Weston Solutions, Inc.
1400 Weston Way
West Chester, PA 19380
610-701-3000 ● Fax 610-701-3186
westonsolutions www..com

May 24, 2017

Greg Ham (3HS31)
On-scene Coordinator
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, Pennsylvania 19103

Re: Sparrows Point – Sediment Assessment Southeast Area
Field Sampling and Analysis Plan –Round 2
EPA Contract No. EP-S3-15-02
TDD No. W501-15-08-003
Document Control No. W0053.1A.02034

Dear Mr. Ham:

Weston Solutions, Inc. (Weston) is pleased to submit the final Field Sampling and Analysis Plan for the second round of Sediment and Surface Water Sampling at the Sparrows Point – Sediment Assessment Southeast Area site.

If you have questions regarding this report, please call me at (610) 701-3490.

Sincerely,

Chuck Rapone
Senior Project Scientist

Attachment(s)

cc: TDD file

FINAL
FIELD SAMPLING PLAN

SPARROWS POINT – SEDIMENT ASSESSMENT
SOUTHEAST AREA
BALTIMORE, MARYLAND

EPA CONTRACT NO.: EP-S3-15-02
TECHNICAL DIRECTION DOCUMENT NO.: W501-15-08-003
DOCUMENT CONTROL NO.: W0053.1A.02034

Prepared For:

U.S. Environmental Protection Agency Region III
Hazardous Site Cleanup Division
1650 Arch Street
Philadelphia, PA 19103

Prepared By:

Weston Solutions, Inc.
1400 Weston Way
West Chester, PA 19380

May 2017

DRAFT

FIELD SAMPLING PLAN
SPARROWS POINT – SEDIMENT ASSESSMENT
SOUTHEAST AREA
BALTIMORE, MARYLAND

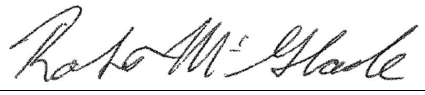
Approved by:		5/24/2017
	WESTON – Project Task Lead Charles Rapone	Date
Aproved by:		5/24/2017
	WESTON – START Program Manager Robert McGlade	Date
Approved by:		
	USEPA – On-Scene Coordinator Greg Ham	Date

TABLE OF CONTENTS

Section **Page**

LIST OF FIGURES

Title

LIST OF TABLES

Title

LIST OF ACRONYMS

°C	degrees Celsius
AES	Atomic Emission Spectroscopy
AOC	area of concern
AVS/SEM	acid volatile sulfide simultaneously extracted metals
BERA	Baseline Ecological Risk Assessment
BSC	Bethlehem Steel Corporation
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLP	Contract Laboratory Program
CVAA	Cold Vapor Atomic Adsorption
DAS	Delivery of Analytical Services
DCC	Description of Current Conditions
DO	dissolved oxygen
EAG	EnviroAnalytics Group
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
ESAT	Environmental Services Assistance Team
FSP	Field Sampling Plan
GPS	Global Positioning System
HHRE	Human Health Risk Evaluation
IATA	International Air Transport Association
ICP	Inductively Coupled Plasma
IDW	investigation-derived waste
MDE	Maryland Department of the Environment
MS	Mass Spectrometry
MS/MSD	matrix spike/matrix spike duplicate
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System

LIST OF ACRONYMS (CONTINUED)

OASQA	Office of Analytical Services and Quality Assurance
ORP	oxidation reduction potential
OSC	On-Scene Coordinator
OSWER	Office of Solid Waste and Emergency Response
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pdf	portable document file
PEC	Probable Effect Concentration
PID	photoionization detector
PPE	personal protective equipment
PSA	Purchase Sale Agreement
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RCS	Release Site Characterization Study
REC	recognized environmental condition
RFA	RCRA Facility Assessment
Rust	Rust Environment and Infrastructure
S/D	spike/duplicate
SCCP	Site Conceptual Cleanup Plan
SIM	selected ion monitoring
SOP	Standard Operating Procedure
SOW	Statement of Work
SquiRT	Screening Quick Reference Table
SSA	Special Study Area
START	Superfund Technical Assessment and Response Team
SVOC	semivolatile organic compound
SWI	site-wide investigation
SWMU	solid waste management unit
TAL	Target Analyte List
TCL	Target Compound List

LIST OF ACRONYMS (CONTINUED)

TDD	Technical Direction Document
TOC	total organic carbon
UFP-QAPP	Uniform Federal Policy-Quality Assurance Project Plan
URS	URS Corporation
VCP	Voluntary Cleanup Program
VOA	volatile organic analysis
VOC	volatile organic compound
WESTON®	Weston Solutions, Inc.

1.0 INTRODUCTION

Under the Eastern Area Superfund Technical Assessment and Response Team (START) Contract No. EP-S3-15-02, Technical Direction Document (TDD) No. W501-15-08-003, the U.S. Environmental Protection Agency (EPA) Region III tasked Weston Solutions, Inc. (WESTON®) to conduct a second round of sampling to complete an assessment of the offshore area of the shoreline at the Sparrows Point Facility Site (the Site) located along southern and eastern shores within the former Bethlehem Steel Corporation (BSC) plant property on the Sparrows Point peninsula in Baltimore County, Maryland. The objective of the assessment is to further characterize the offshore sediments and the stormwater discharging into Jones Creek and Old Road Bay to determine whether contaminants are present in sediment and stormwater at concentrations that present, or may present, a risk to human health or the environment. In order to meet the objective of the assessment, WESTON will collect sediment samples from Jones Creek and stormwater samples from the outfalls located along the southern and eastern shoreline of the Site.

The second round of sediment sampling will include the collection of additional sediment samples and additional analyses (including physical parameters). These samples will be more strategically located, based upon the results of the first round of sampling, to attempt to determine a source of contamination. In addition, to fully characterize the stormwater discharge, multiple samples may be collected throughout the course of a rainfall event to determine fluctuations in contaminant concentrations.

WESTON developed this Field Sampling Plan (FSP) in accordance with the provisions of the EPA Region III START 5 Program-Wide Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) (WESTON, 2015a).

2.0 BACKGROUND

This section describes the site location, presents a description of the Site, and summarizes previous investigations conducted at the Site. This section is identical to Section 2.0 of the Sparrows Point Southeast Area Sediment Sampling Final Field Sampling and Analysis Plan (WESTON, 2016a).

2.1 SITE LOCATION

The Site comprises approximately 3,100 acres on the north side of the Patapsco River in Baltimore County, Maryland, and is located approximately 9 miles southeast of downtown Baltimore, as depicted on Figure 1, Site Location Map. The approximate geographic coordinates of the center of the Site are 39.21264º north latitude and 76.46974º west longitude. The Site includes the shoreline areas of the peninsula located immediately surrounding the former Sparrows Point Facility and is bounded to the west by Bear Creek, to the south by the Patapsco River, and to the east by Old Road Bay, Jones Creek, and residential areas of the City of Edgemere beyond. As shown in Figure 2, Site Layout Map, the southeast shoreline portion surrounding the former Sparrows Point Facility, where this assessment will be conducted, is located along the southern and eastern shores adjacent to the former BSC plant on Sparrows Point, and is bordered by the Patapsco River to the south, Old Road Bay to the east, and Jones Creek to the northeast.

2.2 SITE DESCRIPTION

Most buildings within the Site have been demolished with concrete slabs, if present, remaining on grade (Rust Environment and Infrastructure [Rust], 1998). The existing ground surface is relatively flat; however, manmade features such as buildings, landfills, and material stockpiles are present throughout the Site. Land reclamation and fill placement activities have been conducted at the Site since the early 1900s. Fill deposited at the Site consists primarily of iron and steel-making slag and waste byproduct materials that have been placed for grade-leveling. In general, fill placement occurred in three areas: (1) stream channels and estuaries that originally extended into Sparrows Point peninsula; (2) the entire southern shoreline of the peninsula to expand southward into the Patapsco River; and (3) throughout the property to level grades (EnviroAnalytics Group [EAG], 2015a).

2.3 SITE HISTORY

From the late 1800s until 2012, the production and manufacturing of steel was conducted at Sparrows Point. Pennsylvania Steel built the first furnace at Sparrows Point in 1887. BSC purchased the facility in 1916 and constructed mills to produce hot rolled sheet, cold rolled sheet, galvanized sheet tin mill products, and steel plate. During peak steel production in 1959, the facility operated 12 coke-oven batteries, 10 blast furnaces, and 4 open-hearth furnaces (EA, 2014). Iron and steel production operations

and processes at Sparrows Point included raw material handling, coke production, sinter production, iron production, steel production, and semi-finished and finished product preparation. In 1970, Sparrows Point was the largest steel facility in the United States, producing hot and cold rolled sheets, coated materials, pipes, plates, and rod and wire. The steelmaking operations at the facility ceased in fall 2012 (EAG, 2014).

According to the Description of Current Conditions (DCC) Report produced by Rust, the Site was formerly occupied by businesses conducting iron and steel production operations within areas generally referred to as Open Hearth Furnace Area, Primary Rolling Mills Area, and Blast Furnace Area. Other former operations include a power generation building and associated oil storage facilities, a vehicle maintenance area, and areas occupied by a former employee town (Rust, 1998).

On September 11, 2014, the Site was accepted into the Maryland Department of the Environment (MDE) Voluntary Cleanup Program (VCP). The Site's current and anticipated future use is Tier 3 (Industrial), and plans for the Site include demolition of existing structures and redevelopment over the next several years.

2.4 PREVIOUS SITE INVESTIGATIONS

In August 1993, potential sources of releases of hazardous substances to the environment from the Site were identified in a final Resource Conservation and Recovery Act (RCRA) Facility Assessment Phase II Report (RFA Report) prepared for EPA by A.T. Kearney (Kearney, 1993). The RFA Report provided an updated report for the Site from an initial Draft RFA Report prepared by PRC Environmental Management on April 12, 1988. The Final RFA Report identified 203 solid waste management units (SWMUs) and 28 areas of concern (AOCs) where a release occurred or had the potential to release hazardous wastes or hazardous waste constituents to various media (EAG, 2014).

On October 10, 1997, EPA and MDE filed a multimedia Consent Decree through the U.S District Court for the Court of Maryland seeking relief from alleged endangerment to public health, welfare, or the environment from contamination at and around the Site. Pursuant to the requirements of the 1997 Consent Decree, a site-wide investigation (SWI) and associated environmental assessments have been performed at the Site. The SWI focused on characterizing the nature and extent of releases from the facility. As part of the SWI, work has been completed to implement an investigation and screening

process to evaluate potential source areas of releases to the environment and determine if further action (or no further action) is necessary.

Numerous investigations have been completed as part of the SWI program required by the Consent Decree. Major submittals completed to date as part of the SWI include:

- Description of Current Conditions (Rust, 1998).
- Site-Wide Investigation Work Plan (CH2M Hill, 2000).
- Site-Wide Investigation Groundwater Study Report, July 2001 (CH2M Hill, 2001).
- Site-Wide Investigation Release Site Characterization Study (RCS), June 2002 (CH2M, Hill 2002).
- CA725 Facility Investigation and Human Health Risk Evaluation (HHRE) Findings, ISG Sparrows Point, June 2005 (URS Corporation [URS], 2005).
- Ecological Risk Assessment Strategy Document; ISG Sparrows Point Facility (URS, 2006).
- Site-Wide Investigation: Report of Nature & Extent of Releases to Groundwater from the Special Study Areas (SSAs) (URS, 2007a).
- Final Ecological Risk Assessment Work Plan for On-Site Areas (URS, 2007b).
- Screening Level Ecological Risk Assessment for On-Site Areas Final (URS, 2009a).
- Supplemental Report County Lands Parcel 1B Ponds Final (URS, 2009b).
- Final Baseline Ecological Risk Assessment for On-Site Areas (BERA) Report (URS, 2011).
- Quality Assurance Project Plan-Sparrows Point Terminal Site, Prepared by ARM Group (EAG, 2015b).

In 2014, a Site Conceptual Cleanup Plan (SCCP) of the Site was prepared by EAG on behalf of the current owner and seller; Sparrows Point LLC. The SCCP is intended to provide an agreed upon course of action for further investigation, remediation, closure, and pathway exclusion of applicable areas for the Site pursuant to the December 14, 2013, Purchase Sale Agreement (PSA) between HRP Sparrows Point, LLC (HRP or Purchaser) and Sparrows Point, LLC. The SCCP outlines the objectives, approach, methods, and schedule to complete investigation and remediation and achieve "closure" of environmental obligations of the Site (EAG, 2014).

2.5 PREVIOUS SEDIMENT ASSESSMENT

In June 2016, WESTON collected 39 sediment samples from 13 transects along the southeast shoreline of the Sparrows Point peninsula in Baltimore County, Maryland. Four transects were located within the Patapsco River, five transects were located within Old Road Bay, and four transects were located within Jones Creek. Three sediment samples were collected from each transect. Each sediment sample was collected to a maximum depth of 6 inches using a Petite Ponar dredge that was operated from a 16-foot Jon boat.

The collected sediment samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and inorganics, including mercury and cyanide. Sediment analytical results were compared to their respective EPA Biological Technical Assistance Group (BTAG) screening benchmarks for freshwater sediment and National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table (SquiRT) Probable Effect Concentrations (PECs) screening benchmarks for freshwater sediment (EPA, 2016a; NOAA, 2008).

PCBs were not detected in any of the sediment samples collected from the southeast shoreline at the Site. One VOC, carbon disulfide, was detected at concentrations exceeding the BTAG screening benchmark for freshwater sediment in seven samples collected from Patapsco River and in one sample collected from Transect E in Old Road Bay. Concentrations of VOCs did not exceed applicable NOAA SquiRT PEC screening benchmarks for freshwater in any sediment sample. Concentrations of numerous polycyclic aromatic hydrocarbons (PAHs) and metals were detected above applicable BTAG screening benchmarks and NOAA SQuiRT PEC screening benchmarks in samples collected from all three sampling areas. The majority of metals containing the highest concentrations that exceeded their respective BTAG and NOAA SQuiRT PEC benchmarks were collected from sample location K03 located within Jones Creek, adjacent to Outfall 17.

2.6 STORMWATER DISCHARGE IDENTIFICATION SUMMARY

Based upon the results of previous investigations at the Site and document review, several areas in and around the buildings and facilities located at the Site have been identified as potential historical sources of groundwater contamination. Potential sources to be identified were recognized environmental

conditions (RECs), identified during the Phase I Environmental Site Assessment (ESA) conducted in August 2013 (Weaver Boos Consultants, 2014).

Following the identification and evaluation of all RECs at the Site, SWMUs and AOCs were identified during the DCC. Stormwater runoff from these areas is diverted and collected by a network of culverts, underground pipes, and drainage ditches, and discharged through stormwater outfalls into Patapsco River, Jones Creek, and Old Road Bay. According to the DCC, 35 outfalls are covered under the current National Pollutant Discharge Elimination System (NPDES) Permit for BSC. A detailed discussion of the existing NPDES discharge locations is presented in a Site-Wide Investigation RCS, (CH2M Hill, 2002).

Stormwater on the east side of the southeast shoreline is directed east and then discharged to Jones Creek and Old Road Bay through Outfalls 001, 016, 017, 059, 065, and 068. Stormwater from the southern portion of the Site is directed to the southwest and discharged to the Patapsco River through Outfall 044. Stormwater from the northern portion of the facility is directed north to the Tin Mill Canal and Humphreys Creek Wastewater Treatment Plant and is discharged to Bear Creek through Outfall 014. The outfalls associated with the Site are shown on Figure 2, Site Layout Map.

3.0 OBJECTIVE AND DATA USE

The objectives of the sampling activities presented in this FSP are to conduct an assessment of the southeast shoreline of the Site to determine if hazardous substances, pollutants or contaminants associated with the former Sparrows Point Facility have contaminated offshore sediments and to provide stormwater data from the outfalls to identify potential sources of contamination to the sediments. Analytical data will be used to evaluate whether the Site warrants additional action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Analytical results will be compared to their respective EPA BTAG screening benchmarks for freshwater sediment and NOAA SquiRT PECs screening benchmarks for freshwater sediment (EPA, 2016a; NOAA, 2008).

4.0 PROPOSED ACTIVITIES

This section describes the scope of work, including proposed sampling activities and field measurements; summarizes samples to be collected for the project; explains how samples will be collected and handled; and describes equipment decontamination procedures and the disposal of investigation-derived waste (IDW) generated during sampling.

4.1 SCOPE OF WORK

As part of the assessment for the Site, WESTON will perform the following tasks:

- Collect up to 35 surface sediment samples and 10 subsurface sediment samples to approximately 4 ft below the sediment surface.
- Collect up to seven stormwater samples.
- Collect field duplicate samples for each sample matrix, four for sediment and one for stormwater.
- Document and record sample locations using Global Positioning System (GPS) technology and enter sample location information into a Scribe database.
- Photo document sampling activities and sampling locations.
- Package and ship samples collected to the assigned EPA Contract Laboratory Program (CLP) laboratory or Tier IV laboratory (i.e., WESTON-subcontracted laboratory) for the following analyses: VOCs, SVOCs including PAHs, PCBs, Target Analyte List (TAL) metals including mercury, and cyanide and physical parameters including grain size analysis, pH, total organic carbon (TOC), and acid volatile sulfide simultaneously extracted metals (AVS/SEM).

4.2 FIELD ACTIVITIES

This section describes the proposed sampling activities and proposed sample locations. Proposed sediment and stormwater sampling locations are shown on Figure 3 *Sediment Sample Locations* and Figure 4 *Stormwater Sample Locations*, respectively. The proposed samples to be collected are summarized in Table 1, Proposed Sampling. Actual sample locations may vary based upon field conditions and observations at the time of sampling, at the discretion of the On-Scene Coordinator (OSC). In addition, if sufficient sample volume is not able to be collected at any one location, the location may be modified at the discretion of the OSC. Table 2 summarizes the matrices, analyses,

analytical methods, containers, preservatives, detection limits, and maximum holding times for all the samples proposed to be collected during the sampling event.

The second round of sampling for the offshore investigation for the southeast shoreline area will consist of collecting surface and subsurface sediment and stormwater samples to evaluate potential migration paths for contaminants to the offshore environment. Samples will be submitted to the assigned EPA CLP laboratory and/or Tier IV laboratory for analysis. This FSP describes additional sampling and analytical procedures for the collection of surface sediment using a Petite Ponar dredge and subsurface sediment using an Ogeechee core sampler to approximately 4 ft below the sediment surface.

4.2.1 SEDIMENT SAMPLING

WESTON will collect up to 35 surface sediment samples and 10 subsurface sediment samples during the subsequent sampling of the southeast shoreline offshore investigation. Proposed sample locations are depicted on Figure 3, Sediment Sample Locations. The locations of sediment samples were organized into nine transects, consisting of sample locations within Jones Creek, and assigned transect identifiers N through V from the south to north as depicted on Figure 3.

Subsurface sample locations were selected based on the results of the June 2016 sediment sampling results and were selected to determine the vertical extent of contamination to provide further characterization of the nature and extent of contamination. Subsurface sediment cores will be collected using an Ogeechee core sampler to approximately 4 ft below the sediment surface.

Sediment samples will be collected as discrete grab samples from the southeast shoreline area of Sparrows Point in accordance with WESTON Standard Operating Procedure (SOP) No. 303, Sediment Sampling (WESTON, 2015b). Surface sediment samples will be collected using a Petite Ponar dredge operated from a 16-ft Jon boat. Each sample will consist of one successful Ponar grab in which the dredge is lowered through the water to the sediment surface and is recovered with a full receptacle of sediment. Sediment samples will be targeted from the sediment surface to a maximum depth of 6 inches. Ponar grabs that do not achieve sufficient penetration depth will be discarded. Additional attempts will be made until the desired penetration is achieved. The subsurface sediment sample will be collected using an Ogeechee core sampler with dedicated plastic liners. The Ogeechee is hand-driven into the bottom surface, collecting a 4-foot core sample from the top of the sediment. A slide hammer

will be used in conjunction with the core sampler to assist with the removal of the sampler from the sediment. In the event that a subsurface sediment sample cannot be collected at the designated sample location due to water depth, the subsurface sample location will be collected as close as possible to the designated sample location. Sediment core lithology from the Ogeechee will be documented by recording of boring logs in a field logbook and taking digital photographs prior to sample collection. Along with visual screening, a photoionization detector (PID) will be used to screen the sediment core. Any observed staining and/or organic vapor readings will be recorded for each sediment boring.

Sediment will be placed from the Ponar or the Ogeechee into a stainless steel bowl or equivalent receptacle. Sediment samples for VOC analysis will be collected first using 5-gram terracore sampling devices. The sediment will then be homogenized with a stainless steel or disposable hand trowel, and all extraneous material (i.e., pebbles, plant material, shells) will be removed to the greatest extent practicable. During this process, the sediment will be screened using a PID. Homogenized materials will then be placed directly in the appropriate sample containers for analysis. A sediment sampling form that indicates the PID measurements, texture, location, date/time of collection, and observations of the material recovered will be compiled for each sampling location.

Sediment samples will be collected for SVOCs (including PAHs by selected ion monitoring [SIM]), PCBs, and TAL metals (including mercury and cyanide analysis). Additionally, at the discretion of the OSC, a selected number of samples will be analyzed for VOCs and physical parameters including grain size analysis, pH, TOC, and AVS/SEM. Sample volume, container types, and preservation requirements for the analytical methods proposed for this project are provided in Table 2.

4.2.2 STORMWATER SAMPLING

Stormwater samples will be collected from seven stormwater outfalls exiting the facility to assess potential sources of contaminants to the offshore sediments. If possible, stormwater samples will be collected during, or immediately after a rain event, from any of the active stormwater outfalls (Outfalls 001, 016, 017, 044, 059, 065, and 068) located along the southeast shoreline area that are observed to be flowing. For purposes of this sampling, a rain event is defined as any measurable amount of rain that causes the stormwater outfalls to flow. If a rain event does not occur during the sampling event, then stormwater samples will collected from any outflows observed to be flowing. The stormwater

outfall locations are depicted on Figure 4, Stormwater Sample Locations. Grab samples of stormwater will be collected from the outfalls during, or immediately after the storm event, to capture the runoff. Samples will be collected directly from the water flowing out of each outfall into sample containers for analysis. During sampling, at each location water quality measurements including, pH, turbidity, specific conductance, dissolved oxygen (DO), oxidation reduction potential (ORP), and temperature will be measured in accordance with WESTON SOP No. 210, Field pH, Conductivity, and Temperature Measurement (WESTON, 2011a) using a multi-parameter YSI water quality meter or equivalent instrumentation.

Stormwater samples will be analyzed for VOCs, SVOCs (including PAHs by SIM), PCBs, TAL metals (including mercury), and cyanide. The sample containers, preservatives, and holding time requirements for stormwater are provided in Table 2.

4.3 SAMPLE IDENTIFICATION

The Sample Identifier will be listed on the chain-of-custody document for each sample and will provide the date and sample location as follows:

SESL-MMDDYY-XX-##

The "SESL" prefix refers to the Site name – Southeast Shoreline at the Sparrows Point Facility. The "MMDDYY" refers to the date of sample collection (i.e., 060116 for June 1, 2016). The "XX" portion of the Sample Identifier refers to the sample type ("SD" for surface sediment, "SS" for subsurface sediment, "ST" for stormwater, "FB" for field blank, "RB" for rinsate blank, and "TB" for trip blank). The "##" portion of the suffix refers to the unique sequential sample number assigned to a specific sampling location. For sediment samples, each transect has been assigned a letter and will be assigned a number consecutively moving away from the shoreline. Stormwater samples will be labeled with "ST" followed by the outfall number. Duplicate samples will be assigned with a "-01" after the "##" portion of the suffix.

In addition to the Sample Identifier, samples to be shipped to CLP or Delivery of Analytical Services (DAS) laboratories for analysis will be assigned unique CLP sample numbers. Organics samples will be identified in the format C#### (where the # may represent a number or letter), and the corresponding

inorganics sample ID will be in the format MC####. The CLP sample number and the Sample Identifier will be included on the chain-of-custody, the bottle labels, and the sample tags attached to each bottle.

4.4 SAMPLE MANAGEMENT

WESTON will document field activities using logbooks, photographic records, and chain-of-custody documentation. Documentation, record keeping, and data management activities will be conducted in accordance with the WESTON UFP-QAPP (WESTON, 2015a) and in accordance with the *Contract Laboratory Program Guidance for Field Samplers* (EPA, 2014), unless otherwise specified. Each sampling location will be noted in the field logbook in accordance with WESTON SOP No. 101, Logbook Documentation (WESTON, 2015c). Scribe software will be used for sample documentation and data management.

Sample handling, packaging, and shipment procedures will be in accordance with the *Contract Laboratory Program Guidance for Field Samplers* (EPA, 2014). Sample labels and tags will be affixed to each sample container and labeled with appropriate identifying information (i.e., location, date, time, condition, added preservatives). The dates and times of collection for each sample will be noted on the sampling form and on the chain-of-custody form. Sample containers will be placed within protective packaging to prevent breakage and stored in a secure insulated cooler with ice (kept at ≤ 6 degrees Celsius [°C] without freezing) until being shipped off-site to an assigned EPA CLP laboratory or Tier IV laboratory (i.e., WESTON-subcontracted laboratory). A temperature blank will be placed in each sample cooler. Additional field quality assurance/quality control (QA/QC) samples will be collected as specified in Table 2.

Samples will be placed in plastic zipper bags. Bagged containers will be placed in coolers with ice and packed with appropriate absorbent and packing material. All sample documents will be sealed in a plastic zipper bag and affixed to the underside of each cooler lid. The lid will be sealed with shipping tape and custody seals will be affixed to the cooler. Coolers will be labeled with the origin and destination locations.

Chain-of-custody documents will be completed using Scribe software and will accompany field samples to the laboratory in accordance with WESTON SOP No. 103, Chain-of-Custody Documentation (WESTON, 2016b). Samples will be shipped to the designated CLP or Tier IV

laboratories by Federal Express. Regulations for packaging, marking, labeling, and shipping hazardous materials and wastes are promulgated by the U.S. Department of Transportation. Air carriers that transport hazardous materials require compliance with the current International Air Transport Association (IATA) regulations, which apply to shipment and transport of hazardous materials by air carrier. WESTON will follow all applicable IATA regulations.

4.5 DECONTAMINATION AND INVESTIGATION-DERIVED WASTE

Dedicated, disposable sampling equipment and personal protective equipment (PPE) will be used wherever applicable. Disposable sampling equipment and PPE will be double-bagged and disposed of as dry industrial waste. Non-dedicated sampling equipment, such as the petite Ponar will undergo a gross decontamination between each sampling point with Alconox, followed by a double rinse with distilled water, in accordance with WESTON SOP No. 301, Decontamination Procedures (WESTON, 2011b). IDW is defined as any byproduct of the field activities that is suspected or known to be contaminated with hazardous substances. IDW will be handled in accordance with Office of Solid Waste and Emergency Response (OSWER) 9345.3-02 (EPA, 1991) and WESTON SOP No. 019, Investigative Derived Waste Compliance Plan (WESTON, 2012).

5.0 ANALYTICAL PARAMETERS AND METHODS

Sediment and stormwater samples will be analyzed for Target Compound List (TCL) VOCs, SVOCs (including PAHs by SIM), PCBs, and TAL metals including mercury and cyanide. Analysis will be conducted in accordance with EPA CLP Methods SOM02.4 and ISM02.4 for organics and inorganics, respectively (EPA, 2016b and EPA, 2016c). TAL metals analysis will be conducted through Inductively Coupled Plasma (ICP)-Atomic Emission Spectroscopy (AES) for aluminum, calcium, iron, magnesium, potassium, and sodium. The remaining remaining metals will be analyzed by ICP-Mass Spectrometry (MS). Mercury will be run by Cold Vapor Atomic Absorption (CVAA). At the discretion of the OSC, a select number of sediment samples will be analyzed for VOCs and physical parameters including grain size analysis, pH, TOC, and AVS/SEM. Table 2, Analytical Parameters, summarizes the matrices, analyses, analytical methods, containers, preservatives, QA/QC samples, and technical holding times for the samples proposed for collection during the sampling event.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

This section describes the QA and QC procedures for personnel during the site sampling event, including responsibilities, field QC, laboratory QC, data evaluation, and data management.

6.1 FIELD QUALITY CONTROL

Field QA/QC measures will consist of collecting field duplicates and field blanks (e.g., trip blank samples, ambient field blank samples, and equipment rinsate blank samples). These measures will be applied in accordance with the WESTON UFP-QAPP (WESTON, 2015a). The number and types of QC samples to be collected are summarized in Table 2. Field duplicate samples will be collected at a rate of 1 per 20 samples per sample matrix and will be used to test the reproducibility of sampling procedures and analytical results.

Trip blank samples will be collected and provided in each cooler containing samples for VOC analysis. Trip blank samples will be used to assess whether samples may have become cross-contaminated with VOCs during storage and shipment.

Ambient field blanks will be collected at a frequency of 1 per day or 1 per 20 field samples for each parameter to be analyzed, whichever is greater. Ambient field blanks are generated in the field by pouring laboratory grade deionized water into the sampling container and preserving the sample according to method requirements. The ambient field blank results will be used to assess whether contaminants were introduced during sample collection, storage, and shipment as well as sample handling by the laboratory.

Equipment rinsate blanks will be collected from non-dedicated sampling equipment at a frequency of 1 per day or 1 per 20 samples per matrix for each sampling equipment type for each parameter to be analyzed, whichever is greater. Equipment rinsate blank results will be used to verify proper decontamination of non-dedicated sampling equipment and field filters (for dissolved metals analysis).

Temperature blanks will be placed in each sample cooler and used to determine whether samples have been adequately cooled during shipment and storage. The temperature blank will be prepared using tap water placed in a volatile organic analysis (VOA) vial without preservative.

6.2 LABORATORY QUALITY CONTROL

Samples will be shipped to the EPA Region III CLP laboratory assigned through the EPA Region III Office of Analytical Services and Quality Assurance (OASQA) Branch or the assigned Tier IV DAS laboratory. Laboratory QC measures will consist of all QC elements identified in the analytical method or CLP Statement of Work (SOW) as required by EPA Region III policy, and will incorporate all reportable QC (including forms and deliverables) required by the SOW and this FSP.

Because samples will be shipped to EPA CLP or DAS laboratories, analysis of matrix spike/matrix spike duplicate (MS/MSD) samples is required for PCBs and spike/duplicate (S/D) for inorganic analyses. EPA Region III does not require analysis of MS/MSD samples for CLP VOCs or SVOCs.

MS/MSD and S/D sample results are used to assess analytical precision and accuracy in a specific sample matrix. WESTON field personnel will collect a minimum of 1 MS/MSD and 1 S/D sample per 20 samples of the same matrix. For water samples, the MS/MSD sample will require collection of a triple volume of sample, and the analysis for the S/D sample will involve the collection of a double volume of sample. Additional sample volume is not required for the sediment samples. See Table 2, Analytical Parameters, for a summary of QA/QC samples being collected.

6.3 DATA VALIDATION

Validation of all analytical data will be performed by the Environmental Services Assistance Team (ESAT) contractor under the direction of the OASQA Branch. Organic and inorganic data will be validated at the EPA Region III Organic Level 2 and Inorganic Level 2, respectively, in accordance with the EPA CLP *National Functional Guidelines for Superfund Organic Methods Data Review*, EPA-540-R-2016-002 (EPA, 2016d) and the EPA CLP *National Functional Guidelines for Inorganic Superfund Methods Data Review*, EPA-540-R-2016-001 (EPA, 2016e).

6.4 DATA EVALUATION AND MANAGEMENT

This section describes how WESTON will evaluate data generated from the sampling event, determine whether data are representative of the Site, and make certain that data are secure and retrievable.

6.4.1 DATA EVALUATION

WESTON will review the data validation reports to determine whether any major or minor deficiencies were encountered during sampling and analysis. These deficiencies may include major deficiencies (such as unusable or rejected data) or minor deficiencies affecting data, including data that were estimated or qualified due to failure to meet project-specific or National Functional Guideline QC acceptance limits.

To assess the effectiveness of field sampling procedures and implement corrective actions as needed, WESTON will evaluate field blank results. Trip blank contamination not attributed to laboratory sources may be due to contamination in the field or during shipment. Rinsate blank contamination, not otherwise attributed to laboratory sources, may be due to inadequate decontamination procedures or contamination in source water used for the rinsate blank. Ambient field blank contamination, not attributed to laboratory sources, suggests contaminants from either airborne sources that may have been entrained in the analytical sample during collection or from the source water used to generate the ambient field blank. Failure of the trip blank to meet the temperature acceptance criteria indicates the need to better ice down the samples.

6.4.2 DATA REPRESENTATIVENESS AND COMPLETENESS

The intent of this FSP is to obtain a complete data set that is representative of site conditions. Data will be reviewed for completeness. If not all samples were collected, resulting in less than 100% completeness, the reason for the data gaps will be identified in the Trip Report. If any data are rejected, the reason for the data rejection will be discussed in the Trip Report. If sampling activities or procedures vary significantly from this FSP because of unexpected conditions in the field or other unforeseeable factors, WESTON will discuss these deviations from the FSP and whether the changes affect data representativeness in the Trip Report.

6.4.3 DATA MANAGEMENT

EPA Region III will provide WESTON with a validation report for the analytical data in portable document file (pdf) format along with an importable Excel electronic data deliverable (EDD). WESTON will upload the EDD data to the Scribe database and compare the EDD results to the sample

results received in pdf format in conjunction with the data validation report to ensure their consistency. All electronic data will be stored in a Scribe database for future retrieval and reference, based on the OSC's requirements.

7.0 SCHEDULE AND DELIVERABLES

WESTON anticipates that sample collection will take place the week of June 26, 2017. WESTON will ship samples to the assigned laboratories for analysis immediately following collection. WESTON expects to receive validated analytical data from EPA Region III approximately 35 days after the laboratory receives the samples. WESTON will provide EPA with the Trip Report within 70 days after all site activities have been completed and validated data are available.

Information obtained during the sampling event will be compiled into a Trip Report. The Trip Report will discuss data collection methods and document sampling locations and include data summary tables, figures, maps, and site photographic documentation.

8.0 REFERENCES

CH2M Hill. 2000. Site-Wide Investigation (SWI) Work Plan. June 2000.

CH2M Hill. 2001. Site-Wide Investigation Groundwater Study Report. July 2001.

CH2MHill. 2002. Site-Wide Investigation Release Site Characterization Study. June 2002.

EA (EA Engineering, Science and Technology, Inc.). 2014. Work Plan for Offshore Investigation of the Phase I Area of the Sparrows Point Site. September 2014.

EAG (EnviroAnalytics Group). 2014. A Site Conceptual Cleanup Plan-Former RD Steel Facility. May 2014.

EAG (EnviroAnalytics Group). 2015a. Phase II Investigation Work Plan-Area B Groundwater Investigation. Prepared by ARM Group. October 2014.

EAG (EnviroAnalytics Group). 2015b. Quality Assurance Project Plan-Sparrows Point Terminal Site. Prepared by ARM Group. October 2015.

EPA (U.S. Environmental Protection Agency). 1991. Management of Investigative Derived Waste During Site Inspections. Office of Solid Waste and Emergency Response (OSWER) 9345.3-02. May 1991.

EPA (U.S. Environmental Protection Agency). 2014. *Contract Laboratory Program Guidance for Field Samplers*. Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9200.2-147 EPA 540-R-014-013. October 2014.

EPA (U.S. Environmental Protection Agency). 2016. Region 3 BTAG Freshwater Sediment Screening Benchmarks.

EPA (U.S. Environmental Protection Agency). 2016b. *EPA Contract Laboratory Program Statement of Work for Organic Superfund Methods, Multi-Media, Multi-Concentration,* SOM02.4. September.

EPA (U.S. Environmental Protection Agency). 2016c. *EPA Contract Laboratory Program Statement of Work For Inorganic Superfund Methods, Multi-Media, Multi-Concentration,* ISM02.4. September.

EPA (U.S. Environmental Protection Agency). 2016d. *National Functional Guidelines for Superfund Organic Methods Data Review*. EPA-540-R-2016-002. September.

EPA (U.S. Environmental Protection Agency). 2016d. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. EPA-540-R-2016-001. September.

Kearney, A.T. 1993. Final RCRA Facility Assessment Phase II Report. August 1993.

NOAA (National Oceanic and Atmospheric Administration). 2008. Screening Quick Reference Tables (SQuiRT) Cards.

Rust (Rust Environment and Infrastructure). 1998. Description of Current Conditions Report-Bethlehem Steel Corporation Report. January 1998.

URS (URS Corporation). 2005. CA725 Facility Investigation and Human Health Risk Evaluation (HHRE) Findings, ISG Sparrows Point, June 9, 2005.

URS (URS Corporation). 2006. Ecological Risk Strategy Document: ISG Sparrows Point Facility, Sparrows Point, Maryland

URS (URS Corporation). 2007a. Site-Wide Investigation, Report of Nature & Extent of Releases to Groundwater from the Special Study Areas. International Steel Group, ISG Sparrows Point, Inc. Facility, Sparrows Point, Maryland.

URS (URS Corporation). 2007b. Final Ecological Risk Assessment Work Plan for On-Site Areas. ISG Sparrows Point Facility, Sparrows Point, Maryland. Prepared for ISG Sparrows Point, January 2007.

URS (URS Corporation). 2009a. Screening Level Ecological Risk Assessment for On-Site Areas. ISG Sparrows Point Facility, Sparrows Point Maryland. Prepared for Severstal Sparrows Point, LLC. April 2009.

URS (URS Corporation). 2009b. Supplemental Report: County Lands Parcel 1B Ponds, Final. ISG Sparrows Point Facility, Sparrows Point Maryland. Prepared for Severstal Sparrows Point, LLC. May 2009.

URS (URS Corporation). 2011. Final Baseline Ecological Risk Assessment for On-Site Areas (BERA) Report. October 7, 2011.

Weaver Boos Consultants. 2014. Phase I Environmental Site Assessment. May.

WESTON (Weston Solutions, Inc.). 2011a. Field pH, Conductivity, and Temperature Measurement. SOP No. 210. August 2011.

WESTON (Weston Solutions, Inc.). 2011b. Decontamination Procedures. SOP No. 301. August 2011.

WESTON (Weston Solutions, Inc.). 2012. Investigative Derived Waste Compliance Plan. SOP No. 019. May 2012.

WESTON (Weston Solutions, Inc.). 2015a. EPA Region III Superfund Technical Assessment and Response Team 5 (START-5 Contract) Program-Wide Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP). Draft. July 2015.

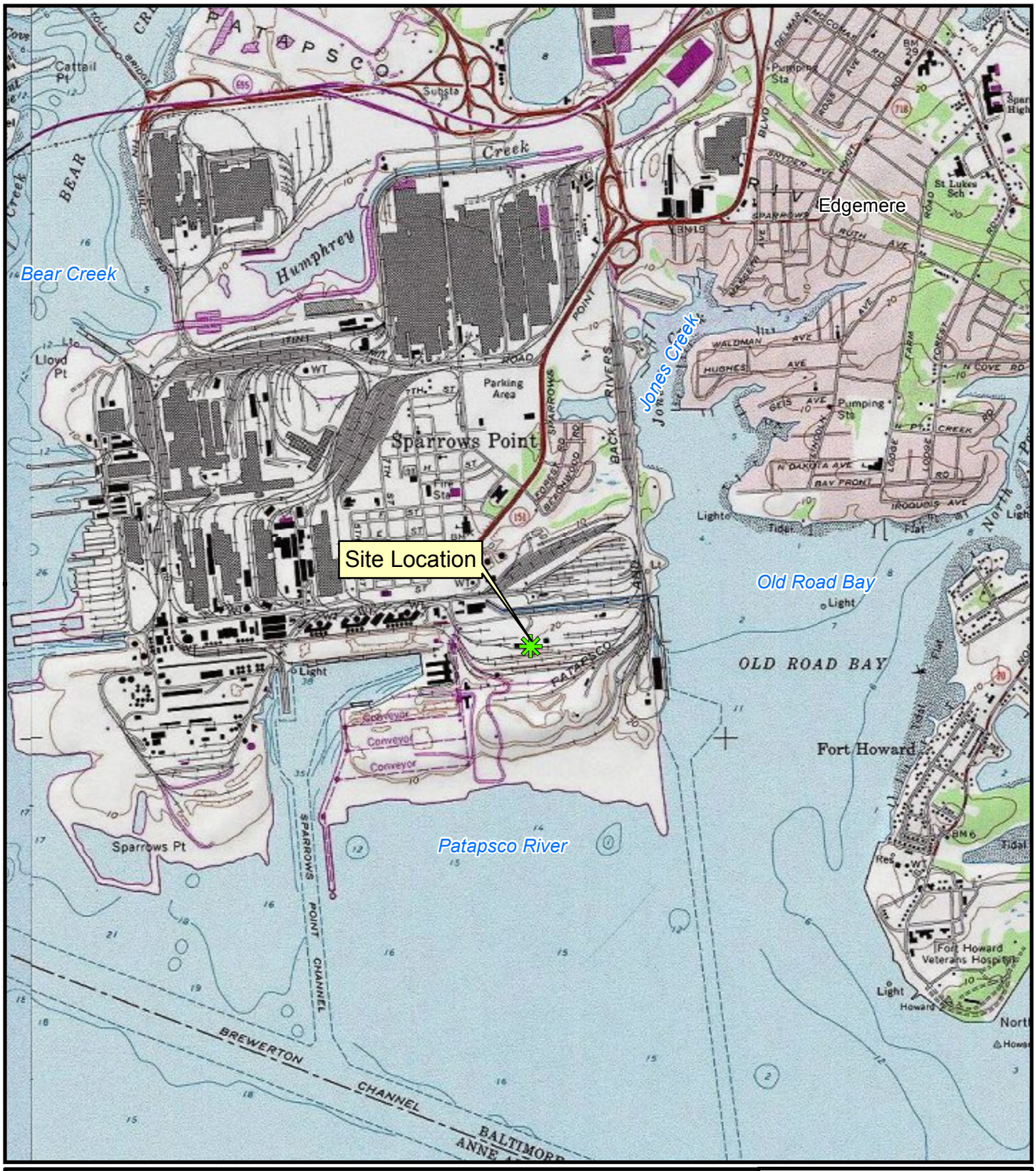
WESTON (Weston Solutions, Inc.). 2015b. Sediment Sampling. SOP 303. November 2015.

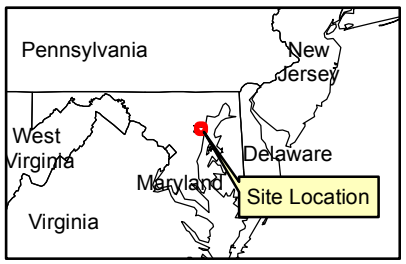
WESTON (Weston Solutions, Inc.). 2015c. Logbook Documentation. SOP No. 101. July 2015.

WESTON (Weston Solutions, Inc.). 2016a. Sparrows Point Southeast Area Sediment Sampling Final Field Sampling Plan.

WESTON (Weston Solutions, Inc.). 2016b. Chain-of-Custody Documentation. SOP No. 103. September.

FIGURES





USGS 7.5 Minute Quadrangle
Sparrows Point MD, 1975

N

Coordinate System:
WGS84 UTM Zone 18N Feet

0 2,000 4,000
Feet

Sparrows Point Sediment Assessment
Baltimore, Baltimore County, Maryland

Figure 1
Site Location Map

TDD# W501-15-08-003
Contract: EP-S3-15-02
Prepared: 3/1/2016

WESTON SOLUTIONS

File: Y:\EPA_Region_III\Sparrows_Point\MXD\Site_Location_Map.mxd, 3/1/2016 10:29:54 AM, ricksc

Legend

- Approximate Location of Active Stormwater Outfall
- Southeast Shoreline

Imagery: ESRI, Bing Mapping Service

N

Coordinate System: WGS84 UTM Zone 18N Feet

0 1,350

Feet

Sparrows Point Sediment Assessment
Baltimore, Baltimore County, Maryland

Figure 2
Site Layout Map

TDD# W501-15-08-003
Contract: EP-S3-15-02
Prepared: 2/26/2016

WESTON SOLUTIONS

File: Y:\EPA_Region_III\Sparrows_Point\MXD\Site_Layout.mxd, 2/26/2016 9:18:04 AM, ricksc

Legend

- Approximate Location of Active Stormwater Outfall
- Proposed Surface Sediment Sample Location
- Proposed Subsurface Sediment Sampling Location and Proposed Surface Sediment Sample Location to be Analyzed for Physical Parameters

Imagery: ESRI, Bing Mapping Service

Coordinate System: WGS84 UTM Zone 18N Feet

N

0 1,350

Feet

Sparrows Point Sediment Assessment
Baltimore, Baltimore County, Maryland

Figure 3
Sediment Sample Locations

TDD# W501-15-08-003
Contract: EP-S3-15-02
Prepared: 5/18/2017

WESTON SOLUTIONS

File: Y:\EPA_Region_III\Sparrows_Point\MXD\Prop_soil_locs.mxd, 5/18/2017 2:20:18 PM, ricksc

Legend

- Approximate Location of Active Stormwater Outfall
- Stormwater Sample Locations

Imagery: ESRI, Bing Mapping Service

N

Coordinate System: WGS84 UTM Zone 18N Feet

0 1,350

Feet

Sparrows Point Sediment Assessment
Baltimore, Baltimore County, Maryland

Figure 4
Stormwater Sample Locations

TDD# W501-15-08-003
Contract: EP-S3-15-02
Prepared: 2/26/2016

WESTON SOLUTIONS

File: Y:\EPA_Region_III\Sparrows_Point\MXD\SW_sample_locs.mxd, 2/26/2016 9:23:20 AM, ricksc

TABLES

Table 1 Proposed Sampling

Sample Identifier	Sample Matrix	Sampling Location Description	Rationale
SESL-2017-SS-B01	Subsurface Sediment	South East Shoreline within Patapsco River; Round 1 Location B01; Subsurface Sediment Sample	Assess surface water migration destination
SESL-2017-SD-B01	Surface Sediment	South East Shoreline within Patapsco River; Round 1 Location B01; Subsurface Sediment Sample	Assess surface water migration destination
SESL-2017-SS-D03	Subsurface Sediment	South East Shoreline within Patapsco River; Round 1 Location D03; Subsurface Sediment Sample	Assess surface water migration destination
SESL-2017-SD-D03	Surface Sediment	South East Shoreline within Patapsco River; Round 1 Location D03; Subsurface Sediment Sample	Assess surface water migration destination
SESL-2017-SS-F03	Subsurface Sediment	South East Shoreline within Old Road Bay; Round 1 Location F03; Subsurface Sediment Sample; Located within the vicinity of Outfall 059	Assess surface water migration destination
SESL-2017-SD-F03	Surface Sediment	South East Shoreline within Old Road Bay; Round 1 Location F03; Subsurface Sediment Sample; Located within the vicinity of Outfall 059	Assess surface water migration destination
SESL-2017-SS-H01	Subsurface Sediment	South East Shoreline within Old Road Bay; Round 1 Location F03; Subsurface Sediment Sample; Located within the vicinity Outfall 001	Assess surface water migration destination
SESL-2017-SD-H01	Surface Sediment	South East Shoreline within Old Road Bay; Round 1 Location F03; Subsurface Sediment Sample; Located within the vicinity Outfall 001	Assess surface water migration destination
SESL-2017-SD-N01 through N03	Surface Sediment	South East Shoreline; Transect N; Located at the mouth of Jones Creek and Old Road bay and in the vicinity of Outfall 016	Assess surface water migration destination
SESL-2017-SD-O01 through O05	Surface Sediment	South East Shoreline; Transect O; Located in the vicinity of Outfall 016 along the eastern shoreline within Jones Creek	Assess surface water migration destination
SESL-2017-SS-O04	Subsurface Sediment	South East Shoreline; Subsurface Sediment Location within Transect O	Assess surface water migration destination
SESL-2017-SD-P01 through P03	Surface Sediment	South East Shoreline; Transect P; Located in the vicinity of Outfall 017 extending the Round 1 K transect to the western shoreline within Jones Creek	Assess surface water migration destination
SESL-2017-SS-K03	Subsurface Sediment	South East Shoreline; Round 1 Location K03 hot spot; Located in the vicinity of Outfall 016	Assess surface water migration destination
SESL-2017-SD-K03	Surface Sediment	South East Shoreline; Round 1 Location K03 hot spot; Located in the vicinity of Outfall 016	Assess surface water migration destination
SESL-2017-SD-Q01 through Q03	Surface Sediment	South East Shoreline; Transect Q; Located in between Outfall 068 and 17 within Jones Creek	Assess surface water migration destination
SESL-2017-SD-R01 through R03	Surface Sediment	South East Shoreline; Transect R; Located in upstream of Outfall 068 and within Jones Creek	Assess surface water migration destination
SESL-2017-SS-R02	Subsurface sediment	South East Shoreline; Subsurface Sample Location R02; Located in between Outfall 068 and 17 within Jones Creek	Assess surface water migration destination
SESL-2017-SS-M01	Subsurface Sediment	South East Shoreline; Round 1 Location M01 hot spot; Located in the vicinity of Outfall 068	Assess surface water migration destination

Table 1 Proposed Sampling (Continued)

Sample Identifier	Sample Matrix	Sampling Location Description	Rationale
SESL-2017-SD-M01	Surface Sediment	South East Shoreline; Round 1 Location M01 hot spot; Located in the vicinity of Outfall 068	Assess surface water migration destination
SESL-2017-SD-S01 through S03	Surface Sediment	South East Shoreline; Transect S; Located in upstream in Jones Creek	Assess surface water migration destination
SESL-2017-SD-T01 through T03	Surface Sediment	South East Shoreline; Transect T; Located in upstream in Jones Creek	Assess surface water migration destination
SESL-2017-SS-T02	Subsurface Sediment	South East Shoreline; Subsurface Sample Location T02; Located in upstream of Jones Creek	Assess surface water migration destination
SESL-2017-SD-U01 through U03	Surface Sediment	South East Shoreline; Transect U; Located in upstream in Jones Creek	Assess surface water migration destination
SESL-2017-SD-V01 through V03	Surface Sediment	South East Shoreline; Transect V; Located in upstream in Jones Creek	Assess surface water migration destination
SESL-2017-SS-V02	Subsurface Sediment	South East Shoreline; Subsurface Sample Location V02; Located in upstream of Jones Creek	Assess surface water migration destination
SESL-2017-SD-XXX-01	Surface Sediment	Surface Sediment Duplicate-TBD	QA/QC
SESL-2017-SD-XXX-02	Surface Sediment	Surface Sediment Duplicate-TBD	QA/QC
SESL-2017-SD-XXX-03	Surface Sediment	Surface Sediment Duplicate-TBD	QA/QC
SESL-2017-SS-XXX-01	Subsurface Sediment	Subsurface Sediment Duplicate-TBD	QA/QC
SESL-2017-ST-044	Stormwater	Southeast Shoreline; Outfall 044	Assess surface water migration
SESL-2017-ST-059	Stormwater	Southeast Shoreline; Outfall 059	Assess surface water migration
SESL-2017-ST-065	Stormwater	Southeast Shoreline; Outfall 065	Assess surface water migration
SESL-2017-ST-001	Stormwater	Southeast Shoreline; Outfall 001	Assess surface water migration
SESL-2017-ST-016	Stormwater	Southeast Shoreline; Outfall 016	Assess surface water migration
SESL-2017-ST-017	Stormwater	Southeast Shoreline; Outfall 017	Assess surface water migration
SESL-2017-ST-068	Stormwater	Southeast Shoreline; Outfall 068	Assess surface water migration
SESL-2017-ST-001-01	Stormwater	Duplicate Sample of SEDL-2016-ST-001	QA/QC
SESL-2017-TB-01	Aqueous	Trip blank	QA/QC
SESL-2017-TB-02	Aqueous	Trip blank	QA/QC
SESL-2017-FB-01	Aqueous	Field blank	QA/QC
SESL-2017-RB-01	Aqueous	Rinsate blank	QA/QC
SESL-2017-RB-01	Aqueous	Rinsate blank	QA/QC

Table 1 Proposed Sampling (Continued)

Notes: QA/QC = Quality assurance/quality control
SESL = Southeast Shoreline
SD = Surface Sediment
SS = Subsurface Sediment
ST = Stormwater
FB = Field Blank
RB = Rinsate Blank
TB = Trip Blank

Table 2 Analytical Parameters

Matrix	Parameter	Analytical Method	Container Type	Preservative	Detection Limit	Technical Holding Time	Number of Field Samples	Number of. Field Duplicates	Number of Designated Lab QC Samples[1]
Stormwater	TAL VOCs	CLP SOW SOM02.4	Three 40-mL VOA vials	Ice 4°C, HCl, pH<2	CRQL	14 days analysis	7	1	0
	TAL SVOCs	CLP SOW SOM02.4	Two 1-L amber	Ice	CRQL	7 days (extraction) 40 days (analysis)	7	1	0
	PAHs by SIM	CLP SOW SOM02.4	Two 1-L amber	Ice	CRQL	7 days (extraction) 40 days (analysis)	7	1	0
	TAL PCBs	CLP SOW SOM02.4	Two 1-L amber	Ice	CRQL	7 days (extraction 40 days (analysis)	7	1	1 MS/MSD
	TAL Metals & Hg	CLP SOW ISM02.4 ICP-MS+Hg	1-L polyethylene	Ice, HNO_3 to pH <2	CRQL	180 days (metals) 28 days (Hg)	7	1	1 S/D
	Cyanide	CLP SOW ISM02.4	1-L polyethylene	Ice 4° C, NaOH to pH >12	CRQL	14 days (analysis)	7	1	1 S/D
Soil/Sediment	TAL VOCs	CLP SOW SOM02.4	Three EnCore® samplers and one 2-oz jar	Ice	CRQL	48hrs (to preserve)	10	1	0
	TAL SVOCs	CLP SOW SOM02.4	One 8-oz jar (amber glass)	Ice	CRQL	14 days (extraction) 40 days (analysis)	35	4	0
	PAHs by SIM	CLP SOW SOM02.4			CRQL	14 days (extraction) 40 days (analysis)	35	4	0
	TAL PCBs	CLP SOW SOM02.4	One 8-oz jar (amber glass)	Ice	CRQL	14 days (extraction) 40 days (analysis)	35	4	2 MS/MSD
	TAL Metals &Hg Cyanide	CLP SOW ISM02.4 ICP-AESand ICP-MS Hg+CN	One 4-oz jar	Ice	CRQL	180 days (metals) 28 days (Hg); 14 days (cyanide)	35	4	2 S/D

Table 2 Analytical Parameters (Continued)

Matrix	Parameter	Analytical Method	Container Type	Preservative	Detection Limit	Technical Holding Time	Number of Field Samples	Number of. Field Duplicates	Number of Designated Lab QC Samples[1]
	Grain Size	ASTM D422	One 16-oz. jar	Ice	NA	none	10	0	0
	pH	EPA 9045	One 4-oz. jar	Ice	NA	ASAP	10	0	0
	TOC	Lloyd Kahn	One 4-oz. glass jar	Ice	1000 mg/kg	28 days	10	0	0
	AVS/SEM	EPA-821-R-91-100 (1991)	One 4-oz. glass jar, minimal headspace	Ice	Varies	14 days (analysis)	10	0	1 MS
Rinsate Blank Sample	TAL VOC	CLP SOW SOM02.4	Three 40-mL amber VOA vials	Ice, HCl to pH<2	CRQL	14 days (analysis)	5	NA	NA
	TAL SVOCs	CLP SOW SOM02.4	Two 1-L amber	Ice	CRQL	7 days (extraction) 40 days (analysis)	4	NA	NA
	TAL PCBs	CLP SOW SOM02.4	Two 1-L amber	Ice	CRQL	7 days (extraction) 40 days (analysis)	4	NA	NA
	TAL Metals &Hg	CLP SOW ISM02.4	1-L polyethylene	Ice, HNO_3 to pH <2	CRQL	180 days (metals) 28 days (Hg)	4	NA	NA
	Cyanide	CLP SOW ISM02.4	1-L polyethylene	Ice, NaOH to pH >12	CRQL	14 days (analysis)	4	NA	NA
Aqueous Blanks (Trip and Field)	TAL VOCs	CLP SOW SOM02.4	Three 40-mL VOA vials	Ice, HCl to pH<2	CRQL	14 days (analysis)	6 (3 for field blank and 3 for trip blank)	NA	NA

Table 2 Analytical Parameters (Continued)

NOTES:

[1]Lab QC samples will be provided for stormwater PCBs and Inorganic parameters and triple volume will be provided for the PCB MS/MSD and double volume will be provided for the inorganics S/D. No additional volume will be needed for soil Lab QC samples.

Metals for soil/sediment samples will be run by ICP-AES for aluminum, calcium, iron, magnesium, potassium, and sodium; remaining metals will be analyzed by ICP-MS. Hg will be run by Cold Vapor Atomic Absorption (CVAA).

°C = degrees Celsius
ASTM = American Society for Testing and Materials International
AVS/SEM = acid volatile sulfide simultaneously extracted metals
CLP = Contract Laboratory Program
CN = cyanide
CRQL = Contract-required quantitation limit
HCl = Hydrochloric acid
Hg = mercury
HNO_3 = Nitric acid
ICP-AES =
ICP-MS = Inductively coupled plasma-mass spectroscopy
ISM02.4 = CLP SOW Inorganic Superfund Method
L = Liter
mL = Milliliter
MS/MSD = matrix spike/matrix spike duplicate
NA = Not applicable
NaOH = Sodium hydroxide
oz = ounce
PAH = polycyclic aromatic hydrocarbon
PCB = Polychlorinated biphenyl
QC = Quality control
S/D = matrix spike/duplicate
SOM02.4 = CLP SOW Superfund Organic Method
SOW = Statement of work
SVOC = Semivolatile organic compound
TAL = Target analyte list
TOC = total organic compound
VOA = Volatile organic analysis
VOC = Volatile organic compound