

Work Plan for Additional Investigation at Site 19, Site 27, and Stump Neck SWMU 14 at Naval Support Facility, Indian Head, Indian Head, Maryland

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1.0 Introduction

This work plan presents the proposed approach to conducting additional investigations at Site 19 (Catch Basins at Chip Collection Houses), Site 27 (Thermal Destructor 1), and Stump Neck Solid Waste Management Unit (SWMU) 14 (Photographic Lab Septic Tank System) at the Naval Support Facility, Indian Head (NSF-IH), Indian Head, Maryland.

This memorandum supplements and references the following documents:

- CH2M HILL, 2005. *Final Site Screening Process Investigation Work Plan for Sites 19, 26, and 27, Wetland Area Adjacent to Site 45, and Stump Neck SWMUs 14 and 30, Naval District Washington, Indian Head, Indian Head, Maryland* (herein referred to as SSP Work Plan).
- CH2M HILL, 2006. *Draft Site Screening Process Investigation Report for Sites 19, 26, and 27, Wetland Area Adjacent to Site 45, and Stump Neck SWMUs 14 and 30, Naval District Washington, Indian Head, Indian Head, Maryland* (herein referred to as SSP Report).
- Tetra Tech NUS Inc., 2004. *Master Plans for Installation Restoration Program Environmental Investigations, Naval District Washington, Indian Head, Indian Head, Maryland* (herein referred to as Master Plans).

2.0 Rationale for Field Investigation

As part of a site screening process (SSP) investigation conducted for six sites in 2005 and for two sites in June 2006, various environmental samples were collected from Sites 19 and 27, and SWMU 14. The results are presented in the SSP Report. The results and rationale for the

additional investigation at each site are summarized below. The SSP Report provides more details for each site.

Site 19: Surface soil samples were collected from 0 to 6 inches below ground surface (bgs) around and downgradient of the two chip collection basins at Building 785 and Building 1051. Based on the results, no further action for the Building 1051 catch basin was recommended in the SSP Report. Because of potential human health and ecological risks associated with nitroglycerin and lead, Building 785 was recommended for an additional investigation.

Site 27: In 2005, four soil borings were advanced to depths ranging from 10 to 14 feet bgs. One soil sample was collected from each boring and analyzed for unsymmetrical dimethylhydrazine (UDMH), hydrazine, target analyte list (TAL) metals, target compound list (TCL) semivolatile organic compounds (SVOCs), TCL volatile organic compounds (VOCs), explosives (including nitroglycerin and nitroguanidine), total organic carbon (TOC), and pH.

Neither UDMH nor hydrazine, the anticipated chemicals of potential concern, was detected in soil at Site 27. However, based on arsenic concentrations observed in the samples, the Indian Head Installation Restoration Team (IHIRT) agreed to collect surface soil samples to delineate the extent of metals at the site. In June 2006, five surface soil samples were collected and analyzed for TAL metals. The results are presented in the SSP Report. The report identified potential human health and ecological risks associated with metals in surface soil, specifically arsenic, cadmium, chromium, lead, and zinc.

SWMU 14: In 2005, six soil borings (three in each leach field) were advanced to depths ranging from 14 to 24 feet bgs. One subsurface soil sample was collected immediately above the water table from each boring. A second soil sample was collected from one of the borings, US14SB05, based on field evidence of possible contamination (stained dark sand). In addition to soil sampling, two monitoring wells were installed, one in each leach field. A groundwater sample was collected from IU14MW01, located in the older leach field. The groundwater sample was analyzed for TCL VOCs, TCL SVOCs, TAL metals (filtered and unfiltered), TOC, and pH. A groundwater sample could not be collected from IU14MW02, located in the newer leach field, because of insufficient well yield at the screened interval.

The results indicated that there are no human health or ecological risks associated with subsurface soil. Cobalt in groundwater was identified as a chemical of potential concern and was determined to pose a potential risk to human health and ecological receptors.

During the IHIRT partnering meeting on December 13, 2006, the IHIRT agreed that additional investigations are warranted for these sites. A sampling approach was proposed to and accepted by the IHIRT during the April 4, 2007, partnering meeting.

3.0 Objectives

The objectives of the additional investigation for each site are as follows:

Site 19

- Characterize the nature and extent of metals and explosives (including nitroglycerin and nitroguanidine) in surface and subsurface soil downgradient from the Building 785 catch basin.
- Determine if metals and explosives (including nitroglycerin and nitroguanidine) are present in groundwater downgradient from the Building 785 catch basin.
- Perform human health and ecological risk screenings to assess whether detected constituents in site soil pose potential risks to human health and ecological receptors.

Site 27

- Characterize the nature and extent of metals in surface soil around the concrete pad.
- Perform human health and ecological risk screenings to assess whether detected constituents in site soils pose potential risks to human health and ecological receptors.

SWMU 14

- Determine if metals (total and dissolved) are present in well IU14MW01 (older drain field).
- Determine if VOCs, SVOCs, metals (total and dissolved) are present in well IU14MW02 (newer drain field).
- Determine if metals (total and dissolved) are present in groundwater beneath the former septic tank and in both drain fields.
- Perform human health and ecological risk screenings to assess whether detected constituents in groundwater pose potential risks to human health and ecological receptors.

4.0 Scope of Work

4.1 Field Activities and Procedures

Field activities to be conducted include the following:

- Mobilization/demobilization
- Field activities
- Sample collection
- Sampling frequency, QA/QC samples, and sample handling
- Survey sample locations
- Decontamination of sampling equipment
- Investigation-derived waste (IDW) handling

4.1.1 Mobilization/Demobilization

The Navy will verify accessibility of the sites (because of nearby site operations). Utility clearance will be performed by a subcontractor; in addition, Miss Utility will be contacted before any intrusive work is conducted. Mobilization includes those activities required for general site conditions, including coordination with the Navy, stakeout of sample locations, and site orientation for field staff. Prior to mobilization, CH2M HILL field personnel will

review this Work Plan. Demobilization will consist of following proper decontamination procedures for all personnel and equipment and making sure that the site is left in the condition it was prior to mobilization.

4.1.2 Field Activities

Site 19

Soil Sampling. Four direct-push technology (DPT) borings (IS19DP01 through IS19DP04) will be advanced along the drainageway at distances of 25, 100, 200, and 300 feet from the former chip collection box (Figure 1). Soil samples will be collected from three depth intervals (0 to 0.5 foot, 2 to 3 feet, and 5 to 6 feet bgs) at each location, for a total of 12 soil samples.

The samples collected from the upper two depth intervals will be analyzed for TAL metals and explosives (including nitroglycerin and nitroguanidine). The samples will be analyzed on a 7-day turnaround time (TAT). The results of the 2- to 3-foot depth interval will be compared to EPA Region III Risk-based Concentrations (RBCs). The 5- to 6-foot depth interval samples will be analyzed if the concentrations of the 2- to 3-foot depth interval samples are higher than the RBCs.

Groundwater Sampling. One grab groundwater sample from one DPT location (IS19DP01) will be collected and analyzed for TAL metals (total and dissolved) and explosives (including nitroglycerin and nitroguanidine) on a standard TAT. The sample will be taken 25 feet from the former chip collection box (Figure 1).

Site 27

Surface Soil Sampling. Surface soil (0 to 0.5 foot bgs) samples will be collected and analyzed using a tiered approach. A total of seven Tier 1 samples will be collected from locations IS27SS06 through IS27SS12 at distances of approximately 20 feet from the concrete pad, and six Tier 2 samples will be collected from locations IS27SS13 through IS27SS18 at distances of 40 feet from the pad (Figure 2).

The Tier 1 samples will be analyzed for TAL metals on a 14-day TAT. The results will be compared to RBCs. If the concentrations are higher than the RBCs, then the Tier 2 samples nearest to the impacted Tier 1 location(s) will be analyzed for TAL metals.

SWMU 14

Groundwater Sampling. Groundwater samples will be collected from the existing monitoring wells, IU14MW01 (older drain field) and IU14MW02 (newer drain field) (Figure 3). The well IU14MW01 groundwater sample will be analyzed for TAL metals (total and dissolved) because VOCs and SVOCs were not found at concentrations posing risk concerns during the SSP investigation. The well IU14MW02 groundwater sample will be analyzed for TCL VOCs, TCL SVOCs, TAL metals (total and dissolved), TOC, and pH because it was not sampled during the SSP investigation.

In addition, grab groundwater samples will be collected from seven DPT points (IU14 DP01 through IU14DP07), one near the former septic tank, and three associated with each drain field (Figure 3). Depths to the drain lines and septic tank are unknown, but they are

expected to be within 4 feet bgs. The samples will be analyzed for TAL metals (total and dissolved). If groundwater cannot be sampled from IU14MW02, then the three DPT groundwater samples in the newer drain field will also be analyzed for TCL VOCs and TCL SVOCs because these parameters have not yet been investigated in groundwater in this area.

4.1.3 Sample Collection

All surface soil samples will be collected with a disposable plastic trowel. Samples will be placed in a stainless steel mixing bowl and homogenized. The samples will then be transferred to the sampling container. The DPT subsurface soil and groundwater samples will be collected in accordance with SOP SA-2.5 in the Master Plans. After collection, each sample will be placed in a cooler with ice and stored at 4°C for shipment to an offsite laboratory.

For all sampling performed at each site, the appropriate number of field quality assurance/quality control (QA/QC) samples, including field blanks, equipment blanks, and duplicates, will be analyzed in addition to laboratory QA/QC samples, including matrix spike/matrix spike duplicate samples.

4.1.4 Sampling Frequency, QA/QC Samples, and Sample Handling

Table 1 presents the sample media, number of samples, analyses, and collection procedures for this investigation. Table 2 presents the analytical procedures and the frequency at which field QA/QC samples will be collected. Tables 3 and 4 list the sample containers, preservatives, and holding times required for the intended analyses for solid and aqueous samples, respectively. Samples will be labeled, handled, documented, packaged, and shipped as detailed in the Master Plans and using the protocol from the SSP investigation.

4.1.5 Survey of Sample Locations

The horizontal locations (northing and easting coordinates) of the soil and groundwater locations will be surveyed with a portable global positioning system unit. The horizontal locations will be referenced to the 1983 North American datum.

4.1.6 Decontamination of Sampling Equipment

All non-dedicated sampling equipment will be decontaminated before beginning sampling activities and after each use. To minimize the amount of liquid IDW, disposable hand trowels will be used for sampling activities. Decontamination procedures are presented as part of the standard operating procedures provided in the Master Plans.

4.1.7 IDW Handling

All handling and disposal of IDW will be performed in accordance with the Master Plans (SOP SA-7.1). IDW generated during field investigation activities will consist of soil cuttings from DPT activities, purge water, and decontamination water. Paper towels used to wipe down equipment, personal protective equipment, and disposable trowels used during sampling will be disposed in the facility dumpsters.

5.0 Documentation

All sampling and field information will be documented in a field log book.

6.0 Data Evaluation and Reporting

Following laboratory analyses of the samples, a third-party data validator will validate the soil data and monitoring well groundwater data. Field and laboratory data will be used to perform human health and ecological risk screenings in accordance with Section 2.5, Data Evaluation, of the SSP Work Plan. Field activities conducted, analytical results, interpretation, and recommendations for management decisions will be presented in a technical memorandum and submitted to the IHIRT.

7.0 Standard Operating Procedures

Fieldwork will follow the standard operating procedures provided in the Master Plans and will be consistent with that performed during the SSP investigation.

8.0 Health and Safety

Health and safety procedures will follow those described in the Master Plans, the CH2M HILL Master Health and Safety Plan for NSF-IH, and a site-specific health and safety plan.

9.0 Schedule

Fieldwork is anticipated to commence and end in July 2007.

Tables

TABLE 1
 Sampling and Analysis Summary
 Work Plan for Additional Investigation at Site 19, Site 27, and Stump Neck SWMU 14
 Naval Support Facility, Indian Head, Indian Head, Maryland

Media	Number of Samples	Analysis	Procedures
Surface Soil (Site 19)	4	TAL Metals/Cyanide, Explosives, Nitroglycerin, Nitroguanidine	Obtain surface soil samples with a disposable hand trowel
Subsurface Soil (Site 19)	8	TAL Metals/Cyanide, Explosives, Nitroglycerin, Nitroguanidine	Obtain subsurface soil samples from direct push borings from depths of 2 to 3 feet and 5 to 6 feet below ground surface
Groundwater from Direct Push Boring (Site 19)	1	TAL Metals/Cyanide, Filtered Metals, Explosives, Nitroglycerin, Nitroguanidine	Purge and sample temporary well using a peristaltic pump
Surface Soil (Site 27)	13	TAL Metals/Cyanide	Obtain surface soil samples with a disposable hand trowel
Groundwater from Monitoring Wells (Stump Neck SWMU 14)	2	<u>IU14MW01</u> : TAL Metals/Cyanide, Filtered Metals <u>IU14MW02</u> : TAL Metals/Cyanide, Filtered Metals, TCL VOCs, TCL SVOCs, TOC, pH	Purge and sample monitoring wells using a peristaltic pump
Groundwater from Direct Push Borings IU14DP01 through IU14DP04 (Stump Neck SWMU 14)	7	<u>IU14DP01 through IU14DP04</u> : TAL Metals/Cyanide, Filtered Metals <u>IU14DP05 through IU14DP07</u> : TAL Metals/Cyanide, Filtered Metals; TCL VOCs and TCL SVOCs if sample cannot be collected from IU14MW02	Purge and sample temporary well using a peristaltic pump

TABLE 2

Summary of Samples to be Submitted for Analysis

*Work Plan for Additional Investigation at Site 19, Site 27, and Stump Neck SWMU 14
Naval Support Facility, Indian Head, Indian Head, Maryland*

Matrix	Laboratory Parameter (Method)	Samples	Field Duplicates ¹	Field Blanks ²	Equipment Blanks ³	Trip Blanks	Solids Total ⁵	Aqueous Total	MS/MSDs ⁴
Surface Soil (Site 19)	TAL Metals/Cyanide by ILM04	4	1				5	0	
	Nitroglycerin by SW846-8332	4	1				5	0	
	Nitroguanidine by SW846-8330 (Modified)	4	1				5	0	
	Nitroaromatics / Nitramines by SW846-8330	4	1				5	0	
Subsurface Soil (Site 19)	TAL metals/Cyanide by ILM04	8	1		1		9	1	1/1
	Nitroglycerin by SW846-8332	8	1		1		9	1	1/1
	Nitroguanidine by SW846-8330 (Modified)	8	1		1		9	1	1/1
	Nitroaromatics / Nitramines by SW846-8330	8	1		1		9	1	1/1
Groundwater from Direct Push Boring (Site 19)	TAL Metals/Cyanide by ILM04	1	1	1			0	3	1/1
	Filtered Metals by ILM04	1	1				0	2	1/1
	Nitroglycerin by SW846-8332	1	1	1			0	3	1/1
	Nitroguanidine by SW846-8330 (Modified)	1	1	1			0	3	1/1
	Nitroaromatics / Nitramines by SW846-8330	1	1	1			0	3	1/1
Surface Soil (Site 27)	TAL metals by ILM04.1	13	2		1		15	1	1/1
Groundwater from Monitoring Wells (Stump Neck SWMU 14)	TAL Metals/Cyanide by ILM04	2	1	1	1		0	5	1/1
	Filtered Metals by ILM04	2	1		1		0	4	1/1
	TCL VOCs by OLM04.2	1	1	1	1	1	0	5	1/1
	TCL SVOCs by OLM04.2	1	1	1	1		0	4	1/1
	TOC by Lloyd Kahn	1	1				0	2	1/1
	pH by SW845-9045C	1	1				0	2	1/1
Groundwater from Direct Push Borings	TAL Metals/Cyanide by ILM04	7	1				0	8	1/1
	Filtered Metals by ILM04	7	1				0	8	1/1

TABLE 2

Summary of Samples to be Submitted for Analysis

Work Plan for Additional Investigation at Site 19, Site 27, and Stump Neck SWMU 14

Naval Support Facility, Indian Head, Indian Head, Maryland

Matrix	Laboratory Parameter (Method)	Samples	Field Duplicates ¹	Field Blanks ²	Equipment Blanks ³	Trip Blanks	Solids Total ⁵	Aqueous Total	MS/MSDs ⁴
(Stump Neck SWMU 14)	TCL VOCs by OLM04 ⁶	3	1				0	4	1/1
	TCL SVOCs by OLM04 ⁶	3	1				0	4	1/1

Notes:

- 1 Field duplicates are collected at a rate of 1 per 10 samples per matrix.
- 2 Field Blanks are collected at a rate of 1 per sampling event per week.
- 3 Equipment Blanks are collected at a rate of 1 per day per matrix where equipment is decontaminated (i.e., if dedicated disposable equipment is not used). One per event if disposable equipment is used.
- 4 Matrix Spikes/Matrix Spike Duplicates (MS/MSDs) are collected at a frequency of 1 per 20 per matrix. MS/MSDs represent samples for which extra volume must be collected for the laboratory to perform required QC analyses. Triple the normal volumes will be collected for all analyses.
- 5 Solids total consists of the samples and their field duplicates.
- 6 Samples for these analyses will only be collected if samples cannot be collected from IU14MW02.

TAL = Target Analyte List; NA = Not appropriate given analyte list
TCL = Target Compound List TOC = Total Organic Carbon
SW846 = Test Methods for Evaluating Solid Waste

TABLE 3
 Summary of Required Containers, Preservatives, and Holding Times for Solid Samples
Work Plan for Additional Investigation at Site 19, Site 27, and Stump Neck SWMU 14
Naval Support Facility, Indian Head, Indian Head, Maryland

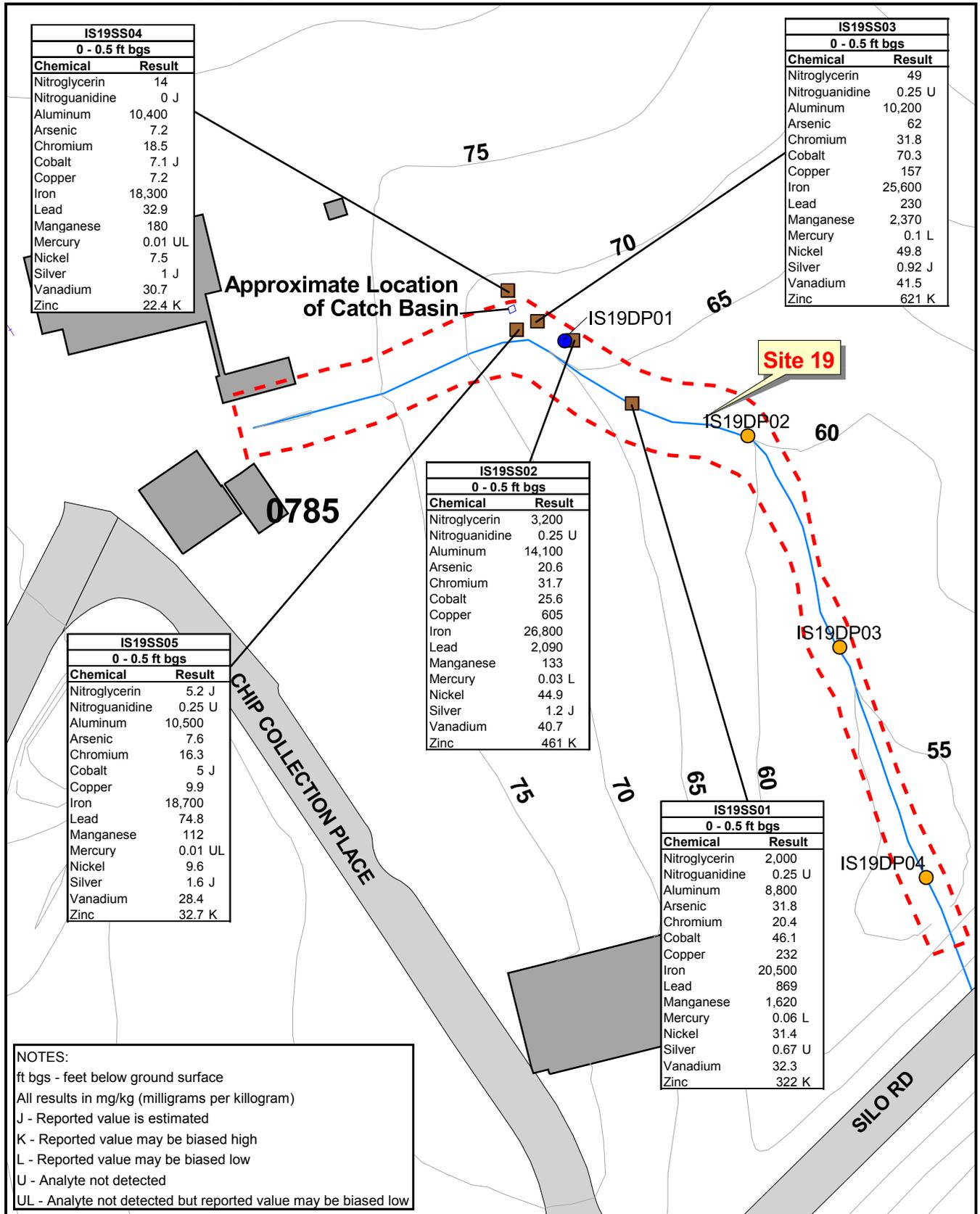
Parameter	Container Type	Preservation	Holding Time	Notes
TAL Metals/Cyanide	One 8-oz jar	Cool to 4°C	6 months (28 days for mercury, 14 days for cyanide)	Share 8-oz jar
Nitroglycerin	One 4-oz jar	Cool to 4°C	14 days to extract; 40 days to analysis	Share 8-oz jar
Nitroguanidine	One 4-oz jar	Cool to 4°C	14 days to extract; 40 days to analysis	Share 8-oz jar
Nitroaromatics / Nitramines	One 4-oz jar	Cool to 4°C	14 days to extract; 40 days to analysis	Share 8-oz jar

TABLE 4
 Summary of Required Containers, Preservatives, and Holding Times for Liquid Samples
Work Plan for Additional Investigation at Site 19, Site 27, and Stump Neck SWMU 14
Naval Support Facility, Indian Head, Indian Head, Maryland

Parameter	Container Type	Preservation	Holding Time	Notes
TAL Metals/Cyanide	One 500-mL HDPE One 250-mL HDPE	HNO ₃ to pH<2; NaOH to pH>12; cool to <4°C	6 months (28 days for Mercury, 14 days for Cyanide)	
Filtered TAL Metals	One 500-mL HDPE	HNO ₃ to pH<2; cool to <4°C	6 months (28 days for Mercury)	
Nitroglycerin	Two 1L amber glass	cool to <4°C	14 days to extract, 40 days to analysis	Share two 1L amber glasses
Nitroguanidine	Two 1L amber glasses	cool to <4°C	14 days to extract, 40 days to analysis	Share two 1L amber glasses
Nitroaromatics / Nitramines	Two 1L amber glasses	cool to <4°C	14 days to extract, 40 days to analysis	Share two 1L amber glasses
TCL VOCs	Three 40 mL glass vials	HCl to pH<2 and cool to 4°C	14 days to analysis	
TCL SVOCs	Two 1L amber glass	Cool to 4°C	7 days to extract; 40 days to analysis	
TOC	One 500-mL HDPE container	HCl or H ₂ SO ₄ to pH<2 and cool to <4°C	28 days to analysis	
pH	One 250-mL HDPE container	Cool to 4°C		

HDPE= high-density polyethylene

Figures



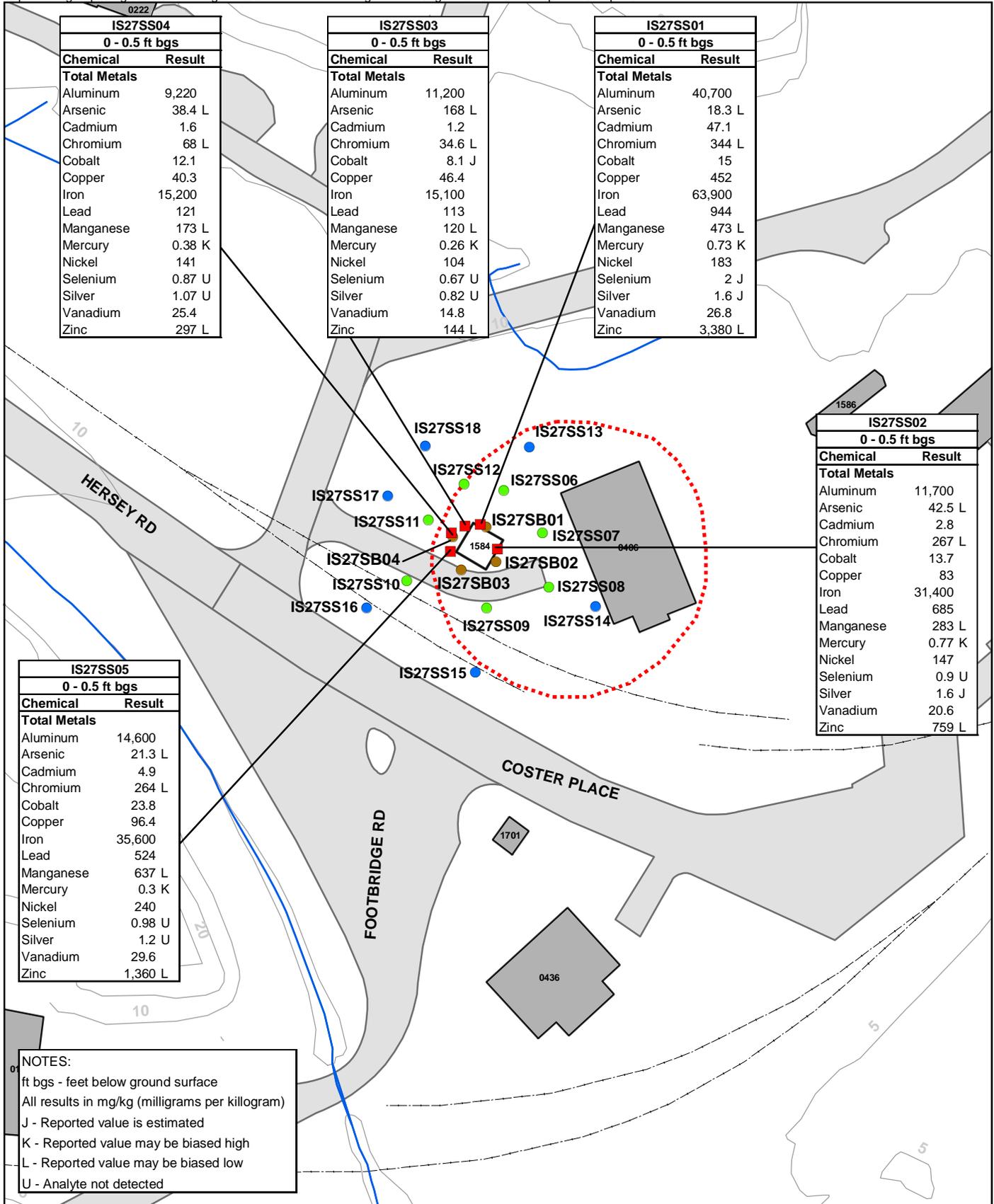
LEGEND

- Approximate Site Boundary
- Proposed DPT Soil Sample Location
- Proposed DPT Soil and Groundwater Sample Location
- Surface Soil Sample Location (sampled during the 2005 SSP investigation, CH2M HILL, 2006)
- Elevation Contour (5 Foot interval)
- Water Bodies
- Buildings
- Roads & Paved Areas

0 30 60 Feet
1 INCH = 60 FEET

Figure 1
Proposed Sample Locations
Work Plan for Additional Investigation
at Site 19, Site 27, and Stump Neck SWMU 14
NSF-IH, Indian Head, Maryland

CH2MHILL



NOTES:
 ft bgs - feet below ground surface
 All results in mg/kg (milligrams per kilogram)
 J - Reported value is estimated
 K - Reported value may be biased high
 L - Reported value may be biased low
 U - Analyte not detected

LEGEND

- Surface Soil Sample Locations (sampled during the 2005 SSP investigation, CH2M HILL, 2006)
- Subsurface Soil Sample Location (sampled during the 2005 SSP investigation, CH2M HILL, 2006)
- Proposed Tier 1 DPT Soil Sample Location
- Proposed Tier 2 DPT Soil Sample Location
- Concrete Pad (Former Structure)
- ▭ Roads and Paved Areas
- ▭ Buildings
- ~ Elevation Contour (5 foot interval)
- ⋄ Approximate Site Boundary
- ~ Water Bodies
- ~ Railroad

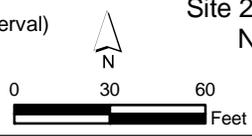
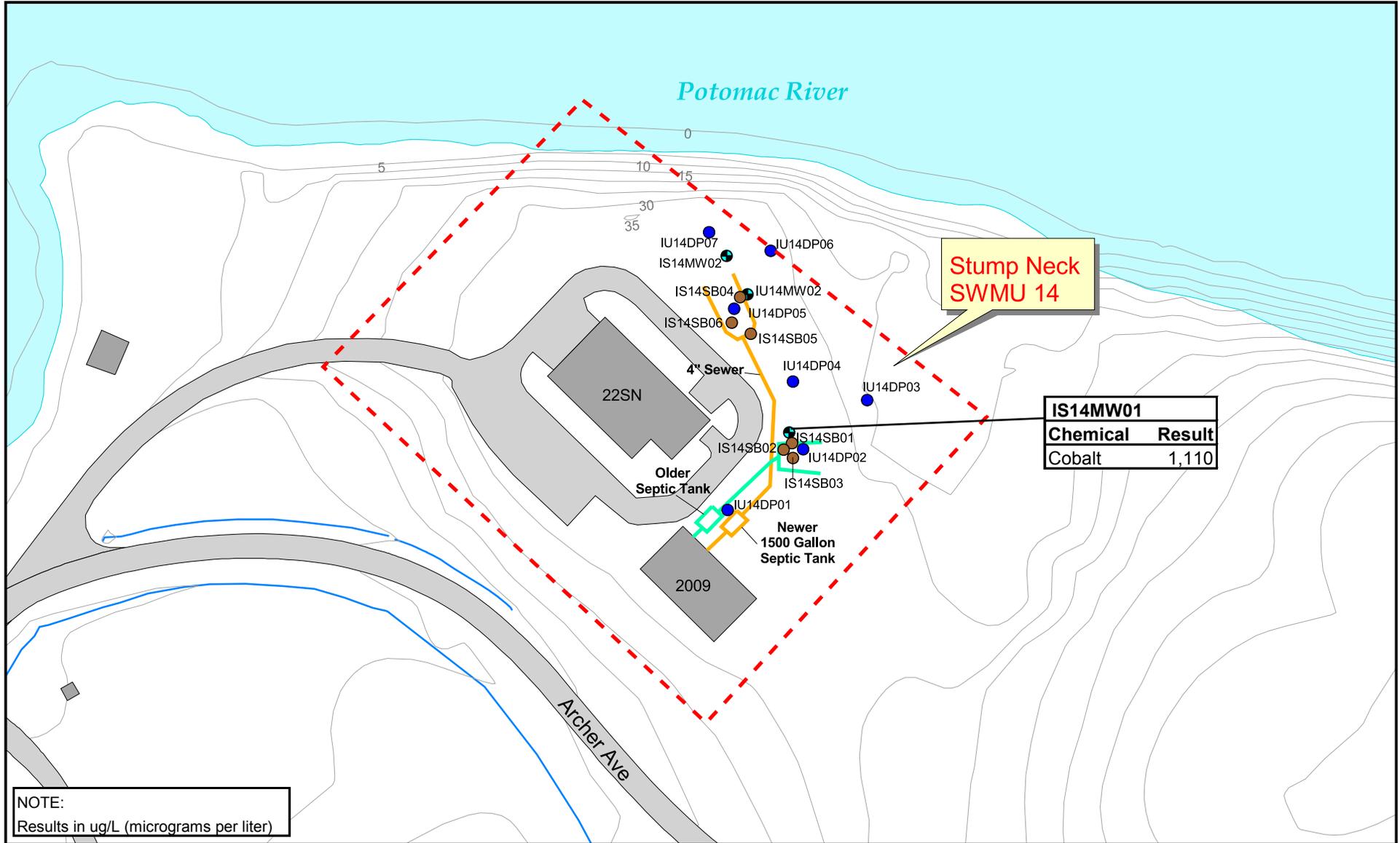


Figure 2
 Proposed Sample Locations
 Work Plan for Additional Investigation at Site 19,
 Site 27, and Stump Neck SWMU 14
 NSF-IH, Indian Head, Maryland





NOTE:
Results in ug/L (micrograms per liter)

LEGEND

- Approximate SWMU Boundary
- Buildings
- Roads & Paved Areas
- Water Bodies
- Elevation Contours (5 Foot Interval)

- Subsurface Soil Sample Location (sampled during the 2005 SSP investigation, CH2M HILL, 2006)
- Monitoring Well Location (sampled during the 2005 SSP investigation, CH2M HILL, 2006)
- Proposed DPT Groundwater Sample Location

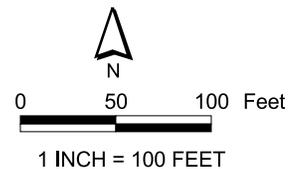


Figure 3
Proposed Sample Locations
Work Plan for Additional Investigation at Site 19,
Site 27, and Stump Neck SWMU 14
NSF-IH, Indian Head, Maryland

