CENWS-ODS-ND

MEMORANDUM FOR: RECORD August 10, 2017

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM MILLENNIUM BULK TERMINALS LONGVIEW (NWS-2010-1225) FOR OPEN-WATER FLOWLANE DISPOSAL IN THE COLUMBIA RIVER.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability of 472,000 cubic yards (CY) of dredged material at the proposed Millennium Bulk Terminals Longview (MBT-Longview) project site for open-water disposal (Figure 1). The project proposes to disposal of the material in the flow-lane area of the Columbia River or beneficially re-use the material at an upland location on the MBT-Longview project site. This memorandum only addresses flow-lane disposal; the DMMP agencies do not make upland beneficial re-use determinations.

2. Background. MBT-Longview is located on the Washington side of the Columbia River between RM 62 and 64. MBT-Longview proposes to build a coal export terminal on a portion of an existing industrial site owned by Northwest Alloys (NW Alloys) in Cowlitz County. The proposal includes construction of a new trestle and Coal Export Terminal docks 2 and 3 (Figure 1). MBT-Longview is proposing new work and maintenance dredging to provide capacity for fully loaded Panamax class vessels at the Coal Export Terminal Docks 2 and 3.

   The majority of the proposed dredging footprint has never been dredged previously. The eastern portion of the proposed dredging footprint has been characterized and dredged previously to an authorized depth of -40 feet (ft) Columbia River Datum (CRD) with a 2-foot overdredge allowance (-42 ft CRD total) to allow vessel traffic to access Dock 1 just upstream (DMMP, 2010; DMMP, 2016).

   The proposed project depth is -43 ft CRD with 2 ft allowable over depth. Figures 2a and 2b shows the existing bathymetry and dredge prism footprint. Using 2016 bathymetry, the calculated dredge volume is 363,200 CY including required dredging to -43 ft CRD, allowable over depth, slopes to be dredged at 3H:1V, and future infill prior to permit approvals and dredging. Future accretion at Docks 2 and 3 is anticipated to require maintenance dredging up to 100,000 CY as frequently as annually to maintain -43 ft CRD over a 10-year period after the initial dredging is completed.

   Initially, the project proponent submitted a partial characterization Sampling and Analysis Plan (SAP) in fall 2016 to down-rank the site prior to a subsequent full characterization. The partial characterization SAP was completed and approved by the DMMP agencies in December 2016. Sampling using a vibracore was attempted in January 2017, but high current velocities prevented successful sample collection. A second sampling attempt was scheduled in March 2017, but unfavorable river velocities again obstructed field sampling efforts.

   Following two unsuccessful attempts to collect samples for a partial characterization, the project proponent decided to pursue a full characterization (FC) using a drill rig mounted on a barge with spuds to maintain position while sampling. The final full characterization SAP was completed on May 3 (DOF, 2017).

The exact disposition of the dredged material to be characterized remains undetermined. The FC SAP was purposefully designed to provide sampling information sufficient to meet the requirements for flow-lane disposal as determined by the DMMP and to provide the information needed by the project's consultants to evaluate the usefulness of the dredge prism material for potential upland use. The DMMP does not make upland beneficial use determinations; therefore, this decision memorandum only applies to the potential flow-lane disposal option.

3. Project Summary. Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	Moderate
Characterized dredging volume (CY)	472,000
Proposed dredging depth (ft CRD)	-43 ft CRD
Proposed dredging depth + overdepth	-45 ft CRD
Draft SAP received	April 12, 2017
DMMP comments provided on draft SAP	April 17, 2017
2nd Draft SAP	April 24, 2017
DMMP comments provided on 2nd draft SAP	April 26, 2017
Revised figures and text received	April 27, 2017
DMMP comments provided on figures and text	May 1, 2017
SAP approved	May 3, 2017
Sampling dates	May 10 - May 30, 2017
Draft Sediment data Characterization Report (SCR) received	June 23, 2017
DMMP comments provided on draft SCR	June 29, 2017
2nd draft SCR received	July 5, 2017
DMMP comments provided on 2nd draft SCR	July 11, 2017
Final data report received	July 12, 2017
DMMO tracking number	MBTLO-1-A-F-380
EIM study ID	MBTLO17
USACE Permit Application Number	NWS-2010-1225
Recency Determination (moderate rank = 5 years)	May 2022

4. Project Ranking and Sampling Requirements. Sediments at the MBT-Longview project are currently ranked "moderate" (DMMP, 2016). For moderate-ranked project on the lower Columbia River, the number of samples and analyses are calculated using the following guidelines (DMMP, 2016):
   - Maximum volume of sediment represented by each field sample = 4,000 CY
   - Maximum sediment volume represented by each DMMU = 40,000 CY

Due to the large calculated dredge prism volume (363,200 CY) and variable dredge prism depth (0 – 20 ft below mudline), the project was subdivided into a total of 13 DMMUs encompassing one surface and four subsurface layers to represent a possible total sediment volume of 472,000 CY (Table 2).

The number of cores planned for collection within each DMMU to form each composite sample ranged from three to ten, depending upon the DMMU volume. A minimum of one z-sample core was planned per each DMMU that interfaced with the z-layer. DMMUs were proposed in 4 ft layers starting from the surface and extending downwards, such that the depth boundaries of each DMMU varied across the site consistent with the surface bathymetry. Figure 3 is a composite figure showing all DMMUs and actual sampling locations. DMMUs are stacked vertically in Figure 3 such that the progression towards dark orange (subsurface 4) represents those areas of the dredge prism with the greatest sediment accumulation and each DMMU include the footprint of all subsurface DMMUs beneath it. Figures 4 through 8 show each layer individually and its associated cores from which subsamples were collected for compositing.

5. Sampling. Sampling occurred May 10 through May 30 at the locations shown in Figures 4 through 8. A total of 60 sediment cores were collected using a hollow-stem auger drill rig parked on a barge. Initially, one drill/barge was deployed. A second drill rig (on a second barge) joined the effort about halfway through the field sampling effort. Field samples were maintained on ice in coolers aboard the barges until all subsamples for the specific DMMU had been collected. Once all field samples for a DMMU were collected, compositing was conducted on board the larger of the two barges. Samples were transmitted twice weekly to the lab by courier. Table 2 presents the sample station elevations, boring depths, and core sections organized by core ID. By the nature of the sample design, a single core ID could contain up to 5 field subsamples and one z-layer archive sample.

   A total of 13 DMMU composites were collected and submitted to Analytical Resources, Inc., in Tukwila, Washington for laboratory analysis. Due to holding time constraints, ammonia and sulfides analyses were performed on each discrete field subsample rather than as part of the composite analysis. This extended the maximum sample holding time for the composite samples from 7 to 14 days.

   Z-samples. Two foot z-samples were collected from 35 of 60 cores across the site. Z-sample material was archived pending the results of the composite samples from the overlying dredge prism. Because no exceedances of DMMP freshwater criteria were found in the dredge prism samples, z-sample analysis was not required for this project.

6. Sediment Conventional, Grain Size and Chemical Analysis.

   The chemical data for the 13 DMMU composites are compared to the DMMP freshwater guidelines in Table 4. No chemicals were detected in exceedance of the DMMP screening level 1 (SL1) guidelines. PAHs, chlorinated hydrocarbons, phthalates, phenols, organotins, pesticides, and PCBs were not detected in any DMMUs. Metals, miscellaneous extractables, and petroleum hydrocarbons were either not detected or were detected at concentrations well below the SL1 for all DMMUs.

   The average ammonia and sulfide concentrations ranged from 215 to 304 and 2.8 to 42.8 mg/kg, respectively, and are presented in Table 4. Please see the full data report (DOF, 2017b) for the individual field subsample concentrations of ammonia and sulfides.

Dioxins/furans. Dioxins/furans analysis was required for all DMMUs given their locations, past historical site use, and lack of previous dioxin/furans sediment data. Dioxin/furan TEQ data is included in Table 5.

Dioxins/furans were detected at low levels ranging from 1.02 up to 1.62 toxicity equivalents (TEQ, with U = ½ estimated reporting limit), which is below the range of background values for sediment samples from the lower Columbia River (0.65 to 2.89 pptr TEQ) (DMMP, 2016). The DMMP agencies concur that the material from all DMMUs passes the DMMP dioxin/furan guidelines for open-water disposal.

7. Biological Testing. There were no SL1 exceedances for the standard COCs. The dioxin/furan concentrations ranged from 1.02 to 1.62 pptr TEQ, which lies below the range of Columbia River background (0.65 to 2.89 pptr TEQ) (DMMP, 2016). Therefore, bioassays and bioaccumulation testing were not required.

8. Sediment Exposed by Dredging. Sediment exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 2013) or the State's anti-degradation standard (DMMP, 2008). Two foot z-samples were collected from 35 of 60 cores across the site (Table 2). Based on the tiered testing approach, analysis of z-samples is not required because all DMMU composite samples are below the SL1 criteria. Therefore, this project is in compliance with the State of Washington anti-degradation standard.

9. Debris Management. The DMMP agencies implemented a debris screening requirement following the 2015 SMARM in order to prevent the disposal of solid waste and debris at open-water disposal sites in Puget Sound (DMMP, 2015).

   Geographically, the project area is located on the Columbia River downstream of the Cowlitz River and receives significant sediment input from upstream sources. The majority of the proposed dredging area has never been dredged; the eastern upstream end overlaps with the Weyerhaeuser Longview project area, which is dredged frequently. Past dredging at the adjacent Weyerhaeuser Longview project has historically encountered homogeneous sand and silty sediment; large woody debris has been rarely, if ever, encountered in Weyerhaeuser Longview project dredging area.

   During core sampling for the MBT-Longview project, wood debris was reported at three sample locations (20, 30, and 31) at the upstream end of the proposed dredging prism; all three sample locations were re-located within 30 ft of the proposed target location to avoid wood debris and to allow sufficient sample penetration. Wood fragments were observed in at least one of the re-located coring locations.

   Based on the above information, the DMMP agencies concur that the dredge area is of low concern for debris and a screening grid is not required for this project. However, if any debris larger than 1 foot in any dimension is encountered, it must be segregated and disposed of in an upland landfill or other appropriate use. At no time may any debris greater than one foot in any dimension be disposed at an open-water disposal site.

10. Suitability Determination. In summary, based on the results of the previously described testing, the DMMP agencies concluded that up to 472,000 cubic yards of dredged material in DMMUs 1 through 13 are suitable for open-water disposal.

Subsequent annual maintenance dredging requests will need to coordinate with the DMMP to ensure that this Suitability Determination is still applicable.

The DMMP agencies do not make upland beneficial re-use determinations. The local health jurisdiction should be consulted for that evaluation.

A pre-dredge meeting with DNR, Ecology, EPA and the Corps of Engineers is required at least 7 days prior to dredging. A dredging and disposal quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting. Dredging, positioning, and disposal will all need to be addressed with enough detail to provide assurance to the agencies that the dredge plan will be properly implemented.

A Portland District Corps of Engineers agreement must be acquired for open-water disposal. Disposal at the selected flow-lane site must be in accordance with Portland District procedures.

This suitability determination does ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, the resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

10. References.

DMMP, 2008. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

DMMP, 2016. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, August 2016

DMMP, 2016. *Determination Regarding the Suitability of Proposed Dredged Material from Northwest Alloys Longview for Open-Water Flow-lane Disposal in the Columbia River,* January 7, 2016.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

Dalton Olmsted Fuglevand (DOF), 2017a. *Sediment Characterization Sampling and Analysis Plan for Flow Lane and Beneficial Use Upland Disposal,* Millennium Bulk Terminals-Longview Coal Export Terminal, Longview, WA. Prepared for Grette Associates. May 3, 2017.

DOF, 2017b. *Sediment Characterization Report,* Millennium Bulk Terminals-Longview Coal Export Terminal for Flow Lane and Upland Disposal, Longview, WA. Prepared for Grette Associates. July 12 2017.

11. Agency Signatures.

signed copy on file in DMMO - Seattle District office

Concur:

Date Heather Fourie – U.S. Army Corps of Engineers, Seattle District

Date Erika Hoffman - Environmental Protection Agency

Date Laura Inouye, Ph.D. - Washington Department of Ecology

Date Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Danette Guy – USACE, Seattle District Regulatory
Glenn Grette – Grette Associates
Nancy O'Bourke – Dalton, Olmstead, & Fuglevand, Inc.
USACE Portland District Waterways Maintenance Section

Table 2. DMMU Volume Summary

DMMU Depth Below Mudline (ft)	DMMU Layer	Calculated Layer Volume (CY)	Proposed Number of DMMUs	Chracterized Volume per DMMU (CY)
0 to 4	Surface	163,000	6	40,000
4 to 8	Subsurface 1	86,000	3	40,000
8 to 12	Subsurface 2	67,300	2	40,000
12 to 16	Subsurface 3	37,500	1	40,000
16 to 20	Subsurface 4	9,000	1	12,000
20 +		400		
	Actual Calculated Total Volume	**363,200**	**Total Volume Represented by DMMUs**	**472,000**

Table 3. Sample locations and DMMUs

Core ID	Existing Mudline Elevation (ft CRD)	Core Length (ft)	Field Subsample Elevations (ft CRD)	DMMU ID	Field Subsample Feet Below Mudline (ft)
1	-27.48	19.6	-27.4 to -31.4	1	0 to 4
			-31.4 to -35.4	7	4 to 8
			-35.4 to -39.4	10	8 to 12
			-39.4 to -43.4	12	12 to 16
			-43.4 to -45.0	13	16 to 17.6
			-45.0 to -47.0		z-layer archived
2	-27.1	19.9	-27.1 to -31.1	3	0 to 4
			-31.1 to -35.1	8	4 to 8
			-35.1 to -39.1	11	8 to 12
			-39.1 to -43.1	12	12 to 16
			-43.1 to -45.0	13	16 to 17.9
			-45.0 to -47.0		z-layer archived
3	-25.7	21.3	-25.7 to -29.7	5	0 to 4
			-29.7 to -33.7	9	4 to 8
			-33.7 to -37.7	11	8 to 12
			-37.7 to -41.7	12	12 to 16
			-41.7 to -45.0	13	16 to 19.3
			-45.0 to -47.0		z-layer archived
4	-31.9	15.1	-31.9 to -35.9	1	0 to 4
			-35.9 to -39.9	7	4 to 8
			-39.9 to -43.9	10	8 to 12
			-43.9 to -45.0	12	12 to 13.1
			-45.0 to -47.0		z-layer archived
5	-32.3	14.7	-32.3 to -36.3	2	0 to 4
			-36.3 to -40.3	7	4 to 8
			-40.3 to -44.3	10	8 to 12
			-44.3 to -45.0	12	12 to 12.7
			-45.0 to -47.0		z-layer archived
6	-32	15	-32.0 to -36.0	2	0 to 4
			-36.0 to -40.0	8	4 to 8
			-40.0 to -44.0	11	8 to 12
			-44.0 to -45.0	12	12 to 13
			-45.0 to -47.0		z-layer archived
7	-29.9	17.1	-29.9 to -33.9	2	0 to 4
			-33.9 to -37.9	8	4 to 8
			-37.9 to -41.9	11	8 to 12
			-41.9 to -45.0	12	12 to 15.1
			-45.0 to -47.0		z-layer archived
8	-26.9	20.1	-26.9 to -30.9	3	0 to 4
			-30.9 to -34.9	8	4 to 8
			-34.9 to -38.9	11	8 to 12
			-38.9 to -45.0	12	12 to 18.1
			-45.0 to -47.0		z-layer archived
9	-29.2	17.8	-29.2 to -33.2	3	0 to 4
			-33.2to -37.2	9	4 to 8
			-37.2 to -41.2	11	8 to 12
			-41.2 to -45.0	12	12 to 15.8
			-45.0 to -47.0		z-layer archived
10	-31	16	-31.0 to -35.0	4	0 to 4

Core ID	Existing Mudline Elevation (ft CRD)	Core Length (ft)	Field Subsample Elevations (ft CRD)	DMMU ID	Field Subsample Feet Below Mudline (ft)
			-35.0 to -39.0	9	4 to 8
			-39.0 to -43.0	11	8 to 12
			-43.0 to -45.0	12	12 to 14
			-45.0 to -47.0		z-layer archived
11	-34	13	-34.0 to -38.0	1	0 to 4
			-38.0 to -42.0	7	4 to 8
			-42.0 to -45.0	10	8 to 11
			-45.0 to -47.0		z-layer archived
12	-34.6	12.4	-34.6 to -38.6	2	0 to 4
			-38.6 to -42.6	7	4 to 8
			-42.6 to -45.0	10	8 to 10.4
			-45.0 to -47.0		z-layer) archived
13	-35.5	11.5	-35.5 to -39.5	1	0 to 4
			-39.5 to -43.5	7	4 to 8
			-43.5 to -45.0	10	8 to 9.5
			-45.0 to -47.0		z-layer archived
14	-27.2	12	-27.2 to -31.2	1	0 to 4
			-31.2 to -35.2	7	4 to 8
			-35.2 to -39.2	10	8 to 12
15	-32.4	12	-32.4 to -36.4	2	0 to 4
			-36.4 to -40.4	8	4 to 8
			-40.4 to -44.4	10	8 to 12
16	-34.4	12.6	-34.4 to -38.4	1	0 to 4
			-38.4 to -42.4	7	4 to 8
			-42.4 to -45.0	10	8 to 10.6
			-45.0 to -47.0		z-layer archived
17	-34.3	12.7	-34.3 to -38.3	5	0 to 4
			-38.3 to -42.3	9	4 to 8
			-42.3to -45.0	11	8 to 10.7
			-45.0 to -47.0		z-layer archived
18	-35.8	11.2	-35.8 to -39.8	4	0 to 4
			-39.8 to -43.8	9	4 to 8
			-43.8 to -45.0	11	8 to 9.2
			-45.0 to -47.0		z-layer archived
19	-40.5	6.5	-40.5 to -45.0	3	0 to 4.5
			-45.0 to -47.0		z-layer archived
20	-39.2	7.8	-39.2 to -43.2	6	0 to 4
			-43.2 to -45.0	9	4 to 5.8
			-45.0 to -47.0		z-layer archived
21	-40.3	6.7	-40.3 to -44.3	6	0 to 4
			-44.3 to -45.0	9	4 to 4.7
			-45.0 to -47.0		z-layer archived
22	-38.9	8.1	-38.9 to -42.9	3	0 to 4
			-42.9 to -45.0	8	4 to 6.1
			-45.0 to -47.0		z-layer archived
23	-38.9	8.1	-38.9 to -42.9	3	0 to 4
			-42.9 to -45.0	8	4 to 6.1
			-45.0 to -47.0		z-layer archived
24	-42.9	4.1	-42.9 to -45.0	6	0 to 2.1
			-45.0 to -47.0		z-layer archived
25	-42.5	4.5	-42.5 to -45.0	6	0 to 2.5
			-45.0 to -47.0		z-layer archived

Core ID	Existing Mudline Elevation (ft CRD)	Core Length (ft)	Field Subsample Elevations (ft CRD)	DMMU ID	Field Subsample Feet Below Mudline (ft)
26	-41.4	5.6	-41.4 to -45.0 -45.0 to -47.0	6	0 to 3.6 z-layer archived
27	-42	5	-42.0 to -45.0 -45.0 to -47.0	6	0 to 3 z-layer archived
28	-40.7	6.3	-40.7 to -45.0 -45.0 to -47.0	6	0 to 4.3 z-layer archived
29	-28.9	4	-28.9 to -32.9	6	0 to 4
30	-42.4	4.4	-42.4 to -45.0 -45.0 to -47.0	6	0 to 2.4 z-layer archived
31	-42	5	-42.0 to -45.0 -45.0 to -47.0	6	0 to 3 z-layer archived
32	-27.7	8	-27.7 to -31.7 -31.7 to -35.7	5 9	0 to 4 4 to 8
33	-43.4	3.6	-43.4 to -45.0 -45.0 to -47.0	5	0 to 1.6 z-layer archived
34	-41.9	5.1	-41.9 to -45.0 -45.0 to -47.0	5	0 to 3.1 z-layer archived
35	-35.3	4	-35.3 to -39.3	5	0 to 4
36	-29.8	4	-29.8 to -33.8	5	0 to 4
37	-35.1	4	-35.1 to -39.1	5	0 to 4
38	-26.7	4	-26.7 to -30.7	5	0 to 4
39	-42.6	4.4	-42.6 to -45.0 -45.0 to -47.0	5	0 to 2.4 z-layer archived
40	-38.8	4	-38.8 to -42.5	4	0 to 4
41	-42.2	4.8	-42.2 to -45.0 -45.0 to -47.0	4	0 to 2.8 z-layer archived
42	-43	4	-43.0 to -45.0 -45.0 to -47.0	4	0 to 2 z-layer archived
43	-34	4	-34.0 to -38.0	4	0 to 4
44	-38.3	4	-38.3 to -42.3	4	0 to 4
45	-32.6	8	-32.6 to -36.6 -36.6 to -40.6	4 9	0 to 4 4 to 8
46	-36.4	8	-36.4 to -40.4 -40.4 to -44.4	4 9	0 to 4 4 to 8
47	-42	5	-42.0 to -45.0 -45.0 to -47.0	4	0 to 3 z-layer archived
48				not used	
49	-33.6	4	-33.6 to -37.6	3	0 to 4
50	-35.4	8	-35.4 to -39.4 -39.4 to -43.4	3 8	0 to 4 4 to 8
51	-32.2	4	-32.2 to -36.2	3	0 to 4
52	-35.9	11.1	-35.9 to -39.9 -39.9 to -43.9 -43.9 to -45.0 -45.0 to -47.0	3 8 11	0 to 4 4 to 8 8 to 9.1 z-layer archived
53	-29	4	-29.0 to -33.0	2	0 to 4
54	-27.2	8	-27.2 to -31.2 -31.2 to -35.2	2 7	0 to 4 4 to 8
55	-30.5	4	-30.5 to -34.5	2	0 to 4
56	-28.5	8	-28.5 to -32.5 -32.5 to -36.5	2 8	0 to 4 4 to 8
57	-35.5	4	-35.5 to 39.5	2	0 to 4

Core ID	Existing Mudline Elevation (ft CRD)	Core Length (ft)	Field Subsample Elevations (ft CRD)	DMMU ID	Field Subsample Feet Below Mudline (ft)
58	-24.9	4	-24.9 to -28.9	1	0 to 4
59	-27.4	4	-27.4 to -31.4	1	0 to 4
60	-28.5	4	-28.5 to -32.5	1	0 to 4
61	-27.6	12	-27.6 to -31.6	1	0 to 4
			-31.6 to -35.6	7	4 to 8
			-35.6 to -39.6	10	8 to 12

Table 4. Chemical analysis results for MBT-Longview compared to DMMP freshwater guidelines

Parameter	Analysis Method	Screening Limits		DMMU																									
		SL1	SL2	1		2		3		4		5		6		7		8		9		10		11		12		13	
Metals (mg/kg dry weight)																													
Arsenic	EPA 6010/6020	14	120	6.72	J	8.32	J	6.42	J	4.99	J	6.80	J	6.32	J	5.67	J	6.02	J	5.44	J	4.72	J	5.92	J	6.62	J	6.52	J
Cadmium	EPA 6010/6020	2.1	5.4	0.56		0.62		0.61		0.65		0.71		0.54		0.56		0.64		0.56		0.55		0.67		0.56		0.67	
Chromium	EPA 6010/6020	72	88	36.4		45.1		43		35.5		41		32.7		33.9		42.7		38.6		35.4		42.3		37		39.7	
Copper	EPA 6010/6020	400	1,200	35.7		37.5		36.5		37.8		37.5		32.9		33.8		35.2		34.4		30.2		36.3		32.7		34.1	
Lead	EPA 6010/6020	360	>1300	10.3		9.9		10.4		11.8		10.6		9.74		9.85		9.89		10.5		9.09		10.2		9.47		10.1	
Mercury	EPA 7471	0.66	0.8	0.04	U	0.05		0.05		0.06		0.05		0.08		0.04		0.05		0.06		0.04	U	0.06		0.05		0.05	
Nickel	EPA 6010/6020	38	110	29.5		30.4		29.2		29.3		31		26.6		27.6		28.9		28.9		25.4		28.6		28.1		28.5	
Selenium	EPA 6020/7440	11	>20	3.4		3.2		3.7		2.8		2.4		2.7		2.9		3.3		2.0		2.5		2.2		2.8		3.2	
Silver	EPA 6010/6020	0.57	1.7	0.49	U	0.52	U	0.51	U	0.51	U	0.51	U	0.51	U	0.45	U	0.51	U	0.51	U	0.47	U	0.48	U	0.50	U	0.47	U
Zinc	EPA 6010/6020	3,200	>4200	75		80		81		81		83		74		75		80		77		69		79		76		79	
Organometallic Compounds (bulk; ug/kg)																													
Tributyltin ion (bulk sediment)	SW2870-SIM/Krone	47	320	3.7	U	3.8	U	3.7	U	3.8	U	3.8	U	3.8	U	3.9	U	3.5	U	3.6	U	3.7	U	3.6	U	3.5	U	3.6	U
Monobutyltin	SW2870-SIM/Krone	540	>4,800	3.9	U	4.0	U	3.9	U	4.0	U	4.0	U	4.0	U	4.1	U	3.7	U	3.8	U	4.0	U	3.8	U	3.7	U	3.8	U
Dibutyltin	SW2870-SIM/Krone	910	130,000	5.5	U	5.6	U	5.5	U	5.7	U	5.7	U	5.6	U	5.8	U	5.3	U	5.4	U	5.6	U	5.3	U	5.3	U	5.4	U
Tetrabutyltin	SW2870-SIM/Krone	97	>97	4.7	U	4.9	U	4.7	U	5.0	U	4.9	U	4.9	U	5.0	U	4.6	U	4.7	U	4.8	U	4.6	U	4.5	U	4.6	U
PAHs (ug/kg dry weight)																													
LPAHs																													
Napththalene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Acenaphthylene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Acenaphthene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Fluorene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Phenanthreene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Anthracene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
1-Methylnaphthalene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
2-Methylnaphthalene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
HPAH																													
Fluoranthene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Pyrene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Benz(a)anthracene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Chrysene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Benzofluoranthenes (b,j,k)	EPA 8270D	---	---	38.2	U	39.3	U	38.8	U	39.7	U	38	U	39.3	U	37.9	U	39.6	U	39.7	U	39.3	U	39.2	U	39.6	U	39.8	U
Benzo(a)pyrene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Indeno(1,2,3-c.d)pyrene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Dibenz(a,h)anthracene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Benzo(g,h,i)perylene	EPA 8270D	---	---	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Total PAHs		17,000	30,000	38.2	U	39.3	U	38.8	U	39.7	U	38	U	39.3	U	37.9	U	39.6	U	39.7	U	39.3	U	39.2	U	39.6	U	39.8	U
Chlorinated Hydrocarbons (ug/kg dry weight)																													

Parameter	Analysis Method	Screening Limits		DMMU																									
		SL1	SL2	1		2		3		4		5		6		7		8		9		10		11		12		13	
beta-Hexachlorocyclohexane	EPA 8270D/8081	7.2	11	0.52	U	0.48	U	0.49	U	0.48	U	0.49	U	0.48	U	0.48	U	0.48	U	0.5	U	0.49	U	0.5	U	0.49	U	0.5	U
Phthalates (ug/kg dry weight)																													
Di-n-butyl phthalate	EPA 8270D	380	1,000	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Bis(2-ethylhexyl)phthalate	EPA 8270D	500	22,000	47.8	U	49.1	U	48.4	U	49.6	U	47.5	U	49.1	U	47.4	U	49.5	U	49.6	U	49.1	U	49	U	49.5	U	49.8	U
Di-n-octyl phthalate	EPA 8270D	39	>1,100	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Phenols (ug/kg dry weight)																													
Phenol	EPA 8270D	120	210	19.1	U	19.6	U	19.4	U	19.8	U	19	U	9.7	J	18.9	U	19.8	U	10.3	J	19.6	U	18.3	J	19.8	U	11.3	J
4-Methylphenol	EPA 8270D	260	2,000	19.1	U	19.6	U	19.4	U	19.8	U	19		19.3	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Pentachlorophenol	EPA 8270D	1,200	>1,200	96	U	98	U	97	U	99	U	95	U	98	U	95	U	99	U	99	U	98	U	98	U	99	U	100	U
Miscellaneous Extractables (ug/kg)																													
Benzoic acid	EPA 8270D	2,900	3,800	73.3	J	112	J	116	J	198	U	74.5	J	77.3	J	189	U	78.2	J	198	U	196	U	62.5	J	198	U	108	J
Dibenzofuran	EPA 8270D	200	680	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Carbazole	EPA 8270D	900	1,100	19.1	U	19.6	U	19.4	U	19.8	U	19	U	19.6	U	18.9	U	19.8	U	19.8	U	19.6	U	19.6	U	19.8	U	19.9	U
Pesticides & PCBs (ug/kg)																													
2,4’ DDD and 4,4’ DDD	EPA 8081	310	860	1.03	U	0.96	U	0.98	U	0.97	U	0.99	U	0.95	U	0.96	U	0.97	U	1	U	0.98	U	1	U	0.99	U	0.99	U
2,4’ DDE and 4,4’ DDE	EPA 8081	21	33	1.03	U	0.96	U	0.98	U	0.97	U	0.99	U	0.95	U	0.96	U	0.97	U	1	U	0.98	U	1	U	0.99	U	0.99	U
2,4’ DDT and 4,4’ DDT	EPA 8081	100	8,100	1.03	U	0.96	U	0.98	U	0.97	U	0.99	U	0.95	U	0.96	U	0.97	U	1	U	0.98	U	1	U	0.99	U	0.99	U
Dieldrin	EPA 8081	4.9	9.3	1.03	U	0.96	U	0.98	U	0.97	U	0.99	U	0.95	U	0.96	U	0.97	U	1	U	0.98	U	1	U	0.99	U	0.99	U
Endrin ketone	EPA 8081	8.5	>8.5	1.03	U	0.96	U	0.98	U	0.97	U	0.99	U	0.95	U	0.96	U	0.97	U	1	U	0.98	U	1	U	0.99	U	0.99	U
Total PCB Aroclors	EPA 8082	110	2,500	19.1	U	19.6	U	18.8	U	12.1	J	19.5	U	19.2	U	19.4	U	18.9	U	18.6	U	19.6	U	18.5	U	18.4	U	18.4	U
Total Petroleum Hydrocarbons (mg/kg)																													
TPH-diesel	NWTPH-Dx	340	510	8.53	U	8.79	U	10.5		8.81	U	8.95	U	22.4		7.97	U	8.51	U	8.48	U	7.71	U	8.31	U	8.41	U	8.46	U
TPH-residual	NWTPH-Dx	3,600	4,400	12.2	U	18.6	U	13.3	U	13.1		13.2		12.7		10.5	U	12.7	U	11.8	U	9.86	U	11.6	U	12.1	U	12.2	U
Conventionals (mg/kg)																													
Ammonia (average(1))	Plumb 1981			223		235		256		290		245		215		234		273		266		304		276		265		251	
Total Sulfides (average(1))	PSEP 1986/ Plumb 1981			2.8		12.2		23.4		5.6		5.0		5.8		15.4		10.9		7.6		12.3		11.5		15.0		42.8	
Total Solids (%)				58.3		56.23		57.82		56.04	B	56.06	B	56.98	B	61.91		58.58		59.03	B	64.04		56.06		59.54		59.69	
Total Organic Carbon (%) (TOC)				2.06		1.38		1.7		2.68		2.79		7.74		1.23		1		2.45		1.58		1.68		1.59		1.97	
Grain Size																													
% Clay				29		29		30		30		32		24		26		27		26		20		26		24		22	
% Silt				63		61		65		64		51		57		66		69		69		70		58		70		73	
% Sand & Gravel				8		10		5		6		17		19		7		4		5		10		16		6		5	
Dioxins/Furans																													
TEQ ND=0	EPA 1613B			0.33		0.16		0.06		0.06		0.08		0.32		0.22		0.16		0.02		0.09		0.25		0.20		0.03	
TEQ ND=1/2 EDL	EPA 1613B			1.04		1.12		1.58		1.47		1.62		1.12		1.02		1.09		1.59		1.51		1.12		1.17		1.60	
DMMP DETERMINATION				**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**		**PASS**	
DMMU Volume (CY)				40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		40,000		12,000	

J = estimated concentration
U = not detected at the reported concentration
SL = screening level
Shaded cell exceeds one or more criteria.

Table 5. Dioxin/Furan data

		DMMU1					DMMU2					DMMU3				
Compound	**TEF (WHO 2005)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**
2,3,7,8-TCDF	0.1	1.01	0.041	EMPC,J,B	0.00	0.00	0.994	ND	U	0.05	0.00	0.995	ND	U	0.05	0.00
2,3,7,8-TCDD	1	1.01	ND	U	0.51	0.00	0.994	ND	U	0.50	0.00	0.995	ND	U	0.50	0.00
1,2,3,7,8-PeCDF	0.03	1.01	0.171	EMPC,J	0.01	0.01	0.994	ND	U	0.01	0.00	0.995	ND	U	0.01	0.00
2,3,4,7,8-PeCDF	0.3	1.01	ND	U	0.15	0.00	0.994	ND	U	0.15	0.00	0.995	ND	U	0.15	0.00
1,2,3,7,8-PeCDD	1	1.01	0.096	EMPC,J	0.10	0.10	0.994	0.066	EMPC,J	0.07	0.07	0.995	ND	U	0.50	0.00
1,2,3,4,7,8-HxCDF	0.1	1.01	0.5	J,B	0.05	0.05	0.994	ND	U	0.05	0.00	0.995	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDF	0.1	1.01	0.154	EMPC,J,B	0.02	0.02	0.994	ND	U	0.05	0.00	0.995	ND	U	0.05	0.00
2,3,4,6,7,8-HxCDF	0.1	1.01	ND	U	0.05	0.00	0.994	ND	U	0.05	0.00	0.995	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDF	0.1	1.01	0.114	EMPC,J,B	0.01	0.01	0.994	ND	U	0.05	0.00	0.995	ND	U	0.05	0.00
1,2,3,4,7,8-HxCDD	0.1	1.01	0.19	J	0.02	0.02	0.994	ND	U	0.05	0.00	0.995	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDD	0.1	1.01	0.256	J	0.03	0.03	0.994	0.152	EMPC,J,B	0.02	0.02	0.995	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDD	0.1	1.01	0.194	EMPC,J	0.02	0.02	0.994	0.254	EMPC,J	0.03	0.03	0.995	0.223	EMPC,J	0.02	0.02
1,2,3,4,6,7,8-HpCDF	0.01	1.01	0.857	J,B	0.01	0.01	0.994	0.121	J,B	0.00	0.00	0.995	0.19	J,B	0.00	0.00
1,2,3,4,7,8,9-HpCDF	0.01	1.01	ND	U	0.01	0.00	0.994	ND	U	0.00	0.00	0.995	ND	U	0.00	0.00
1,2,3,4,6,7,8-HpCDD	0.01	2.53	5.97	B	0.06	0.06	2.49	3.91	B	0.04	0.04	2.49	3.1	B	0.03	0.03
OCDF	0.0003	2.03	0.407	J,B	0.00	0.00	1.99	0.246	J,B	0.00	0.00	1.99	0.588	J,B	0.00	0.00
OCDD	0.0003	10	43.9	B	0.01	0.01	9.94	28.1	B	0.01	0.01	9.95	26.2	B	0.01	0.01
TOTAL TEQ					**1.04**	**0.33**				**1.12**	**0.16**				**1.58**	**0.06**

Notes:
J = estimated concentration
U = not detected at the reported concentration
B = Blank contamination
EMPC = Estimated Maximum Possible Concentration
TEF = toxic equivalency factor
TEQ = toxic equivalency

Table 5 continued...

		DMMU4					DMMU5					DMMU6				
Compound	**TEF (WHO 2005)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**
2,3,7,8-TCDF	0.1	0.991	ND	U	0.05	0.00	1.01	ND	U	0.05	0.00	0.991	ND	U	0.05	0.00
2,3,7,8-TCDD	1	0.991	ND	U	0.50	0.00	1.01	ND	U	0.51	0.00	0.991	ND	U	0.50	0.00
1,2,3,7,8-PeCDF	0.03	0.991	ND	U	0.01	0.00	1.01	ND	U	0.02	0.00	0.991	0.062	J,B	0.00	0.00
2,3,4,7,8-PeCDF	0.3	0.991	ND	U	0.15	0.00	1.01	ND	U	0.15	0.00	0.991	ND	U	0.15	0.00
1,2,3,7,8-PeCDD	1	0.991	ND	U	0.50	0.00	1.01	ND	U	0.51	0.00	0.991	0.184	EMPC,J	0.18	0.18
1,2,3,4,7,8-HxCDF	0.1	0.991	ND	U	0.05	0.00	1.01	ND	U	0.05	0.00	0.991	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDF	0.1	0.991	ND	U	0.05	0.00	1.01	ND	U	0.05	0.00	0.991	0.032	EMPC,J,B	0.00	0.00
2,3,4,6,7,8-HxCDF	0.1	0.991	ND	U	0.05	0.00	1.01	ND	U	0.05	0.00	0.991	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDF	0.1	0.991	0.07	EMPC,J,B	0.01	0.01	1.01	ND	U	0.05	0.00	0.991	0.095	J,B	0.01	0.01
1,2,3,4,7,8-HxCDD	0.1	0.991	0.079	EMPC,J,B	0.01	0.01	1.01	ND	U	0.05	0.00	0.991	0.195	EMPC,J,B	0.02	0.02
1,2,3,6,7,8-HxCDD	0.1	0.991	ND	U	0.05	0.00	1.01	ND	U	0.05	0.00	0.991	0.207	EMPC,J,B	0.02	0.02
1,2,3,7,8,9-HxCDD	0.1	0.991	0.169	J,B	0.02	0.02	1.01	0.324	EMPC,J	0.03	0.03	0.991	0.384	EMPC,J,B	0.04	0.04
1,2,3,4,6,7,8-HpCDF	0.01	0.991	0.074	EMPC,J,B	0.00	0.00	1.01	0.159	J,B	0.00	0.00	0.991	0.185	EMPC,J,B	0.00	0.00
1,2,3,4,7,8,9-HpCDF	0.01	0.991	ND	U	0.00	0.00	1.01	ND	U	0.01	0.00	0.991	0.036	J	0.00	0.00
1,2,3,4,6,7,8-HpCDD	0.01	2.48	2.06	J,B	0.02	0.02	2.53	4.02	B	0.04	0.04	2.48	3.51	B	0.04	0.04
OCDF	0.0003	1.98	ND	U	0.00	0.00	2.03	0.165	EMPC,J,B	0.00	0.00	1.98	0.224	EMPC,J,B	0.00	0.00
OCDD	0.0003	9.91	16.3	B	0.00	0.00	10.1	32.3	B	0.01	0.01	9.91	25.8	B	0.01	0.01
TOTAL TEQ					**1.47**	**0.06**				**1.62**	**0.08**				**1.12**	**0.32**

Notes:
J = estimated concentration
U = not detected at the reported concentration
B = Blank contamination
EMPC = Estimated Maximum Possible Concentration
TEF = toxic equivalency factor
TEQ = toxic equivalency

Table 5 continued...

		DMMU7					DMMU8					DMMU9				
Compound	**TEF (WHO 2005)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**
2,3,7,8-TCDF	0.1	0.996	ND	U	0.05	0.00	0.993	ND	U	0.05	0.00	0.997	ND	U	0.05	0.00
2,3,7,8-TCDD	1	0.996	ND	U	0.50	0.00	0.993	ND	U	0.50	0.00	0.997	ND	U	0.50	0.00
1,2,3,7,8-PeCDF	0.03	0.996	0.066	J	0.00	0.00	0.993	0.08	J	0.00	0.00	0.997	ND	U	0.01	0.00
2,3,4,7,8-PeCDF	0.3	0.996	ND	U	0.15	0.00	0.993	ND	U	0.15	0.00	0.997	ND	U	0.15	0.00
1,2,3,7,8-PeCDD	1	0.996	0.14	EMPC,J	0.14	0.14	0.993	0.071	EMPC,J	0.07	0.07	0.997	ND	U	0.50	0.00
1,2,3,4,7,8-HxCDF	0.1	0.996	ND	U	0.05	0.00	0.993	ND	U	0.05	0.00	0.997	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDF	0.1	0.996	0.024	EMPC,J,B	0.00	0.00	0.993	ND	U	0.05	0.00	0.997	ND	U	0.05	0.00
2,3,4,6,7,8-HxCDF	0.1	0.996	0.028	J	0.00	0.00	0.993	ND	U	0.05	0.00	0.997	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDF	0.1	0.996	0.049	EMPC,J,B	0.00	0.00	0.993	ND	U	0.05	0.00	0.997	ND	U	0.05	0.00
1,2,3,4,7,8-HxCDD	0.1	0.996	ND	U	0.05	0.00	0.993	0.072	EMPC,J	0.01	0.01	0.997	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDD	0.1	0.996	0.117	EMPC,J	0.01	0.01	0.993	0.412	EMPC,J,B	0.04	0.04	0.997	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDD	0.1	0.996	0.207	J	0.02	0.02	0.993	0.256	EMPC,J	0.03	0.03	0.997	ND	U	0.05	0.00
1,2,3,4,6,7,8-HpCDF	0.01	0.996	0.065	J,B	0.00	0.00	0.993	0.174	J,B	0.00	0.00	0.997	ND	U	0.00	0.00
1,2,3,4,7,8,9-HpCDF	0.01	0.996	ND	U	0.00	0.00	0.993	ND	U	0.00	0.00	0.997	ND	U	0.00	0.00
1,2,3,4,6,7,8-HpCDD	0.01	2.49	2.93	B	0.03	0.03	2.48	2.99	B	0.03	0.03	2.49	1.71	J,B	0.02	0.02
OCDF	0.0003	1.99	0.198	J,B	0.00	0.00	1.99	0.332	EMPC,J,B	0.00	0.00	1.99	ND	U	0.00	0.00
OCDD	0.0003	9.96	23.8	B	0.01	0.01	9.93	27	B	0.01	0.01	9.97	14.5	B	0.00	0.00
TOTAL TEQ					**1.02**	**0.22**				**1.09**	**0.19**				**1.59**	**0.02**

Notes:
J = estimated concentration
U = not detected at the reported concentration
B = Blank contamination
EMPC = Estimated Maximum Possible Concentration
TEF = toxic equivalency factor
TEQ = toxic equivalency

Table 5 continued...

	DMMU10						DMMU11					DMMU12				
Compound	TEF (WHO 2005)	RL	Result	Q	TEQ (U=0.5RL)	TEQ (U=0)	RL	Result	Q	TEQ (U=0.5RL)	TEQ (U=0)	RL	Result	Q	TEQ (U=0.5 RL)	TEQ (U=0)
2,3,7,8-TCDF	0.1	1.01	0.041	EMPC,J,B	0.00	0.00	1.00	0.104	EMPC,J,B	0.01	0.01	0.998	ND	U	0.05	0.00
2,3,7,8-TCDD	1	1.01	ND	U	0.51	0.00	1.00	ND	U	0.50	0.00	0.998	ND	U	0.50	0.00
1,2,3,7,8-PeCDF	0.03	1.01	0.041	EMPC,J	0.00	0.00	1.00	ND	U	0.02	0.00	0.998	ND	U	0.01	0.00
2,3,4,7,8-PeCDF	0.3	1.01	ND	U	0.15	0.00	1.00	ND	U	0.15	0.00	0.998	ND	U	0.15	0.00
1,2,3,7,8-PeCDD	1	1.01	ND	U	0.51	0.00	1.00	0.143	EMPC,J	0.14	0.14	0.998	0.104	EMPC,J	0.10	0.10
1,2,3,4,7,8-HxCDF	0.1	1.01	ND	U	0.05	0.00	1.00	ND	U	0.05	0.00	0.998	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDF	0.1	1.01	ND	U	0.05	0.00	1.00	ND	U	0.05	0.00	0.998	ND	U	0.05	0.00
2,3,4,6,7,8-HxCDF	0.1	1.01	ND	U	0.05	0.00	1.00	ND	U	0.05	0.00	0.998	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDF	0.1	1.01	0.07	EMPC,J,B	0.01	0.01	1.00	0.077	J,B	0.01	0.01	0.998	ND	U	0.05	0.00
1,2,3,4,7,8-HxCDD	0.1	1.01	ND	U	0.05	0.00	1.00	ND	U	0.05	0.00	0.998	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDD	0.1	1.01	ND	U	0.05	0.00	1.00	0.153	J,B	0.02	0.02	0.998	0.131	J,B	0.01	0.01
1,2,3,7,8,9-HxCDD	0.1	1.01	0.344	J	0.03	0.03	1.00	0.299	J	0.03	0.03	0.998	0.252	J,B	0.03	0.03
1,2,3,4,6,7,8-HpCDF	0.01	1.01	0.2	EMPC,J,B	0.00	0.00	1.00	0.267	J,B	0.00	0.00	0.998	0.313	EMPC,J,B	0.00	0.00
1,2,3,4,7,8,9-HpCDF	0.01	1.01	ND	U	0.01	0.00	1.00	ND	U	0.01	0.00	0.998	ND	U	0.00	0.00
1,2,3,4,6,7,8-HpCDD	0.01	2.52	3.45	B	0.03	0.03	2.51	3.11	B	0.03	0.03	2.50	4.35	B	0.04	0.04
OCDF	0.0003	2.01	ND	U	0.00	0.00	2.01	0.282	EMPC,J,B	0.00	0.00	2.00	0.838	J,B	0.00	0.00
OCDD	0.0003	10.1	26.2	B	0.01	0.01	10.0	25.1	B	0.01	0.01	9.98	43	B	0.01	0.01
TOTAL TEQ					**1.51**	**0.09**				**1.12**	**0.25**				**1.17**	**0.20**

Notes:
J = estimated concentration
U = not detected at the reported concentration
B = Blank contamination
EMPC = Estimated Maximum Possible Concentration
TEF = toxic equivalency factor
TEQ = toxic equivalency

Table 5 continued...

		DMMU13				
Compound	**TEF (WHO 2005)**	**RL**	**Result**	**Q**	**TEQ (U=0.5RL)**	**TEQ (U=0)**
2,3,7,8-TCDF	0.1	0.996	ND	U	0.05	0.00
2,3,7,8-TCDD	1	0.996	ND	U	0.50	0.00
1,2,3,7,8-PeCDF	0.03	0.996	ND	U	0.01	0.00
2,3,4,7,8-PeCDF	0.3	0.996	ND	U	0.15	0.00
1,2,3,7,8-PeCDD	1	0.996	ND	U	0.50	0.00
1,2,3,4,7,8-HxCDF	0.1	0.996	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDF	0.1	0.996	ND	U	0.05	0.00
2,3,4,6,7,8-HxCDF	0.1	0.996	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDF	0.1	0.996	ND	U	0.05	0.00
1,2,3,4,7,8-HxCDD	0.1	0.996	ND	U	0.05	0.00
1,2,3,6,7,8-HxCDD	0.1	0.996	ND	U	0.05	0.00
1,2,3,7,8,9-HxCDD	0.1	0.996	ND	U	0.05	0.00
1,2,3,4,6,7,8-HpCDF	0.01	0.996	ND	U	0.00	0.00
1,2,3,4,7,8,9-HpCDF	0.01	0.996	ND	U	0.00	0.00
1,2,3,4,6,7,8-HpCDD	0.01	2.49	2.31	J,B	0.02	0.02
OCDF	0.0003	1.99	0.551	J,B	0.00	0.00
OCDD	0.0003	9.96	18.6	B	0.01	0.01
TOTAL TEQ					**1.60**	**0.03**

Notes:
J = estimated concentration
U = not detected at the reported concentration
B = Blank contamination
EMPC = Estimated Maximum Possible Concentration
TEF = toxic equivalency factor
TEQ = toxic equivalency

Figure 1. Site Location Map

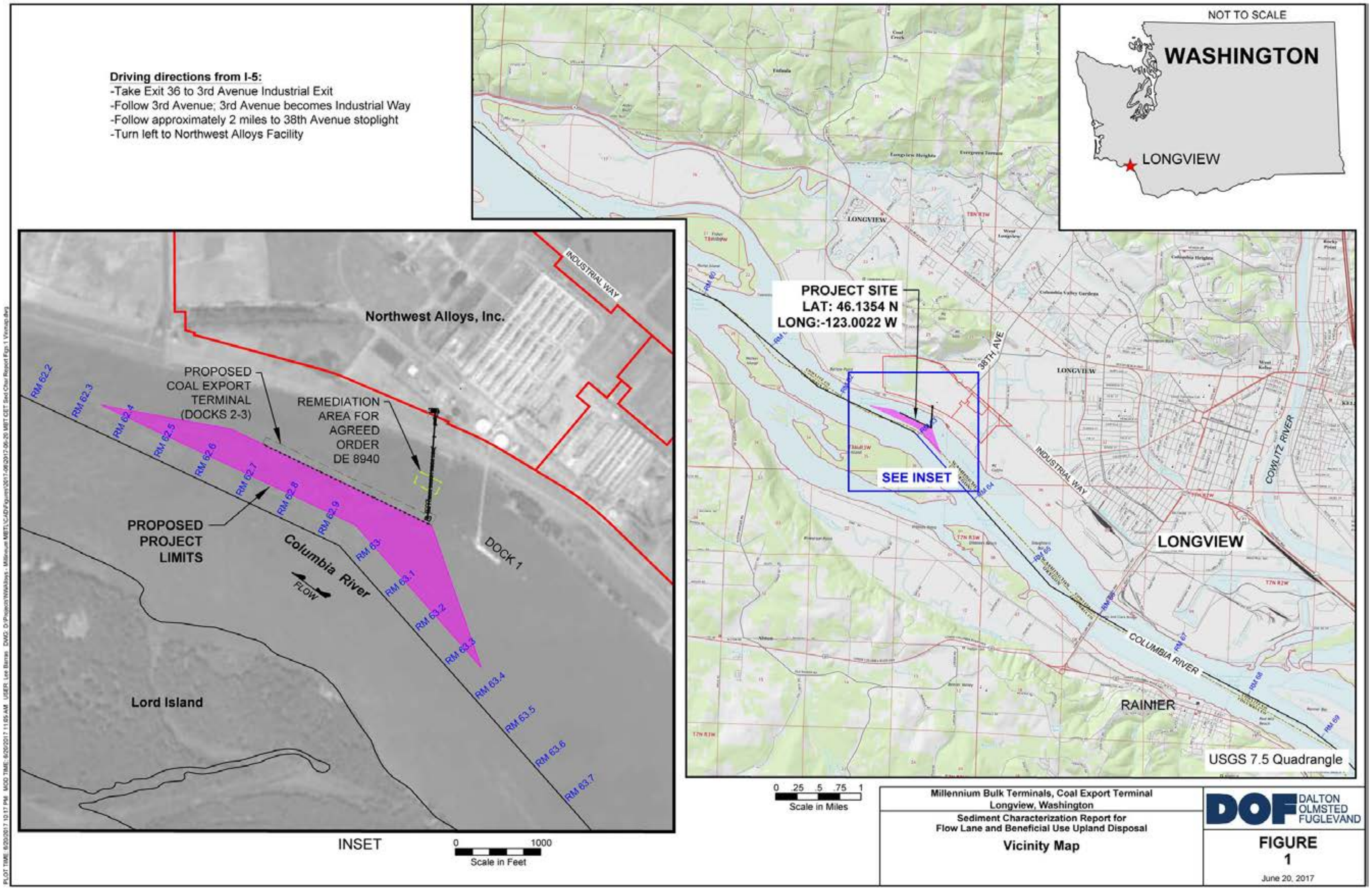

Figure 2a. Dredge Prism Bathymetry and Footprint – West Side

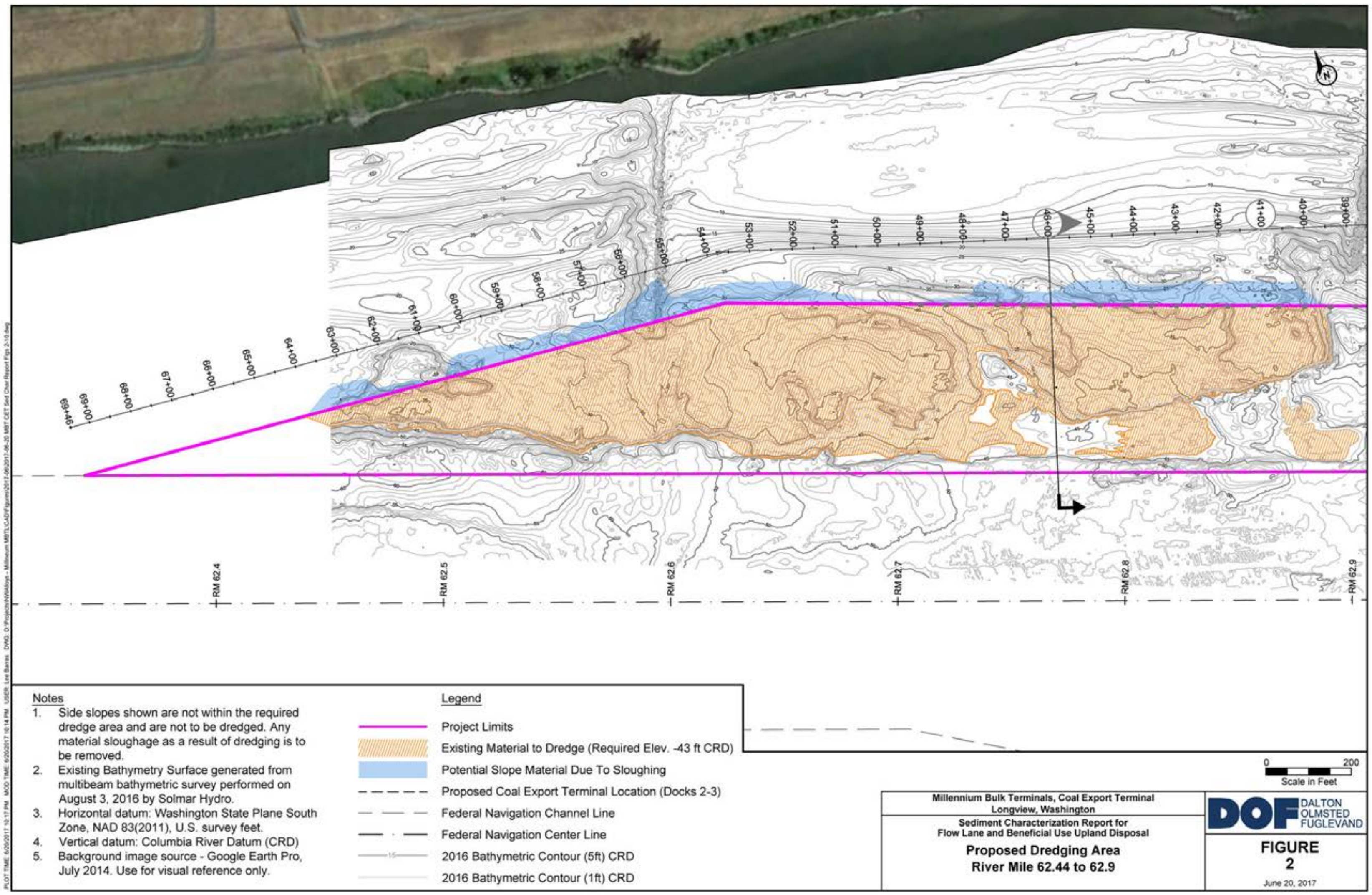

Figure 2b. Dredge Prism Bathymetry and Footprint – East Side

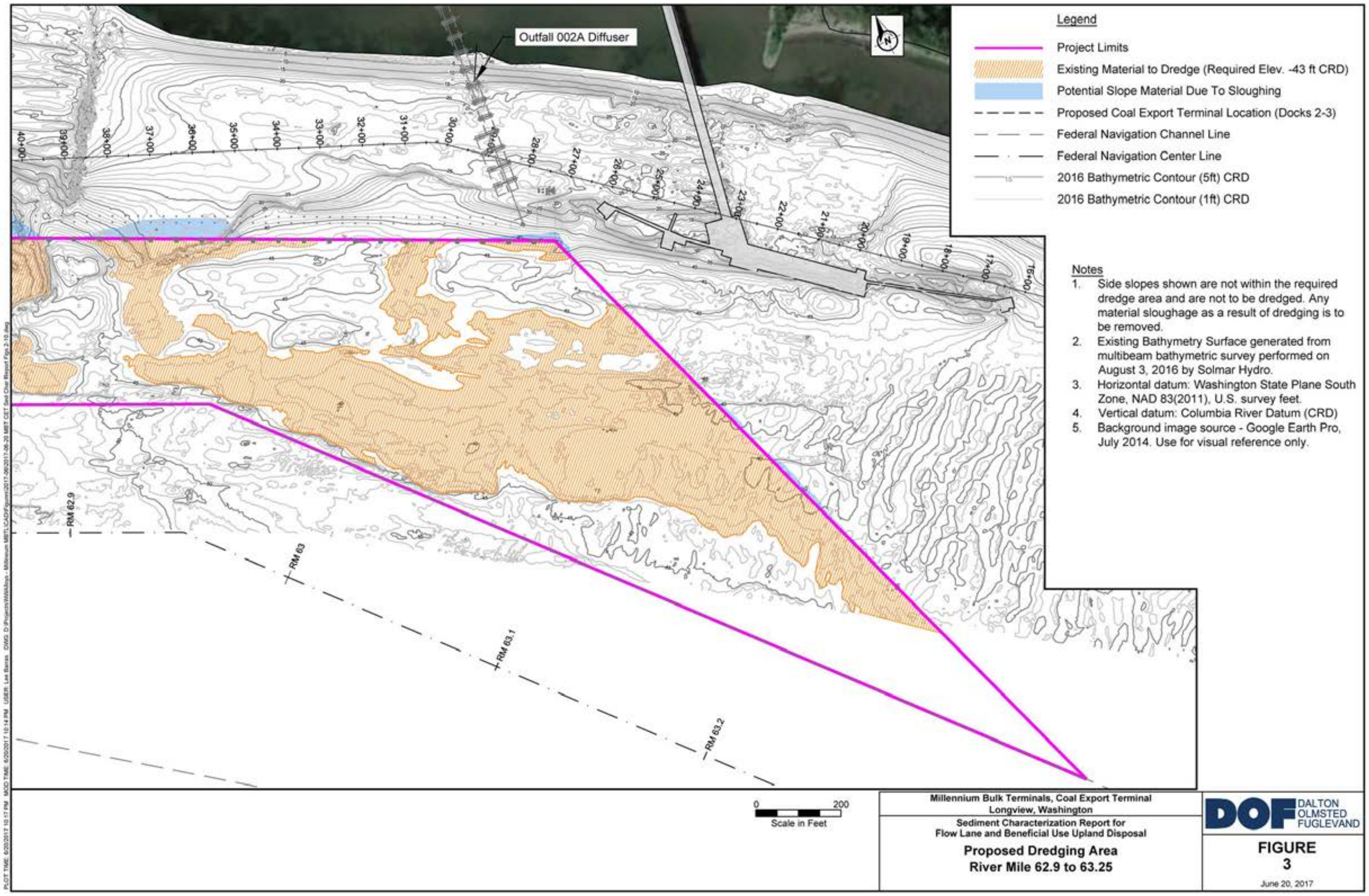

Figure 3a. Sample Locations and DMMU Compositing - West Side

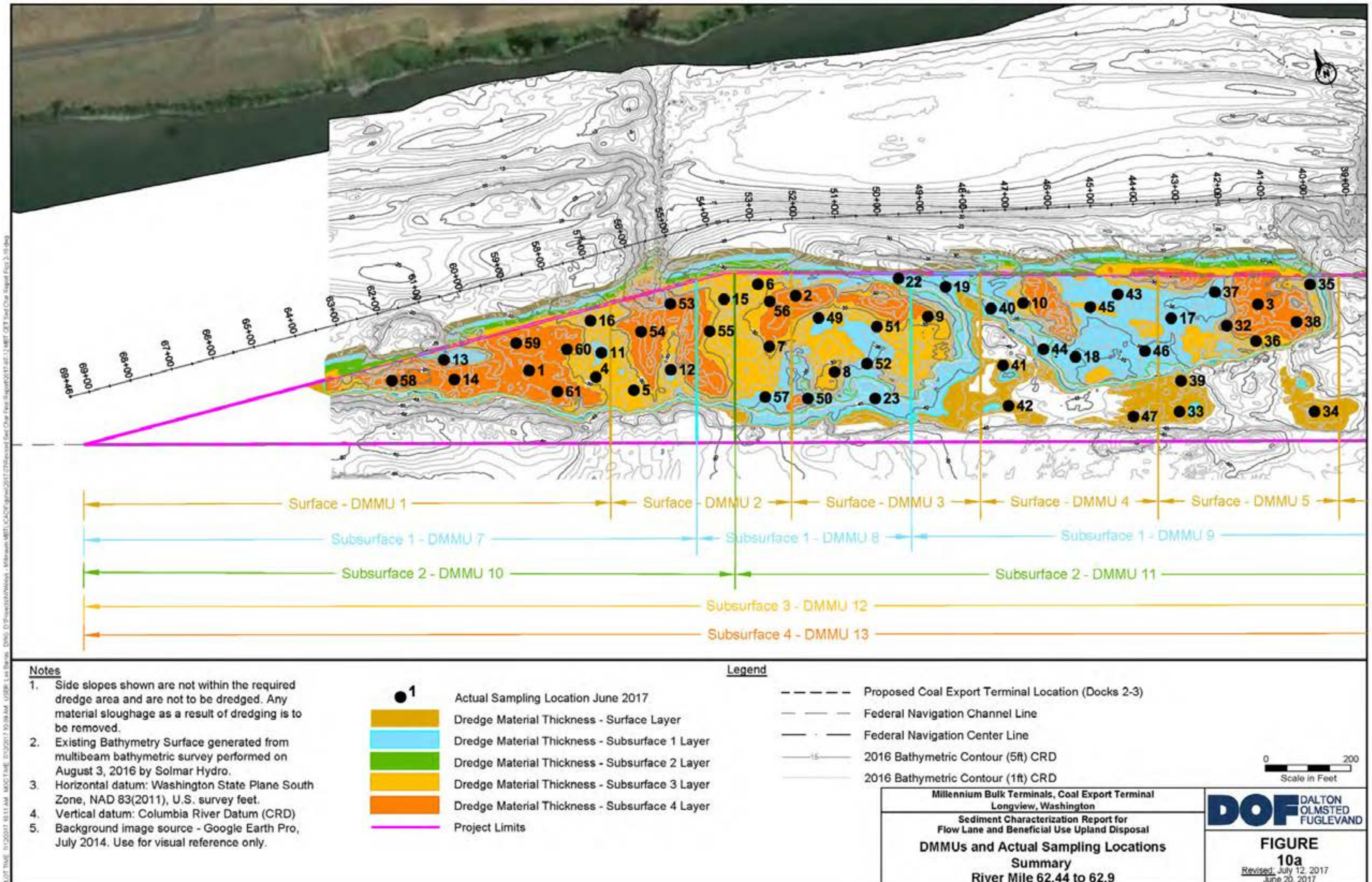

Figure 3b. Sample Locations and DMMU Compositing - East Side

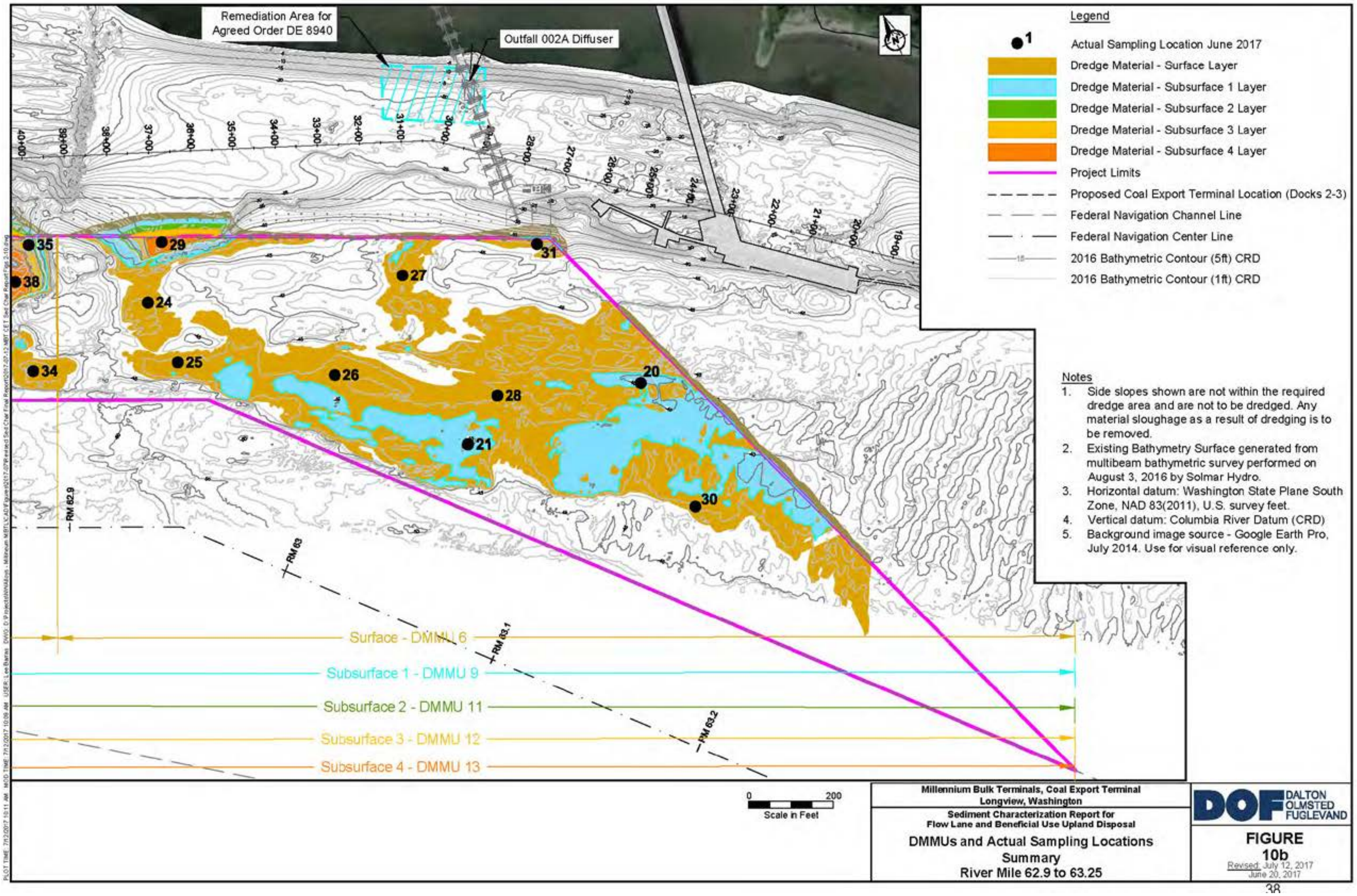

Figure 4a. Surface Layer (0-4 ft below mudline) DMMUs 1, 2, 3, 4, 5 and associated cores – West side

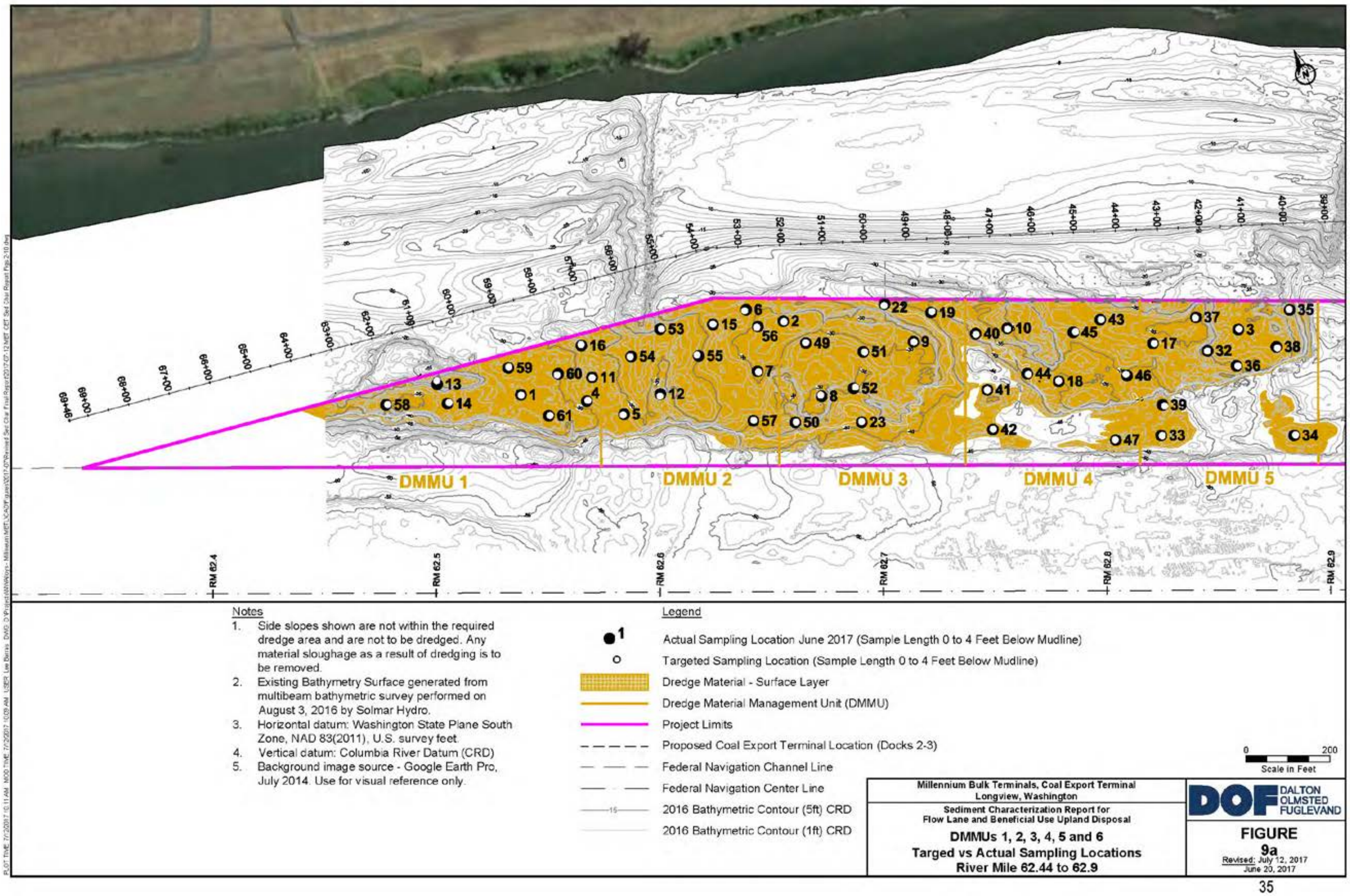

Figure 4b. Surface Layer (0-4 ft below mudline) DMMUs 1, 2, 3, 4, 5 and associated cores – East side

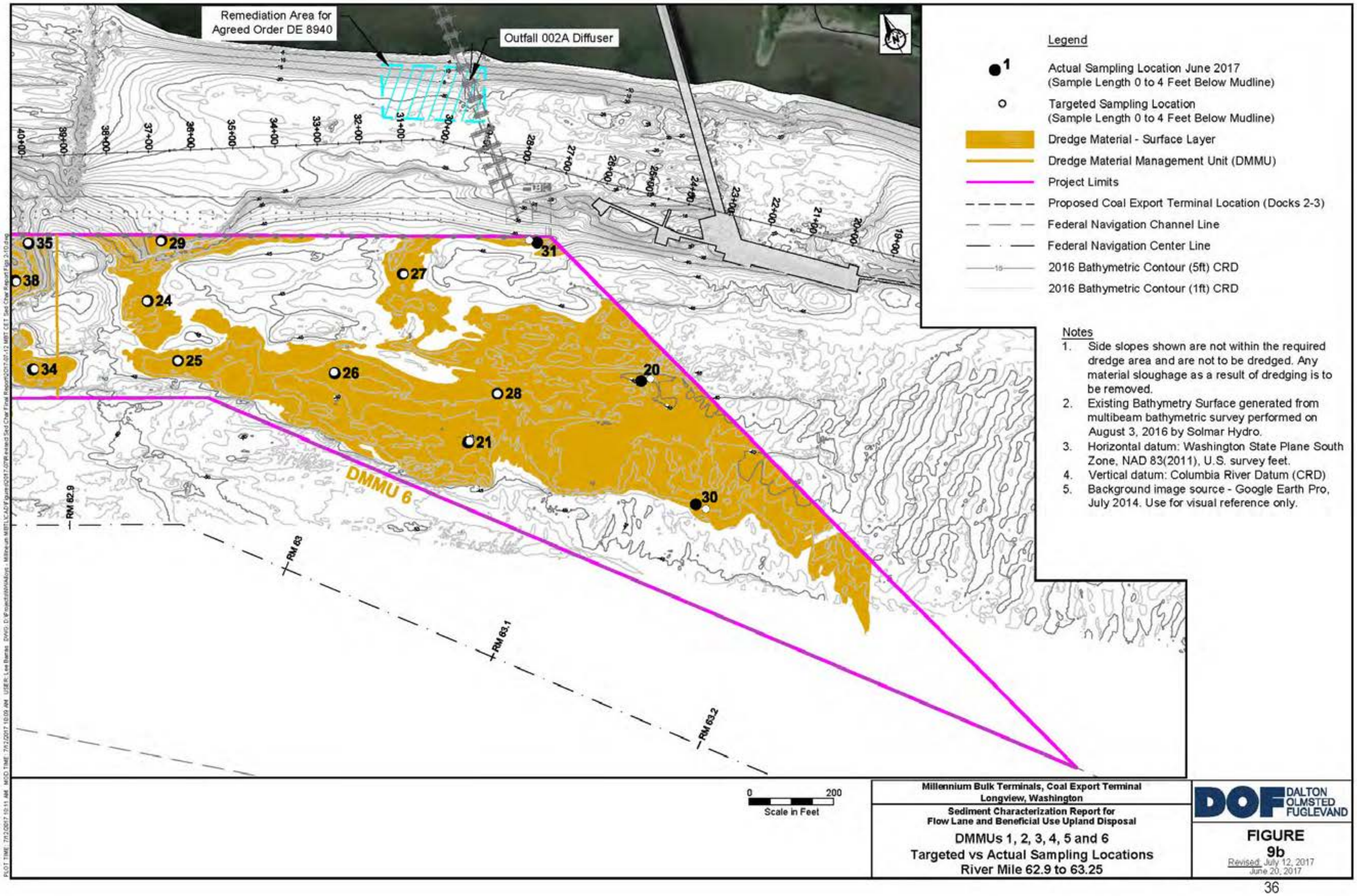

Figure 5a. SubSurface Layer 1 (4-8 ft below mudline) DMMUs 6, 7, 8 and associated cores – West side

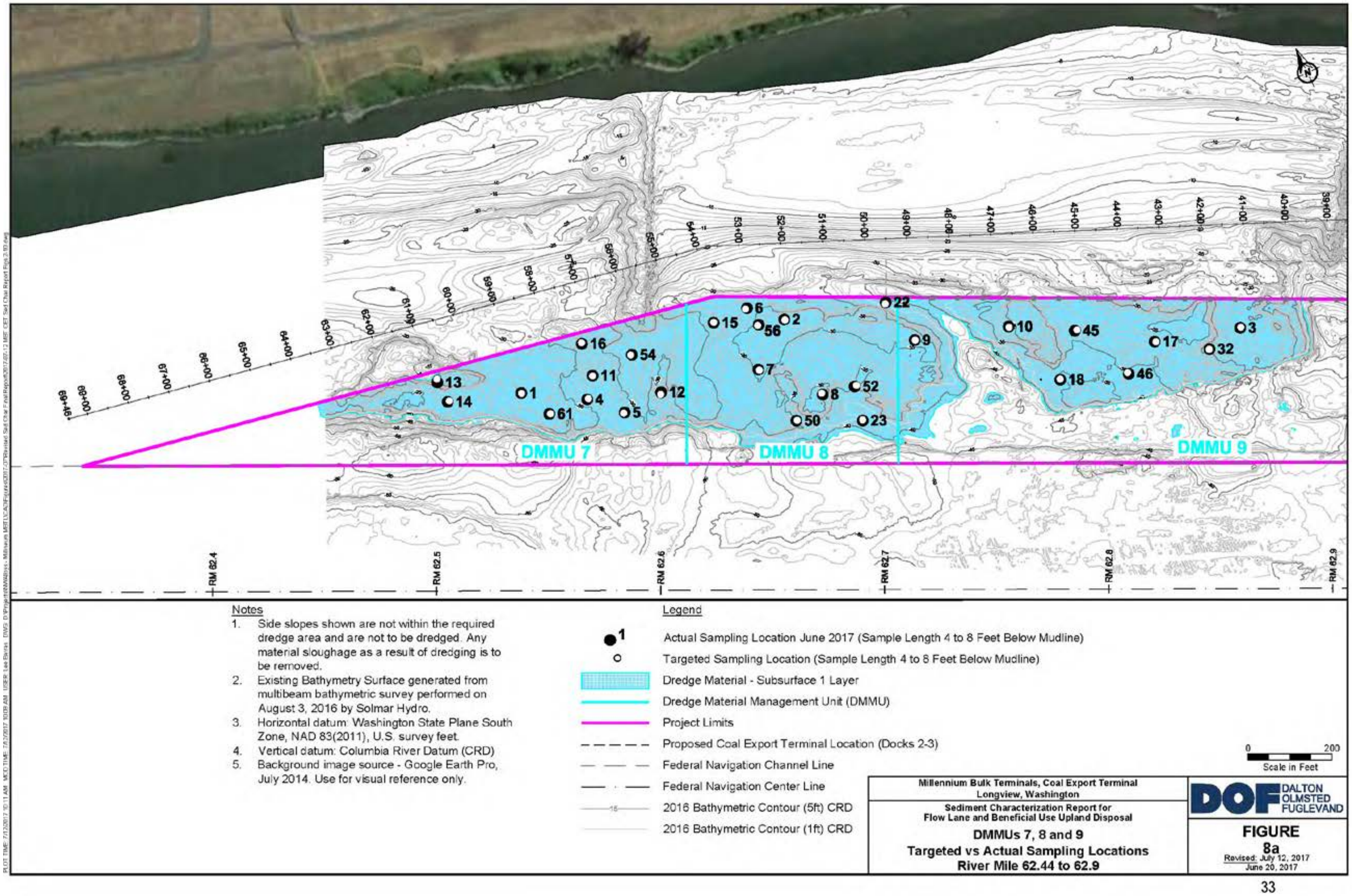

Figure 5b. SubSurface Layer 1 (4-8 ft below mudline) DMMUs 6, 7, 8 and associated cores – East side

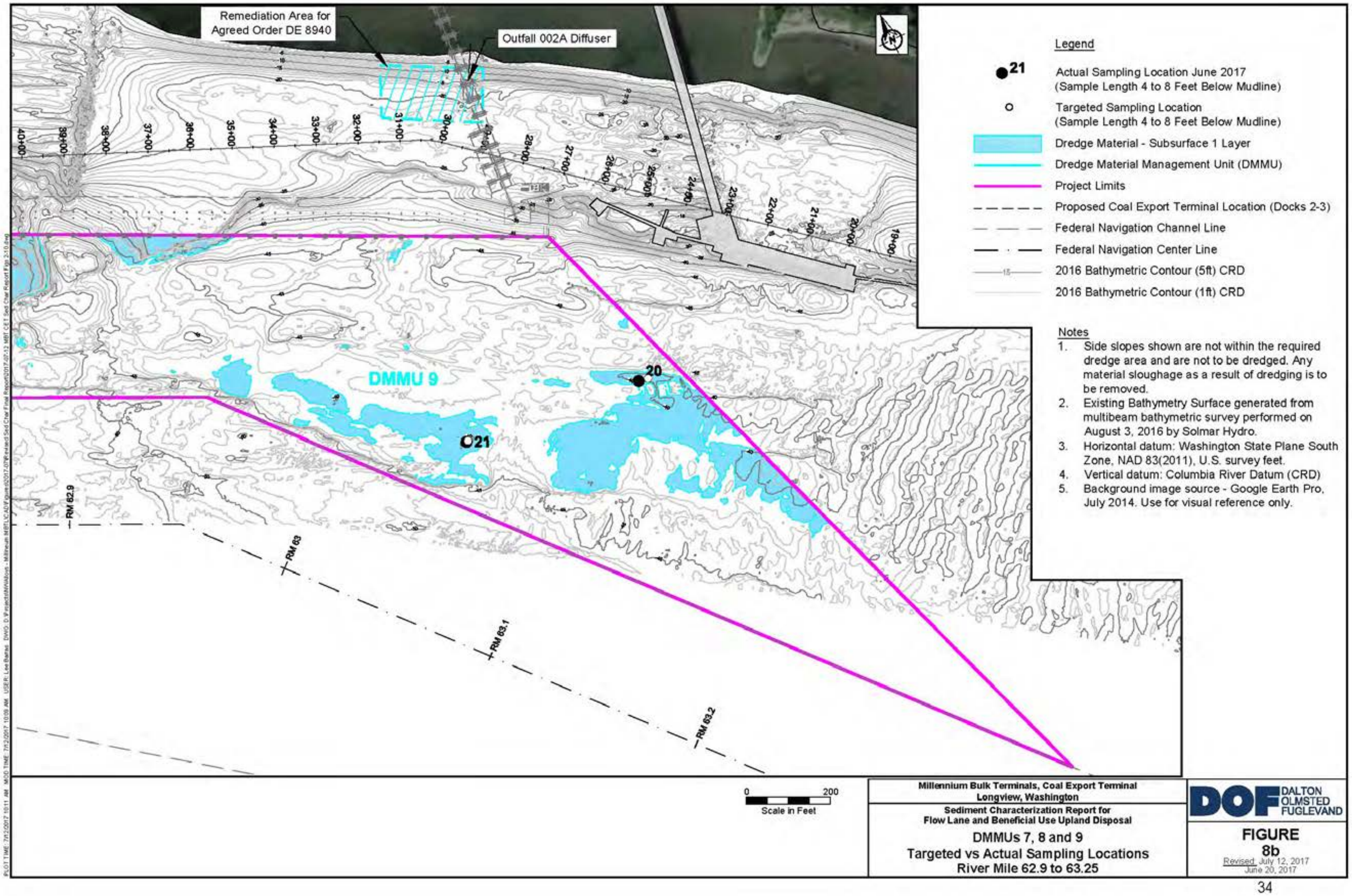

Figure 6a. SubSurface Layer 2 (8-12 ft below mudline) DMMUs 10, 11 and associated cores – West side

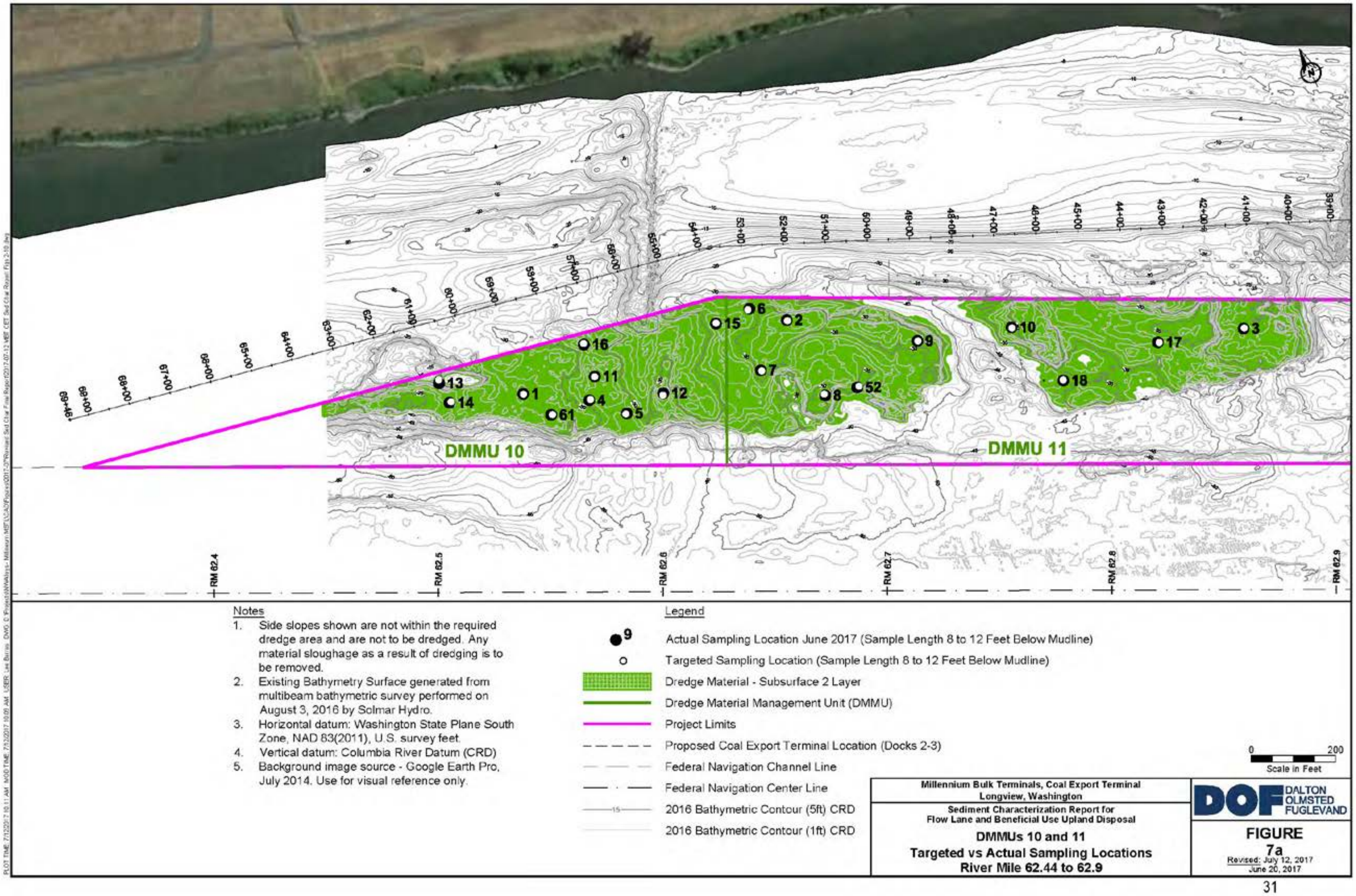

Figure 6b. SubSurface Layer 2 (8-12 ft below mudline) DMMUs 10, 11 and associated cores – East side

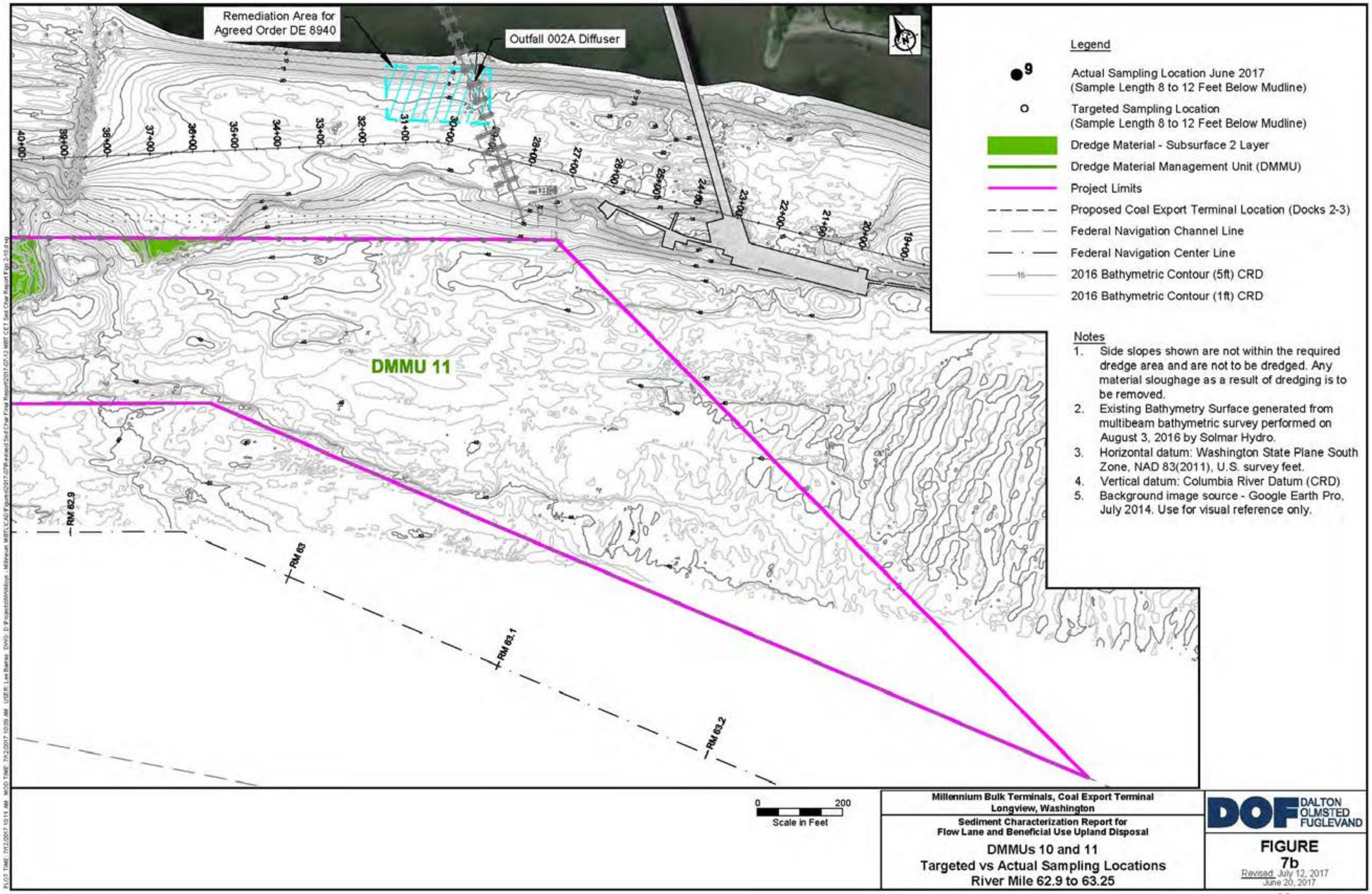

Figure 7a. SubSurface Layer 3 (12-16 ft below mudline) DMMU 12 and associated cores – West side

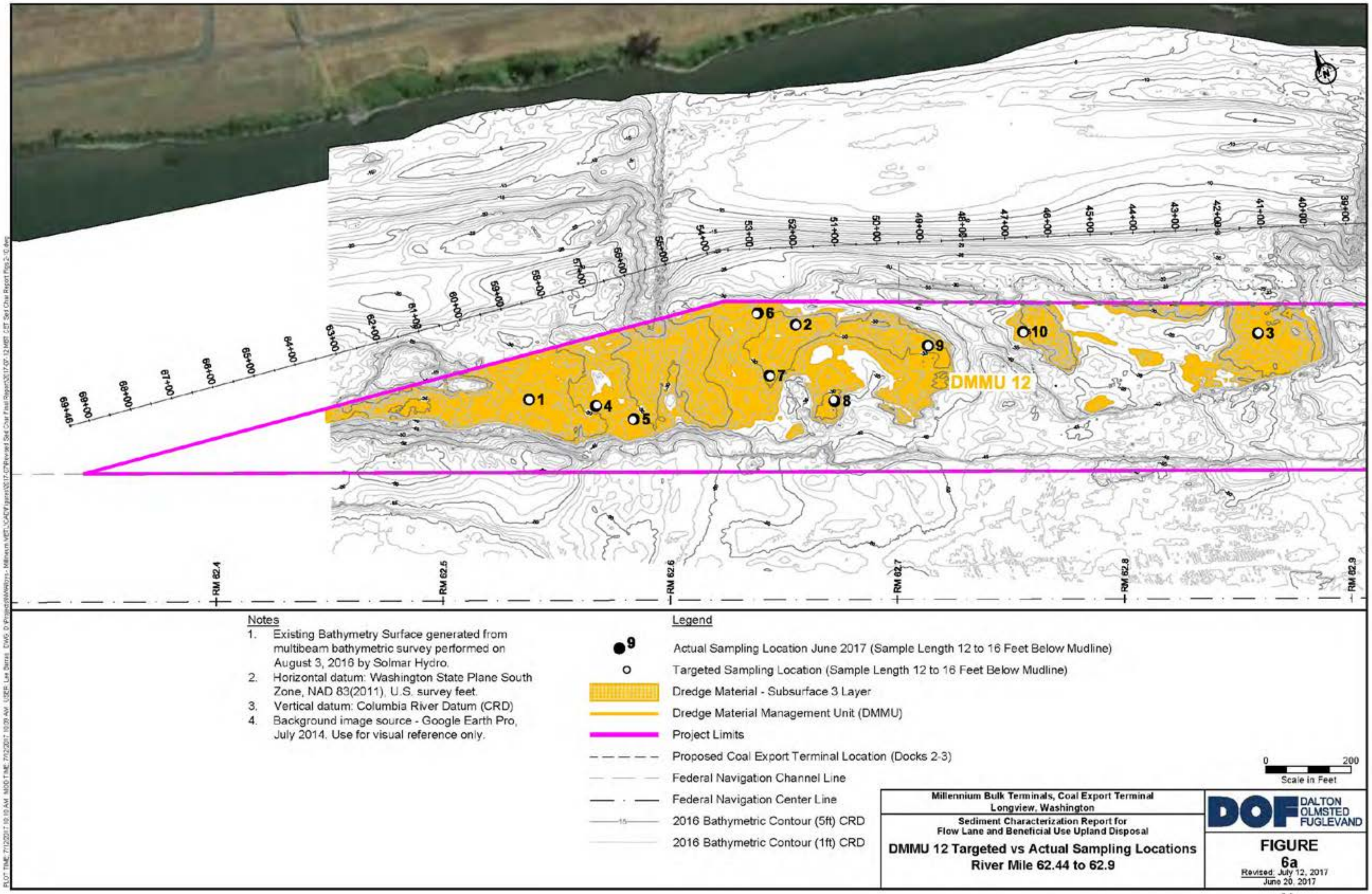

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Figure 7b. SubSurface Layer 3 (12-16 ft below mudline) DMMU 12 and associated cores – East side

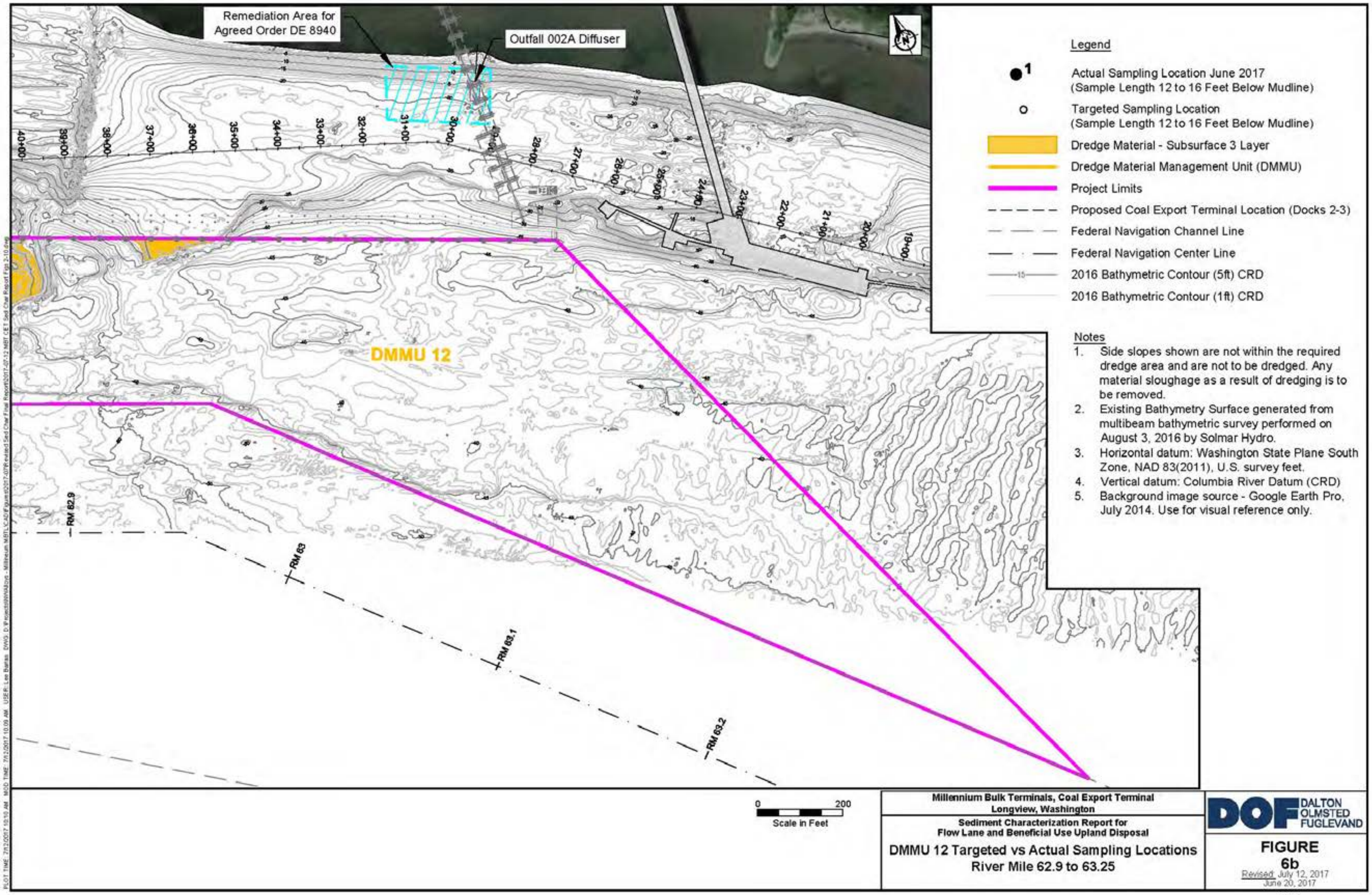

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Figure 8a. SubSurface Layer 4 (16-20+ ft below mudline) DMMU 13 and associated cores – West side

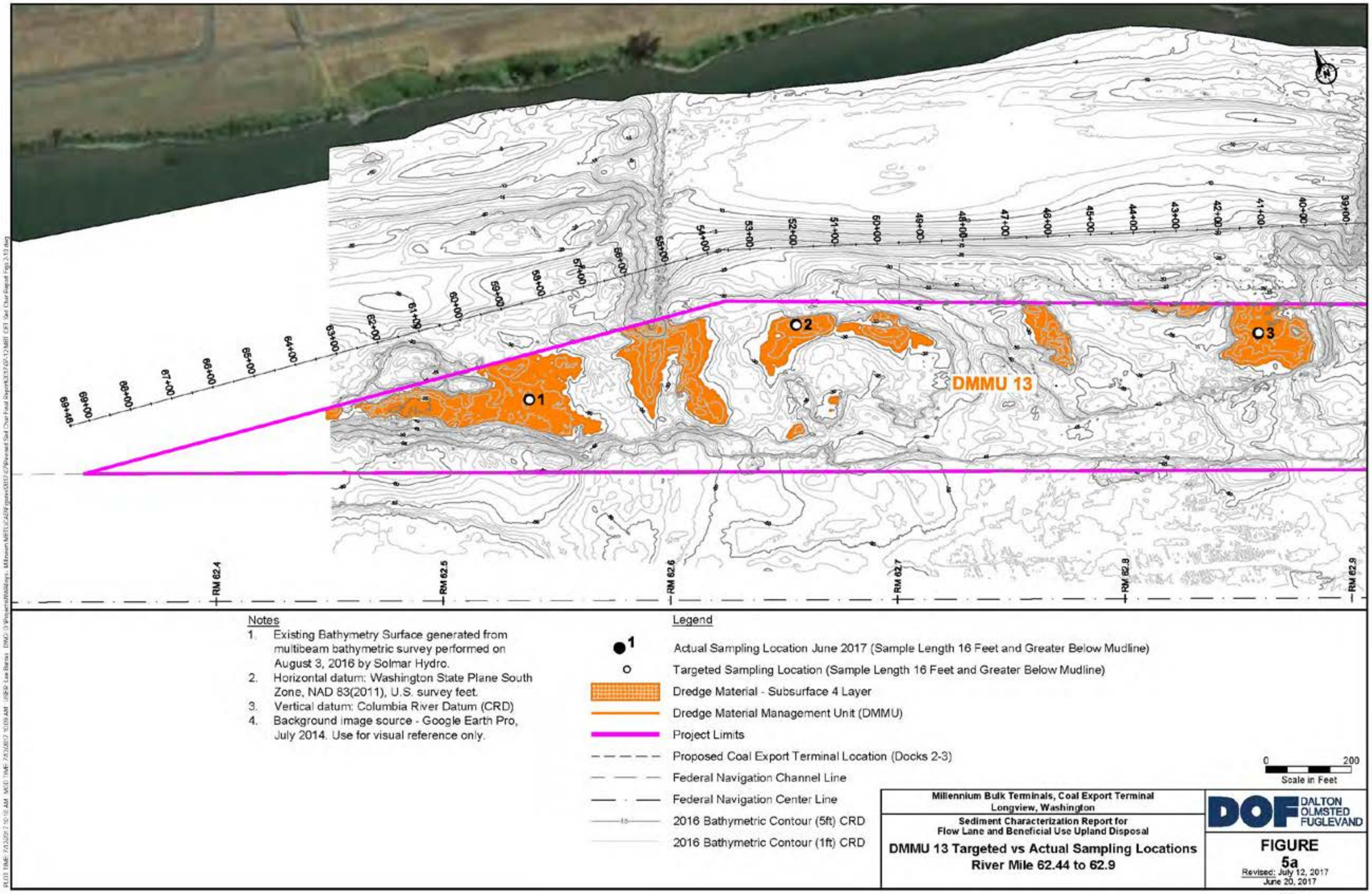

Figure 8b. SubSurface Layer 4 (16-20+ ft below mudline) DMMU 13 and associated cores – East side