



DEPARTMENT OF THE NAVY

INDIAN HEAD DIVISION
NAVAL SURFACE WARFARE CENTER
101 STRAUSS AVE
INDIAN HEAD MD 20640-5035

5090
Ser 046/169
1 Sep 98

Mr. Elmer Biles
6315 Indian Head Highway
Indian Head, MD 20640

Dear Mr. Biles:

We are writing in response to your letter of August 14, 1998, concerning the Installation Restoration (IR) Site 57 Remedial Investigation Work Plan. We appreciate you taking the time to review this document and provide your comments to us. The Navy has been trying to get the public involved in remediation activities at Naval facilities to ensure that everyone, especially in nearby communities, understands what is being done and to address all concerns prior to conducting fieldwork. The only way this can be done is by receiving input from active citizens, like you.

A copy of your letter is included as enclosure (1). Your first comment refers to sampling at the location that the storm sewer downgradient from IR Site 57 discharges into the Mattawoman Creek and the number of samples that are to be taken at this location. First, we need to mention that the Executive Summary should state that 31 water samples, rather than 30, and 6 sediment samples will be taken with respect to the storm sewer system. This estimate is based on the assumption that each manhole has 2 inlet pipes and 1 outlet pipe. We know that some of the manholes have only 1 inlet pipe and 1 outlet pipe, while others have up to 4 inlet pipes and 1 outlet pipe.

In addition, Table 3-2 from the work plan, which has been reduced in size for inclusion in this letter as enclosure (2), provides details on the samples to be taken and their locations. The locations of the samples referenced in the table are shown on Figure 4-3 of the work plan. This figure has been included as enclosure (3).

One last item to mention before we can proceed is that the sampling nomenclature, as discussed on page 6-4 of the work plan, provides the site number, the media to be sampled (water, soil, sediment), and the sample number, among other information. For example, sample S57SW009 refers to IR Site 57 (S57) surface water (SW) sample number 009; and sample S57SD005 refers to IR Site 57 (S57) sediment (SD) sample number 005.

Based on this information, the sample numbers that you have listed in your comment refer to 6 separate samples at 3 distinct locations: 3 water samples and 3 sediment samples. A surface water sample (S57SW009) and a sediment sample (S57SD005) will be taken at the outfall of the 36-inch pipe at Mattawoman Creek. A surface water sample (S57SW010) and a sediment sample (S57SD006) will be taken 50 feet down stream from the outfall to Mattawoman Creek. And, a surface water sample (S57SW016) and a sediment sample (S57SD012) will be taken at the discharge of the concrete channel to Mattawoman Creek. Again, these samples are shown on enclosure (3).

Next, your letter states that "...this is not an adequate sampling for measuring contaminants at what has to be a primary point of consideration. One of our primary objectives in this investigative work must be to assure ourselves that there is no discharge of contaminants from Site 57 by whatever source into the Mattawoman Creek."

We would like to address the second portion of this comment first. The purpose of a Remedial Investigation (RI) is to characterize a site, that is, to determine the nature and extent of contamination of that site. This includes determining contaminants at the site; locating all possible paths that contaminants can follow to reach a receptor, such as humans, fish, etc.; and determining how far the contaminants have migrated. Once the site has been characterized through an RI, then final remedial action alternatives will be determined and one selected to remediate the site during a Feasibility Study. Therefore, the primary objective of the RI, as stated above, is to fully characterize the site.

To address the first part of your comment, it is important to note that this storm sewer receives industrial wastewater, such as cooling water from the powerhouse, and is regulated by the Maryland Department of the Environment (MDE) under the National Pollutant Discharge Elimination System (NPDES) as Industrial Wastewater Outfall (IW) 80. The NPDES permit for our Activity sets a limit of 100 parts per billion (ppb) of trichloroethylene (TCE) for IW 80. The permit became effective on February 1, 1998, and requires quarterly sampling for TCE. However, beginning in January 1999, IW 80 will be sampled monthly for TCE. NPDES sample results to date for TCE at IW 80 are listed below:

<u>Quarter</u>	<u>Sample Date</u>	<u>Concentration of TCE</u>
1	March 5, 1998	81 ppb
2	April 14, 1998	78 ppb
*	June 9, 1998	19 ppb
**	June 9, 1998	<5 ppb
3	July 1, 1998	51 ppb

* Sample taken during an NPDES inspection.

** Sample taken by MDE inspector during NPDES inspection.

From this data, we can see that TCE from IR Site 57 is already entering the Mattawoman Creek at levels below the permitted limit of 100 ppb.

Also, as discussed in previous Restoration Advisory Board meetings, a removal action will be conducted prior to this RI study to decrease, and hopefully eliminate, the discharge of TCE to the Mattawoman Creek. The removal action involves the relining of approximately 800 feet of the storm sewer pipe to eliminate TCE-contaminated groundwater infiltration into the storm sewer.

Your final statement in your first comment suggests that we increase the number of samples at the discharge point and schedule them over a period of time so that we can have confidence in the results. This would be appropriate after a final site remediation has been conducted, to ensure that the remedial action was successful. We can discuss this issue again during the Remedial Design phase of IR Site 57, which is budgeted for fiscal year 1999.

In your second comment, you discuss the need for regular sampling of fish and shellfish in the Mattawoman Creek to ensure that they are safe to eat. Although this issue is not within the scope of the IR Site 57 RI work, it is an extremely important issue for the Navy and is worth addressing in this letter.

We are planning to conduct an Ecological Risk Assessment (ERA) of the Mattawoman Creek in the future. In fact, we have already had a team on-site to view the Mattawoman Creek and some IR sites along the Creek. The team, a technical resource for the Navy, contains members from the Naval Facilities Engineering Service Center in Port Hueneme, California; the EPA; and the U.S. Fish & Wildlife Service. The team will be assisting us in preparing a sampling scheme to obtain a thorough and accurate ERA of the Mattawoman Creek.

Prior to conducting the ERA, we need to obtain sediment samples in the Mattawoman Creek. This preliminary sampling will assist us in determining locations to sample for fish and biota. As we have discussed many times during Restoration Advisory Board meetings, funding for IR work is limited, especially with respect to studies. However, our Engineering Field Activity Chesapeake has budgeted for the preliminary sediment sampling in fiscal year (FY) 1999 and the ERA work in FY 2000. Information obtained in these efforts will be instrumental in determining risks to human health from eating fish from the Mattawoman Creek.

Even though prior risk assessments are based on limited data, none have stated that eating fish from the Mattawoman Creek positively causes adverse health effects on humans. They do, however, suggest that additional sampling is required to provide a more accurate risk assessment. Therefore, as discussed above, we plan to perform additional sampling to ensure that prior discharges and spills from our Activity do not adversely affect human health and the environment. If so, then these sites must be and will be remediated to eliminate the problem. This, in essence, is the true purpose of the Navy Installation Restoration Program.

5090
Ser 046/169

We hope that this response adequately addresses your concerns. If you have any additional comments or questions, please contact Mr. Shawn Jorgensen or Ms. Elaine Magdinec of my staff on (301) 743-6745.

Sincerely,



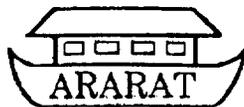
CHERYL E. DESKINS
Director, Waste Management
and Prevention Division
By direction of the Commander

Encl:

- (1) E. Biles ltr of 14 Aug 98
- (2) Table 3-2 of IR Site 57 RI Work Plan
- (3) Figure 4-3 of IR Site 57 RI Work Plan

Copy to:

RAB Members
EFACHES (Code 181)
Interested Parties



6315 Indian Head Highway
Indian Head, Maryland 20640

FAX 743-4180 6747
Mr. Shawn Jorgenson
Attention Code 046C
Indian Head Division
Naval Surface Warfare Center
101 Strauss Avenue
Indian Head, MD 20640-5035

August 14, 1998

REF: IR Site 57, Remedial Investigation Work Plan

Dear Mr. Jorgensen:

In reviewing the Investigation Work Plan for Site 57 I have the following comments:

1. The Executive Summary identifies in ES-1 some 30 water samples to be taken with respect to the storm sewer system and 6 for sediment samples. Table 3-2, however sites only one (1) sample each for assessing:

a. "stormwater at the discharge" -- outfall of the 36' pipe at the Mattawoman Creek (S57SW009 and S57SD005)

b. "Sediment at the discharge"--50' downstream from the outfall to Mattawoman Creek (S57SW010 and S57SD006)

c. "Examining for other contaminants"--at the discharge of the concrete channel to Mattawoman Creek(S57SW016 and S57SD012)

Does this represent a total of three or six samples?

In any event this is not an adequate sampling for measuring contaminants at what has to be a primary point of consideration. One of our primary objectives in this investigative work must be to assure ourselves that there is no discharge of contaminants from site 57 by whatever source into the Mattawoman Creek.

The proposed sampling at the above discharge points into the Mattawoman Creek should be significantly increased and scheduled over a period of time so that we can have confidence in the results.

2. As a related item to any investigative work relating to an assessment of Mattawoman contamination whether it be for site 57 or any other restoration project I strongly urge that regular sampling be done (either by the Fish and Wildlife Service or by private contractor) to make certain that the fish and shellfish in the Mattawoman are safe to eat and if not to make certain that the NSWC is not the source of contamination. **This should be a primary objective of the RAB.**

Thank you for the opportunity of commenting. If you have any questions please give me a call.

Sincerely,


Elmer S. Biles

ENCLOSURE(1)

TABLE 3-2
 INVESTIGATION MATRIX
 SITE 57 - FORMER DRUM LOADING AREA
 INDIAN HEAD DIVISION, NSW
 INDIAN HEAD, MARYLAND
 PAGE 2 OF 7

STUDY BOUNDARY			INVESTIGATION OBJECTIVES			IDENTIFY INPUTS TO THE DECISION					DECISION RULE	
Population, Contaminant Source/ Media/Path	Special	Temporal	Human Health Risk	Ecological Risk	Engineering	Investigative Technique	Location	Work Plan Figure	Quantity of Samples	Matrix		Analytical Parameter
			Determine vadose zone modeling parameters. Determine Aquifer modeling parameters (deep confining unit and confining lens) Determine total organic concentration (TOC) in aquifer soils for transport modeling.			Determine geotechnical (e.g., permeability) characteristics of the soil. Estimate the leachability of contamination from subsurface soil. Determine the soil characteristics with respect to RCRA requirements.	Collect "unsaturated" (5-in by 5-in) subsurface soil sample for geotechnical analyses. Collect soil samples from the screened interval of monitoring wells for estimating the partition coefficient (Kd) for the soil contaminants. Review regulations and estimate soil RCRA characteristics by evaluating soil sample analytical results.	4-1	6	Soil	Modeling parameters (Permeability for vertical hydraulic conductivity, moisture content, TOC, bulk density, grain size, and specific gravity). TCL VOC (including ethyl ether), TOC	If regulations and an evaluation of RCRA characteristics indicate the need, appropriate disposal options will consider the soils as hazardous waste.
	Downgradient from Study Area	Same as Site Area.	Determine if VOC contamination exists in the subsurface soils down gradient from the site.				Subsurface soil samples to determine if down gradient site-related contamination exists. Examine for other contamination	4-1	4	Soil	TCL VOCs (including ethyl ether)	If VOC contamination is detected in the down gradient surface soil samples then an additional round of sampling will be necessary to determine the extent of contamination.
							Collect samples at soil boring location S57S8005.	4-1	2	Soil	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Epiptenes (including nitrocellulose, nitroguanidine and nitroglycerine)	
Hot Spot Soil	Near the southern corner of Building 292	Sampling conducted in association with surface and subsurface sampling	Identify if an immediate threat to human health or the environment exists			Evaluate samples from location S57MW003 with respect to human health risk and ecological risk. Determine the concentration of VOC contamination which constitutes a hot spot. Determine the limits of the VOC hot spot. Determine the soil characteristics with respect to RCRA requirements. Determine if any structures or physical barriers exist which would effect implementation of remedial actions. Determine the configuration of the foundation of Building 292 at the south corner.	The hot spot is in the approximate location of S57S8002 and S57S8007. Sampling discussed in the surface and subsurface rows above. Human health risk assessment and Ecological risk assessment. Compare "hot spot" contamination concentrations to levels found over the site area. Review regulations and estimate soil RCRA characteristics by evaluating soil sample analytical results. Visual inspection and review facility utility maps. Examine construction drawings available from the facility	4-1	Sample listed above	Soil	Samples will be analyzed as identified in surface and subsurface site area sections.	If it is determined based on analytical results obtained from the soil sampling event that an immediate threat to human health or the environment exists, then a removal action will be considered. If regulations and an evaluation of RCRA characteristics indicate the need, appropriate disposal options will consider the soils as hazardous waste. If subsurface soil contamination extends below the foundation of Building 292, it may not be possible to cost effectively remove "hot spot" soil located at elevations below the foundation.
Groundwater	Upgradient from Study Area	Same sampling episode as potable wells.	Determine if VOC contamination exists in the groundwater up gradient of the site.				Install upgradient monitoring wells and sample groundwater to determine if upgradient groundwater contamination exists.	4-2	2	Water	TCL VOCs (including ethyl ether)	If VOC contamination is detected in the groundwater up gradient of the site, then an additional round of sampling may be necessary to verify analytical results, and a field investigation will be necessary if the source is to be determined.

ENCLOSURE(2)

TABLE 3-2

INVESTIGATION MATRIX
 SITE 57 - FORMER DRUM LOADING AREA
 INDIAN HEAD DIVISION, NSWC
 INDIAN HEAD, MARYLAND
 PAGE 3 OF 7

DRAFT FINAL

STUDY BOUNDARY			INVESTIGATION OBJECTIVES			IDENTIFY INPUTS TO THE DECISION						DECISION RULE
Population: Contaminant Source/ Media/Path	Special	Temporal	Human Health Risk	Ecological Risk	Engineering	Investigative Technique	Location	Work Plan Figure	Quantity of Samples	Matrix	Analytical Parameter	
						Examine for other contamination	Collect samples from well cluster S57MW012 & S57MW013	4-2	2	Water	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycenne), Ammonium Perchlorate, TOC, pH, Hardness (CaCO3)	
					Determine the depth of the groundwater Determine the hydraulic characteristics of the upgradient aquifer and determine the aquifer type.	Measure groundwater surface elevation. Hydraulic conductivity field tests and sampling	All Monitoring Wells All Monitoring Wells	4-2	4	Water	TDS	
	Site Area	Same sampling episode as potable wells.	Determine level of VOC contamination in the groundwater in the site area. Determine if other site-related contaminants exist in the Site Area.			Install monitoring wells and sample groundwater to define contaminant concentrations and extent.	In assumed hot spot area (see entry below) and at southern edge of site area: Install well cluster (1 in deep surficial aquifer, 1 in shallow surficial aquifer per cluster) at locations S57MW006, S57MW011 and as indicated below	4-2	2	Water	TCL VOCs (including ethyl ether)	If other site-related contamination is detected, further field investigations may be required
					Determine depth to groundwater. Determine groundwater flow direction	Install monitoring wells and sample groundwater to define contaminant concentrations and extent, also to examine for other contaminants. Measure groundwater surface elevation.	All Monitoring Wells All Monitoring Wells	4-2	2	Water	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycenne), TOC, pH, and Hardness (CaCO3)	
					Determine if there are seasonal or tidal influences on the groundwater table. Determine the hydraulic characteristics of the aquifer and determine the aquifer type. Determine geology of the aquifer.	Measure groundwater elevations quarterly Hydraulic conductivity field tests and sampling Log monitoring wells and soil borings	All Monitoring Wells All Monitoring Wells All Monitoring Wells		4	Water	TDS	
	Downgradient from Study Area	Same sampling episode as potable wells.	Determine if VOC contamination exists in the groundwater downgradient of the site.			Install down gradient monitoring wells and sample groundwater to determine if down gradient groundwater contamination exists.	Downgradient of site near northern and southern corners of Big 160 Well cluster (deep surficial aquifer, shallow surficial aquifer) at locations S57MW007 & S57MW008, and S57MW005	4-2	3	Water	TCL VOCs (including ethyl ether)	
					Determine depth to groundwater. Determine the hydraulic characteristics of the down gradient aquifer and determine the aquifer type.	Examine for other contamination Measure groundwater surface elevation. Hydraulic conductivity field tests and sampling	Collect samples from cluster S57MW008 & S57MW010 All Monitoring Wells All Monitoring Wells	4-2	2	Water	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycenne), Ammonium Perchlorate, TOC, pH, Hardness (CaCO3)	If VOC contamination is detected in the down gradient groundwater, then an additional round of sampling may be necessary to verify the analytical results, and additional wells will be necessary if the extent of the plume is to be determined
									5	Water	TDS	

TABLE 3-2
 INVESTIGATION MATRIX
 SITE 57 - FORMER DRUM LOADING AREA
 INDIAN HEAD DIVISION, NSWC
 INDIAN HEAD, MARYLAND
 PAGE 4 OF 7

Population/ Contaminant Source/ Media/Path	STUDY BOUNDARY		INVESTIGATION OBJECTIVES			IDENTIFY INPUTS TO THE DECISION					DECISION RULE	
	Special	Temporal	Human Health Risk	Ecological Risk	Engineering	Investigative Technique	Location	Work Plan Figure	Quantity of Samples	Matrix		Analytical Parameter
				Determine if site-related groundwater contamination is entering Mattawoman Creek.		Site inspection and sampling of viable seeps.	To be determined in the field	Not Shown	5	Water	TCL VOCs (including ethyl ether)	If no visual evidence of seeps is found, the samples will not be collected.
							To be determined in the field	Not Shown	5	Sediment	TCL VOCs (including ethyl ether)	If no visual evidence of seeps is found, the samples will not be collected.
Storm Sewer Trench and Bedding	Study area and downgradient of the Study Area		Determine if VOC contamination exists in the groundwater along the storm sewer trench/bedding down gradient of the site.		Determine the depth to groundwater.	Install temporary wells. Collect samples to determine the presence of contamination. Water level measurements. When groundwater is not encountered during the installation of an initial temporary well, collect a soil sample from the depth estimated for the pipe bedding.	Locations: S57TW001, S57TW002, S57TW003 All Temporary Wells Temporary wells where groundwater is not encountered	4-4	3	Water	TCL VOCs (including ethyl ether)	If analytical results indicate the presence of contamination, additional field investigations may be required. If groundwater is not encountered collect a soil sample from the depth of the pipe bedding
					Determine if the storm sewer or the trench/bedding material affect local groundwater flow patterns. Determine if the storm sewer trench/pipe bedding material is acting as a preferential pathway for contaminated groundwater.	Evaluate based on water level measurements. Evaluate based on analytical results and water level measurements.		4-4	3	Soil	TCL VOCs (including ethyl ether)	
Storm Sewer	Upgradient of the Study Area	Same as Site Area.	Determine if VOC contamination exists in the storm sewer water and/or sediment upgradient of the site. Determine if other site-related contamination is present.			Collect stormwater samples. Collect stormwater samples. Collect sediment sample from the bottom of the manhole. Collect sediment sample from the bottom of the manhole.	Manhole MH-427. (Assume 2 inlets and one outlet) Sample all inlets and outlet. S57SW001 three samples. Manhole MH-429. (Assume 2 inlets and one outlet) Sample all inlets and outlet. S57SW002 three samples. Manhole MH-427 invert. S57SD001 Manhole MH-429 invert. S57SD002	4-3	3	Water	TCL VOCs (including ethyl ether)	If VOC contamination is detected in the stormwater up gradient of the site, then an additional round of sampling will be necessary to verify the contamination and additional field investigation will be necessary to determine the source of contamination.
								4-3	3	Water	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine)	If contamination is detected in the stormwater up gradient of the site, then an additional round of sampling will be necessary to verify the contamination and additional field investigation will be necessary to determine the source of contamination.
								4-3	1	Sediment	TCL VOCs (including ethyl ether)	If VOC contamination is detected in the sediment up gradient of the site then an additional round of sampling will be necessary to verify the contamination and additional field investigation will be necessary to determine the source of contamination.
								4-3	1	Sediment	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine)	If contamination is detected in the sediment up gradient of the site, then an additional round of sampling will be necessary to verify the contamination and additional field investigation will be necessary to determine the source of contamination.
	Study Area	Collect samples when sufficient flow exists, but no sooner than 3 days following the last storm event	Determine the concentration of VOC contamination in the storm sewer water on the site area.			Collect storm water samples	Manhole MH-01(430) in 24" VC pipe (Assume 5 inlets). S57SW003	4-3	5	Water	TCL VOCs (including ethyl ether)	

TABLE 3-2
 INVESTIGATION MATRIX
 SITE 57 - FORMER DRUM LOADING AREA
 INDIAN HEAD DIVISION, NSWC
 INDIAN HEAD, MARYLAND
 PAGE 5 OF 7

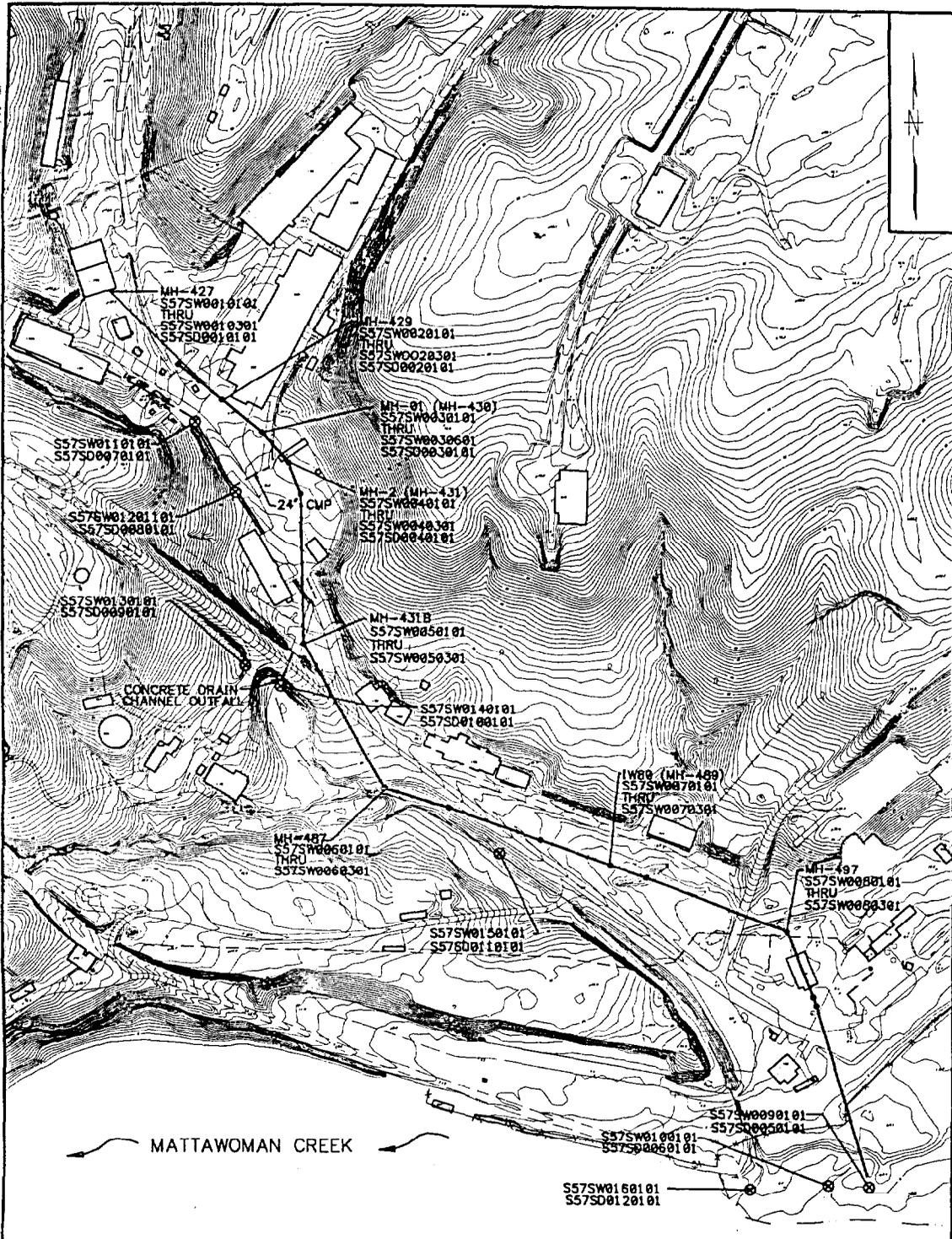
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STUDY BOUNDARY			INVESTIGATION OBJECTIVES			IDENTIFY INPUTS TO THE DECISION						DECISION RULE
Population/Contaminant Source/ Media/Path	Special	Temporal	Human Health Risk	Ecological Risk	Engineering	Investigative Technique	Location	Work Plan Figure	Quantity of Samples	Matrix	Analytical Parameter	
			Determine if other site-related contamination is present. Determine if there are contaminated sediments in the storm sewer system.			Collect stormwater samples Collect sediment sample from the bottom of the manhole Review facility records, visual inspection, field measurements, survey, and dye testing Visual field inspection Estimate the flow in sewer to evaluate if there is a net loss or net gain of water in the system.	Manhole MH-01(430) in 24" VC pipe (Assume 1 outlet). S57SW003 Manhole MH-01(430) in 24" VC pipe. S57SD003 Sampled manholes	4-3	1	Water	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pse/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine)	
					Determine the storm sewer layout, material and size. Assess the structural integrity of the storm sewer. Assess the storm sewer for possible infiltration or exfiltration.							
Downgradient of the Study Area	Same as Site Area.		Determine if VOC contamination exists in the storm sewer water and/or sediments down gradient of the site. Determine if other site-related contamination is present.			Collect stormwater samples Visual inspection Sample stormwater at the discharge Sample sediment at the discharge	For manholes MH-02(MH-431), MH-431B, MH-487, MH-488(W-80), and MH-497 (Assume 2 inlets and 1 outlet per manhole). Sample all inlets and outlets. For manholes MH-02(431), MH-488(W-80) outlet samples to be submitted for the additional analysis. Manholes MH-02(431) S57SD004 Outfall of 36-inch VC pipe at Mattawoman Creek. S57SW000 and S57SD005	4-3	15	Water	TCL VOCs (including ethyl ether)	If VOC contamination is detected in the down gradient monitoring well, then an additional round of sampling may be necessary to verify and additional field investigation may be necessary to determine the extent of the plume.
					Determine if the storm sewer system outlets to Mattawoman Creek. Determine contaminant levels in stormwater discharging to Mattawoman Creek. Determine the concentration of ecological parameters in the storm water discharging to Mattawoman Creek.	Collect sediment sample from the bottom of the manhole Visual inspection		4-3	2	Water	TCL SVOCs, TCL Pse/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine)	
						Sample stormwater at the discharge		4-3	1	Sediment	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pse/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine), TOC, AVS/SEM	
						Sample sediment at the discharge		4-3	1	Water	Ecological Parameter (Turbidity, TDS, TSS, chloride, fluoride, nitrate/nitrite, sulfate, salinity, and dissolved oxygen) TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pse/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine), TOC, AVS/SEM	
							50 feet down stream from the outfall to Mattawoman Creek. S57SW010 and S57SD006	4-3	1	Water	TCL VOCs (including ethyl ether)	

TABLE 3-2
 INVESTIGATION MATRIX
 SITE 57 - FORMER DRUM LOADING AREA
 INDIAN HEAD DIVISION, NSWC
 INDIAN HEAD, MARYLAND
 PAGE 6 OF 7

STUDY BOUNDARY			INVESTIGATION OBJECTIVES			IDENTIFY INPUTS TO THE DECISION					DECISION RULE	
Population/ Contaminant Source/ Media/Path	Special	Temporal	Human Health Risk	Ecological Risk	Engineering	Investigative Technique	Location	Work Plan Figure	Quantity of Samples	Matrix		Analytical Parameter
Concrete Drain Channel	Up gradient of concrete drain channel at 10' CMP pipe outlet.	Same as Site Area	Determine if VOC contamination exists in the storm water or the sediment in the concrete channel upgradient of the site.			Stormwater and sediment sample collection	At 10' CMP outlet into concrete channel S57SW011 and S57SD007	4-3	1	Sediment	TCL VOCs (including ethyl ether), TOC, AVS/SEM	If VOC contamination is detected in the stormwater up gradient of the site, then an additional round of sampling will be necessary to verify and an additional investigation will be needed to determine the source of contamination.
	Concrete drain channel in the Site Area by the 24' CMP outlet.	Collect samples when sufficient flow exists, but no sooner than 3 days following the last storm event.	Determine if VOC contamination exists in the storm water or the sediment in the concrete channel in the area of the site.			Stormwater and sediment sample collection in the concrete drain channel	At outlet of 24' CMP. S57SW012	4-3	1	Water	TCL VOCs (including ethyl ether)	
						Determine the dimensions, slope, and depth below grade of the concrete drain channel. Determine the surface water run-off flow path with respect to the concrete channel.	At outlet of 24' CMP. S57SD008	4-3	1	Sediment	TCL VOCs (including ethyl ether)	
Down gradient of the Study Area.	Same as Site Area.		Determine if VOC contamination exists in the storm water and/or sediments in the channel down gradient of the site.	Determine the concentration of ecological parameters in the drainage swale which discharges to Metawoman Creek. Determine the concentration of ecological parameters in the drainage swale which discharges to Metawoman Creek.		Stormwater and sediment sample collection	50 feet up gradient of outlet in swals. S57SW013 and S57SD009	4-3	1	Water	TCL VOCs (including ethyl ether) Ecological Parameter (Turbidity, TDS, TSS, chloride, fluoride, nitrate/nitrite, sulfate, salinity, and dissolved oxygen).	If VOC contamination is detected in the up gradient stormwater, then an additional round of sampling may be necessary to verify the extent of contamination.
					Examine for other contaminants	At outlet of concrete channel. S57SW014 and S57SD010	4-3	1	Water	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine)		
								4-3	1	Sediment	TCL VOCs (including ethyl ether), TCL SVOCs, TCL Pests/PCBs, TAL metals (including cyanide), Explosives (including nitrocellulose, nitroguanidine and nitroglycerine), TOC, AVS/SEM	
							In the stream, directly south of Build 157. S57SW015 and S57SD011	4-3	1	Water	TCL VOCs (including ethyl ether)	
								4-3	1	Sediment	Ecological Parameter (Turbidity, TDS, TSS, chloride, fluoride, nitrate/nitrite, sulfate, salinity, and dissolved oxygen) TCL VOCs (including ethyl ether), TOC, AVS/SEM	

ACAD: 0. 2/12/98 86/15/98 MF



LEGEND

- ⊗ SEDIMENT AND/OR STORM WATER SAMPLE LOCATION
- ==== LOCATION OF CONCRETE DRAIN CHANNEL
- — — — — LOCATION OF STORM SEWER MAIN LINE
- ● — — — — MANHOLE LOCATION STORM SEWER SYSTEM
- - - - - INTERMITTENT STREAM
- * * * * * CHAIN LINK FENCE

0 200 400
SCALE IN FEET

DRAWN BY: HJP DATE: 2/12/98 CHECKED BY: _____ DATE: _____ COST/SCHED-AREA: _____ SCALE: AS NOTED	<p>Brown & Root Environmental</p> <p>PROPOSED STORM WATER AND SEDIMENT SAMPLING FROM STORM WATER SEWER SYSTEM AND CONCRETE DRAIN CHANNEL LOCATION MAP SITE 57-FORMER DRUM LOADING AREA INDIAN HEAD DIVISION NSWC INDIAN HEAD, MARYLAND</p>	CONTRACT NO. 7129 OWNER NO. 0245 APPROVED BY: <i>[Signature]</i> DATE: 7/8/98 DRAWING NO. FIGURE 4-3 REV. 0
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DRAFT FINAL

ENCLOSURE(3)