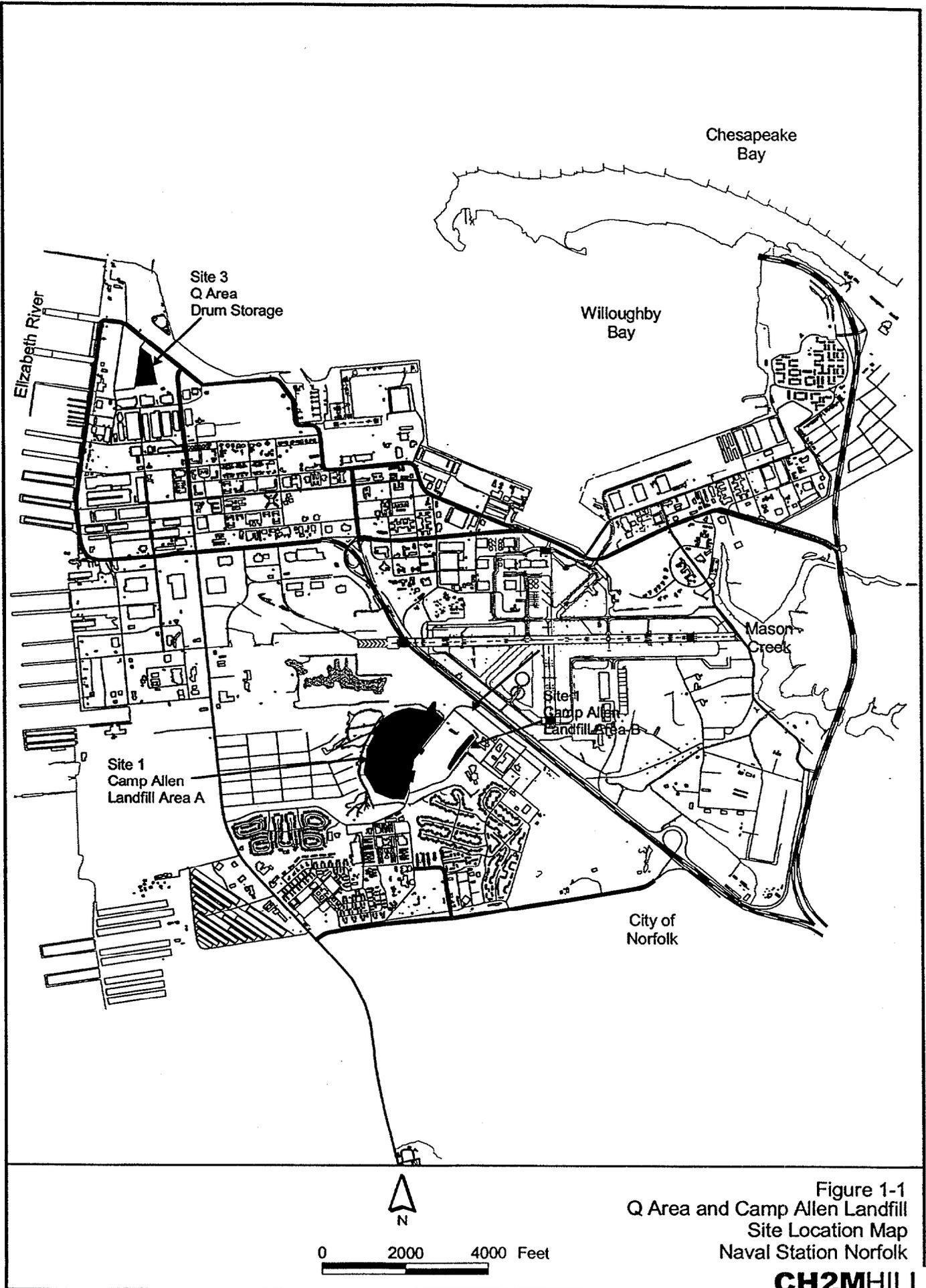


Figure 1-1  
Q Area and Camp Allen Landfill  
Site Location Map  
Naval Station Norfolk

## 2.0 Initial Evaluation and Sampling Rationale

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In 1981, the Department of the Navy initiated the Navy Assessment and Control of Installation Pollutants (NACIP) Program. The NACIP Program utilized a three-phased approach to site study and cleanup. The program encompassed an Initial Assessment Study (IAS) that was to identify and assess sites posing a potential threat to human health or the environment due to contamination from past hazardous materials operations. This study is documented in *Initial Assessment Study of Sewells Point Naval Complex, Norfolk, Virginia* by Environmental Science and Engineering, Inc., 1983. CALF and Q-Area were areas of concern identified during this study. This section provides general background information and existing conditions for the CALF and Q-Area as well as the proposed scope of work and rationale for execution related to this Supplemental Investigation Work Plan. Specific sampling techniques and analytical methods proposed for the investigation are documented in Section 3.

### 2.1 Camp Allen Landfill

#### Site Summary

As shown in Figure 2-1, the CALF site consists of two distinct areas: Area A and Area B. The Area A landfill, which operated from the mid-1940s until 1974, is approximately 45 acres in size and was used as a borrow area prior to landfilling practices. During its operational period, the site was used for incineration and disposal activities. Materials disposed of at the site include the following: metal plating and parts cleaning sludge, paint-stripping residue, various chlorinated organic solvents, overage chemicals, pesticides, asbestos, incinerator ash, fly and bottom ash from the Base power plant, and miscellaneous debris. Many of the landfill materials originated at the Camp Allen Salvage Yard (Site 22).

In 1971, a fire occurred in the northern section of the Camp Allen Salvage Yard in an area where waste oils, solvents, paints, acids, caustics, and pesticides were stored pending disposal. The fire was reportedly caused by incompatible storage of chemicals. Area B of the landfill is the location where the burned residue and remaining waste materials were buried in trenches to the east and northeast of the salvage yard (Figure 2-1). Area B is approximately 2 acres in size.

Currently, the Base brig facility and a heliport are located over a portion of the Area A landfill. Area B is not used at the present time. The majority of the site is soil-covered and vegetated to minimize surface erosion as the landfill is adjacent to tidal drainage ditches that convey stormwater run-off to the Willoughby Bay.

#### Site Background

Contamination from prior disposal practices at the Camp Allen Landfill site has affected surface and subsurface soil, sediment, surface water, and groundwater. The primary contaminants found at the site, in all media, are volatile organic compounds (VOCs). Areas

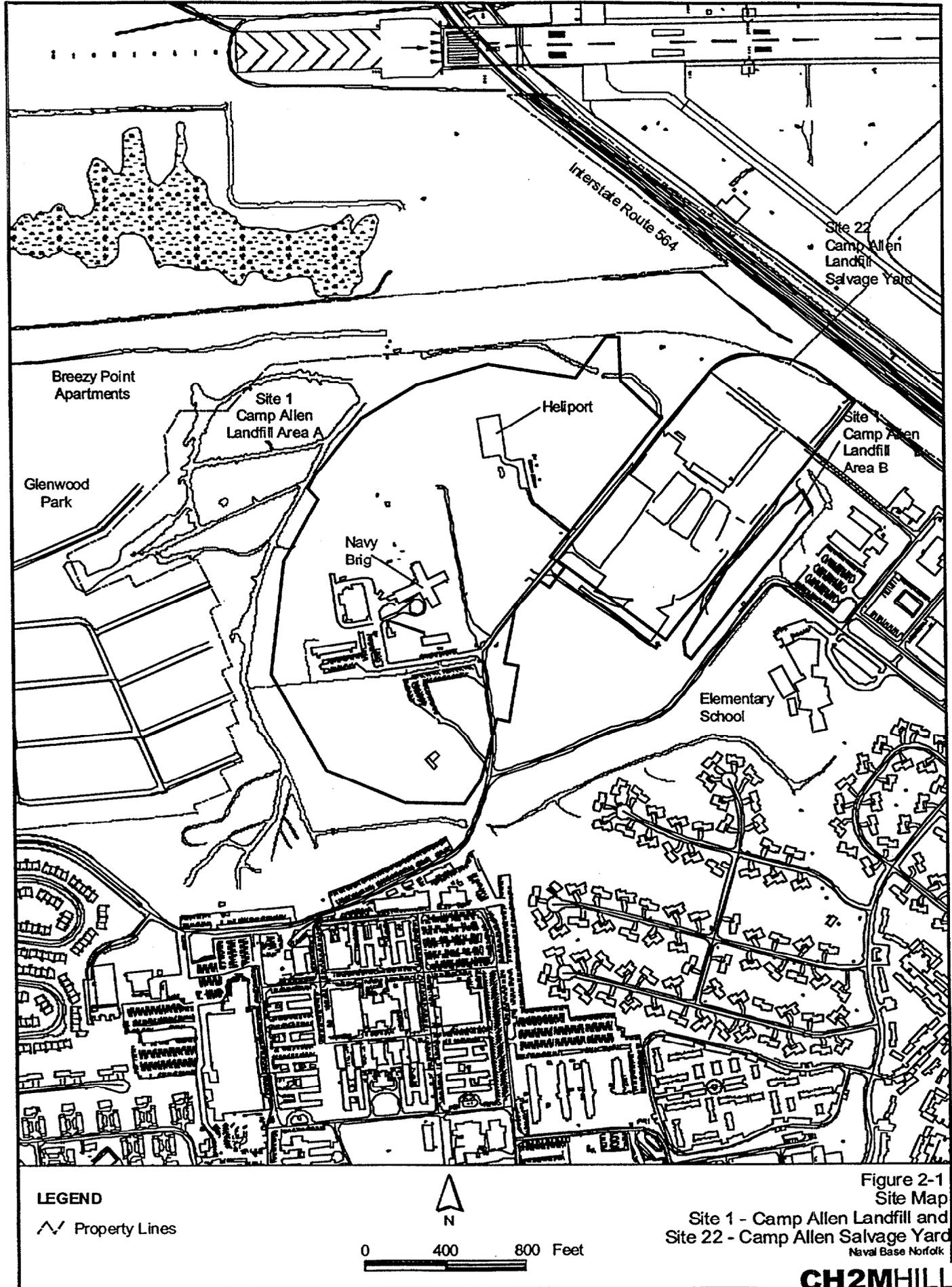


Figure 2-1  
Site Map

Site 1 - Camp Allen Landfill and  
Site 22 - Camp Allen Salvage Yard  
Naval Base Norfolk

of inorganic contamination of surface water and sediments in the surrounding drainage ditches and in the onsite pond also were detected. Groundwater contamination was found in both the water-table aquifer and the Yorktown Aquifer in Areas A and B. The presence of contamination in the deeper Yorktown Aquifer is thought to be due to the lack of a confining layer between the two aquifers beneath much of the Camp Allen Landfill area.

A non-time-critical removal action was implemented in May 1994 and completed in January 1995 at Area B. During this operation, the primary source areas of contamination were removed. The Camp Allen Landfill site remedial investigation and feasibility study (RI/FS) was completed in 1994. A Decision Document was signed in July 1995 requiring localized treatment of groundwater and soil using vacuum extraction. Plans for remediation of the site called for implementation of a groundwater extraction and treatment system in Areas A and B, and dual-phase vapor extraction (DPVE) for "hot spots" identified in Area A.

Continuous operation of the groundwater extraction and treatment system began in November, 1998 and consisted of pump-and-treat systems for groundwater remediation installed in Area A (for Yorktown groundwater in the western part of the area and for surficial groundwater in the northern part of the area) and in Area B (for both surficial and Yorktown groundwater). The DPVE system was completed and began operation in May 1998.

### **CALF Site Specific Information and Sampling Rationale**

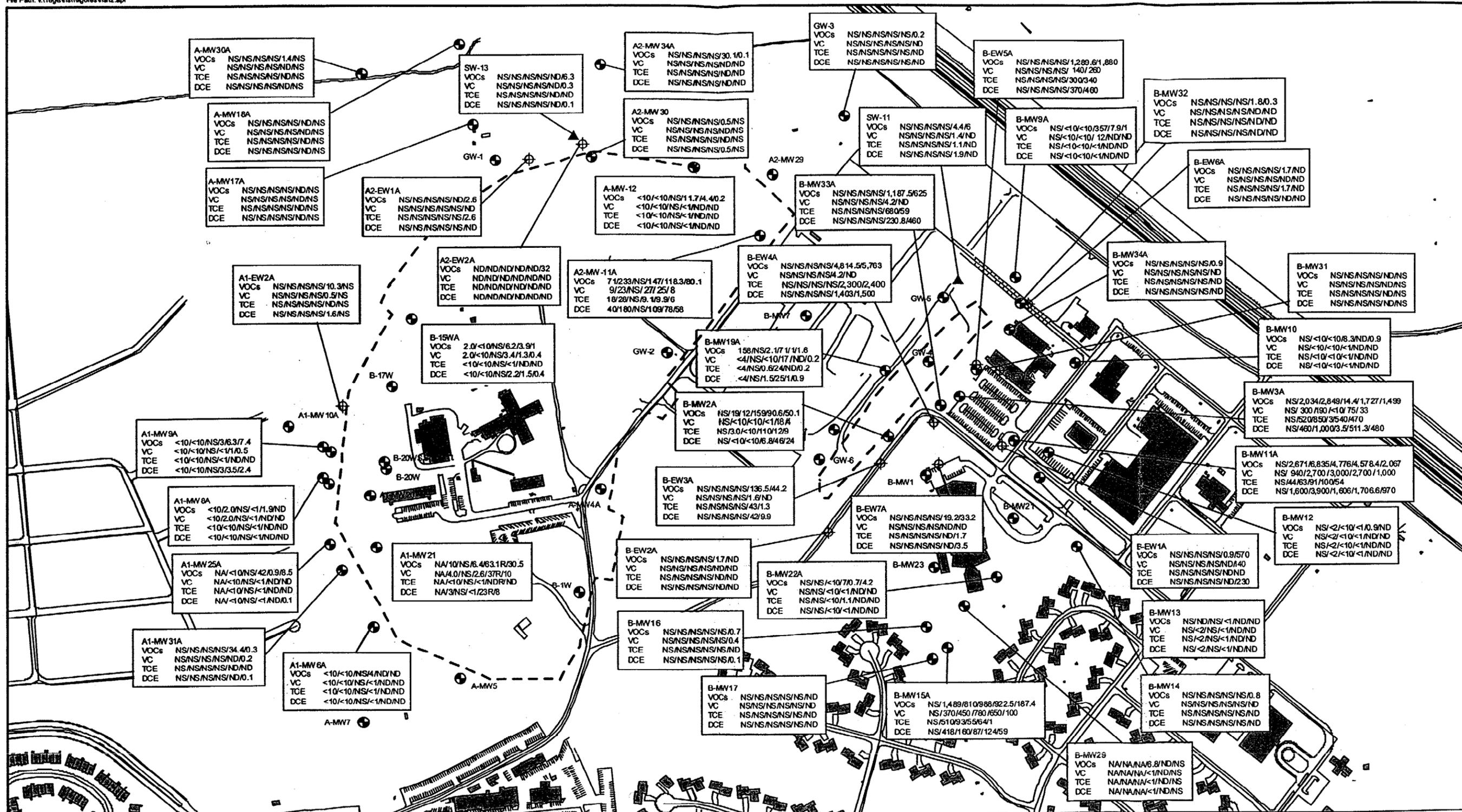
The objectives of the supplemental investigation are to further delineate a hotspot identified near the Camp Allen Elementary School, and conduct pump tests to evaluate the effectiveness of the extraction wells east of Area B. This section provides the specific history and sampling rationale behind each objective. The following recommendations for the supplemental investigation are based on a complete review of all available analytical data collected during previous investigations.

#### **Hotspot Delineation**

Previous studies have shown that elevated concentrations of VOCs have been consistently detected at monitoring well B-MW15A. Figure 2-2 provides historical VOC concentration data for the shallow monitoring wells at the CALF. The VOC concentrations at B-MW15A appear to be localized due to low to non-detect concentrations observed in three wells located within 200 feet of B-MW15A. In an effort to further delineate the nature and extent of the hotspot proximal to well B-MW15A, it is recommended that four additional monitoring wells be installed. The proposed locations are given in Figure 2-3. Three of the wells will be installed to the south and east of well B-MW15A to assess downgradient conditions. One additional monitoring well will be installed to the northeast, replacing well B-MW29, which was previously damaged. Following well development, groundwater samples will be collected from the new wells as well as B-MW15A and analyzed for Low Concentration VOCs.

#### **Aquifer Testing**

The purpose of conducting pump tests at the CALF is to further assess the hydrologic characteristics of the shallow aquifer and assess if the flow rates of the extraction wells in Area B can be increased. These extraction wells (B-EW4A and B-EW5A) are shown in Figure 2-4. A 48 hour pump test is proposed for each extraction well. The tests will be conducted at a flow rate of 5 GPM and nearby monitoring wells will be used to observe the changes in

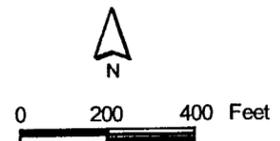


**LEGEND**

- ▲ SURFACE WATER WELL LOCATION
- SHALLOW MONITORING WELL LOCATION
- ⊕ SHALLOW EXTRACTION WELL
- - - AREA BOUNDARY LINE

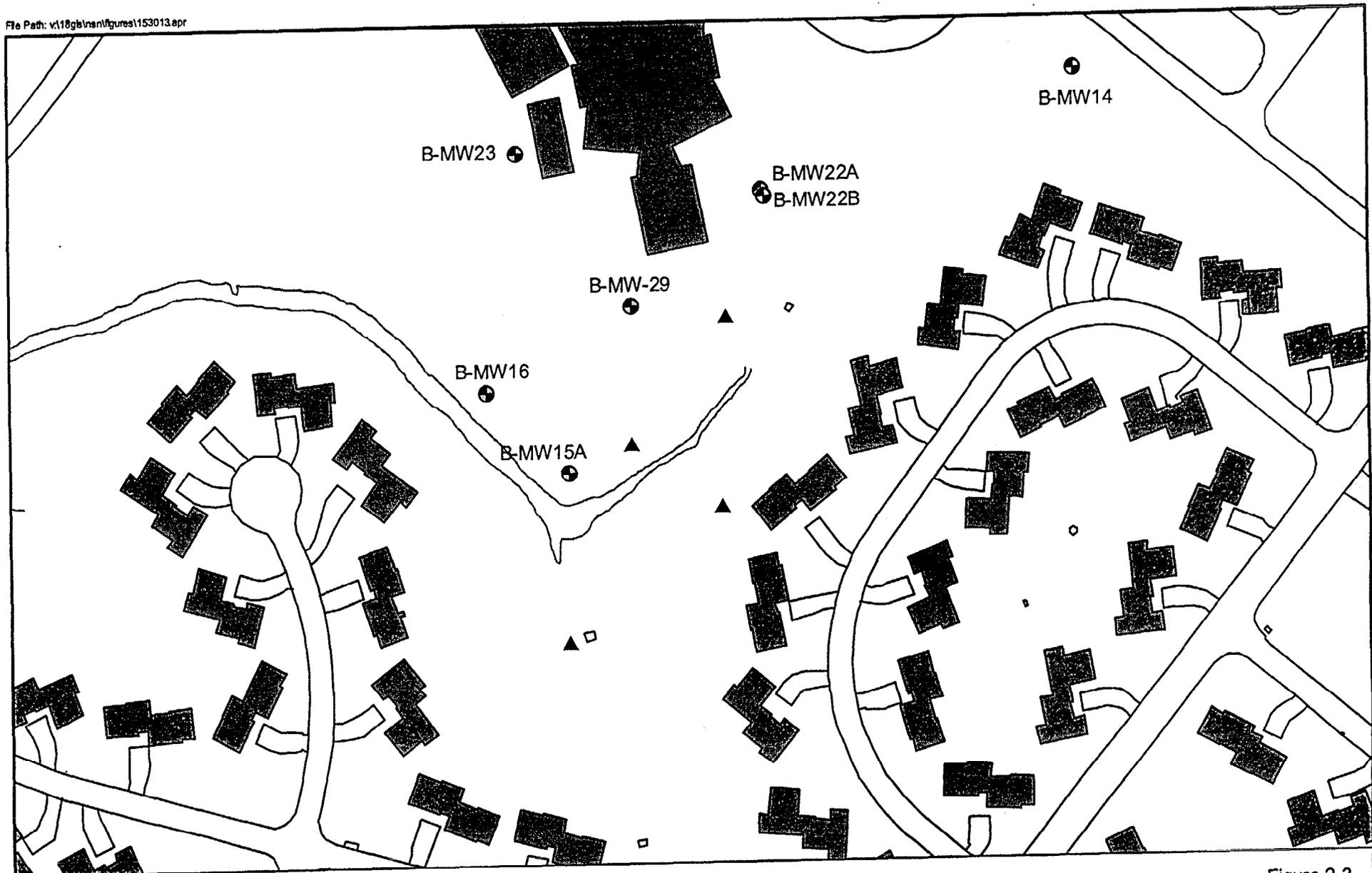
NOTE: UNITS ARE MICROGRAMS PER LITER  
 NS/70/63/27/25.9/23.5 = VALUES IN: 1992/1997/1998/1999/2000/2001

- R = DATA REJECTED BY VALIDATOR
- B = ALSO DETECTED IN A BLANK SAMPLE
- VOCs = TOTAL VOLATILE ORGANIC COMPOUNDS
- VC = VINYL CHLORIDE
- TCE = TRICHLOROETHENE
- DCE = 1,2-DICHLOROETHENE (TOTAL)
- NS = NOT SAMPLED
- ND = NO VOCs DETECTED
- NA = WELL NOT AVAILABLE



**FIGURE 2-2**  
 VOLATILE ORGANIC COMPOUNDS IN  
 SELECTED SHALLOW MONITORING WELLS  
 IN 1992, 1997, 1998, 1999, 2000, AND 2001  
 - AREAS A AND B  
 CAMP ALLEN LANDFILL  
 LONG-TERM MONITORING PROGRAM  
 NAVAL STATION NORFOLK  
**CH2MHILL**

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**LEGEND**

- ▲ Proposed Monitoring Well Locations
- Existing Monitoring Wells

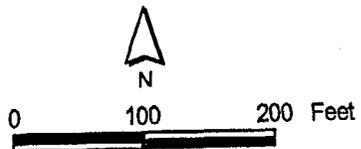


Figure 2-3  
Proposed Monitoring Well Locations  
Camp Allen Landfill  
Naval Station Norfolk

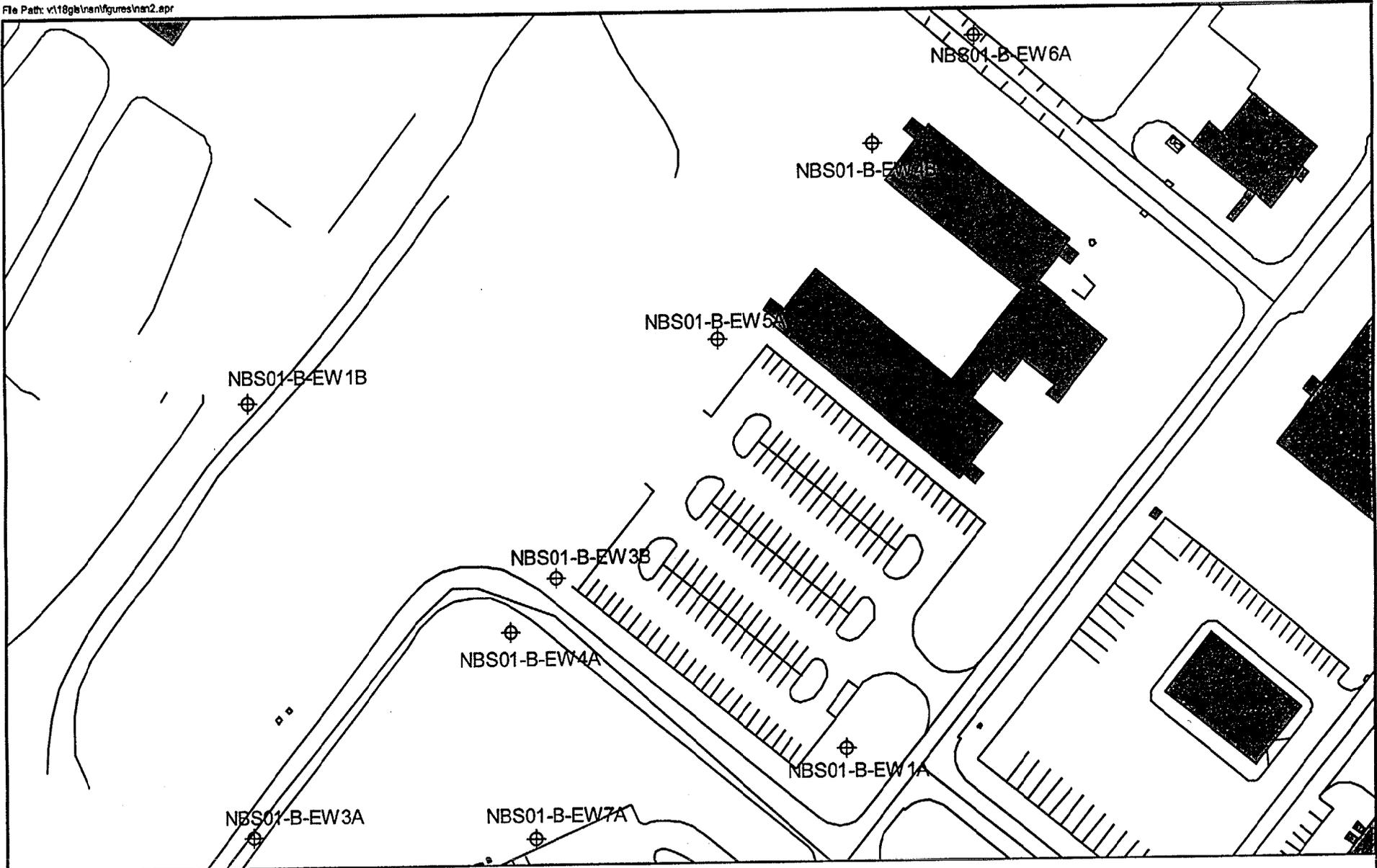


Figure 2-4  
Extraction Well Locations  
Camp Allen Landfill  
Naval Station Norfolk

water levels throughout the area. The data generated during these tests will be used to assess the hydraulic conductivity and maximum production of each well to determine if their flow rates can be increased.

## **2.2 Q-Area Drum Storage Yard**

### **Site Summary**

The Q-Area Drum Storage Yard (QADSY), shown on Figure 2-5, was a compound that occupied approximately 5 acres in the northwest corner of NSN near the carrier piers. This area of the NSN was created by dredging operations in the early 1950s. The QADSY was an open earthen yard that was used from the 1950s until the late 1980s to store tens of thousands of drums. Most of the drums contained new petroleum products, various chlorinated organic solvents, paint thinners, and pesticides. Previous investigations showed dark stains on the soil and oil-saturated soil throughout the storage yard, indicating past spills. The northern portion of the yard, which was used to store leaking or damaged drums and hazardous materials, was particularly stained. These drums have been removed, and the site is currently used as a parking lot.

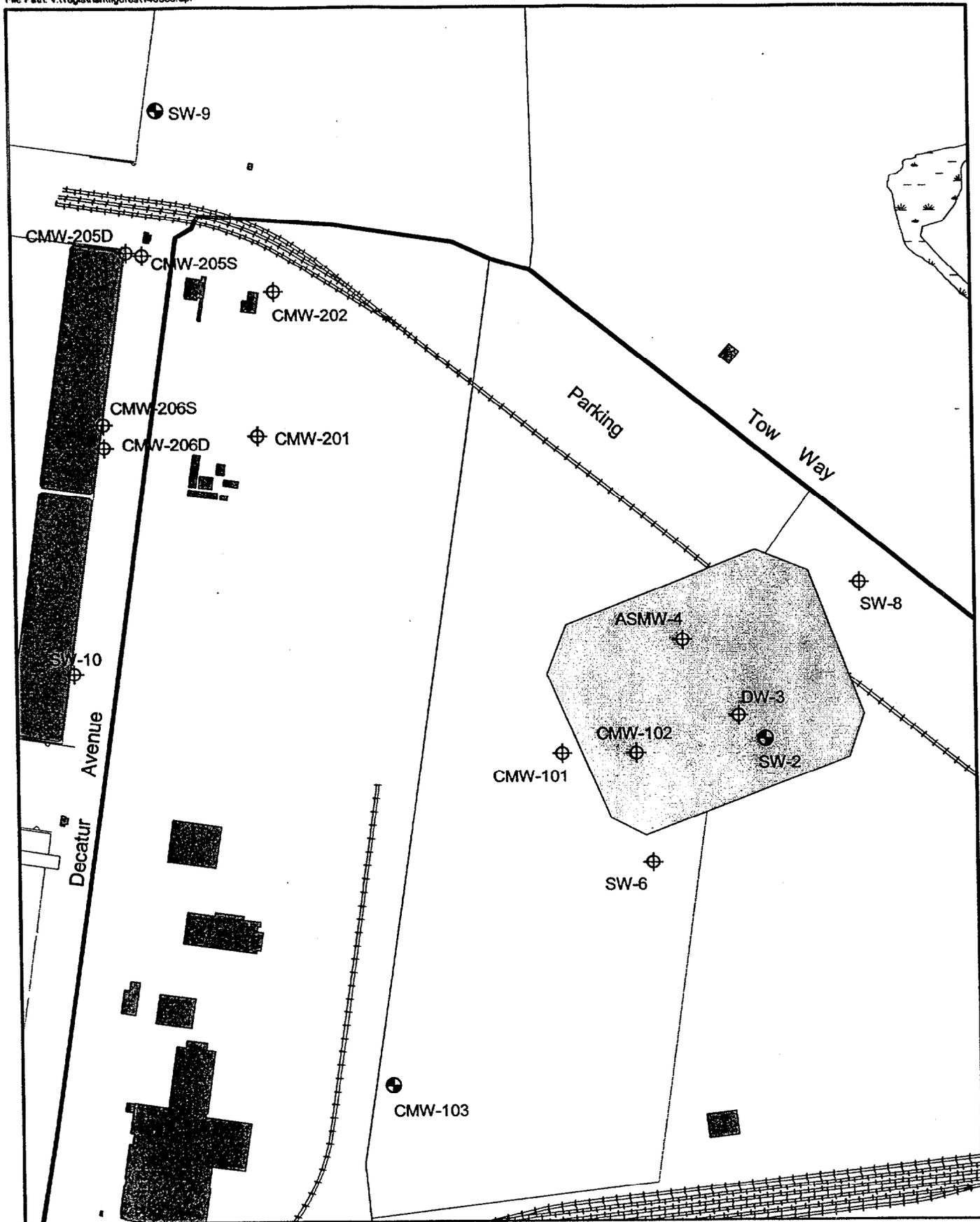
### **Site Background**

An RI/FS for this site was completed in 1996 and revealed that the soil was contaminated with total petroleum hydrocarbons (TPH), VOCs, and pesticides. In addition, VOC contamination was found in onsite and offsite groundwater. The shallow groundwater beneath the hazardous materials (HM) area and the northern portion of the petroleum products (PP) area was the most severely affected. Some low VOC levels were also observed in the deep wells. This may be due to the lack of a confining layer between the two aquifers in this area. The general extent of the groundwater plume, which affects approximately 29 acres beneath the fleet parking area west of the site, has been defined with monitoring-well and direct-push groundwater sampling.

The Decision Document for the site was signed in November 1996 and calls for remediation by air sparging and soil-vapor extraction. A pilot treatability study was performed and the system was constructed. The remediation system began operations at AOC 2 and AOC 1 on August 18, 1998 and August 20, 1998, respectively.

### **Q-Area Site Specific Information and Sampling Rationale**

The purpose of the field effort at the Q-Area is to replace two monitoring wells (CMW-103 and SW-2) that have been covered or damaged through maintenance work in the parking areas. These locations are shown in Figure 2-5. These wells will be sampled during the Long-Term Monitoring (LTM) event scheduled for February, 2002.



**LEGEND**

- ⊕ Existing Monitoring Well
- Proposed Monitoring Well



0 200 400 Feet

Figure 2-5  
Monitoring Well Locations  
Q Area Drum Storage Yard - AOC 1  
Long-Term Monitoring Program  
Naval Station Norfolk

## 3.0 Technical Approach and Investigation Procedures

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This section details the technical approach developed to perform the sampling activities associated with the CALF and Q-Area supplemental investigation as described in this work plan. The goal of the sampling effort is to supplement data collected during previous investigations at Naval Station Norfolk. As described in Section 2, a review of the available analytical data collected during previous investigations was performed and sampling locations were selected based on this review.

The tasks included in the technical approach are listed below. The remainder of this section provides detailed discussions of investigation procedures.

- Task 1: Project Planning
- Task 2: Field Investigation
- Task 3: Sample Analysis and Validation
- Task 4: Data Evaluation
- Task 5: Site Investigation Report

### 3.1 Task 1: Project Planning

This task consists of the preparation of Project Plans associated with the supplemental site investigations. Meetings and project management activities are also documented.

#### Work Plan

A Master Work Plan (WP), Master Sampling and Analysis Plan (SAP), and Master Health and Safety Plan (HASP) have been prepared for the activities to be performed for Installation Restoration Program (IRP) investigations at NSN (Final Master Project Plan, Volumes I and II, Naval Base, Norfolk, Norfolk, Virginia, October 1997). The Master SAP consists of three documents: the Master Field Sampling Plan (FSP), the Master Quality Assurance Project Plan (QAPP), and the Master Investigation-Derived Waste Management Plan (IDWMP). LANTDIV, in conjunction with the United States Environmental Protection Agency (USEPA) Region III, and the Virginia Department of Environmental Quality (VDEQ) has agreed that one set of Master plans will provide the background information needed to understand base-wide site conditions, the approach to be used for investigations, and general types of activities to be accomplished.

This document and the attached Appendix A: Site-Specific Checklists will supplement the Master Plans with site-specific information for the additional investigation at the site. The HASP, FSP, QAPP, and IDWMP are presented as checklists of items based on the existing

Master Work Plans (including other supporting documentation, and additions/deviations from the Master Plan), and are submitted as an Appendix to this document.

The following presents a description of each element of the site-specific plans.

- Site-Specific Investigation-Derived Waste Plan Checklist: The IDWMPs will describe procedures used for the handling and disposal of waste materials generated during the investigations. These waste materials will include personal protective equipment, soils, well-purge water and decontamination fluids. The plans also describe the potential means of disposal, if deemed necessary.
- Site-Specific Quality Assurance Project Plan Checklist: The QAPP checklist describes the data quality objectives (DQOs); samples to be collected and analyses to be performed; analytical quantitation limits; quality assurance/quality control (QA/QC) acceptance criteria; data reduction, validation, and reporting; internal QC procedures (field and laboratory); and corrective action.

CH2M HILL will not begin field sampling at each site until the NTR receives confirmation that laboratory QAPP requirements have been met. The subcontracted analytical laboratory will be Naval Facility Environmental Service Center (NFESC)-certified and will conform to their approved Laboratory Quality Assurance Plan (LQAP). In addition, CH2M HILL will prepare and meet the QAPP requirements as specified by the Navy.

- Site-Specific Field Sampling Plan Checklist: The site-specific work plan checklist describes the field tasks to be performed; the field measurements to be taken; the sampling program (i.e. nomenclature); sampling locations; and applicable standard operating procedures (SOPs).
- Site-Specific Health and Safety Plan Checklist: A HASP will be prepared for each site to address activity-specific precautions, such as HAZWOPER-regulated tasks; hazards of concern; contaminants of concern; personnel; instrumentation required; and decontamination procedures.

The HASP must be reviewed and approved by both the NTR and the Safety/Health Officer of the facility. This plan governs all aspects of the project. The onsite portion of the study shall not begin until this plan has been approved by the NTR.

## Meetings

During the course of the investigations, meetings will be held to discuss the proposed project schedule and findings with the NSN Tier I partnering team. CH2M HILL will provide minutes of the meetings to LANTDIV and Naval Station Norfolk.

## Project Management

The activities involved in project management include daily technical support and guidance, budget and schedule review and tracking, preparation and review of invoices, personnel resources planning and allocation, subcontractor coordination, preparation of

monthly progress reports, and communication and coordination of events with LANTDIV and NSN. Project management will be an ongoing task.

## **3.2 Task 2: Field Investigation**

This task involves efforts related to fieldwork support, the field investigation, and surveying.

### **Field Work Support**

Fieldwork support includes subcontractor procurement, mobilization, and utility clearance, as described in the following subsections.

#### **Subcontractor Procurement**

As part of the initial field mobilization to NSN, CH2M HILL will procure hollow stem auger monitoring well installation, surveying, IDW disposal, analytical laboratory, and data validation services for work at the Base. The subcontracted analytical laboratory will meet NFESC Level D quality control.

The firms providing these services shall be procured using the Basic Ordering Agreements (BOAs) under the CLEAN II contract. In cases where BOAs are not in place for services required under this task order, CH2M HILL will provide subcontractor services in accordance with procedures that will be established between CH2M HILL's contract administrator and LANTDIV's contracting officer.

#### **Mobilization/Demobilization**

Mobilization includes procurement of necessary field equipment, and initial transport to the site. Equipment and supplies will be brought to the site when the CH2M HILL field team mobilizes for field activities.

Demobilization activities include time for IDW sampling and general site restoration prior to the return transport of field equipment and crew. IDW generated during field activities will be containerized in 55-gallon drums for storage. The 55-gallon drums will be properly labeled and stored at a location designated by LANTDIV and NSN prior to disposal.

The IDW disposal method will be dependent on characterization analytical results. Based on previous investigations, it is anticipated that the IDW generated will be disposed of as non-hazardous waste.

#### **Utility Clearance**

Utility clearances will be performed prior to the start of any subsurface investigation activities at the site. CH2M HILL will coordinate subsurface utility clearances with the Miss Utility group and the Public Works Center (PWC) at the Base. CH2M HILL will be responsible for insuring that all appropriate contacts have been made with Base personnel and that clearances have been given for proposed subsurface sampling locations, including marking of utilities near the areas of proposed subsurface sampling locations, prior to the initiation of field operations.

## **Field Sampling Activities**

The objectives of the supplemental investigation at the CALF are to further delineate a hotspot identified near Camp Allen Elementary School, and conduct pump tests to evaluate the effectiveness of the extraction wells east of Area B. The number of samples to be collected from each medium of concern at the site is summarized in Table 3-1. The purpose of the investigation at Q-Area is to replace monitoring wells that have been lost.

### **Camp Allen Landfill**

#### ***Hotspot Delineation***

During the sampling activities, four additional monitoring wells be installed. The wells will be constructed of 2-inch diameter PVC well casings and 10 ft well screens. The shallow wells will extend to a depth of approximately 15 feet, depending on the depth to first encountered water. The monitoring wells will be installed using a hollow stem auger (HSA) drill rig with 4 1/4" inner diameter auger stems. Groundwater samples will be collected from the new wells and B-MW15A. The samples will be analyzed for VOCs.

#### ***Aquifer Testing***

A 48 hour pump tests will be conducted at both extraction wells B-EW4A and B-EW5A. The tests will be conducted at a flow rate of 5 GPM and nearby monitoring wells will be used to observe the changes in water levels throughout the area. A data logger equipped with pressure transducers will be employed to record the water levels at the pumping well and observation wells.

### **Q-Area**

During the investigation activities, two monitoring wells will be replaced (SW-2 and CMW-103). The replacement wells will be constructed to the same specifications as the original wells.

## **Groundwater Sampling Procedures**

Table 3-2 presents the required containers, preservatives, and holding times for groundwater samples. Table 3-3 presents a summary of the number of groundwater samples to be submitted for analysis.

### **Groundwater Sampling Technique**

The supplemental site investigation involves the installation of monitoring wells and the subsequent collection of groundwater samples from the monitoring wells. Grab groundwater samples will be collected from monitoring wells after installation and development has been completed. The applicable SOPs for monitoring well installation, well development, and the collection of groundwater samples are located in Volume 2 of the Master Project Plan.

### **Sampling Equipment Decontamination**

All non-disposable sampling equipment will be decontaminated immediately after each use. The applicable SOPs for the decontamination of personnel and equipment from Volume 2 of the Master Project Plan are included with the Field Sampling Plan checklist.

<b>Table 3-1</b>		
<b>Analytical Sample Summary for CALF Supplemental Site Investigation</b>		
	<b>Site</b>	<b>CALF</b>
<b>Media</b>	<b>Parameter</b>	<b>Number of Samples</b>
Groundwater	TCL Low Concentration VOCs	5
<b>Total Number of Samples</b>		5

**Table 3-2**

**Required Containers, Preservatives, and Holding Times for Aqueous Samples**

<b>Analysis</b>	<b>Sample Container</b>	<b>Preservative</b>	<b>Holding Time</b>	<b>Sample Volume</b>
TCL Low Conc. VOCs	40-ml glass vial w/teflon-lined cap	HCL to pH<2; Cool to 4° C	14 days	Fill completely; no air bubbles

**Table 3-3**

**Summary of Aqueous Samples for Submittal to the Offsite Laboratory for Analysis**

<b>Laboratory Parameter</b>	<b>Samples</b>	<b>Field Duplicates<sup>1</sup></b>	<b>Field Blanks<sup>2</sup></b>	<b>Trip Blanks<sup>3</sup></b>	<b>Matrix Spikes<sup>4</sup></b>	<b>Equip. Blanks<sup>5</sup></b>	<b>Matrix Total</b>
TCL Low Conc. VOCs	5	1	1	1	1	0	9

**Notes:**

<sup>1</sup>Field Duplicates are collected at a frequency of 1 per 10.

<sup>2</sup>Field blanks are collected at a frequency of 1 per source per event or 1 per week of sampling

<sup>3</sup>Trip blanks are shipped with samples submitted for volatile analysis. Trip blanks are collected at a frequency of 1 per cooler of volatile samples.

<sup>4</sup>Matrix spike/ matrix spike duplicates (MS/MSD) are collected at a frequency of 1 per 20.

<sup>5</sup>Equipment blanks are collected at a frequency of 1 per day.

## **Sample Designation**

Sampling locations and samples collected during the course of field work will be assigned unique designations to allow the sampling information and analytical data to be entered into the existing Geographic Information System (GIS) Data Management system currently being developed for NSN under a separate CTO. The following sections describe the sample designation specifications that will be followed by field personnel.

### **Specifications for Field Location Data**

Field station data is information assigned to a physical location in the field at which a sample is collected. For example, a soil boring that has been installed will require a name that will uniquely identify it with respect to other soil boring locations, or other types of sampling locations. The station name provides for a key in the database to which any samples collected from that location can be linked, to form a relational database.

A listing of the location identification numbers will be maintained by the field team leader, who will be responsible for enforcing the use of the standardized numbering system during all field activities. Each station will be designated by an alphanumeric code that will identify the station location by facility, site type, site number, station type, and sequential station number. The schema that will be used to identify field station data is documented in Table 3-4.

### **Specifications for Analytical Data**

Analytical data will be generated through sampling of various media at NSN. Each analytical sample collected will be assigned a unique sample identifier. The schema used as a guide for labeling analytical samples in the field is documented below. The format that will be used for electronic deliverables from the analytical laboratory and the data validator is documented below.

#### ***Sample Identification Schema***

A standardized numbering system will be used to identify all samples collected during water and soil sampling activities. The numbering system will provide a tracking procedure to ensure accurate data retrieval of all samples taken. A listing of the sample identification numbers will be maintained by the field team leader, who will be responsible for enforcing the use of the standardized numbering system during all sampling activities. Sample identification for all samples collected during the investigations will use the following format.

Each sample will be designated by an alphanumeric code that will identify the facility, site, matrix sampled, and contain a sequential sample number. QA/QC samples will have a unique sample designation. The guide for sample identification is documented in Table 3-5. If one qualifier is pertinent to the sample ID but another is not, only the Table 3-4 applicable qualifiers will be used. A non-utilized character space does not have to be maintained.

#### ***Electronic Deliverable File Format***

An offsite laboratory will analyze the samples collected as part of the Supplemental Investigation described in this work plan and tabulate the results in an electronic format specified by CH2M HILL. The data validator will add data validation qualifiers to the table of analytical results. In addition to hard copy data package deliverable, CH2M HILL will

**Table 3-4  
Field Station Schema**

First Segment	Second Segment		
Facility, Site Type, Site Number	Sample Area	Sample Type	Station Number, Qualifier
AAANNN	A	AA	NNNA
Notes: "A" = alphabetic "N" = numeric			
<u>Facility:</u> NB = Norfolk Naval Base  <u>Site Type:</u> S = Site  <u>Site Number:</u> 01 = Camp Allen Landfill	<u>Sample Area:</u> A = Area A Landfill B = Area B Landfill  <u>Sample Type:</u> MW = Monitoring Well  <u>Station Number:</u> Sequential Station Number  <u>Qualifier:</u> A = Shallow B = Deep		

**Table 3-5  
Sample Designation Schema**

First Segment	Second Segment			Third Segment
Facility, Site Type, and Site Number	Sample Area	Sample Type	Sample Location + Sample Qualifier	Additional Qualifiers (sample depth, sampling round, etc.)
AAANN	A	AA	NNNA or NNAA	ANN or NNNN

Notes: "A" = alphabetic "N" = numeric

<p><b>Facility:</b> NB = Norfolk Naval Base</p> <p><b>Site Type:</b> S = Site</p> <p><b>Site Number:</b> 01 = Camp Allen Landfill</p>	<p><b>Sample Area:</b> A = Area A Landfill B = Area B Landfill</p> <p><b>Sample Type:</b> MW = Monitoring Well TB = Trip Blank EB = Equipment Blank FB = Field Blank</p> <p><b>Sample Location:</b> 1. Station Samples (NNA) NNA - refers to sequential station number NNA - letter qualifier for Deep (B) or Shallow (A) 2. QC Samples (NNN) NNN - numbered sequentially for each type of blank (i.e., 1, 2, etc.) collected for that day's sampling NNN - refers to month of sampling event</p> <p><b>Sample Qualifiers:</b> F = filtered sample P = duplicate sample</p>	<p><b>Additional Qualifiers:</b> 1. Monitoring Well Groundwater Sample (refers to sampling round for that well): R01 - Round 1 R02 - Round 2 R03 - Round 3 2. QC Samples NNNN - refers to day and year of sampling event</p>
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receive an electronic file from the data validator in a table format that will facilitate downloading into a database. The format that will be used for electronic deliverables is tabulated in Table 3-6.

## **Surveying**

Sampling locations will be horizontally located using a global positioning system (GPS) following field activities. In addition, monitoring well casing elevations will be surveyed within one-onehundredth of an inch by a qualified surveyor. All survey data will be tied in to the Virginia State Plane coordinate system.

## **3.3 Task 3: Sample Analysis and Validation**

This task involves efforts related to the sample management and data validation. CH2M HILL will be responsible for tracking sample analysis and obtaining results from the laboratory. The analytical data generated during the supplemental investigation field program will be validated by an independent data validation subcontractor according to EPA standard procedures.

### **Sample Analysis**

All analyses of soil and groundwater will be conducted at a contracted laboratory that fulfills all requirements of the U.S. Navy's QA/QC Program Manual and EPA's CLP. A signed certificate of analysis will be provided with each laboratory data package, along with a certificate of compliance certifying that all work was performed in accordance with the applicable federal, state, and local regulations. All analyses will be performed following the highest level of Navy guidance. Analyses will include the proper ratio of field QC samples recommended by NFESC guidance for the DQOs.

This task includes checking the data from the laboratory and converting it into an electronic format that can be readily incorporated into the GIS Data Management system for NSN.

### **Field Quality Control Procedures**

Quality control duplicate samples and blanks are used to provide a measure of the internal consistency of the samples and to provide an estimate of the components of variance and the bias in the analytical process. The details with regard to the number and frequency of field QC samples to be collected during the site investigations are provided above in Table 3-3.

#### **Blanks**

Blanks provide a measure of cross-contamination sources, decontamination efficiency, and other potential errors that can be introduced from sources other than the sample. ASTM Type II water will be used for blanks. Four types of blanks can be generated during sampling activities: trip blanks, field blanks, equipment rinsate blanks, and temperature blanks.

One trip blank will be included in each cooler used for the daily shipment of VOC samples. If more than one cooler is being sent on a given day, all of the VOC samples should be placed in one cooler, if possible, to minimize the number of trip blanks needed. The trip

Table 3-6

## Analytical Data Electronic Deliverable

Field Name	Field Format	Req'd	Description
Sample_ID	A25	R	CH2M HILL sample ID (taken from the chain of custody).
Analysis_Group *	A9	R	The CH2M HILL code for the analysis performed on the sample.
DateTime_Collected	00/00/0000 00:00:00 AM/PM	R	The date the sample was collected (from the chain of custody).
Date_Received	00/00/0000	R	The date the sample was received in the lab.
Date_Extracted	00/00/0000	RA	Extraction or preparation date.
Date_Analyzed	00/00/0000	R	The date the sample was analyzed.
Lab_Sample_ID	A15	R	The laboratory sample ID.
Dilution_Factor	N5	R	The dilution factor used. Use 1 if not diluted.
SDG_Number	A15	R	Laboratory code for the group of samples in a data deliverable package.
Chem_Code	A12	R	The ERPIMS parameter code.
Chem_Name *	A45	R	The compound being analyzed.
CAS_Number *	A6-A2-A1	R	CAS Number (Note dashes).
Ana_Value	N11	R	The analytical result. It should match the number of significant digits on the hard copy. Use detection limit when not detected.
Lab_Qual *	A5	RA	The lab qualifiers, if any (e.g., U, UJ, B); there may be a qualifier not on the valid value table in special cases.
DV_Qual	A5		Left blank for data validation qualifiers.
DV_Qual_Code	A5		Left blank for data validation qualifiers.
Units *	A15	R	The unit of the result (e.g., mg/L).
Detect_Limit	N5	R	The minimum available sample-specific detection limit for the compound, the laboratory reporting limit.
MDL	N10.3	R	Method detection limit.
Prep_Method *	A15	R	Analytical method used for preparation of the sample fraction.
Analysis_Method	A15	R	Analytical method used to analyze the sample fraction. Use ERPIMS codes.
Result_Type *	A15	RA	The laboratory QC type for single compounds (e.g, SURR, IS) All surrogates and internal standard results are to be reported in % recovery units.
Lab_QC_Type *	A15	RA	Laboratory samples (lab blanks, dups, LCS, etc.).
PCT_Moisture	N3,3	RA	Percent moisture for soil samples; not applicable for aqueous samples.
Basis	A3	RA	Concentrations are reported on a wet or dry weight basis. Use ERPIMS codes.
Batch	A12	R	Laboratory code for the batch of samples analyzed together.
Lab_Code	A10	R	The ERPIMS code for the name of the laboratory.
ReRun*	A9	RA	To Report dilutions, re-extractions, and/or reanalyses.
QC_Limits	AAA-AAA	RA	Laboratory QC limits in percent recovery for surrogates, internal standards, laboratory control spikes, calibration checks, interference check standards, serial dilutions, and MS/MSDs.
Comment	A 30	RA	For the laboratory to note exceptions.
<u>Notes:</u>			
* - See valid value list			
TICs are not reported on the EDD			
R - Required field			
NR - Not Required			
RA - Required as Appropriate			
EDD may be submitted in ASCII (comma delimited) or in Excel			

blanks will be prepared before each sampling event, shipped or transported to the field with the sampling bottles, and returned unopened for analysis. Trip blanks will indicate if there is contamination during shipment to the field, from storage in the field, or from shipment from the field to the analytical laboratory.

One field blank will be collected per sampling event. If sampling events extend beyond one week (five working days) or for windy and dusty field conditions, the number of field blanks should be increased. Field blanks are used to determine the chemical quality of water used for such procedures as decontamination and blank collection.

One equipment blank per sample medium will be obtained for each day of sampling. Equipment blanks will give an indication of the efficiency of decontamination procedures.

EPA has also requested that a temperature blank be included in each cooler containing samples for CLP analyses so that the laboratory can record the temperature without disturbing the samples. The temperature blank will be labeled, but will not be given a sample number nor will be listed as a sample on the COC form.

### **Duplicates**

Field duplicate samples will be collected at a frequency of 1 per 10 field samples per matrix. The location from which the duplicates are taken will be randomly selected. Each duplicate sample will be split evenly into two sample containers and submitted for analysis as two independent samples.

### **Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 1 for every 20 field samples collected. Analytical results of these samples indicate the impact the matrix (water and soil) has on extracting the analyte for analysis. MS/MSD samples give an indication of the laboratory's analysis accuracy and precision within the sample matrix. Data validators will use these results to evaluate the accuracy of the analytical data.

### **Data Validation**

Analytical results will be validated by CH2M HILL subcontractors approved by the Navy. Data validators will use EPA Region III guidance. Data that should be qualified will be flagged appropriately. Results for QA/QC samples will be reviewed and the data will be qualified further, if necessary. Finally, the data set as a whole will be examined for consistency, anomalous results, and reasonableness.

## **3.4 Task 4: Data Evaluation**

This task includes reviewing historical data and data generated under this CTO, including generation of figures and tables summarizing the data.

Analytical data will be collected during this investigation in the form of laboratory analytical results and data validation results. This task also includes the evaluation of validated laboratory data and field-generated data.

### **3.5 Task 5: Site Investigation Report**

A Draft Supplemental Site Investigation Report will be prepared for submittal to the NSN Tier I Team. Based on the Tier I Team's evaluation of the results presented in the Draft Report, a Final Report will be prepared.

## **4.0 Project Management and Staffing**

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The CH2M HILL Activity Manager designated for the oversight of this project is Mr. John Tomik. Mr. Tomik will be supported by Mr. Ben Francisco, who will be the CTO Manager for this CTO. Mr. Tomik will be responsible for such activities as technical support and oversight, budget and schedule review and tracking, preparation and review of invoices, personnel resources planning and allocation, and coordination with LANTDIV, NSN, and subcontractors.

The supplemental investigation field program will be directed by qualified CH2M HILL staff members. In addition, CH2M HILL will perform soil and groundwater sampling. CH2M HILL will notify LANTDIV and NSN which CH2M HILL personnel will mobilize to the site prior to initiating field activities.

## 5.0 Contractual Services

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This section documents the anticipated subcontract services required for the completion of tasks documented in this work plan. The supplemental investigation will require subcontract services from the following:

- Hollow Stem Auger Monitoring Well Installation
- Analytical Laboratory
- Data Validation
- Surveyors
- IDW Disposal

**APPENDIX A**

**Site-Specific HASP and Checklists**

## Site-Specific Investigation-Derived Waste Plan Checklist

This checklist supplements the Master IDW Plan with site-specific information for Camp Allen Landfill and Q-Area. It is to be taken into the field with the Master IDW Plan.

Site: CALF & Q-Area

1. IDW Media:  Soil cuttings  
 Well development or purge water  
 Decontamination residual soil and wastewater  
 PPE or disposable equipment  
 Other \_\_\_\_\_
  
2. Expected Regulatory Status:  Hazardous  
 Solid Waste  
 Unknown  
 Other Waste management activities regulated by OSHA HAZWOPER standard (1910.120)
  
3. Site Location: The Q-Area is located proximal to Pier 12 on NSN property. The CALF is located off of Helmick Rd. near the brig facility.
  
4. Nature of Contaminants Expected:  Petroleum contamination  
 Polycyclic aromatic hydrocarbon  
 Pesticides  
 Herbicides  
 PCBs  
 Metals  
 Other
  
5. Volume of IDW Expected:  Drums - Approximately 17. Ten for decontamination fluids/well development water/purge water, one for PPE and other disposable items, and six for drilling cuttings (Hollow Stem Auger cuttings).  
 Cubic Yards  
 Tons  
 Gallons

6. Compositing Strategy for Sample Collection: A composite IDW sample will be collected for both water and soil.

7. IDW Storage

X  As per Master IDW Plan  Other \_\_\_\_\_

8. Waste Disposal

X  As per Master IDW Plan  Other \_\_\_\_\_

## Site-Specific Quality Assurance Project Plan Checklist

This checklist supplements the Master QAPP with site-specific information for CALF and the Q-Area. The Master QAPP and site-specific checklist provide necessary quality assurance information for the additional investigation. This checklist is to be taken into the field with the Master QAPP.

Site: CALF & Q-Area

1. List sampling tasks:

- Monitoring Well Installation
- Monitoring Well Development, and
- Groundwater sampling from monitoring wells.

2. List data quality objectives:

The objective of the sampling is to delineate the extent of contaminants in the groundwater.

3. Organization:

LANTDIV Navy Technical Representative	Winoma Johnson / LANTDIV
USEPA Remedial Project Manager	Mary Cooke / USEPA
VDEQ Federal Facilities Project Manager	Mark Leeper / VDEQ
CH2M HILL Activity Manager	John Tomik / CH2M HILL WDC
Quality Control Senior Review	Ann West / CH2M HILL WDC
Technical Project Manager	Ben Francisco / CH2M HILL VBO
Field Team Leader	Ben Francisco / CH2M HILL VBO

4. Table of samples with analyses to be performed and associated QC samples included in the CALF Supplemental Investigation Work Plan. See Tables

5. Analytical Quantitation Limits:

X \_\_\_ As per Table 8-2 of Master QAPP      \_\_\_ Other

6. QA/QC Acceptance Criteria (e.g., precision, accuracy)

X \_\_\_ As per Table 4-1 of Master QAPP      \_\_\_ Other

7. Data reduction, validation, and reporting:

X \_\_\_ As per Section 9 of Master QAPP      \_\_\_ Other

8. Internal QC Procedures (field and laboratory):

X\_\_\_\_\_As per Section 10 of Master QAPP \_\_\_\_\_Other

9. Corrective Action:

X\_\_\_\_\_As per Section 14 of Master QAPP \_\_\_\_\_Other

10. Other deviations from Master QAPP - None

## Site-Specific Field Sampling Plan Checklist

This checklist supplements the Master Field Sampling Plan with site-specific information for CALF and the Q-Area. The checklist and the Master Field Sampling Plan provide necessary field sampling information for the Supplemental Investigation as described in the Work Plan. This checklist is to be taken into the field with the Master FSP.

Site: CALF & Q-Area

1. Tasks to be performed:
 

<input checked="" type="checkbox"/> Geophysical surveys <input type="checkbox"/> Soil gas surveys <input type="checkbox"/> Surface water and sediment sampling <input type="checkbox"/> Surface soil sampling <input type="checkbox"/> Soil boring installation <input type="checkbox"/> Subsurface soil sampling <input checked="" type="checkbox"/> Monitoring well installation and development <input type="checkbox"/> Monitoring well abandonment	<input checked="" type="checkbox"/> Groundwater sampling <input type="checkbox"/> In-situ groundwater sampling <input checked="" type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Hydrogeologic measurements <input type="checkbox"/> Biota sampling <input type="checkbox"/> Trenching <input checked="" type="checkbox"/> Land surveying <input checked="" type="checkbox"/> Investigation derived waste sampling <input checked="" type="checkbox"/> Decontamination <input type="checkbox"/> Other _____
--	--
  
2. Field measurements to be taken:
 

<input checked="" type="checkbox"/> temperature <input checked="" type="checkbox"/> pH <input checked="" type="checkbox"/> dissolved oxygen <input checked="" type="checkbox"/> turbidity <input checked="" type="checkbox"/> specific conductance <input checked="" type="checkbox"/> organic vapor monitoring  <input type="checkbox"/> geophysical parameters (list): <input type="checkbox"/> electromagnetic induction	<input type="checkbox"/> ground-penetrating radar <input checked="" type="checkbox"/> surveying <input type="checkbox"/> magnetometry <input type="checkbox"/> global positioning system <input type="checkbox"/> soil gas parameters (list): <input type="checkbox"/> combustible gases <input checked="" type="checkbox"/> water-level measurements <input checked="" type="checkbox"/> pumping rate <input type="checkbox"/> other _____
---	---
  
3. Sampling program (nomenclature, etc.):
 

<input type="checkbox"/> As per Section 3.1 of Master FSP	<input checked="" type="checkbox"/> Other See attached Work Plan.
---	---
  
4. Map of sampling locations: See attached Work Plan.
  
5. Table of field samples to be collected: See attached Work Plan.

6. Applicable SOPs or references to specific pages in Master FSP: The following SOPs from Volume 2 of the Master Project Plans are attached.

- Monitoring well installation
- Monitoring well development
- Groundwater Sampling
- Chain-of-Custody
- Packaging and Shipping Procedures
- Field Rinse Blank Preparation
- Decontamination of Personnel and Equipment
- Disposal of Fluids and Solids

7. Site-specific procedures or updates to protocols established in the Master FSP: Described in attached Work Plan.

# CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Site Safety Coordinator (SSC) is to be familiar with these SOPs and the contents of this plan. CH2M HILL's personnel and subcontractors must sign Attachment 1.

## Project Information and Description

**PROJECT NO:** 157392.LT.01102601

**CLIENT:** Navy CLEAN II

**PROJECT/SITE NAME:** Camp Allen Landfill, Q Drum Storage Area

**SITE ADDRESS:**

**CH2M HILL PROJECT MANAGER:** Francisco, Ben

**CH2M HILL OFFICE:** Virginia Beach

**DATE HEALTH AND SAFETY PLAN PREPARED:** 10/26/2001

**DATE(S) OF SITE WORK:** To be determined

**SITE ACCESS:** Contractor badges required

**SITE SIZE:** 47 acres

**SITE TOPOGRAPHY:** Low relief.

**PREVAILING WEATHER:**

**SITE DESCRIPTION AND HISTORY:** The Camp Allen Landfill (CALF) site consists of two distinct areas: Area A and Area B. The Area A landfill, which operated from the mid-1940s until approximately 1974, is approximately 45 acres in size and was used as a borrow area prior to landfilling practices. During its operational period, the site was used for incineration and disposal activities. Materials disposed of at the site include the following: metal plating and parts cleaning sludge, paint-stripping residue, various chlorinated organic solvents, overage chemicals, pesticides, asbestos, incinerator ash, fly and bottom ash from the Base power plant, and miscellaneous debris. In 1971, a fire occurred in the northern section of the Camp Allen Salvage Yard in an area where waste oils, solvents, paints, acids, caustics, and pesticides were stored pending disposal. The fire was reportedly caused by incompatible storage of chemicals. Area B of the landfill is the location where the burned residue and remaining waste materials were buried in trenches to the east and northeast of the salvage yard. Area B is approximately 2 acres in size.

The Q-Area Drum Storage Yard (QADSY) was a compound that occupied approximately 5 acres in the northwest corner of NSN near the carrier piers. This area of the NSN was created by dredging operations in the early 1950s. The QADSY was an open earthen yard that was used from the 1950s until the late 1980s to store tens of thousands of drums. Most of the drums contained new petroleum products, various chlorinated organic solvents, paint thinners, and pesticides. Previous investigations showed dark stains on the soil and oil-saturated soil throughout the storage yard, indicating past spills. The northern portion of the yard, which was used to store leaking or damaged drums and hazardous materials, was particularly stained. These drums have been removed, and the site is currently used as a parking lot.

**DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED:** Four new monitoring wells will be installed and groundwater samples will be collected at the CALF. Two 48 hour pump tests will also be conducted on selected extraction wells at the CALF. Two monitoring wells will be installed at the QADSY.

# Site Map

**This page is reserved for a Site Map.**

**Note locations of Support, Decontamination, and Exclusion Zones; site telephone; first aid station; evacuation routes; and assembly areas.**

# 1 Tasks to be Performed Under this Plan

## 1.1 Description of Tasks

(Reference Field Project Start-up Form)

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hawwoper).

### 1.1.1 Hawwoper-Regulated Tasks

- Drilling
- Groundwater monitoring
- Aquifer testing
- Surveying
- Investigation-derived waste (drum) sampling and disposal
- Observation of material loading for offsite disposal

### 1.1.2 Non-Hawwoper-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hawwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hawwoper-trained personnel. **Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.**

#### TASKS

- Engineering testing/evaluation
- Waste removal/hauling

#### CONTROLS

- Brief on hazards, limits of access, and emergency procedures
- Post contaminant areas as appropriate (refer to Section 8.2 for details)
- Sample and monitor as appropriate (refer to Section 5.0)

## 1.2 Task Hazard Analysis

(Refer to Section 2 for hazard controls)

POTENTIAL HAZARDS	TASKS				
	Drilling with a hollow- stem auger, and well installation	Groundwater monitoring, aquifer testing	Surveying	IDW drum sampling and disposal	Observation of loading material for offsite disposal
Flying debris/objects	X			X	X
Noise > 85dBA	X				X
Electrical	X	X			
Suspended loads	X				X
Buried utilities, drums, tanks	X				
Slip, trip, fall	X	X	X	X	X
Back injury	X	X		X	
Confined space entry			X		
Visible lightning	X	X	X	X	X
Vehicle traffic					X
Elevated work areas/falls					
Fires	X			X	
Entanglement	X				
Drilling	X				
Heavy equipment	X				X
IDW Drum Sampling				X	

## 2 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the SSC for clarification.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 6. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records, and be promptly submitted to the HSM.

**Project-specific frequency for completing self-assessments: Initially and periodically review Self-Assessment Checklists before drilling.**

### 2.1 Project-Specific Hazards

#### 2.1.1 Arsenic

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Avoid skin and eye contact with liquid and particulate arsenic or arsenic trichloride.
- Arsenic is considered a "Confirmed Human Carcinogen."
- Arsenic particulates (inorganic metal dust) are odorless. Vapor and gaseous odor varies depending upon specific organic arsenic compound.
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person.

#### 2.1.2 Benzene

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Skin absorption is a potential route of benzene exposure.
- Benzene is considered a "Confirmed Human Carcinogen."
- A Short Term Exposure Limit (STEL: 15 minutes) exists for this material.
- Benzene has an aromatic odor.
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person.

#### 2.1.3 Cadmium

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Cadmium is considered a "Suspected Human Carcinogen."
- Cadmium particulates (fumes and dust) are odorless.
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person.

#### **2.1.4 Lead**

The following requirements pertain to lead contaminated soils:

- Work shall progress in a sequence from less contaminated to more contaminated areas.
- Water should be added to soils prior to and during excavation, air rotary drilling, and other activities that create or have the potential to create airborne lead contaminated dust. For air rotary drilling operations, water can be added to the boring to reduce dust generation from the cyclone. Depending upon soil type, watering of soil may be required several days prior to commencing ground intrusive activities.
- Personnel working in the vicinity of lead contaminated soil shall wear disposable coveralls or equal and exercise enhanced personal hygiene (i.e., frequent hand washing prior to eating, drinking, and smoking; separation of work and street clothing/footwear; etc.).

#### **2.1.5 Vinyl Chloride**

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Vinyl Chloride is considered a "Confirmed Human Carcinogen."
- A Short Term Exposure Limit (STEL: 15 minutes) exists for this material.
- Vinyl Chloride has a mild, sweet, chloroform-like odor.
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person.

#### **2.1.6 Drilling**

(Reference CH2M HILL SOP HS-35, *Drilling*)

- Only authorized personnel are permitted to operate drill rigs.
- Stay clear of areas surrounding drill rigs during every startup.
- Stay clear of the rotating augers and other rotating components of drill rigs.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Do not wear loose-fitting clothing or other items such as rings or watches that could get caught in moving parts. Long hair should have it restrained.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.
- Smoking around drilling operations is prohibited.

#### **2.1.7 IDW Drum Sampling**

Personnel are permitted to handle and/or sample drums containing investigation-derived waste (IDW) only; handling or sampling other drums requires a plan revision or amendment approved by the CH2M HILL HSM. The following control measures will be taken when sampling drums containing IDW:

- Minimize transportation of drums.
- Sample only labeled drums or drums known to contain IDW.
- Use caution when sampling bulging or swollen drums. Relieve pressure slowly.
- If drums contain, or potentially contain, flammable materials, use non-sparking tools to open.
- Picks, chisels, and firearms may not be used to open drums.
- Reseal bung holes or plugs whenever possible.
- Avoid mixing incompatible drum contents.
- Sample drums without leaning over the drum opening.
- Transfer the content of drums using a method that minimizes contact with material.
- PPE and air monitoring requirements specified in Sections 4 and 5 must address IDW drum sampling.
- Spill-containment procedures specified in Section 7 must be appropriate for the material to be handled.

## 2.2 General Hazards

### 2.2.1 General Practices and Housekeeping

(Reference CH2M HILL SOP HS-20, *General Practices*)

- Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness require enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

### 2.2.2 Hazard Communication

(Reference CH2M HILL SOP HS-05, *Hazard Communication*)

The SSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using Attachment 2.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training using Attachment 3.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

### 2.2.3 Shipping and Transportation of Chemical Products

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods*)

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

### 2.2.4 Lifting

(Reference CH2M HILL SOP HS-29, *Lifting*)

- Proper lifting techniques must be used when lifting any object.
  - Plan storage and staging to minimize lifting or carrying distances.
  - Split heavy loads into smaller loads.
  - Use mechanical lifting aids whenever possible.
  - Have someone assist with the lift -- especially for heavy or awkward loads.
  - Make sure the path of travel is clear prior to the lift.

## 2.2.5 Fire Prevention

(Reference CH2M HILL SOP HS-22, *Fire Prevention*)

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - be maintained in a fully charged and operable condition,
  - be visually inspected each month, and
  - undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
- Post “Exit” signs over exiting doors, and post “Fire Extinguisher” signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

## 2.2.6 Procedures for Locating Buried Utilities

### Local Utility Mark-Out Service

Name: Public Works Center

Phone: 757-444-6414

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SSC should confirm that arrangement.

## 2.2.7 Compressed Gas Cylinders

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

## 2.2.8 Cold Stress

(Reference CH2M HILL SOP HS-09, *Heat and Cold Stress*)

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-Chill Index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SSC/DSC to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast – be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS			
	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm—but not hot—water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.

## 2.3 Biological Hazards and Controls

### 2.3.1 Snakes

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

### 2.3.2 Poison Ivy and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

### 2.3.3 Ticks

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only outside** of clothing with permethrin or permanone and spray skin with only DEET; and check yourself frequently for ticks.

If bitten by a tick, grasp it at the point of attachment and carefully remove it. After removing the tick, wash your hands and disinfect and press the bite areas. Save the removed tick. Report the bite to human resources. Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme: a rash might appear that looks like a bullseye with a small welt in the center. RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, seek medical attention.

### 2.3.4 Bees and Other Stinging Insects

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

### 2.3.5 Bloodborne Pathogens

(Reference CH2M HILL SOP HS-36, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-36, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

## 2.4 Radiological Hazards and Controls

Refer to CH2M HILL's *Corporate Health and Safety Program, Program and Training Manual, and Corporate Health and Safety Program, Radiation Protection Program Manual*, for standards of practice in contaminated areas.

Hazards	Controls
None Known	None Required

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
Arsenic	GW:65	0.01 mg/m <sup>3</sup>	5 Ca	Ulceration of nasal septum, respiratory irritation, dermatitis, gastrointestinal disturbances, peripheral neuropathy, hyperpigmentation	NA
Benzene	GW:0.2	1 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
Cadmium	GW:0.175	0.005 mg/m <sup>3</sup>	9 Ca	Pulmonary edema, coughing, chest tightness/pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, difficulty breathing, loss of sense of smell, emphysema, mild anemia	NA
Chlorobenzene	GW:0.05	10 ppm	1,000	Skin, eye, and nose irritation; drowsiness; uncoordination; CNS depression	9.07
Chloroform	GW:0.05	2 ppm	500 Ca	Dizziness, mental dullness, nausea, confusion, disorientation, headache, fatigue, eye and skin irritation, anesthesia, enlarged liver	11.42
Chromium (hexavalent)	GW:0.0556	0.01 mg/m <sup>3</sup>	15 Ca	Irritated respiratory system, nasal septum perforation, liver and kidney damage, leucytosis, leopen, monocytosis, eosinophilla, eye injury, conjunctivitis, skin ulcer, sensitization dermatitis	NA
Cobalt (Metal, Dusts, and Fumes)	GW:0.342	0.05 mg/m <sup>3</sup>	20	Coughing, difficulty breathing, wheezing, decreased pulmonary function, diffuse nodule fibrosous, dermatitis, respiratory hypersensitivity, asthma	NA
o-Dichlorobenzene (1,2-Dichlorobenzene)	GW:0.022	25 ppm	200	Nose and eye irritation, liver and kidney damage, skin blisters	9.06
p-Dichlorobenzene (1,4-Dichlorobenzene)	GW:0.05	10 ppm	150 Ca	Headache, eye irritation, nausea, vomiting, swelling periorbital, profus rhinitis, jaundice, cirrhosis	8.98
1,1-Dichloroethane	GW:0.083	100 ppm	3,000	CNS depression, skin irritation; liver, kidney, and lung damage	11.06
1,2-Dichloroethane (Ethylene Dichloride)	GW:0.3	1 ppm	50 Ca	CNS depression, nausea, vomiting, dermatitis, eye irritation, liver, kidney, and CNS damage; corneal opacity	11.05
Ethyl Benzene	GW:0.008	100 ppm	800	Eye, skin, and mucous membrane irritation; headache; dermatitis; narcotic; coma	8.76
Lead	GW:1.360	0.05 mg/m <sup>3</sup>	100	Weakness lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
Mercury	GW:0.0031	0.05 mg/m <sup>3</sup>	10	Skin and eye irritation, cough, chest pain, difficult breathing, bronchitis, pneumontitis, tremors, insomnia, irritability, indecision, headache, fatigue, weakness, GI disturbance	

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
1,1,2,2-Tetrachloroethane (Tetrachlorethane)	GW:0.05	1 ppm	100 Ca	Nausea, vomiting, abdominal pain, finger tremors, jaundice, hepatitis, liver tenderness, monocytosis, kidney damage, dermatitis	11.10
Tetrachloroethylene (PCE)	GW:0.05	25 ppm	150 Ca	Eye, nose, and throat irritation; nausea; flushed face and neck; vertigo; dizziness; sleepiness; skin redness; headache; liver damage	9.32
1,1,2-Trichloroethane	GW:0.05	10 ppm	100 Ca	Eye and nose irritation, CNS depression, liver damage, dermatitis	11.00
Trichloroethylene (TCE)	GW:2.4	50 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45
Toluene	GW:0.05	50 ppm	500	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Vinyl Chloride	GW:1.1	1 ppm	NL Ca	Weakness, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities	9.99

### Footnotes:

<sup>a</sup> Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).

<sup>b</sup> Appropriate value of PEL, REL, or TLV listed.

<sup>c</sup> IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

<sup>d</sup> PIP = photoionization potential; NA = Not applicable; UK = Unknown.

## 2.6 Potential Routes of Exposure

**Dermal:** Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.

**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.

**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).



### 3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

Subcontractor:

Subcontractor Contact Name:

Telephone:

The subcontractors listed above are covered by this HSP and must be provided a copy of this plan. However, this plan does not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work. Subcontractors must comply with the established health and safety plan(s). The CH2M HILL SSC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SSC is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review subcontractor performance.

Health and safety related communications with CH2M HILL subcontractors should be conducted as follows:

- Brief subcontractors on the provisions of this plan, and require them to sign the Employee Signoff Form included in Attachment 1.
- Request subcontractor(s) to brief the project team on the hazards and precautions related to their work.
- When apparent non-compliance/unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliance/unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

## 4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-07, *Personal Protective Equipment*, HS-08, *Respiratory Protection*)

### PPE Specifications <sup>a</sup>

Task	Level	Body	Head	Respirator <sup>b</sup>
<ul style="list-style-type: none"> <li>Surveying</li> </ul>	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
<ul style="list-style-type: none"> <li>Drilling</li> <li>Well installation</li> <li>Groundwater sampling</li> <li>Aquifer testing</li> </ul>	Modified D	<b>Coveralls:</b> Cotton coveralls, or uncoated Tyvek if cotton cannot be kept clean <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
All tasks that require upgrade according to the Action Levels in Section 5.0	C	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent <sup>e</sup> .

### Reasons for Upgrading or Downgrading Level of Protection

Upgrade <sup>f</sup>	Downgrade
<ul style="list-style-type: none"> <li>Request from individual performing tasks.</li> <li>Change in work tasks that will increase contact or potential contact with hazardous materials.</li> <li>Occurrence or likely occurrence of gas or vapor emission.</li> <li>Known or suspected presence of dermal hazards.</li> <li>Instrument action levels (Section 5) exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>New information indicating that situation is less hazardous than originally thought.</li> <li>Change in site conditions that decreases the hazard.</li> <li>Change in work task that will reduce contact with hazardous materials.</li> </ul>

<sup>a</sup> Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

<sup>b</sup> No facial hair that would interfere with respirator fit is permitted.

<sup>c</sup> Hardhat and splash-shield areas are to be determined by the SSC.

<sup>d</sup> Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

<sup>e</sup> Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

<sup>f</sup> Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

# 5 Air Monitoring/Sampling

(Reference CH2M HILL SOP HS-06, *Air Monitoring*)

## 5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels <sup>a</sup>	Frequency <sup>b</sup>	Calibration
<b>PID: OVM with 10.6eV lamp or equivalent</b>	<ul style="list-style-type: none"> <li>• Drilling</li> <li>• Well installation</li> <li>• Groundwater sampling</li> <li>• Aquifer testing</li> </ul>	<p>&lt;1 ppm → Level D</p> <p>≥1 ppm → Collect colorimetric tubes, if Benzene or Vinyl Chloride ARE NOT detected, then:</p> <p>1-5 ppm → Level D</p> <p>5-25 ppm → Level C</p> <p>25 ppm → Stop work; Notify HSM</p> <p>If Benzene or Vinyl Chloride ARE detected, then:</p> <p>Stop work; Notify HSM</p>	Initially and periodically during task	Daily
<b>CGI: MSA model 260 or 261 or equivalent</b>	<ul style="list-style-type: none"> <li>• Drilling</li> </ul>	<p>0-10% : No explosion hazard</p> <p>10-25% LEL: Potential explosion hazard</p> <p>&gt;25% LEL: Explosion hazard; evacuate or vent</p>	Continuous during advancement of boring or trench	Daily
<b>Detector Tube: Drager benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube, or equivalent</b>	See PID	<p>No Color Change → See PID</p> <p>Color Change → See PID</p>	Initially and periodically when PID >1 ppm	Not applicable
<b>Colorimetric Tube: Drager vinyl chloride specific (0.5 to 30 ppm range) with pre-tube, or equivalent</b>	See PID	<p>No Color Change → See PID</p> <p>Color Change → See PID</p>	Initially and periodically when PID >1 ppm	Not applicable

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background for more than 5 minutes.

<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

<sup>c</sup> If the measured percent of O<sub>2</sub> is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O<sub>2</sub> action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O<sub>2</sub> action levels are required for confined-space entry (refer to Section 2).

## 5.2 Calibration Specifications

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: OVM, 10.6 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing
CGI: MSA 260, 261, 360, or 361	0.75% pentane	N/A	50% LEL + 5% LEL	1.5 lpm reg direct tubing
PID: MultiRAE 10.6 eV bulb		Per Manufacturer's Specification		
O <sub>2</sub> Meter: MSA 260 or 261		Per Manufacturer's Specification		
Colometric tubes: Benzene and Vinyl Chloride specific		Per Manufacturer's Specification		

## 5.3 Air Sampling

Sampling, in addition to real-time monitoring, may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

### Method Description

Personal air sampling methodology will be determined on the site conditions and contaminated levels encountered. The CH2MHILL Health and Safety Manager will make this determination.

### Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to:

HSM: John Longo/NJO  
Other: Steve Beck/MKE

## 6 Decontamination

(Reference CH2M HILL SOP HS-13, *Decontamination*)

The SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SSC. The SSC must ensure that procedures are established for disposing of materials generated on the site.

### 6.1 Decontamination Specifications

Personnel	Sample Equipment	Heavy Equipment
<ul style="list-style-type: none"><li>• Boot wash/rinse</li><li>• Glove wash/rinse</li><li>• Outer-glove removal</li><li>• Body-suit removal</li><li>• Inner-glove removal</li><li>• Respirator removal</li><li>• Hand wash/rinse</li><li>• Face wash/rinse</li><li>• Shower ASAP</li><li>• Dispose of PPE in municipal trash, or contain for disposal</li><li>• Dispose of personnel rinse water to facility or sanitary sewer, or contain for offsite disposal</li></ul>	<ul style="list-style-type: none"><li>• Wash/rinse equipment</li><li>• Solvent-rinse equipment</li><li>• Contain solvent waste for offsite disposal</li></ul>	<ul style="list-style-type: none"><li>• Power wash</li><li>• Steam clean</li><li>• Dispose of equipment rinse water to facility or sanitary sewer, or contain for offsite disposal</li></ul>

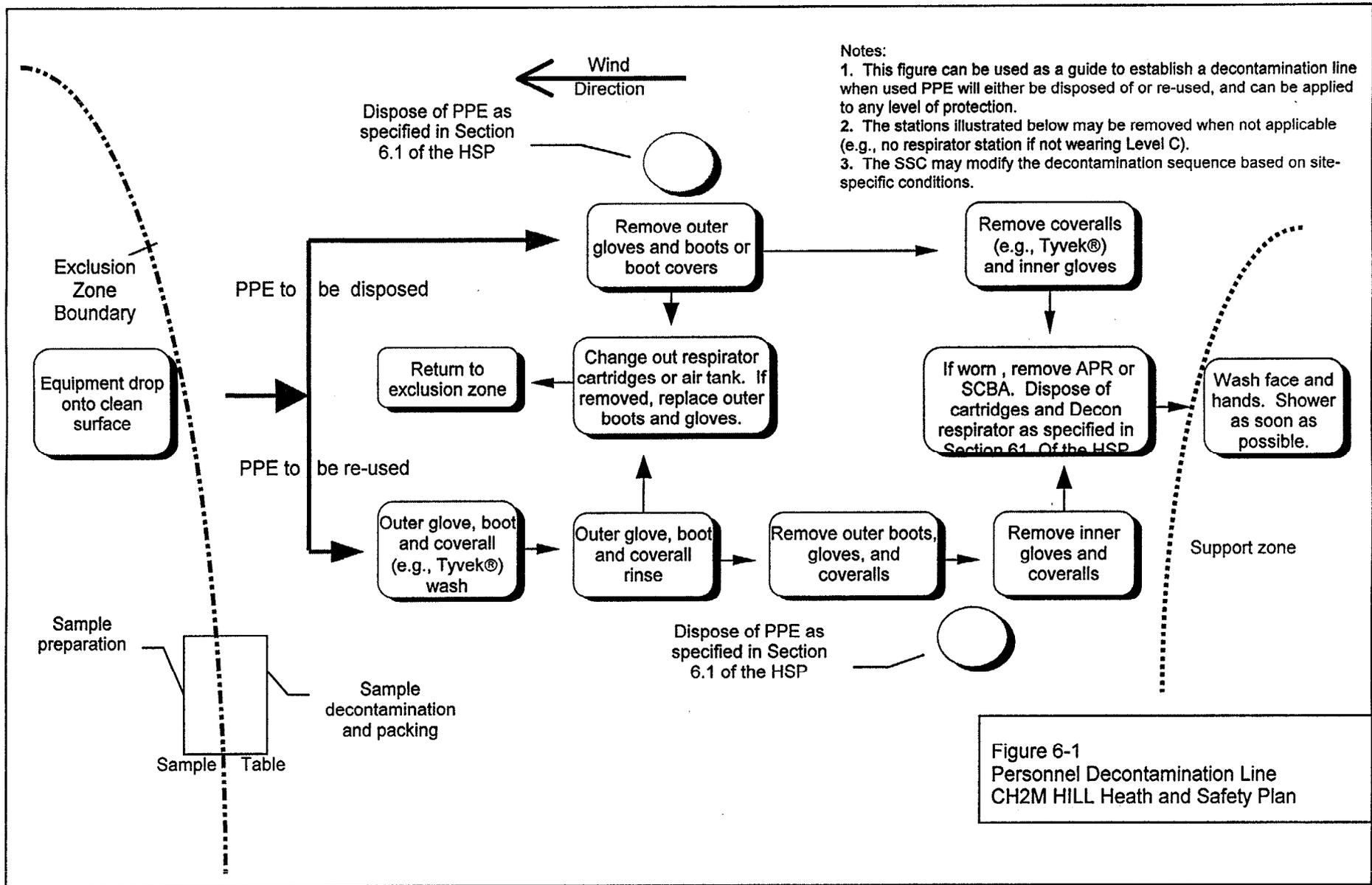
### 6.2 Diagram of Personnel-Decontamination Line

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 6-1 illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SSC to accommodate task-specific requirements.

## 7 Spill-Containment Procedures

Sorbent material will be maintained in the support zone. Incidental spills will be contained with sorbent and disposed of properly.



## 8 Site-Control Plan

### 8.1 Site-Control Procedures

(Reference CH2M HILL SOP HS-11, *Site Control*)

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location in accordance with CH2M HILL SOP HS-71, *OSHA Postings*.
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the “buddy system.”
- Initial air monitoring is conducted by the SSC in appropriate level of protection.
- The SCC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

### 8.2 Hazwoper Compliance Plan

(Reference CH2M HILL SOP HS-19, *Site-Specific Written Safety Plans*)

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section 1.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or while non-Hazwoper-trained staff are working in proximity to Hazwoper activities. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to subsections 2.5 and 5.3 for contaminant data and air sampling requirements, respectively.
- When non-Hazwoper-trained personnel are at risk of exposure, the SSC must post the exclusion zone and inform non-Hazwoper-trained personnel of the:
  - nature of the existing contamination and its locations
  - limitations of their access
  - emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants.
- When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.
- Remediation treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hour of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must not enter the TSDF area of the site.

## 9 Emergency Response Plan

(Reference CH2M HILL, SOP HS-12, *Emergency Response*)

### 9.1 Pre-Emergency Planning

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

### 9.2 Emergency Equipment and Supplies

The SSC should mark the locations of emergency equipment on the site map and post the map.

<b>Emergency Equipment and Supplies</b>	<b>Location</b>
20 LB (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Vehicle
Eye Wash	Support & Decon Zone/Field Vehicle
Potable water	Support & Decon Zone/Field Vehicle
Bloodborne-pathogen kit	Support Zone/Field Vehicle
Additional equipment (specify): Cell Phone	Field Vehicle

### 9.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

## 9.4 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 9.8 (e.g., 911).
- The SSC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 9.7.

## 9.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SSC and a “buddy” will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

## 9.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy’s wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

## 9.7 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help Human Resources administrator complete an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

## 10 Approval

This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

### 10.1 Original Plan

Written By: Ben Francisco

Date: 01/02/02

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Approved By: Steve Beck

Date: 11/09/01

Co-Approved By:   
John Culley/SEA

### 10.2 Revisions

Revisions Made By: Ben Francisco

Date: 01/03/2002

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Revisions to Plan: Contaminants of Concern Table Amended

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Revisions Approved By: Steve Beck

Date: 01/07/2002



## 11 Attachments

- Attachment 1: Employee Signoff Form – Field Safety Instructions
- Attachment 2: Project-Specific Chemical Product Hazard Communication Form
- Attachment 3: Chemical-Specific Training Form
- Attachment 4: Emergency Contacts
- Attachment 5: Project Activity Self-Assessment Checklists
- Attachment 6: Applicable Material Safety Data Sheets





# CH2MHILL

## CHEMICAL-SPECIFIC TRAINING FORM

Location:	Project # : 157392.LT.01102601
HCC:	Trainer:

### TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

### REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:


The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

- Physical and health hazards
- Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

# Emergency Contacts

## 24-hour CH2M HILL Emergency Beeper – 888/444-1226

<p><b>Medical Emergency – 911</b>                  Facility Medical Response #:                  Local Ambulance #:</p>	<p><b>CH2M HILL Medical Consultant</b>                  Dr. Peter Greaney                  GMG WorkCare, Orange, CA                  800/455-6155                  (After hours calls will be returned within 20 minutes)</p>
<p><b>Fire/Spill Emergency – 911</b>                  Facility Fire Response #:                  Local Fire Dept #:</p>	<p><b>Local Occupational Physician</b>                  I &amp; O Medical Center-Hampton                  530 Aberdeen Rd., #4302                  Hampton, VA 23661                  757-825-1100</p>
<p><b>Security &amp; Police – 911</b>                  Facility Security #:                  Local Police #:</p>	<p><b>Corporate Director Health and Safety</b>                  Name: Mollie Netherland/SEA                  Phone: 206/453-5005  <b>24-hour emergency beeper: 888-444-1226</b></p>
<p><b>Utilities Emergency</b>                  Water: 757-444-6414 (Public Works Center)                  Gas: 757-444-6414 (Public Works Center)                  Electric: 757-444-6414 (Public Works Center)</p>	<p><b>Health and Safety Manager (HSM)</b>                  Name: John Longo/NJO                  Phone: 973-316-0159 x 4543</p>
<p><b>Designated Safety Coordinator (DSC)</b>                  Name: Ben Francisco                  Phone: 757-460-3734 x 20</p>	<p><b>Regional Human Resources Department</b>                  Name: Shannon Loos/MKE                  Phone: 414-272-1052 x 265</p>
<p><b>Project Manager</b>                  Name: Ben Francisco                  Phone: 757-460-3734 x 20</p>	<p><b>Corporate Human Resources Department</b>                  Name: John Monark/COR                  Phone: 303/771-0900</p>
<p><b>Federal Express Dangerous Goods Shipping</b>                  Phone: 800/238-5355  <b>CH2M HILL Emergency Number for Shipping Dangerous Goods</b>                  Phone: 800/255-3924</p>	<p><b>Worker's Compensation and Auto Claims</b>                  Sterling Administration Services                  Phone: 800/420-8926 After hours: 800/497-4566                   Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.</p>
<p>Contact the Project Manager. Generally, the Project Manager will contact relevant government agencies.</p>	
<p><b>Facility Alarms:</b> None</p>	<p><b>Evacuation Assembly Area(s):</b> To be determined prior to site activities.</p>
<p><b>Facility/Site Evacuation Route(s):</b> To be determined prior to site activities.</p>	
<p><b>Hospital Name/Address:</b> DePaul Medical Center                  150 Kingsley Ln, Norfolk</p>	<p><b>Hospital Phone #:</b> 757-889-5000</p>

## Directions to Hospital

Include written directions here, and attach or post a highlighted map if needed.

# **CH2M HILL HEALTH AND SAFETY PLAN**

## **Attachment 5**

### **Project Activity Self-Assessment Checklists**

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of a drilling subcontractor is required (complete entire checklist).

SSC/DSC may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
Location: \_\_\_\_\_ PM: \_\_\_\_\_  
Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to drilling hazards  
 Evaluate a CH2M HILL subcontractor's compliance with drilling H&S requirements  
Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
  - Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
  - Check "N/A" if an item is not applicable.
  - Check "N/O" if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-35.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>PERSONNEL SAFE WORK PRACTICES (3.1)</b>				
1. Only authorized personnel operating drill rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel cleared during rig startup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel clear of rotating parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel not positioned under hoisted loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Loose clothing and jewelry removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel instructed not to approach equipment that has become electrically energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Smoking is prohibited around drilling operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel wearing appropriate PPE, per HSP/FSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>GENERAL (3.2.1)</b>				
9. Daily safety briefing/meeting conducted with crew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Daily inspection of drill rig and equipment conducted before use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG PLACEMENT (3.2.2)</b>				
11. Location of underground utilities identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Safe clearance distance maintained from overhead powerlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Drilling pad established, when necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Drill rig leveled and stabilized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG TRAVEL (3.2.3)</b>				
15. Rig shut down and mast lowered and secured prior to rig movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Tools and equipment secured prior to rig movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Only personnel seated in cab are riding on rig during movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Safe clearance distance maintained while traveling under overhead powerlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Backup alarm or spotter used when backing rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG OPERATION (3.2.4)</b>				
20. Kill switch clearly identified and operational	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. All machine guards are in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Rig ropes not wrapped around body parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Pressurized lines and hoses secured from whipping hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Drill operation stopped during inclement weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Air monitoring conducted per HSP/FSI for hazardous atmospheres	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Rig placed in neutral when operator not at controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG MAINTENANCE (3.2.5)</b>				
27. Defective components repaired immediately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Lockout/tagout procedures used prior to maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Cathead in clean, sound condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Drill rig ropes in clean, sound condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Fall protection used for fall exposures of 6 feet or greater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Rig in neutral and augers stopped rotating before cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Good housekeeping maintained on and around rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILLING AT HAZARDOUS WASTE SITES (3.2.6)</b>				
34. Waste disposed of according to HSP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Appropriate decontamination procedures being followed, per HSP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# **CH2M HILL HEALTH AND SAFETY PLAN**

## **Attachment 6**

### **Applicable Material Safety Data Sheets**