



November 22, 2024

Ms. Carrie Sanneman and Mr. Andrew Riggs
Urban Flood Safety & Water Quality District
1880 NE Elrod Drive
Portland, Oregon 97211

**Re: Sampling and Analysis Plan for Maintenance
Dredging at the Sandy Pump Station Forebay
UFD-2024-6-58**

Dear Ms. Sanneman and Mr. Riggs:

GSI Water Solutions, Inc. (GSI), is pleased to provide the Urban Flood Safety and Water Quality District (UFSWQD) with this Sampling and Analysis Plan (SAP) for sediment sampling, profiling, and reporting associated with maintenance dredging of the Sandy Pump Station Forebay (Forebay) in Fairview, Oregon. The proposed activities (Project) will consist of obtaining sediment cores within the Forebay, collecting and analyzing sediment samples, and preparing a technical memorandum discussing the proposed maintenance dredging project, the chemical results, and potential disposal options for dredged materials. This SAP is prepared for submission to the Oregon Department of Environmental Quality (DEQ) for approval prior to commencement of sampling activities. Sampling activities are anticipated to occur in early to mid-December 2024. Dredging activities will be conducted under NWP 2003-688-6 and its associated 401-WQC between June and September 2025.

Site Description

The Forebay is in Fairview, Oregon (Figure 1), and receives stormwater runoff from approximately 1,800 acres of mixed-use commercial and industrial lands, including the Troutdale Airport (Figure 1). Water is pumped from the Forebay through a federally authorized levee and discharged into the Columbia River.

Water enters the Forebay from two points:

1. From Salmon Creek to the south, which is connected to the Forebay through culverts that run under Marine Drive.
2. From the Sundial Channel to the east, through a flow control structure. During periods of low water, this channel collects drainage water from the Sundial Wetlands and discharges it eastward to a diversion point with Salmon Creek. During periods of high water, diverted water flows west through this channel and discharges into the Forebay (DEQ, 2021).

Project Description

The pump station has the capacity to convey a 100-year storm. However, the pump station can no longer operate at historical setpoints due to sediment accumulation in the Forebay, resulting in higher rates of pump-cycling and less flood storage capacity. This Project seeks to remove the accumulated sediment from the Forebay, restoring conveyance capacity and improving operational efficiency.

UFSWQD is planning on conducting maintenance dredging during the 2025 in-water work window (June 15 to September 15) in the Forebay. Currently, sediments have accumulated to approximately 9 to 10 feet North American Vertical Datum of 1988 (NAVD 88) and need to be removed to approximately 6.5 feet NAVD 88 to be below pump intakes and increase water capacity in the Forebay. Maintenance dredging is anticipated to generate up to approximately 750 cubic yards of material. Disposal of the material will be based on the findings of sediment characterization activities.

Previous Sampling and Results

A previous sediment investigation was completed within the Forebay in 2005 (CH2M HILL, 2005). This investigation employed a Ponar® sampler to collect grab samples of surface sediment (0 to 4 inches below mudline). Results from the two samples collected in the Forebay (DDF-01 and DDF-02) (Figure 1) included detections of polycyclic aromatic hydrocarbons (PAHs), various metals, and fluoride. No detections were returned for polychlorinated biphenyls (PCBs), volatile organic compounds (except 0.005 milligrams per kilogram bromomethane), semivolatile organic compounds, and cyanide. Upon comparison with DEQ screening level values at the time, CH2M HILL found that the results did not suggest ecological impacts or warrant further investigation.

Proposed Sediment Sampling

Sediment characterization activities will be completed in general accordance with the draft Environmental Management and Testing Plan (EMTP) (UFSWQD, 2024) and the Field Sampling Plan (FSP) (Apex, 2024) developed for UFSWQD. A summary of anticipated sampling activities is provided in the attached SAP form (Table 1).

Sedimentation in the Forebay is assumed to be of consistent chemical quality. As such, the entire dredge prism (DP) will be characterized by one sample (i.e., the DP will be treated as one dredged material management unit [DMMU]), and the future leave surface (LS) will be characterized by one additional sample.

Four sediment cores along the long axis of the proposed DP (Figure 1). These cores will aim to capture sediment from the mudline to 5.5 feet NAVD 88 along the centerline (deepest) part of the Forebay. Sediment from mudline to 6.5 feet NAVD 88 will represent DP material, and sediment from 6.5 to 5.5 feet NAVD 88 will represent leave surface material (Figure 2). The total depth of sampling will be determined based on the mudline elevation, which will be calculated relative to the water surface elevation using the onsite staff gauge, or contemporary bathymetric data (shown in Figure 1 and quantified in Figure 2). It is anticipated that the Forebay will be drained prior to or during sampling activities and that sample points will be directly accessed from the banks; otherwise, sample points will be accessed by raft or boat. A variety of hand methods may be employed to collect sediment depending on its physical characteristics and may include hand auguring or push tubes. All reusable sampling equipment will be decontaminated between sample points following the procedure described in the FSP (Apex, 2024).

Each accepted core from a given location will be logged consistent with the United Soil Classification System ASTM D2487-17 standards and photographed. Representative material from the recovered length representing the DP and LS material will be placed in separate decontaminated stainless-steel bowls and homogenized until uniform color and consistency are achieved. Homogenized material from each bowl will be placed into an appropriate laboratory-supplied analytical sample jar for archive. The remaining material will be retained until all sampling is complete. After all subsamples have been collected, equal volumes of material from each discrete DP or LS subsample will be composited and homogenized into samples representing the DP and LS of the entire DMMU. Additional archive material from these composites will be placed in laboratory-supplied analytical sample

jars. Excess material from sampling will be returned to its point of origin. No quality control samples will be collected in the field.

Depending on field conditions and the ability to collect acceptable cores, field work is anticipated to take one day, after which samples will be prepared for delivery to the contracted laboratory.

Analytical Program

The analytical program is indicated on the attached SAP form. Apex Laboratories, LLC (Apex), of Tigard, Oregon will conduct the laboratory analyses. Analytical test methods will have method reporting limits that meet applicable criteria needed for evaluation (if not, method detection limits will be used). DP and LS samples will be analyzed for the same analytical suite, which will include the following:

- Total petroleum hydrocarbons as diesel and oil by NWTPH-Dx with silica gel cleanup
- PAHs by U.S. Environmental Protection Agency (EPA) Method 8270E-SIM
- Organochlorine pesticides by EPA Method 8081B
- Metals, including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver, by EPA Method 6020B
- Fluoride by EPA Method 300.0

Archive material will be stored frozen at Apex pending analytical results and screening of the composite samples.

Reporting

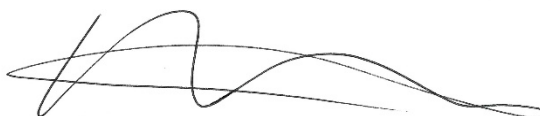
Upon receipt of analytical results, a Sampling and Analysis Report will be prepared in accordance with Appendix D of the EMTP (UFSWQD, 2024) and Section 11 of the FSP (Apex, 2024). This report will be in technical memorandum format and detail field activities and analytical results. It will also include a Level 2B data validation and comparison of results against DEQ Clean Fill criteria (DEQ, 2019). If concentrations in the LS exceed those of the DP, results will be screened against Columbia Slough in-water sediment screening levels for the Lower Slough (DEQ, 2014).

If you have any questions regarding this letter, please feel free to give me a call at (208) 991-6713.

Sincerely,
GSI Water Solutions, Inc.



Braedon Warner, GIT
Geologist



Benjamin Johnson, RG, LHG
Hydrogeologist

Attachments:

Table 1 – SAP Form

Figure 1 – Sandy Pump Station Forebay Sampling Locations

Figure 2 – Sampling Schematic

References

- Apex. 2024. Field Sampling Plan – Environmental Management and Testing Plan for Ditch Maintenance. Prepared for Urban Flood Safety & Water Quality District. August 21, 2024.
- DEQ. 2014. Lower Columbia Slough Screening Levels. State of Oregon Department of Environmental Quality Cleanup Program. June 3, 2014.
- DEQ. 2019. Clean Fill Determinations. Oregon Department of Environmental Quality, Materials Management. February 21, 2019.
- DEQ. 2021. Port of Portland Sundial Channel Passage Exemption Request – Benefit Analysis. Memorandum from Ben Walczak to Katherine Nordholm. August 13, 2021.
- CH2M HILL. 2005. Data Report – Drainage District Forebay Investigation, Post-Demolition RI/RA, RMC-Troutdale Facility. Technical Memorandum No. 35. Prepared for the U.S. Environmental Protection Agency. June 6, 2005.
- UFSWQD, 2024. Environmental Management and Testing Plan – Draft. Urban Flood Safety & Water Quality District. August 8, 2024.

Table 1. SAP Form**Urban Flood Safety and Water Quality District****Sampling and Analysis Plan for Sediment Sampling under the
UFSWQD Environmental Management and Testing Plan Task Order UFD-2024-6-58**

Prepared by: Braedon Warner	Date: November 12, 2024 For questions regarding this SAP, contact: Andrew Riggs (ariggs@urbanfloodsafety.org)
-----------------------------	---

PROJECT DESCRIPTION

Length (ft)	Approx. 650
Width (ft)	Approx. 80
Current Mudline (ft NAVD 88)	Approx. 9.0 to 9.9
Estimated Volume (cy)	Approx. 750
In-Water Work Window (year)	2025
Dredging Method	Excavation
Placement Site(s)	Based on Characterization

SAMPLING INFORMATION

Proposed No. of DMMUs	1	
Proposed DMMU Volume (cy)	~750	
Subsamples (SS)/DMMU	4	
Leave Surface Layer Elevation (ft NAVD 88)	6.5	
DP	Sample Interval (ft NAVD 88)	Mudline to 6.5
	Composite? (Y/N)	Y
	Subsample Archive (Y/N)	Y
LS	Sample Interval (ft NAVD 88)	6.5 to 5.5
	Composite? (Y/N)	Y
	Subsample Archive (Y/N)	Y

ANALYTICAL PROGRAM

Analysis	DP	LS
Diesel/Oil-Range Hydrocarbons (NWTPH-Dx with Silica Gel Cleanup)	X	X
PAHs (EPA 8270E)	X	X
Organochlorine Pesticides (EPA 8081B)	X	X
Metals (EPA 6020B) ¹	X	X
Fluoride (EPA 300.0)	X	X

PROJECT TEAM

Role	Name and Title	Phone Number
UFSWQD Project Leader	Andrew Riggs Senior Engineering Technician (UFSWQD)	(503) 281-5675
Consultant Project Manager	Braedon Warner Project Geologist (GSI)	(208) 991-6713

Senior QA Manager	Benjamin Johnson, RG, LHG Principal Hydrogeologist (GSI)	(503) 679-4543
Field Manager/Coordinator	Braedon Warner Project Geologist (GSI)	(208) 991-6713
Project Chemist (QA Data Review)	Mitch Fargher Data Analyst (GSI)	(503) 560-7618
Laboratory Project Manager	Philip Nerenberg Lab Director (Apex Laboratories)	(503) 718-2323
Field Support	Alex McCarthy, RG Consultant Geologist (GSI)	(202) 538-4166

NOTES / REMARKS: The proposed dredging depth is 6.5 feet NAVD 88. Sediment characterization will consist of obtaining cores from four locations within the DMMU and compositing these cores to represent the DP and LS (6.5 to 5.5 feet NAVD 88) intervals. Discrete subsamples from each core location will also be obtained and archived. DP and LS samples will be analyzed for those compounds specified above.

ACRONYMS

¹Metals analysis includes arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

cy = cubic yards

DMMU = Dredged material management unit

DP = Dredge Prism

EPA = Environmental Protection Agency

ft = feet

LS = Leave Surface

NAVD 88 = North American Vertical Datum of 1988

SAP = Sampling and Analysis Plan

NWTPH = Northwest Total Petroleum Hydrocarbons

PAHs = Polycyclic aromatic hydrocarbons

PCB = Polychlorinated biphenyl

UFSWQD = Urban Flood Safety and Water Quality District

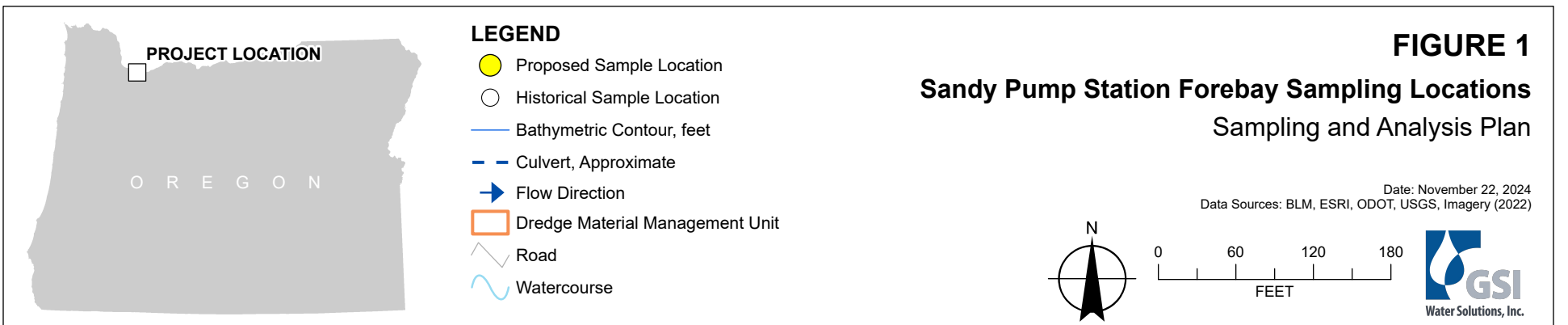
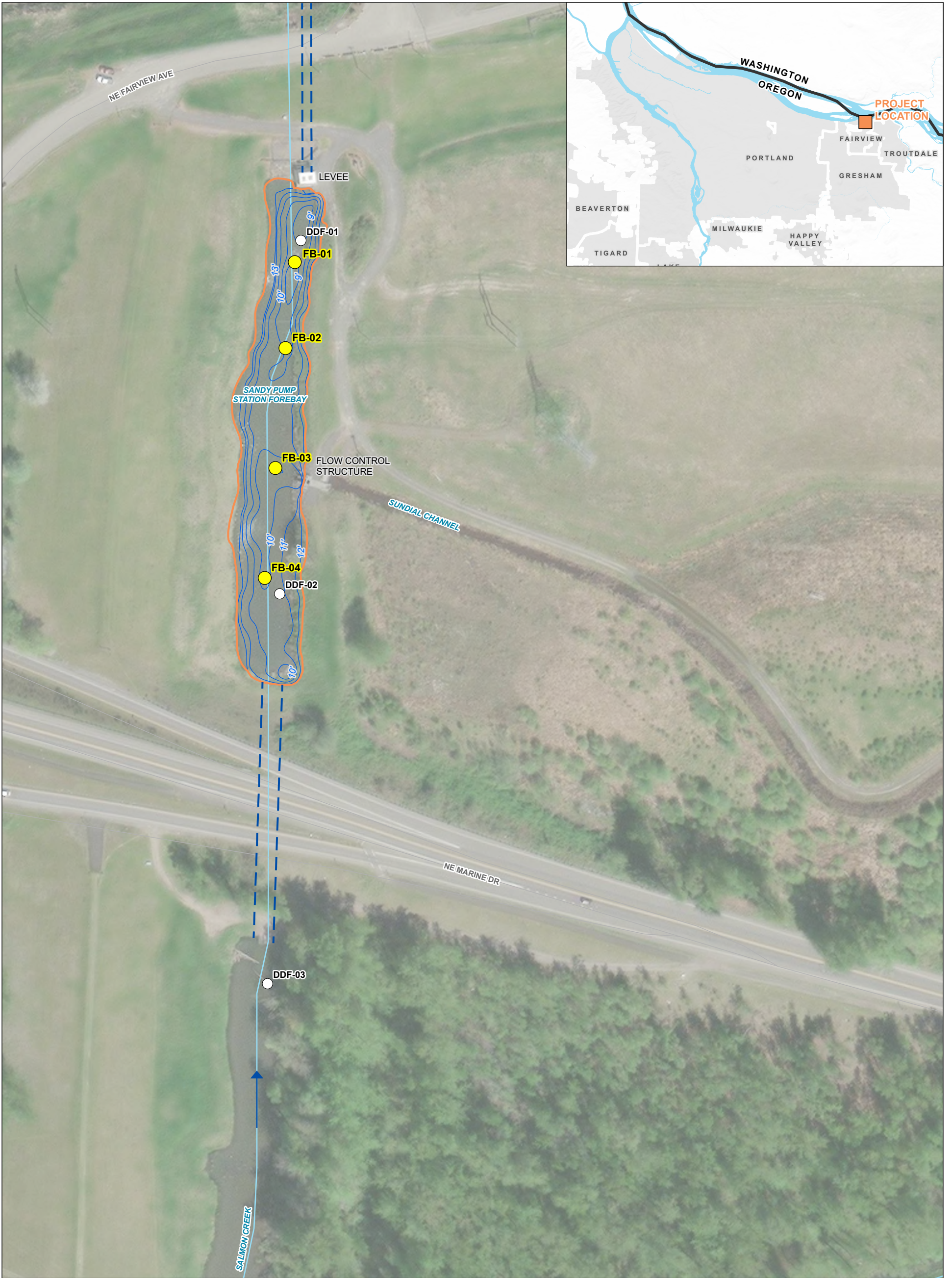
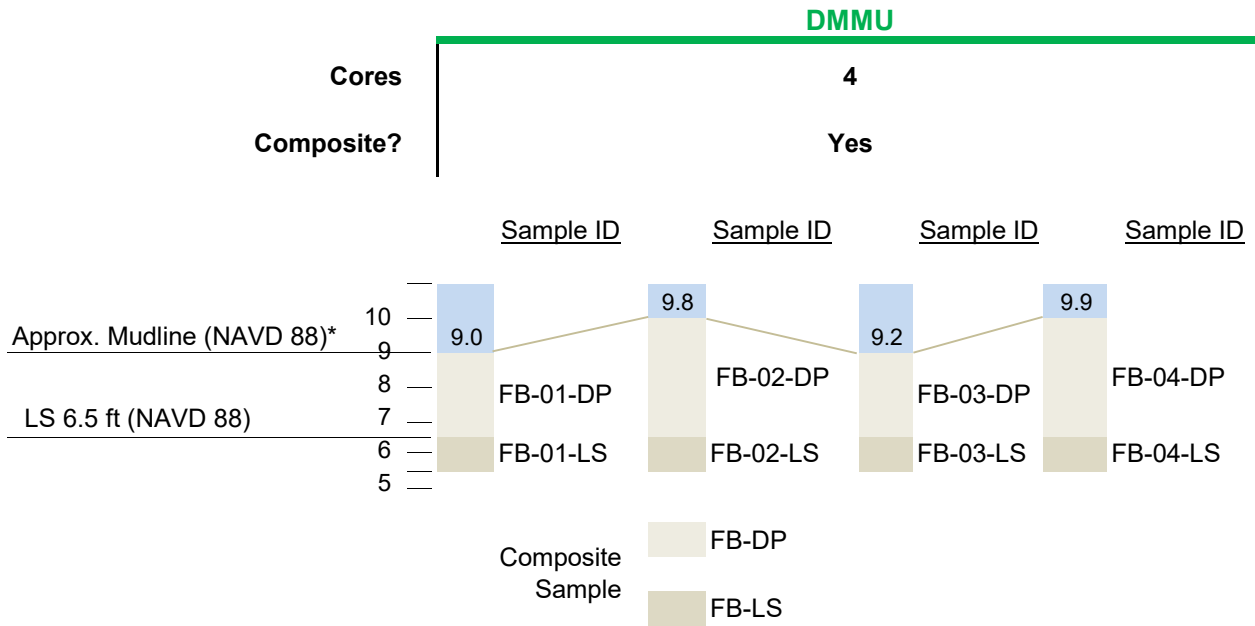


Figure 2. Sampling Schematic
Sampling and Analysis Plan for Maintenance Dredging at the Sandy Pump Station Forebay



*Current mudline elevation approximated from bathymetric data.