FINAL
FIELD SAMPLING AND ANALYSIS PLAN

SPARROWS POINT – SEDIMENT ASSESSMENT
SOUTHEAST AREA
BALTIMORE, MARYLAND

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Prepared For:

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Hazardous Site Cleanup Division
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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 Site Assessment for the offshore investigation of the southeast shoreline at the Sparrows Point Facility site (the Site) located along southern and eastern shores within the former Bethlehem Steel plant property on the Sparrows Point peninsula in Baltimore County, Maryland. The objective of the assessment is to characterize the offshore sediment and stormwater located along the southeast shoreline area to determine whether contaminants are present in sediment 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 and stormwater samples from various locations at the Site.

A second round of sampling will be conducted once the results of the first round of sampling have been received and evaluated. The second round of sampling will include the collection of additional sediment and stormwater samples, and may also include 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. A revised Field Sampling and Analysis Plan (FSP) will be submitted for the second round of sampling.

WESTON developed this 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, summarizes previous investigations conducted at the Site, and summarizes proposed groundwater investigations to be completed by EnviroAnalyticals Group (EAG).

2.1 SITE LOCATION

The Sparrows Point Site comprises approximately 3,100 acres on the north side of the Patapsco River in Baltimore County, Maryland, and is located approximately nine 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; 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 at which this assessment will be conducted, is located along the southern and eastern shores adjacent to the former Bethlehem Steel 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 had been demolished with concrete slabs, if present, remaining on grade (Rust, 1998). The existing ground surface is relatively flat, but contains manmade features such as buildings, landfills, and material stockpiles. Land reclamation and fill placement activities have been conducted at the Site since the early 1900s. Currently, most buildings within the Site have been demolished with concrete slabs remaining on grade. 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 modes: (1) stream channels and estuaries that originally extended into the Sparrows Point peninsula were filled; (2) the entire southern shoreline of the peninsula was expanded southward into the Patapsco River; and (3) fill was placed throughout the property to level grades (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. Bethlehem Steel Corporation (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 Environment and Infrastructure (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.

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 identified 203 Solid Waste Management Units (SWMUs) and 28 Areas of Concern (AOCs) where a release occurred or that 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 Sparrows Point Facility. 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- Groundwater Study (CH2M Hill, 2000)
- Site-Wide Investigation Groundwater Study Report (SWI), July 2001 (CH2M Hill, 2001)
- Site-Wide Investigation Release Site Characterization Study (RCS), June 2002 (CH2M, Hill 2002)
- Site-Wide Investigation: Report of Nature & Extent of Releases to Groundwater from the Special Study Areas (SSAs) (URS, 2007a).
- CA725 Facility Investigation and Human Health Risk Evaluation (HHRE) Findings, ISG Sparrows Point, June 2005 (URS, 2005);
- Ecological Risk Assessment Strategy Document; ISG Sparrows Point Facility (URS, 2006);
- 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 Upcoming Groundwater Investigations

In October 2015, EAG submitted a Work Plan to complete a comprehensive groundwater investigation on a central portion of the Sparrows Point Facility. The investigation is currently ongoing and validated groundwater data is expected in April 2016. The objectives of this investigation are to:

- Determine the presence or absence of impacts to groundwater in the central portion of the Sparrows Point Facility.
- Identify potential continuing sources of groundwater contamination.
- Characterize the quality of groundwater at the perimeter of the central portion of Sparrows Point Facility that potentially is discharging to surface water.

The proposed groundwater monitoring system design incorporates collecting groundwater samples from newly installed, and several existing groundwater monitoring wells (EAG, 2015a).

The southeast shoreline was not the primary focus of this investigation; however, the data that will be collected during this investigation regarding groundwater conditions at the Site will be utilized for the purposes of sample location and analysis selection for the sediment sampling discussed in this FSP. Based upon the results of the groundwater investigation, sample locations or analyses may be adjusted at the discretion of the EPA On-Scene Coordinator (OSC).

2.6 POTENTIAL SOURCE 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. The first 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. According to the DCC thirty-five outfalls are covered under the current National Pollutant Discharge Elimination System (NPDES) Permit. A detailed discussion of the existing NPDES discharge locations is presented in a Site-Wide Investigation Release Site Characterization Study (RCS), (CH2MHill, 2002).

Stormwater associated with the outfalls located on the east side of the southeast shoreline is directed east and then discharged to Jones Creek and Old Road Bay through outfalls 001, 017, 016, 065, 059, 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 objective of the sampling activities presented in this FSP is to conduct a removal assessment of the southeast shoreline of the Site to determine if hazardous materials, pollutants and contaminants associated with the former Sparrows Point Facility have contaminated offshore sediments, and to provide stormwater chemistry data from nearby 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).

Components of this assessment include the following:

- Surface sediment sampling and analysis; and,
- Stormwater sampling and analysis to assess the potential effects of discharge from stormwater outfalls from the southeast shoreline of Patapsco River, Old Road Bay and Jones Creek;

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 removal assessment for the Site, WESTON will perform the following tasks:

- Collect up to 42 sediment samples.
- Collect up to 7 stormwater samples.
- Collect field duplicate samples for each sample matrix, five 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 all samples collected to the assigned EPA Contract Laboratory Program (CLP) laboratory or Tier IV laboratory (i.e., WESTON-subcontracted laboratory) for the following analyses: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals including mercury, and cyanide.

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 Sampling Locations and Figure 4, Stormwater Sample Locations, respectively. The proposed samples to be collected are summarized in Table 1, Proposed Sample Summary. Actual sample locations may vary based upon field conditions and observations at the time of sampling, at the discretion of the OSC and the results of the groundwater investigation to be conducted by EAG. 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.

Initially, sampling for the offshore investigation for the southeast shoreline area will consist of collecting 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. Following receipt of the analytical results from the initial sampling, the EPA OSC will determine what additional surface or subsurface sediment sampling is necessary to achieve the project objectives. Subsequent surface and subsurface sampling of the sediments, along with additional stormwater samples, will be described in a revision to this FSP. The addendum will describe additional sampling and analytical procedures for collection of additional sediment and/or subsurface sediment using a boat-mounted Vibracore sample collection system to approximately 6 ft below the sediment surface.

4.2.1 SEDIMENT SAMPLING

WESTON will collect up to forty-two surface sediment samples during the initial southeast shoreline offshore investigation. Proposed sample locations are depicted on Figure 3, Sediment Sample Locations. These locations were selected to provide spatial coverage of the area, and also to assess the potential transport of contaminants to the offshore environment from stormwater drainage. The locations of sediment samples were organized into 14 transects, consisting of three sampling locations each, to assess the following locations as depicted on Figure 3:

- The southeast shoreline within Patapsco River; assigned transect identifiers A through D from the west to east.
- The southeast shoreline within Old Road Bay; assigned transect identifiers E through I from the south to north.
- The east shoreline within Jones Creek; assigned transect identifiers J through M from the south to north.

If determined by the EPA OSC to be necessary to achieve the assessment objectives, additional surface and/or subsurface sediment samples may be collected during a second round of field sampling

to provide further characterization of the nature and extent of contamination. Subsurface sediment cores will be collected using a Vibracore sampler to approximately 6 ft below the sediment surface. Locations for this sampling event will be selected based on the results of the initial sampling and analysis.

Sediment samples will be collected as discrete grab samples from the southeast shoreline area of Sparrows Point in accordance with WESTON SOP 303, Sediment Sampling (WESTON, 2015b). 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 six inches. Ponar grabs that do not achieve sufficient penetration depth will be discarded. Additional attempts will be made until the desired penetration is achieved.

Sediment will then be placed from the Ponar into a stainless steel bowl or equivalent receptacle. Sediment samples for VOC analysis will be collected first using 5 gram EnCore® sampling devices or collected directly into 4 ounce glass jars with septum. 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 photoionization detector (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 VOCs, SVOCs (including PAHs by Selected Ion Monitoring [SIM]), PCBs, and TAL metals (including mercury and cyanide analysis). 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 068, 017, 016, 001, 065, 059 and 044) located in 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 storm water 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. Additional stormwater samples will be collected during the second round of sampling and additional criteria for a rain event may be defined. 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 directly 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 – South East Shoreline at the Sparrows Point Facility. The MMDDYY refers to the date of sample collection (i.e., 040116 for April 1, 2016). The XX portion of the Sample Identifier refers to the sample type (“SS” for surface 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.

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, 2014a), 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, 2014a). 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 COC form. Sample containers will be placed within protective packaging to prevent breakage and stored in a secure insulated cooler with ice (kept at ≤ 6 °C without freezing) until being shipped off-site to an assigned EPA Contract Laboratory Program (CLP) laboratory or Tier IV laboratory (i.e., WESTON-subcontracted laboratory). A temperature blank will be placed in each sample cooler. Additional field 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, 2011b). Samples will be shipped to the designated CLP or Tier IV laboratories via 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, 2011c). 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

All 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 SOM02.3 and ISM02.3 for organics and inorganics, respectively (EPA, 2015a and EPA, 2015b). TAL Metals analysis will be conducted through Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS). 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).

Field duplicate samples will be collected at a rate of one 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 one per day or one 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 one per day or one 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). 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.

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 Branch (OASQA) 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.

Since samples will be shipped to EPA CLP or DAS laboratories, analysis of matrix spike and 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 matrix spike/duplicate (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 one MS/MSD and one 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. Inorganic and organic data will be validated at the Organic Level 2 and Inorganic Level 2, in accordance with USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, USEPA-540-R-014-002, August 2014 (EPA, 2014b) and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, USEPA-540-R-013-001, August 2014 (EPA, 2014c).

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 which 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 due to 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 20, 2016. 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

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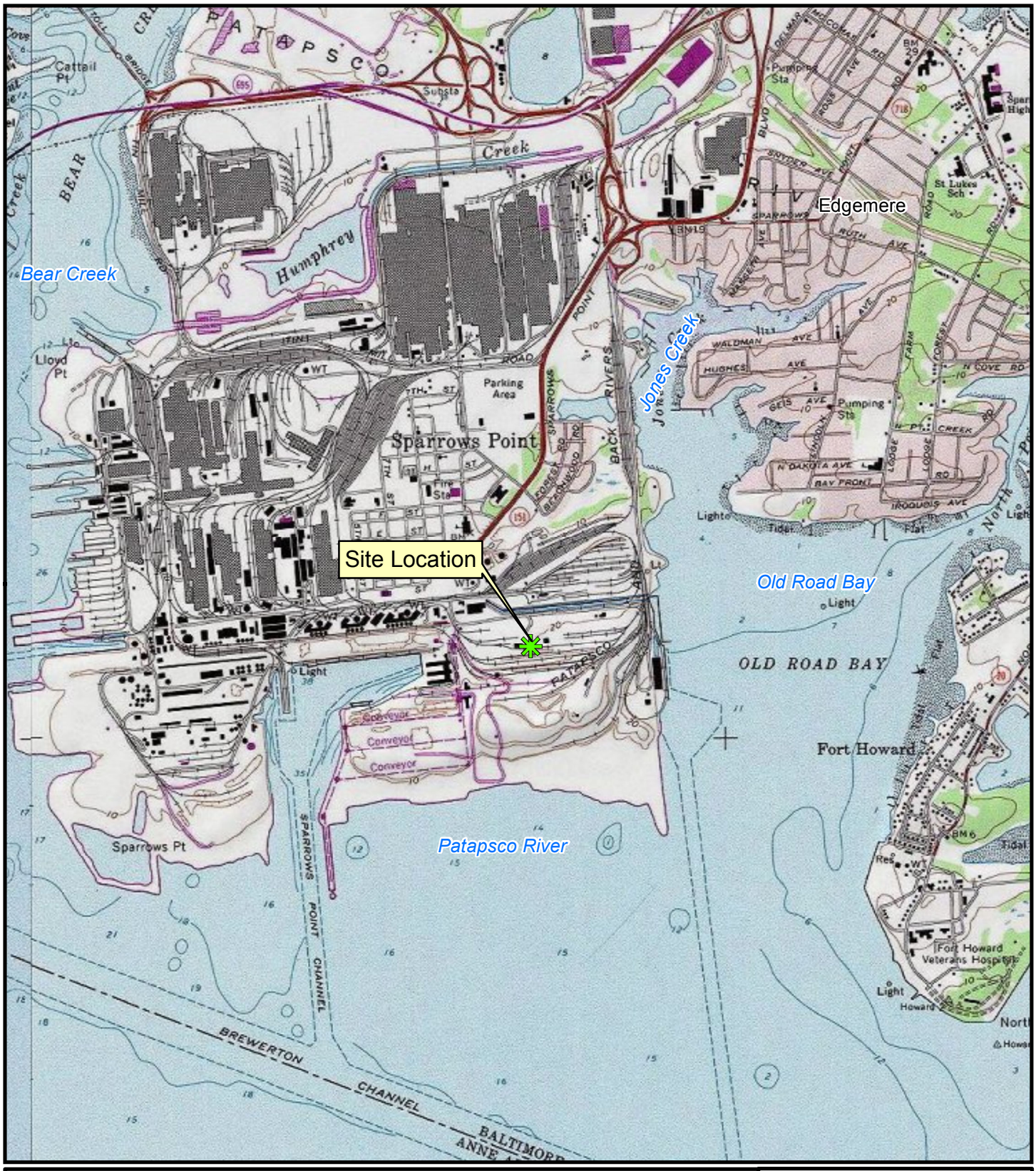
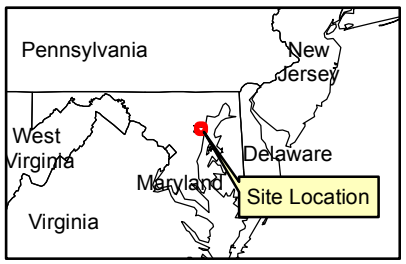
FIGURES





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

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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

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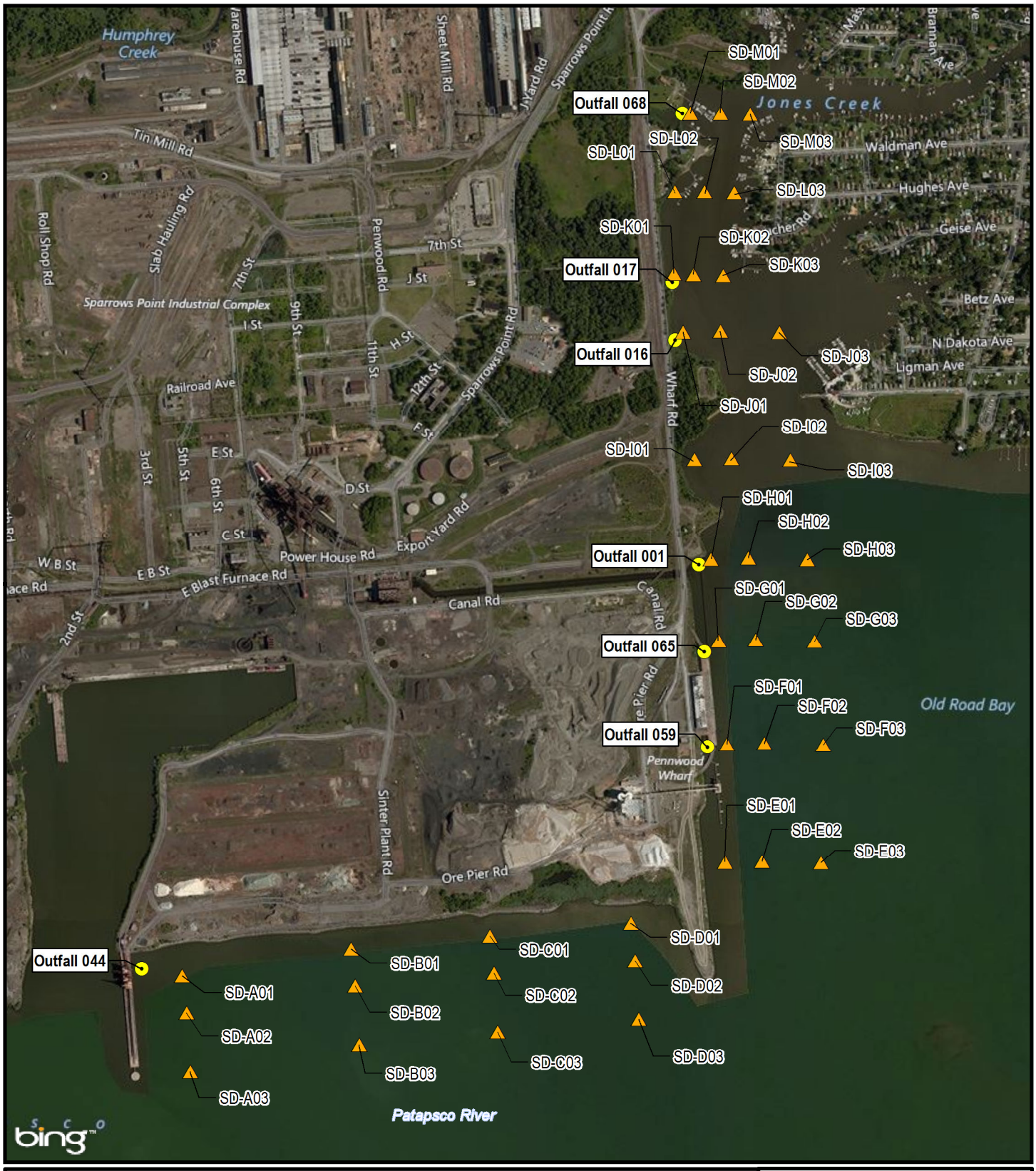

Legend

- Proposed Sediment Sample Location
- Approximate Location of Active Stormwater Outfall

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 3
Sediment Sample Locations

TDD# W501-15-08-003
Contract: EP-S3-15-02
Prepared: 4/19/2016

WESTON SOLUTIONS

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Legend

- Approximate Location of Active Stormwater Outfall
- Storm Water 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

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TABLES

Table 1 Proposed Sampling

Sample Identifier	Sample Matrix	Sampling Location Description	Rationale
SESL-2016-SS-A01 through A03	Sediment	South East Shoreline; Transect A; Located within the vicinity of Outfall 044; Southern shoreline within Patapsco River	Assess surface water migration destination
SESL-2016-SS-B01 through B03	Sediment	South East Shoreline; Transect B; Spatial coverage of southern shoreline within Patapsco River	Background
SESL-2016-SS-C01 through C03	Sediment	South East Shoreline; Transect C; Spatial coverage of southern shoreline within Patapsco River	Assess surface water migration destination
SESL-2016-SS-D01 through D03	Sediment	South East Shoreline; Transect D; Spatial coverage of the southern portion of eastern shoreline within Patapsco River	Assess surface water migration destination
SESL-2016-SS-E01 through E03	Sediment	South East Shoreline; Transect E; Spatial coverage of eastern shoreline within Old Road Bay	Assess surface water migration destination
SESL-2016-SS-F01 through F03	Sediment	South East Shoreline; Transect F; Located within the vicinity of Outfall 059 within Old Road Bay	Assess surface water migration destination
SESL-2016-SS-G01 through G03	Sediment	South East Shoreline; Transect G; Located within the vicinity of Outfall 065 within Old Road Bay	Assess surface water migration destination
SESL-2016-SS-H01 through H03	Sediment	South East Shoreline; Transect H; Located in the vicinity of Outfall 001 along the eastern shoreline within Old Road Bay	Assess surface water migration destination
SESL-2016-SS-I01 through I03	Sediment	South East Shoreline; Transect I; Located at the mouth of Jones Creek and Old Road bay	Assess surface water migration destination
SESL-2016-SS-J01 through J03	Sediment	South East Shoreline; Transect J; Located in the vicinity of Outfall 016 along the eastern shoreline within Jones Creek	Assess surface water migration destination
SESL-2016-SS-K01 through K03	Sediment	South East Shoreline; Transect K; Located in the vicinity of Outfall 017 along the eastern shoreline within Jones Creek	Assess surface water migration destination
SESL-2016-SS-L01 through L03	Sediment	South East Shoreline; Transect L; Located in between Outfall 068 and 17 within Jones Creek	Assess surface water migration destination
SESL-2016-SS-M01 through M03	Sediment	South East Shoreline; Transect M; Located in the vicinity of Outfall 068 within Jones Creek	Assess surface water migration destination
SESL-2016-ST-044	Stormwater	Southeast Shoreline; Outfall 044	Assess surface water migration
SESL-2016-ST-059	Stormwater	Southeast Shoreline; Outfall 059	Assess surface water migration
SESL-2016-ST-065	Stormwater	Southeast Shoreline; Outfall 065	Assess surface water migration
SESL-2016-ST-001	Stormwater	Southeast Shoreline; Outfall 001	Assess surface water migration
SESL-2016-ST-016	Stormwater	Southeast Shoreline; Outfall 016	Assess surface water migration
SESL-2016-ST-017	Stormwater	Southeast Shoreline; Outfall 017	Assess surface water migration

Sample Identifier	Sample Matrix	Sampling Location Description	Rationale
SESL-2016-ST-068	Stormwater	Southeast Shoreline; Outfall 068	Assess surface water migration
SESL-2016-ST-001-01	Stormwater	Duplicate Sample of SEDL-2016-ST-001	QA/QC
SESL-2016-TB-01	Aqueous	Trip blank	QA/QC
SESL-2016-TB-02	Aqueous	Trip blank	QA/QC
SESL-2016-FB-01	Aqueous	Field blank	QA/QC
SESL-2016-RB-01	Aqueous	Rinsate blank	QA/QC

Notes: QA/QC = Quality assurance/quality control
SESL = Southeast Shoreline
SS = Surface Sediment
ST = Stormwater
FB = Field 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 SOM02.3	Three 40-mL VOA vials	Ice 4°C, HCl, pH<2	CRQL	14 days analysis	7	1	0
	TAL SVOCs	CLP SOW SOM02.3	Four 1-L amber	Ice	CRQL	7 days (extraction) 40 days (analysis)	7	1	0
	TAL PCBs	CLP SOW SOM02.3	Two 1-L amber	Ice	CRQL	7 days (extraction 40 days (analysis)	7	1	1
	TAL Metals & Hg	CLP SOW ISM02.3 ICP-MS+Hg	1-L polyethylene	Ice 4°C, HNO_3 to pH <2	CRQL	180 days (metals) 28 days (Hg)	7	1	1
	Cyanide	CLP SOW ISM02.3	1-L polyethylene	Ice 4° C, NaOH to pH >12	CRQL	14 days	7	1	1
Soil/Sediment	TAL VOCs	CLP SOW SOM02.3	Three EnCore® samplers and one 2-oz jar or one 4-oz jar with septum	Ice	CRQL	2 days (unpreserved)	43	5	0
	TAL SVOCs	CLP SOW SOM02.3	One 8-oz jar (amber glass)	Ice	CRQL	14 days (extraction) 40 days (analysis)	43	5	0
	TAL PCBs	CLP SOW SOM02.3	One 8-oz jar (amber glass)	Ice	CRQL	14 days (extraction) 40 days (analysis)	43	5	3
	TAL Metals &Hg Cyanide	CLP SOW ISM02.3 ICP-MS+Hg+CN	One 4-oz jar	Ice	CRQL	180 days (metals) 28 days (Hg); 14 days (cyanide)	43	5	3
Rinsate Blank Sample	TAL VOC	CLP SOW SOM02.3	Three 40 mL VOA vials	Ice 4°C, HCl, pH<2	CRQL	14 days analysis	5	NA	NA
	TAL	CLP SOW	Two 1-L	Ice	CRQL	7 days (extraction)	4	NA	NA

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]
	SVOCs	SOM02.3	amber			40 days (analysis)			
	TAL PCBs	CLP SOW SOM02.3	Two 1-L amber	Ice	CRQL	7 days (extraction) 40 days (analysis)	4	NA	NA
	TAL Metals &Hg	CLP SOW ISM02.3	1-L polyethylene	Ice 4°C, HNO_3 to pH <2	CRQL	180 days (metals) 28 days (Hg)	4	NA	NA
	Cyanide	CLP SOW ISM02.3	1-L polyethylene	Ice 4° C, NaOH to pH >12	CRQL	14 days	4	NA	NA
Aqueous Blanks (Trip and Field)	TAL VOCs	CLP SOW SOM02.3	Three 40-mL VOA vials	Ice 4°C, HCl, pH<2	CRQL	14 days analysis	8 (4 for field blank and 4 for trip blank)	NA	NA

Notes:

[1] Designate 1 sample per 20 samples for laboratory QC (i.e., MS/MSD for PCB analysis and S/D for inorganic analysis). A triple volume is required for the PCB sample designated for MS/MSD analysis. Additional sample volume is not required for the inorganic sample designated for S/D analysis.

CLP = Contract Laboratory Program

CRQL = Contract-required quantitation limit

HCL = Hydrochloric acid

Hg; CN = Mercury; cyanide

HNO_3 = Nitric acid

ICP-MS = Inductively coupled plasma-mass spectroscopy

ISM02.3 = CLP SOW Inorganic Superfund Method

L = Liter

mL = Milliliter

MS/MSD = matrix spike/matrix spike duplicate

NA = Not applicable

NaOH = Sodium hydroxide

PCB = Polychlorinated biphenyl

QC = Quality control

S/D = matrix spike/duplicate

SOM02.3 = CLP SOW Superfund Organic Method

SOW = Statement of work

SVOC = Semivolatile organic compound

TAL = Target analyte list

VOA = Volatile organic analysis

VOC = Volatile organic compound