CENWS-OD-TS-NR-DMMO

MEMORANDUM FOR: RECORD October 20, 2014

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM LA CONNER MARINA FOR UNCONFINED OPEN-WATER DISPOSAL AT THE PORT GARDNER NONDISPERSIVE SITE.

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 up to 136,500 cubic yards (cy) of dredged material from La Conner Marina for disposal at the Port Gardner nondispersive open-water site.

2. Background. La Conner Marina, located on the eastern shoreline of the Swinomish Channel (see Figure 1), consists of two moorage basins – north and south. The Port of Skagit County needs to conduct maintenance dredging in the moorage basins to minimize the potential for grounding of vessels and docks at the facility during low tides (GeoEngineers, 2014a). Sediment from the marina was tested in 1993 and 2001 (PSDDA, 1993; DMMP, 2001). There were no exceedances of the DMMP screening levels in either year and all dredged material was found suitable for open-water disposal. On the basis of the data from these two cycles of testing, the La Conner Marina was down-ranked from moderate to low (DMMP, 2003).

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

Table 1. Project Summary

Project ranking	Low
Proposed dredging volume	136,500 cubic yards
Proposed dredging depth	-12 feet MLLW plus 1 foot overdepth
1st draft SAP received	February 26, 2014
Comments provided by DMMP agencies	March 11, 2014
2nd draft SAP received	March 28, 2014
Comments provided by DMMP agencies	April 14, 2014
Final SAP received	April 17, 2014
SAP approved	April 24, 2014
Sampling dates	June 16-18, 2014
Draft data report received	September 17, 2014
Comments provided by DMMP agencies	September 23, 2014
Final data report received	September 30, 2014
DMMO tracking number	LACMA-1-A-F-359
EIM study ID	LACMA14

USACE Permit Application Number	NWS-2014-00357
Recency Determination (low rank = 7 years)	June 2021

4. Project Ranking and Sampling Requirements. For a low-ranked project with heterogeneous sediment, the number of samples and analyses are calculated using the following guidelines (DMMP, 2013):
    - Maximum volume of sediment represented by each field sample = 8,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) = 48,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the subsurface portion of the dredging prism = 72,000 cubic yards

    North Basin: The volume of sediment (including overdepth, sideslopes and a 30% uncertainty factor) is estimated to be 57,800 cubic yards (GeoEngineers, 2014a). The thickness of the dredging prism, including overdepth, ranges from 1 to 4 feet; therefore all material is surface material. The dredging prism was divided into two dredged material management units (DMMUs N1 and N2), each represented by a composite of sediment from four sampling stations (Figure 2).

    South Basin: The volume of sediment (including overdepth, sideslopes and a 30% uncertainty factor) is estimated to be 78,700 cubic yards. The thickness of the dredging prism, including overdepth, ranges from 1 to 6 feet. While a small quantity of subsurface material is present in the South Basin, it would not be practicable to dredge it separately from the surface material in the event that the surface sediment were found to be unsuitable for open-water disposal, while the subsurface material was found to be suitable. Therefore, for the purpose of this characterization, all sediment in the South Basin was considered surface material. The dredging prism was divided into two DMMUs (S1 and S2), represented by composites of sediment from five and six sampling stations respectively (Figure 3).

5. Sampling. Sampling took place June 16-18, 2014 using a vibracore sampler. Table 1 includes the coordinates of the sampling stations. The target penetration depth was -15 feet MLLW, which included the dredge prism and overdepth (-13 ft MLLW) and 2-foot z-samples (-13 to -15 ft MLLW). The target recovery was 75 percent.

    Multiple coring attempts were made at the majority of the stations in order to achieve the desired penetration depth and target recovery; or to collect sufficient sample material for compositing. Cores that did not achieve the target recovery were rejected. Cores that did not achieve the target penetration depth were also rejected with the exception of cores completed at locations S1-2, S1-5, S2-2, S2-3, S2-5 and S2-6 in the South Basin. These cores met refusal prior to reaching the target penetration depth. Penetration depth for these cores ranged from 13.9 to14.7 feet MLLW, with only partial z-samples recovered. DMMO was notified of the core refusal during the coring activities and an approval was given to accept these cores due to underlying hard material (GeoEngineers, 2014b).

    Table 2 provides the penetration and recovery data. All coring attempts are listed in the table, with the last column indicating whether or not material collected from each attempt was accepted or rejected. Accepted material from each station was mixed and homogenized prior to compositing

with material from other stations. Equal quantities of material from each station within a DMMU were included in the composite representing that DMMU. Table 3 documents the DMMU compositing scheme and the z-samples collected for each accepted core.

6. Chemical and Sediment Conventional Analysis. The sediment conventional and chemistry results can be found in Table 4. The grain-size data show that the proposed dredged material has a high fines content, consisting predominantly of silt (64 to 67 percent) but with a significant fraction of clay as well (27 to 30 percent). The total organic carbon concentration ranged from 0.8 to 1.1 percent. The sulfide concentrations were high, ranging from 1,950 to 3,640 mg/kg.

   All chemical and sediment conventional analytical results were subjected to EPA Stage 2B (EPA, 2009) validation by GeoEngineers. Both lab and validation qualifiers are included in Table 4. The DMMP agencies determined that the analytical results, as qualified, were acceptable for decision-making. Chemical-specific discussions are provided in the following subsections:

   Benzyl Alcohol

   The chemical results indicated that there were no exceedances of screening levels for the DMMP chemicals of concern, with the exception of benzyl alcohol, with concentrations ranging from 130 to 180 ug/kg (SL = 57 ug/kg; ML = 870 ug/kg). In most cases, detected or undetected exceedances of even a single COC would result in a requirement to conduct bioassays. However, in a similar project in 2011, in which benzyl alcohol was the only COC exceeding SL, the DMMP agencies determined that bioassay testing was not necessary (DMMP, 2011) due to the presence of plant material and woody debris in the sediment samples and the lack of anthropogenic sources. Benzyl alcohol is produced naturally by the decay of many plants and is often associated in marine sediments with plant material and woody deposits. Anthropogenic sources of benzyl alcohol include pharmaceuticals, soap, perfume and flavor products.

   The core logs for La Conner Marina indicate that wood and root material was found in six of the cores. However, the presence of plant material was not as visually evident as it was in samples taken from the Snohomish downstream settling basin in 2011. But the sulfides concentrations were much higher at La Conner Marina than in the Snohomish samples. As indicated previously, sulfide concentrations ranged from 1,950 to 3,640 mg/kg at La Conner, compared to a range of 503 to 609 mg/kg in the Snohomish samples that had benzyl alcohol exceedances of SL. Hydrogen sulfide is generated by the bacterial decomposition of organic material under anoxic conditions. The high sulfide concentrations at La Conner Marina provide indirect evidence of the possible presence of decomposed plant material in the sediment. TOC concentrations were similar in both projects, ranging from 0.8 to 1.1 percent at La Conner and from 0.9 to 1.2 percent in the Snohomish downstream settling basin.

   The DMMP agencies used best professional judgment in determining that the benzyl alcohol found in La Conner Marina was most likely derived from natural sources and was unlikely to be anthropogenic in nature. On the basis of this judgment, the agencies determined that bioassays would not be required.

Tributyltin

Tributyltin (TBT) was analyzed in 2001 in the North Basin, where marine maintenance facilities have been located and the probability of finding TBT was highest. TBT was undetected in all three North Basin DMMUs, with a reporting limit of 0.02 ug/l. On the basis of the results from the 2001 testing, the agencies agreed that TBT testing would not be required as part of the 2014 sediment characterization.

Dioxins/Furans

The DMMP agencies determined that there is no reason to believe that dioxins/furans are present in the sediment at La Conner Marina at concentrations that would exceed the DMMP site management objective of 4 pptr TEQ. This determination is supported by the results from dioxin testing in the Swinomish Channel in 2009, where all concentrations were below 0.2 pptr TEQ (DMMP, 2009). However, the DMMP dioxin guidelines (DMMP, 2010) require at least limited dioxin testing for all projects using dispersive sites, even when there is no reason to believe that dioxin may be present at elevated concentrations. There is no such requirement for nondispersive sites.

The Port of Skagit County was informed that use of the Rosario Strait dispersive site would require dioxin testing. The Port chose not to conduct this testing, but would instead transport the material to the nondispersive site in Port Gardner if the material were found to be suitable for open-water disposal.

7. 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 antidegradation standard (DMMP, 2008b). Comparison of the proposed dredged material to SQS serves as a first-tier indicator for this purpose. Table 5 shows that the only detected exceedances of SQS were for benzyl alcohol. As discussed previously, the DMMP agencies used best professional judgment in determining that the benzyl alcohol was most likely derived from natural sources and was unlikely to be anthropogenic in nature. The only other SQS exceedances were non-detects for hexachlorobenzene in DMMUs N1 and S1, with reporting limits of 0.40 and 0.70 mg/kg oc respectively (SQS = 0.38 mg/kg oc). Hexachlorobenzene was also undetected in DMMUs N2 and S2, but with reporting limits below SQS. These latter two samples provide evidence that hexachlorobenzene is not present in the proposed dredged material at concentrations exceeding SQS. Therefore, the reporting limit exceedances of SQS for hexachlorobenzene were deemed insignificant and the agencies agreed that there was no need for analysis of z-samples for this project. With the possible exception of benzyl alcohol, the sediment that will be exposed by dredging is not anticipated to have any exceedances of SQS.

8. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from La Conner Marina for open-water disposal at the Port Gardner site. The approved sampling and analysis plan was followed and the data gathered were deemed sufficient and acceptable for DMMP decision-making.

   There were no SL exceedances for the standard DMMP chemicals of concern, with the exception of benzyl alcohol, which was discussed previously. Therefore, with respect to these chemicals, the dredged material is suitable for open-water disposal. With regard to dioxins/furans, there is no

reason to believe that these chemicals are present in the sediment at La Conner Marina at concentrations that would exceed the DMMP site management objective of 4 pptr TEQ. Therefore, the material is suitable for placement at a nondispersive site. However, in the absence of dioxin testing, the material cannot be placed at a dispersive site.

In summary, based on the results of the previously described testing, the DMMP agencies conclude that all 136,500 cubic yards from the La Conner Marina project are suitable for open-water disposal at the Port Gardner non-dispersive site.

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.

A pre-dredge meeting with DNR, Ecology and the Corps of Engineers is required at least 7 days prior to dredging. A dredging 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. A DNR site use authorization must also be acquired. Disposal at the Port Gardner site must be by bottom-dump barge.

9. References.

DMMP, 2001. *Determination of the Suitability of Sediment Proposed to be Dredged from the Port of Skagit County, La Conner Marina, Skagit County, Washington for Disposal at the Rosario Strait Open-Water Dispersive Site*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, June 11, 2001.

DMMP, 2003. *Area Rerank Determination for the Port of Skagit County, La Conner Marina Project, Skagit County, Washington*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 15, 2003.

DMMP, 2008b. *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, 2009. *Determination on the Suitability of Proposed Dredged Material Tested for the Federal Swinomish Channel Navigation Dredging Project for Either Open-Water Disposal at the Rosario Strait Dispersive Site, or an Appropriate Beneficial Use Site.* Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, December 11, 2009.

DMMP, 2010. *Dredged Material Management Program – New Interim Guidelines for Dioxin.* DMMP agencies, December 2010.

DMMP, 2011. *DMMP Suitability Determination for Proposed Maintenance Dredged Material from the Snohomish River, Everett, Snohomish County, for Unconfined Open-Water Disposal at the Port Gardner Nondispersive Site or at an Approved Beneficial Use or Upland Site.* Prepared by the

Seattle District Dredged Material Management Office for the Dredged Material Management Program, January 30, 2012.

DMMP, 2013. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 2013.

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

EPA, 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. U.S. Environmental Protections Agency, January 2009.

GeoEngineers, 2014a. *Dredged Material Characterization Sampling and Analysis Plan – La Conner Marina Maintenance Dredging Project, La Conner, Washington.* Prepared by GeoEngineers, Seattle for the Port of Skagit County, April 17, 2014.

GeoEngineers, 2014b. *Dredged Material Characterization Report – La Conner Marina Maintenance Dredging Project, La Conner, Washington.* Prepared by GeoEngineers, Seattle for the Port of Skagit County, September 30, 2014.

PSDDA, 1993. *Determination of the Suitability of Dredged Material Tested under PSDDA Evaluation Procedures for the La Conner Marina for Disposal at the Rosario Strait Open-Water Dispersive Site*. Prepared by the Seattle District Dredged Material Management Office for the Puget Sound Dredged Disposal Analysis agencies, April 27, 1993.

10. Agency Signatures.

The signed document is on file in the Dredged Material Management Office.

Concur:

_____ _____
Date David Fox - Seattle District Corps of Engineers

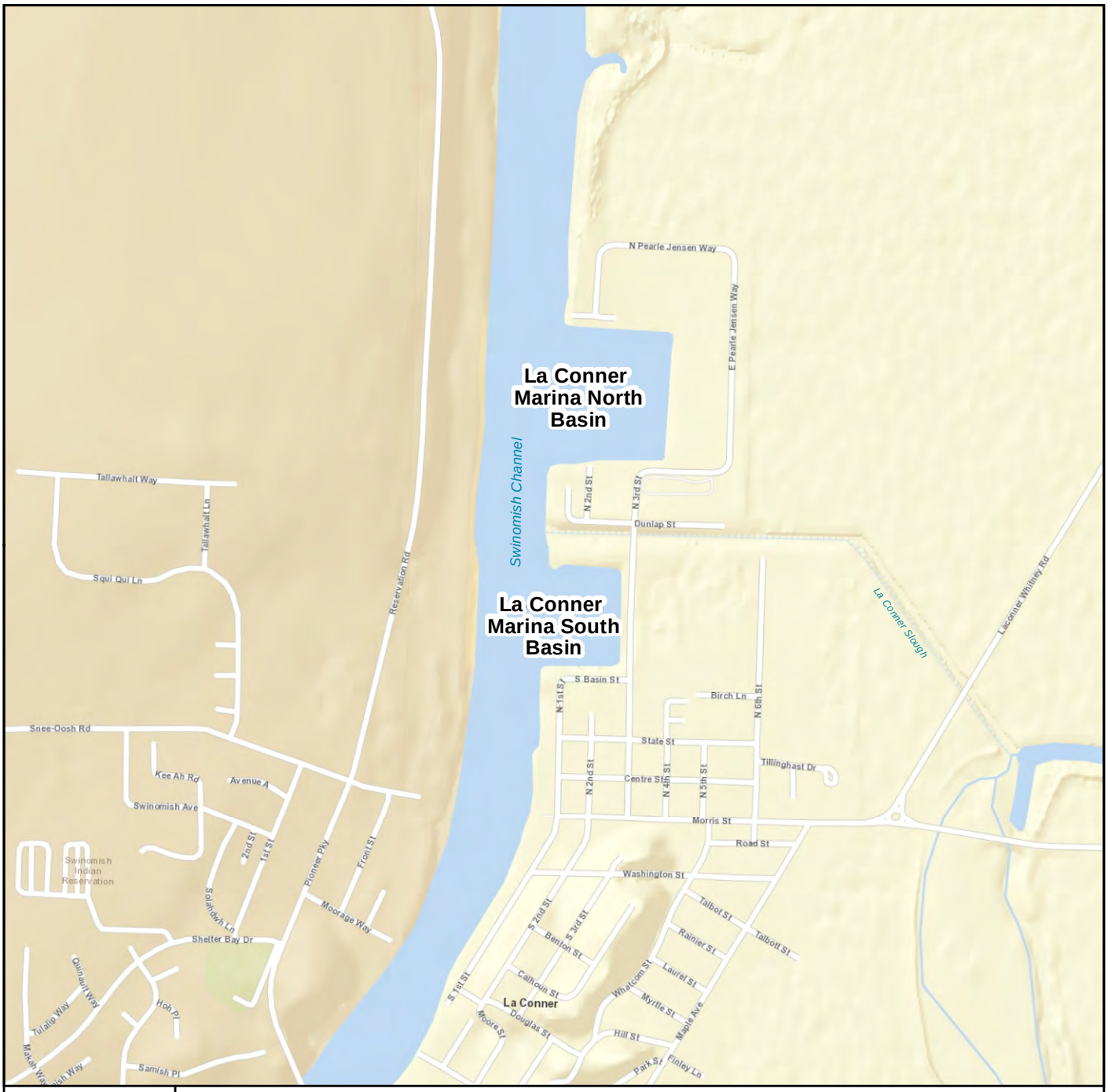
_____ _____
Date Justine Barton - Environmental Protection Agency

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

_____ _____
Date Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Erin Legge – Seattle District Regulatory
John Herzog – GeoEngineers
Heather Haslip – Port of Skagit County
Sara Young – Port of Skagit County



Notes:
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Data Sources: ESRI Data & Maps, Street Data 2013.

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

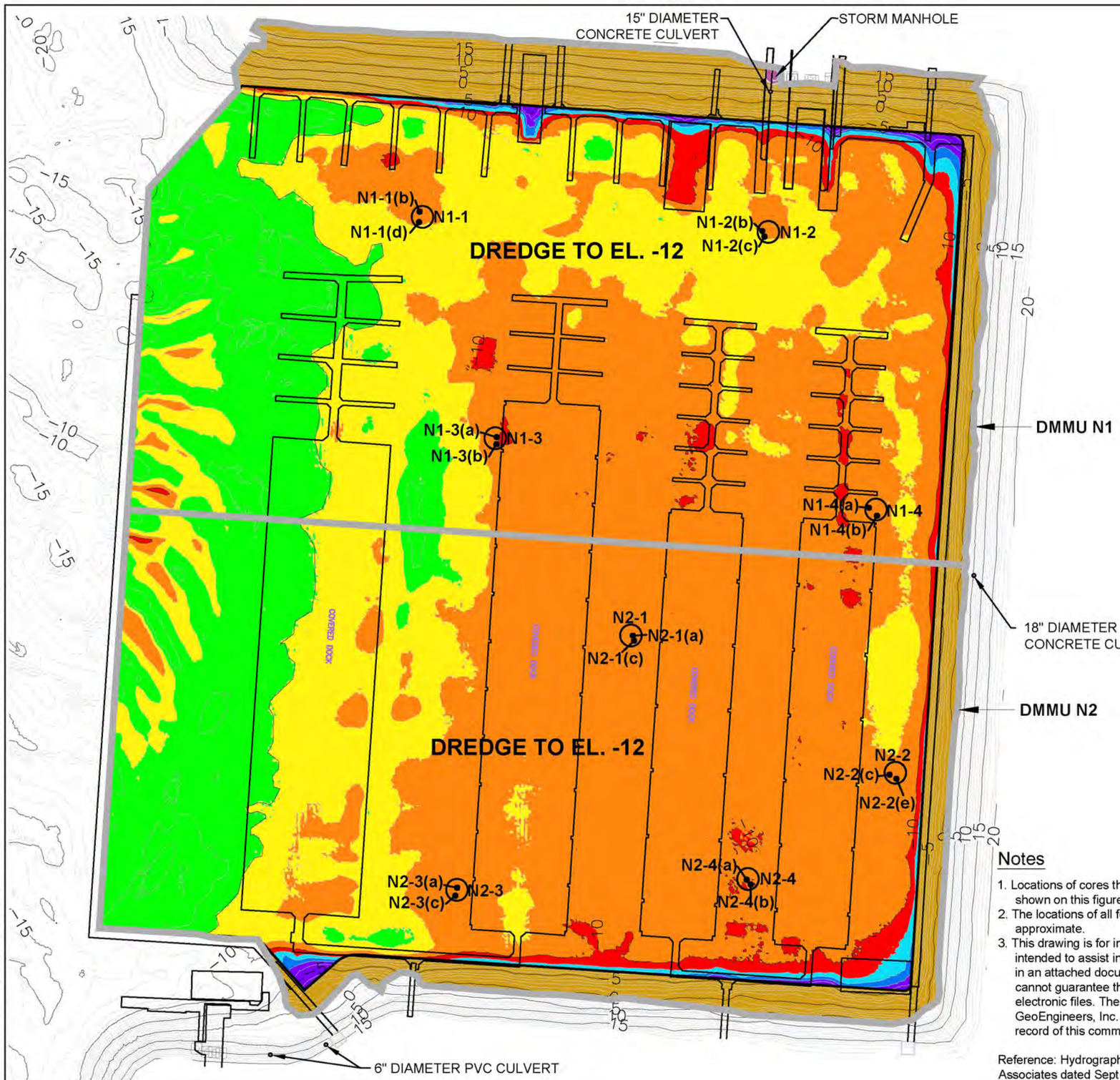
Vicinity Map

La Conner Marina
La Conner, Washington

GeoEngineers

Figure 1

Office: Redmond Path:\\sea\projects\5\5364015\GIS\MXD\5364015001500_F1_VicinityMap.mxd Map Revised: 1/7/2014 MSA



Legend

- N1-1(b) • — Actual Core Location[1]
- N1-1 ○ — Target Core Location
- —10— — Bathymetric Contour (Feet MLLW)
- Dredge Material Management Unit (DMMU)
- Transitional Slope (approximately 2H:1V)
- 5'+ Above Proposed Dredge Elevation
- 4'-5' Above Proposed Dredge Elevation
- 3'-4' Above Proposed Dredge Elevation
- 2'-3' Above Proposed Dredge Elevation
- 1'-2' Above Proposed Dredge Elevation
- 0'-1' Above Proposed Dredge Elevation
- Areas Below Proposed Dredge Elevation
- MLLW — Mean Lower Low Water

Proposed Dredge Volumes

Existing Ground Surface	
Dredge to El. -12 MLLW	31,000 Cubic Yards
30% Uncertainty Factor	9,300 Cubic Yards
1' Overdredge Allowance	17,500 Cubic Yards
Total Dredge Amount =	57,800 Cubic Yards

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Notes

1. Locations of cores that were not accepted are not shown on this figure.
2. The locations of all features shown are approximate.
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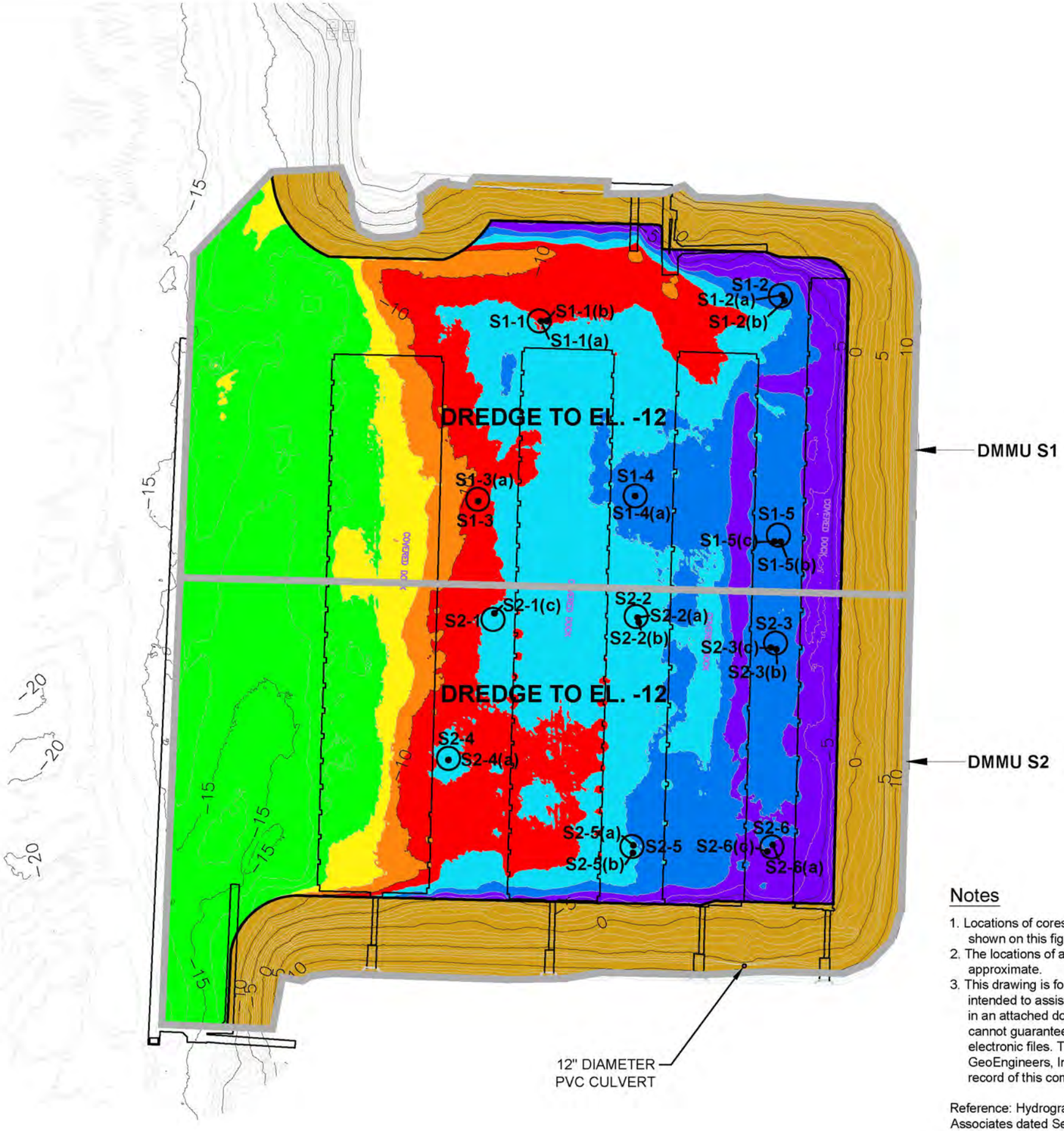
Reference: Hydrographic Survey by David Evans & Associates dated Sept. 12, 2013.

North Basin Project Area
DMMUs and Coring Locations

La Conner Marina
La Conner, Washington

GeoEngineers | Figure 2

P:\15\5364015\00\CAD\5364015-00 Fig 2 North Basin Sept 2014.dwg\TAB:F2 Modified by TMichaud on Sep 17, 2014 - 9:06



Legend

S1-1(a) •	Actual Core Location[1]
S1-1 ○	Target Core Location
—10—	Bathymetric Contour (Feet MLLW)
	Dredge Material Management Unit (DMMU)
	Transitional Slope (approximately 2H:1V)
	5'+ Above Proposed Dredge Elevation
	4'-5' Above Proposed Dredge Elevation
	3'-4' Above Proposed Dredge Elevation
	2'-3' Above Proposed Dredge Elevation
	1'-2' Above Proposed Dredge Elevation
	0'-1' Above Proposed Dredge Elevation
	Areas Below Proposed Dredge Elevation
MLLW	Mean Lower Low Water

Proposed Dredge Volumes

Existing Ground Surface

Dredge to El. -12 MLLW	48,150 Cubic Yards
30% Uncertainty Factor	14,450 Cubic Yards
1' Overdredge Allowance	16,100 Cubic Yards
Total Dredge Amount =	78,700 Cubic Yards

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Notes

1. Locations of cores that were not accepted are not shown on this figure.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Hydrographic Survey by David Evans & Associates dated Sept. 12, 2013.

South Basin Project Area
DMMUs and Coring Locations

La Conner Marina
La Conner, Washington

GeoEngineers | **Figure 3**

P:\1536401\001\CAD\1536401-00 Fig 3 South Basin Sept 2014.dwg\TAB:F3 modified by tmichaud on Sep 17, 2014 - 9:16

TABLE 1

Summary of Core Locations

La Conner Marina Maintenance Dredging Project
La Conner, Washington

Project Area	DMMU	Target Core Location ID	Target Coordinates[1] (NAD83)		Actual Core Location ID	Date	Time	Actual Coordinates[2] (NAD83)	
North Basin	N1	N1-1	48° 24′ 2.62″ N	122° 29′ 42.59″ W	N1-1(a)	6/17/2014	845	48° 24′ 2.60″ N	122° 29′ 42.61″ W
					N1-1(b)		900	48° 24′ 2.67″ N	122° 29′ 42.63″ W
					N1-1(c)		910	48° 24′ 2.57″ N	122° 29′ 42.55″ W
					N1-1(d)		925	48° 24′ 2.57″ N	122° 29′ 42.64″ W
		N1-2	48° 24′ 2.55″ N	122° 29′ 37.86″ W	N1-2(a)	6/17/2014	1040	48° 24′ 2.54″ N	122° 29′ 37.88″ W
					N1-2(b)		1100	48° 24′ 2.56″ N	122° 29′ 37.94″ W
					N1-2(c)		1110	48° 24′ 2.51″ N	122° 29′ 37.91″ W
		N1-3	48° 24′ 0.62″ N	122° 29′ 41.53″ W	N1-3(a)	6/16/2014	1600	48° 24′ 0.63″ N	122° 29′ 41.51″ W
					N1-3(b)		1615	48° 24′ 0.56″ N	122° 29′ 41.51″ W
		N1-4	48° 24′ 0.04″ N	122° 29′ 36.3″ W	N1-4(a)	6/17/2014	955	48° 24′ 0.06″ N	122° 29′ 36.4″ W
					N1-4(b)		1010	48° 23′ 59.99″ N	122° 29′ 36.29″ W
	N2	N2-1	48° 23′ 58.85″ N	122° 29′ 39.62″ W	N2-1(a)	6/16/2014	1410	48° 23′ 58.85″ N	122° 29′ 39.59″ W
					N2-1(b)		1420	48° 23′ 58.9″ N	122° 29′ 39.66″ W
					N2-1(c)		1430	48° 23′ 58.8″ N	122° 29′ 39.57″ W
		N2-2	48° 23′ 57.65″ N	122° 29′ 35.96″ W	N2-2(a)	6/16/2014	1050	48° 23′ 57.63″ N	122° 29′ 35.94″ W
					N2-2(b)		1115	48° 23′ 57.71″ N	122° 29′ 35.97″ W
					N2-2(c)		1140	48° 23′ 57.63″ N	122° 29′ 36.04″ W
					N2-2(d)		1155	48° 23′ 57.67″ N	122° 29′ 35.88″ W
					N2-2(e)		1210	48° 23′ 57.6″ N	122° 29′ 35.95″ W
		N2-3	48° 23′ 56.5″ N	122° 29′ 41.92″ W	N2-3(a)	6/16/2014	1455	48° 23′ 56.52″ N	122° 29′ 41.92″ W
					N2-3(b)		1510	48° 23′ 56.55″ N	122° 29′ 41.87″ W
					N2-3(c)		1525	48° 23′ 56.45″ N	122° 29′ 41.94″ W
		N2-4	48° 23′ 56.66″ N	122° 29′ 37.94″ W	N2-4(a)	6/16/2014	1330	48° 23′ 56.65″ N	122° 29′ 37.96″ W
					N2-4(b)		1345	48° 23′ 56.61″ N	122° 29′ 37.91″ W
South Basin	S1	S1-1	48° 23′ 47.22″ N	122° 29′ 43.7″ W	S1-1(a)	6/17/2014	1300	48° 23′ 47.23″ N	122° 29′ 43.68″ W
					S1-1(b)		1320	48° 23′ 47.23″ N	122° 29′ 43.61″ W
		S1-2	48° 23′ 47.49″ N	122° 29′ 40.59″ W	S1-2(a)	6/17/2014	1415	48° 23′ 47.50″ N	122° 29′ 40.57″ W
					S1-2(b)		1425	48° 23′ 47.45″ N	122° 29′ 40.54″ W
		S1-3	48° 23′ 45.68″ N	122° 29′ 44.45″ W	S1-3(a)	6/17/2014	1445	48° 23′ 45.67″ N	122° 29′ 44.44″ W
		S1-4	48° 23′ 45.74″ N	122° 29′ 42.42″ W	S1-4(a)	6/17/2014	1525	48° 23′ 45.75″ N	122° 29′ 42.42″ W
		S1-5	48° 23′ 45.43″ N	122° 29′ 40.55″ W	S1-5(a)	6/17/2014	1550	48° 23′ 45.43″ N	122° 29′ 40.58″ W
					S1-5(b)		1610	48° 23′ 45.38″ N	122° 29′ 40.52″ W
					S1-5(c)		1630	48° 23′ 45.38″ N	122° 29′ 40.6″ W
	S2	S2-1	48° 23′ 44.65″ N	122° 29′ 44.22″ W	S2-1(a)	6/18/2014	1420	48° 23′ 44.64″ N	122° 29′ 44.20″ W
					S2-1(b)		1430	48° 23′ 44.69″ N	122° 29′ 44.28″ W
					S2-1(c)		1445	48° 23′ 44.71″ N	122° 29′ 44.2″ W
		S2-2	48° 23′ 44.70″ N	122° 29′ 42.37″ W	S2-2(a)	6/18/2014	1130	48° 23′ 44.70″ N	122° 29′ 42.35″ W
					S2-2(b)		1145	48° 23′ 44.66″ N	122° 29′ 42.33″ W
		S2-3	48° 23′ 44.5″ N	122° 29′ 40.56″ W	S2-3(a)	6/18/2014	830	48° 23′ 44.53″ N	122° 29′ 40.57″ W
					S2-3(b)		850	48° 23′ 44.45″ N	122° 29′ 40.55″ W
					S2-3(c)		905	48° 23′ 44.47″ N	122° 29′ 40.62″ W
		S2-4	48° 23′ 43.45″ N	122° 29′ 44.75″ W	S2-4(a)	6/18/2014	1535	48° 23′ 43.44″ N	122° 29′ 44.75″ W
		S2-5	48° 23′ 42.73″ N	122° 29′ 42.36″ W	S2-5(a)	6/18/2014	1320	48° 23′ 42.74″ N	122° 29′ 42.34″ W
					S2-5(b)		1335	48° 23′ 42.67″ N	122° 29′ 42.34″ W
		S2-6	48° 23′ 42.75″ N	122° 29′ 40.55″ W	S2-6(a)	6/18/2014	955	48° 23′ 42.77″ N	122° 29′ 40.54″ W
					S2-6(b)		1020	48° 23′ 42.79″ N	122° 29′ 40.49″ W
					S2-6(c)		1040	48° 23′ 42.71″ N	122° 29′ 40.61″ W

Notes:

[1]Referenced from Dredged Material Characterization Sampling and Analyses Plan (SAP; Appendix A).

[2]Obtained using vessel's real-time kinematic (RTK) global positioning system (GPS).

DMMU = Dredged Material Management Unit

ID = Identification

NAD83 = North American Datum of 1983.

TABLE 2

Summary of Core Collection Data

La Conner Marina Maintenance Dredging Project
La Conner, Washington

Project Area	DMMU	Target Core Location ID	Actual Core Location ID	Real-Time Water Surface Elevation[1] (ft MLLW)	Depth of Water Column[2] (ft)	Mudline Elevation (ft MLLW)		Core Penetration			Recovery				Core Accepted[6] (Yes/No?)
						Expected[3]	Actual[4]	Target Depth[5] (ft MLLW)	Actual Depth (ft MLLW)	Target Depth Achieved?	Target % Recovery[3]	Length (ft)	Actual % Recovery	Target % Recovery Achieved?	
North Basin	N1	N1-1	N1-1(a)	8.62	18.5	-11	-9.88	≥-15	-16.68	Yes	≥75	4.3	63.2%	No	No
			N1-1(b)	8.74	19		-10.26		-17.56	Yes		6.7	91.8%	Yes	Yes
			N1-1(c)	8.69	18.8		-10.11		-17.31	Yes		5.1	70.8%	No	No
			N1-1(d)	8.56	18.6		-10.04		-16.84	Yes		6.3	92.6%	Yes	Yes
		N1-2	N1-2(a)	7.08	17.3	-11	-10.22	≥-15	-15.22	Yes	≥75	2.9	58%	No	No
			N1-2(b)	6.41	16.7		-10.29		-15.89	Yes		5.2	92.9%	Yes	Yes
			N1-2(c)	6.03	16.1		-10.07		-16.67	Yes		5.9	89.4%	Yes	Yes
		N1-3	N1-3(a)	1.18	11.05	-10	-9.87	≥-15	-15.47	Yes	≥75	4.3	76.8%	Yes	Yes
			N1-3(b)	1.1	11.6		-10.5		-15.6	Yes		4.6	90.2%	Yes	Yes
		N1-4	N1-4(a)	8.26	18.6	-11	-10.34	≥-15	-15.94	Yes	≥75	5	89.3%	Yes	Yes
			N1-4(b)	7.99	18.4		-10.41		-15.81	Yes		4.8	88.9%	Yes	Yes
	N2	N2-1	N2-1(a)	0.36	9.5	-11	-9.14	≥-15	-15.49	Yes	≥75	5.3	83.5%	Yes	Yes
			N2-1(b)	0.36	9.5		-9.14		-16.64	Yes		3.5	46.7%	No	No
			N2-1(c)	0.32	9.45		-9.13		-16.28	Yes		5.5	76.9%	Yes	Yes
		N2-2	N2-2(a)	5.54	15.4	-11	-9.9	≥-15	-13.86	No	≥75	4	100%	Yes	No
			N2-2(b)	3.59	13.6		-10.01		-16.01	Yes		3	50%	No	No
			N2-2(c)	2.77	12.9		-10.13		-17.23	Yes		5.5	77.5%	Yes	Yes
			N2-2(d)	2.17	12.4		-10.23		-17.03	Yes		3.4	50.0%	No	No
			N2-2(e)	1.38	11.9		-10.52		-16.92	Yes		5.2	81%	Yes	Yes
		N2-3	N2-3(a)	0.22	9.7	-11	-9.48	≥-15	-16.33	Yes	≥75	5.8	83.9%	Yes	Yes
			N2-3(b)	0.17	9.8		-9.63		-16.43	Yes		4.8	70.6%	No	No
			N2-3(c)	0.04	10		-9.96		-16.16	Yes		4.8	76.6%	Yes	Yes
		N2-4	N2-4(a)	0.18	9.3	-10	-9.12	≥-15	-16.12	Yes	≥75	5.6	80%	Yes	Yes
			N2-4(b)	0.23	9.1		-8.87		-16.32	Yes		6	80.5%	Yes	Yes
South Basin	S1	S1-1	S1-1(a)	1.94	10.35	-9	-8.41	≥-15	-15.66	Yes	≥75	6.7	92.4%	Yes	Yes
			S1-1(b)	1.35	9.9		-8.55		-16.15	Yes		6.4	84.2%	Yes	Yes
		S1-2	S1-2(a)	0.33	7.7	-7.5	-7.37	≥-15	-14.67	No	≥75	6.9	94.5%	Yes	Yes[7]
			S1-2(b)	0.3	7.8		-7.5		-15	Yes		6.2	82.7%	Yes	Yes
		S1-3	S1-3(a)	0.11	8.6	-9.5	-8.49	≥-15	-15.79	Yes	≥75	6.8	93.2%	Yes	Yes
		S1-4	S1-4(a)	0.1	7.3	-8	-7.2	≥-15	-15.60	Yes	≥75	7.9	94%	Yes	Yes
		S1-5	S1-5(a)	0.24	7	-7	-6.76	≥-15	-13.76	No	≥75	6.5	92.9%	Yes	No
			S1-5(b)	0.42	7.3		-6.88		-13.98	No		6.5	91.5%	Yes	Yes[7]
			S1-5(c)	0.7	7.7		-7		-14.1	No		6.2	87.3%	Yes	Yes[7]
	S2	S2-1	S2-1(a)	2.2	10.2	-9	-8	≥-15	-14.8	No	≥75	6.2	91.2%	Yes	No
			S2-1(b)	2.02	10.2		-8.18		-15.68	Yes		5.3	70.7%	No	No
			S2-1(c)	1.75	9.8		-8.05		-15.45	Yes		7.2	97.3%	Yes	Yes
		S2-2	S2-2(a)	6.99	14.6	-8	-7.61	≥-15	-14.61	No	≥75	5.7	81.4%	Yes	Yes[7]
			S2-2(b)	6.92	14.3		-7.38		-14.28	No		5.2	75.4%	Yes	Yes[7]
		S2-3	S2-3(a)	7.54	14.7	-7	-7.16	≥-15	-13.11	No	≥75	5.5	92.4%	Yes	No
			S2-3(b)	7.6	14.9		-7.3		-14.1	No		6.5	95.6%	Yes	Yes[7]
			S2-3(c)	7.64	15		-7.36		-14.66	No		6.1	83.6%	Yes	Yes[7]
		S2-4	S2-4(a)	1.46	9.7	-9	-8.24	≥-15	-15.24	Yes	≥75	6.7	95.7%	Yes	Yes
		S2-5	S2-5(a)	3.9	11.1	-8	-7.2	≥-15	-14.6	No	≥75	6	81.1%	Yes	Yes[7]
			S2-5(b)	3.36	10.7		-7.34		-14.34	No		5.3	75.7%	Yes	Yes[7]
		S2-6	S2-6(a)	8.06	14.5	-7	-6.44	≥-15	-13.94	No	≥75	6.5	86.7%	Yes	Yes[7]
			S2-6(b)	8.05	14.4		-6.35		-13.95	No		4	52.6%	No	No
			S2-6(c)	7.9	14.2		-6.3		-13.9	No		6.5	84.9%	Yes	Yes[7]

Notes:

[1]Obtained using both a tide board at the Marina that was calibrated to a permanent survey control point with known elevation and the sampling vessel's real-time kinematic (RTK) global positioning system (GPS).

[2]Measured by lowering a weighted tape measure from the sampling vessel.

[3]Referenced from Dredged Material Characterization Sampling and Analysis Plan (SAP; Appendix A).

[4]Determined by subtracting measured depth of water column from recorded water surface elevation.

[5]Includes core depth required to characterize dredge prism layer plus 2 feet of Z-layer (i.e. elevation of -15 feet MLLW or greater).

[6]Cores that did not achieve target penetration depth and/or recovery of 75 percent or more were not accepted.

[7]Cores did not achieve target penetration depth; however, were accepted. Refusal was met prior to reaching elevation -15 feet MLLW. DMMO was notified of the core refusal during the coring activities and an approval was given to accept these cores due to underlying hard material.

DMMU = Dredged Material Management Unit
ID = Identification
MLLW = Mean Lower Low Water
bml = below mudline

TABLE 3

Summary of Sample Interval Data

La Conner Marina Maintenance Dredging Project
La Conner, Washington

Project Area	DMMU	Target Core Location ID	Actual Accepted Core Location ID	Dredged Material Sample Interval		Z-Layer Material Sample Interval		Discarded Sample Interval	
				Thickness (ft)	ft MLLW	Thickness (ft)	ft MLLW	Thickness (ft)	ft MLLW
North Basin	N1	N1-1	N1-1(b)	2.74	-10.26 – -13	2	-13 – -15	2.56	-15 – -17.56
			N1-1(d)	2.96	-10.04 – -13	2	-13 – -15	1.84	-15 – -16.84
		N1-2	N1-2(b)	2.71	-10.29 – -13	2	-13 – -15	0.89	-15 – -15.89
			N1-2(c)	2.93	-10.07 – -13	2	-13 – -15	1.67	-15 – -16.67
		N1-3	N1-3(a)	3.13	-9.87 – -13	2	-13 – -15	0.47	-15 – -15.47
			N1-3(b)	2.5	-10.5 – -13	2	-13 – -15	0.6	-15 – -15.60
		N1-4	N1-4(a)	2.66	-10.34 – -13	2	-13 – -15	0.94	-15 – -15.94
			N1-4(b)	2.59	-10.41 – -13	2	-13 – -15	0.81	-15 – -15.81
	N2	N2-1	N2-1(a)	3.86	-9.14 – -13	2	-13 – -15	0.49	-15 – -15.49
			N2-1(c)	3.87	-9.13 – -13	2	-13 – -15	1.28	-15 – -16.28
		N2-2	N2-2(c)	2.87	-10.13 – -13	2	-13 – -15	2.23	-15 – -17.23
			N2-2(e)	2.48	-10.52 – -13	2	-13 – -15	1.92	-15 – -16.92
		N2-3	N2-3(a)	3.52	-9.48 – -13	2	-13 – -15	1.33	-15 – -16.33
			N2-3(c)	3.04	-9.96 – -13	2	-13 – -15	1.16	-15 – -16.16
		N2-4	N2-4(a)	3.88	-9.12 – -13	2	-13 – -15	1.12	-15 – -16.12
			N2-4(b)	4.13	-8.87 – -13	2	-13 – -15	1.32	-15 – -16.32
South Basin	S1	S1-1	S1-1(a)	4.59	-8.41 – -13	2	-13 – -15	0.66	-15 – -15.66
			S1-1(b)	4.45	-8.55 – -13	2	-13 – -15	1.15	-15 – -16.15
		S1-2	S1-2(a)	5.63	-7.37 – -13	1.67	-13 – -14.7	None	None
			S1-2(b)	5.5	-7.5 – -13	2	-13 – -15	None	None
		S1-3	S1-3(a)	4.51	-8.49 – -13	2	-13 – -15	0.79	-15 – -15.79
		S1-4	S1-4(a)	5.8	-7.20 – -13	2	-13 – -15	0.604	-15 – -15.6
		S1-5	S1-5(b)	6.12	-6.88 – -13	0.98	-13 – -14	None	None
			S1-5(c)	6	-7 – -13	1.1	-13 – -14.1	None	None
	S2	S2-1	S2-1(c)	4.95	-8.05 – -13	2	-13 – -15	0.45	-15 – -15.45
		S2-2	S2-2(a)	5.39	-7.61 – -13	1.61	-13 – -14.6	None	None
			S2-2(b)	5.62	-7.38 – -13	1.28	-13 – -14.28	None	None
		S2-3	S2-3(b)	5.7	-7.3 – -13	1.1	-13 – -14.1	None	None
			S2-3(c)	5.64	-7.36 – -13	1.7	-13 – -14.66	None	None
		S2-4	S2-4(a)	4.76	-8.24 – -13	2	-13 – -15	0.24	-15 – -15.24
		S2-5	S2-5(a)	5.8	-7.2 – -13	1.6	-13 – -14.6	None	None
			S2-5(b)	5.66	-7.34 – -13	1.34	-13 – -14.34	None	None
		S2-6	S2-6(a)	6.56	-6.44 – -13	0.94	-13 – -13.94	None	None
			S2-6(c)	6.7	-6.3 – -13	0.9	-13 – -13.9	None	None

Notes:

DMMU = Dredged Material Management Unit

ID = Identification

MLLW = Mean Lower Low Water

bml = below mudline

TABLE 4

Summary of Conventionals and Chemical Analytical Data

La Conner Marina Maintenance Dredging Project

La Conner, Washington

Analysis	CAS Number[1]	DMMP Guidline Values[2]			DMMU ID/Sample ID/Sample Date											
		SL	BT	ML	N1 N1-A-COMP 6/17/2014	Validated Qualifier	Lab Qualifier	N2 N2-A-COMP 6/16/2014	Validated Qualifier	Lab Qualifier	S1 S1-A-COMP 6/17/2014	Validated Qualifier	Lab Qualifier	S2 S2-A-COMP 6/18/2014	Validated Qualifier	Lab Qualifier
Conventionals																
Grain Size (%)																
Gravel, %	--	--	--	--	0.1			0.1			0.1			0.1		
Sand, %	--	--	--	--	8.7			4.3			5.8			4.7		
Silt, %	--	--	--	--	64.3			66.7			64			65.5		
Clay, %	--	--	--	--	27.1			29.1			30.2			29.8		
Fines, %	--	--	--	--	91.4			95.8			94.2			95.3		
Total Solids (%)	--	--	--	--	45.04			48.62			54.25			51.68		
Total volatile solids (%)	--	--	--	--	2.77			5.47			5.16			5.49		
N-Ammonia (mg/kg)	--	--	--	--	76.6			85.4			101			106		
Total Organic Carbon (%)	--	--	--	--	0.948			1.11			0.76			1.02		
Total Sulfides[3] (mg/kg)	--	--	--	--	3,640			2,450			2,470			1,950		
Metals (mg/kg)																
Antimony	7440-36-0	150	--	200	4	J	J	1.7	J	J	1.97	J	J	1.45	J	J
Arsenic	7440-38-2	57	507.1	700	10			10			14			13		
Cadmium	7440-43-9	5.1	11.3	14	0.6			0.6			0.6			0.6		
Chromium	7440-47-3	260	260	--	63			68			63.4			63		
Copper	7440-50-8	390	1,027	1,300	46.5			54.1			49.6			52.8		
Lead	7439-92-1	450	975	1,200	8			9			8			9		
Mercury	7439-97-6	0.41	1.5	2.3	0.09			0.09			0.08			0.08		
Selenium	7782-49-2	--	3	--	0.54	J	J	0.53	J	J	0.464	J	J	0.41	J	J
Silver	7440-22-4	6.1	6.1	8.4	0.6	U	U	0.6	U	U	0.5	U	U	0.5	U	U
Zinc	7440-66-6	410	2,783	3,800	87			93			86			88		
LPAHs (µg/kg)																
Naphthalene	91-20-3	2,100	--	2,400	19	U	U	19	U	U	9.7	J	J	15	J	J
Acenaphthylene	208-96-8	560	--	1,300	19	U	U	19	U	U	20	U	U	20	U	U
Acenaphthene	83-32-9	500	--	2,000	19	U	U	19	U	U	20	U	U	15	J	J
Fluorene	86-73-7	540	--	3,600	19	U	U	21			24			20		
Phenanthrene	85-01-8	1,500	--	21,000	19	U	U	54			36			34		
Anthracene	120-12-7	960	--	13,000	19	U	U	18	J	J	12	J	J	20	U	U
2-Methylnaphthalene[4]	91-57-6	670	--	1,900	19	U	U	19	U	U	20	U	U	20	U	U
Total LPAH	--	5,200	--	29,000	19	UT		93	T		81.7	T		84	T	
HPAHs (µg/kg)																
Fluoranthene	206-44-0	1,700	4,600	30,000	100			110			99			120		
Pyrene	129-00-0	2,600	11,980	16,000	80			110			83			100		
Benz(a)anthracene	56-55-3	1,300	--	5,100	26	J		37	J		26	J		44	J	
Chrysene	218-01-9	1,400	--	21,000	46			69			44			76		
Benzofluoranthenes (b, j ,k)	205-99-2/205-82-3/207-08-9	3,200	--	9,900	54			74			61			110		
Benzo(a)pyrene	50-32-8	1,600	--	3,600	16	J	J	21	J		21	J		18	J	J
Indeno(1,2,3-c,d)pyrene	193-39-5	600	--	4,400	19	UJ	U	13	J	J	20	UJ	U	11	J	J
Dibenz(a,h)anthracene	53-70-3	230	--	1,900	19	U	U	19	U	U	20	U	U	20	U	U
Benzo(g,h,i)perylene	191-24-2	670	--	3,200	11	J	J	14	J	J	20	U	U	14	J	J
Total HPAH	--	12,000	--	69,000	333	T		448	T		334	T		493	T	
Chlorinated Hydrocarbons (µg/kg)																
1,4-Dichlorobenzene[5]	106-46-7	110	--	120	4.8	UJ	U	4.8	UJ	U	4.9	UJ	U	4.9	UJ	U
1,2-Dichlorobenzene[5]	95-50-1	35	--	110	4.8	U	U	4.8	U	U	4.9	U	U	4.9	U	U
1,2,4-Trichlorobenzene[5]	120-82-1	31	--	64	4.8	U	U	4.8	U	U	4.9	U	U	4.9	U	U
Hexachlorobenzene (HCB)	118-74-1	22	168	230	3.8	U	Y	2.7	U	Y	5.6	U	Y	3.6	U	Y
Phthalates (µg/kg)																
Dimethyl phthalate	131-11-3	71	--	1,400	19	U	U	19	U	U	20	U	U	20	U	U
Diethyl phthalate[5]	84-66-2	200	--	1,200	37	U	B	23	U	B	27	U	B	28	U	B
Di-n-butyl phthalate	84-74-2	1,400	--	5,100	19	U	U	19	U	U	50			20	U	U
Butyl benzyl phthalate	85-68-7	63	--	970	19	U	U	19	U	U	20	U	U	20	U	U
Bis(2-ethylhexyl) phthalate	117-81-7	1,300	--	8,300	30	J	J	32	J	J	34	J	J	30	J	J
Di-n-octyl phthalate	117-84-0	6,200	--	6,200	19	U	U	19	U	U	20	U	U	20	U	U

TABLE 4

Summary of Conventionals and Chemical Analytical Data

La Conner Marina Maintenance Dredging Project

La Conner, Washington

Analysis	CAS Number[1]	DMMP Guidline Values[2]			DMMU ID/Sample ID/Sample Date											
		SL	BT	ML	N1 N1-A-COMP 6/17/2014	Validated Qualifier	Lab Qualifier	N2 N2-A-COMP 6/16/2014	Validated Qualifier	Lab Qualifier	S1 S1-A-COMP 6/17/2014	Validated Qualifier	Lab Qualifier	S2 S2-A-COMP 6/18/2014	Validated Qualifier	Lab Qualifier
Phenols (µg/kg)																
Phenol	108-95-2	420	--	1,200	76			61			35			57		
2-Methylphenol	95-48-7	63	--	77	19	U	U	19	U	U	20	U	U	20	U	U
4-Methylphenol	106-44-5	670	--	3,600	40			30			32			34		
2,4-Dimethylphenol[5]	105-67-9	29	--	210	24	U	U	24	U	U	24	U	U	24	U	U
Pentachlorophenol	87-86-5	400	504	690	95	U	U	95	U	U	97	U	U	98	U	U
Miscellaneous Extractables (µg/kg)																
Benzyl alcohol[5]	100-51-6	57	--	870	**180**			**140**			**130**			**140**		
Benzoic acid	65-85-0	650	--	760	410			430			170	J	J	270		
Dibenzofuran	132-64-9	540	--	1,700	19	U	U	19	U	U	14	J	J	16	J	J
Hexachlorobutadiene	87-68-3	11	--	270	0.97	U	U	0.96	U	U	0.97	U	U	0.97	U	U
N-Nitrosodiphenylamine	86-30-6	28	--	130	19	U	U	19	J	U	20	U	U	20	U	U
Pesticides (µg/kg)																
4,4'-DDD	72-54-8	16	--	--	1.3	J	Y	0.96	UJ	U	0.97	UJ	U	0.97	UJ	U
4,4'-DDE	72-55-9	9	--	--	0.97	UJ	U	0.96	UJ	U	0.97	UJ	U	0.97	UJ	U
4,4'-DDT	50-29-3	12	--	--	0.97	U	U	0.96	U	U	0.97	UJ	U	0.97	U	U
Sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT	--	--	50	69	1.3	UT		0.96	UT		0.97	UT		0.97	UT	
Aldrin	309-00-2	9.5	--	--	0.48	U	U	0.48	U	U	0.68	U	Y	1.2	U	Y
cis-chlordane	5103-71-9	--	--	--	0.48	U	U	0.48	U	U	0.48	U	U	0.49	U	U
trans-chlordane	5103-74-2	--	--	--	1.4	U	Y	0.98	U	U	0.48	U	U	1.5	U	Y
cis-nonachlor	5103-73-1	--	--	--	0.97	U	U	0.96	U	U	0.97	U	U	0.97	U	U
trans-nonachlor	39765-80-5	--	--	--	1.2	U	Y	0.96	U	U	2.2	U	Y	0.97	U	U
oxychlordane	27304-13-8	--	--	--	0.97	U	U	0.96	U	U	0.97	U	U	0.97	U	U
Total Chlordane (sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane)	--	2.8	37	--	1.4	UT		0.98	UT		2.2	UT		1.5	UT	
Dieldrin	60-57-1	1.9	--	1,700	0.97	U	U	0.96	U	U	0.97	UJ	U	0.97	U	U
Heptachlor	76-44-8	1.5	--	270	0.48	U	U	0.48	U	U	0.48	U	U	0.49	U	U
Polychlorinate Bipheyls (µg/kg)																
Aroclor 1016	12674-11-2	--	--	--	3.9	U	U	3.8	U	U	3.9	U	U	3.9	U	U
Aroclor 1242	53469-21-9	--	--	--	5.8	U	Y	3.8	U	U	5.8	U	Y	4.9	U	Y
Aroclor 1248	12672-29-6	--	--	--	3.9	U	U	4.8	U	Y	3.9	U	U	3.9	U	U
Aroclor 1254	11097-69-1	--	--	--	3.9	U	U	9.6			3.9	U	U	3.9	U	U
Aroclor 1260	11096-82-5	--	--	--	3.9	U	U	3.8	U	U	3.9	U	U	3.9	U	U
Aroclor 1221	11104-28-2	--	--	--	3.9	U	U	3.8	U	U	3.9	U	U	3.9	U	U
Aroclor 1232	11141-16-5	--	--	--	3.9	U	U	3.8	U	U	3.9	U	U	3.9	U	U
Total PCBs	--	130	--	3,100	5.8	UT		9.6	T		5.8	UT		4.9	UT	
Total PCBs[6]	--	--	38		0.61	UT		0.86	T		0.76	UT		0.48	UT	

Notes:

[1]Chemical abstracts service registry number.

[2]Dredged Material Management Program (DMMP) regulatory guideline values from Table 8-2 of Dredged Material Evalucation and Disposal Procedures User Manual (DMMP User Manual; USACE, 2013) dated July 2013.

[3]Results reported are of discrete sediment samples N1-4-A, N2-4-A, S1-4-A and S2-4-A collected from DMMU N1, N2, S1 and S2, respectively.

[4]2-Methylnaphthalene is not included in the summation for total LPAH.

[5]Analyzed using both SW8270 and SW8270-SIM methods. The results of SW8270-SIM method are presented in this table.

[6]Values normalized to organic carbon and are expressed as mg/kg organic carbon (oc).

DMMU = Dredged Material Management Unit

SL = screening level; BT = bioaccumulation trigger; ML = maximum level

LPAH = Low Molecular weight polycyclic aromatic hydrocarbons

HPAH = High Molecular weight polycyclic aromatic hydrocarbons

U = The analyte was not detected at a concentration greater than the identified reporting limit

Y = The analyte was not detected at or above the reported concentration. The reporting limit was raised due to chromatographic interference.

J = The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

B = The analyte was detected in associated laboratory method blank

T = Total

mg/kg = miligrams per kilogram

µg/kg = micrograms per kilogram

☐ Red bordering and bolding indicates analyte was detected at a concentration above SL.

TABLE 5

Chemical Results Compared to State of Washington Sediment Quality Standards (Ecology, 2013)

La Conner Marina Maintenance Dredging Project

La Conner, Washington

Analysis	CAS Number[1]	Sediment Quality Standard[2]	DMMU ID/Sample ID/Sample Date											
			N1 N1-A-COMP 6/17/14	Validated Qualifier	Lab Qualifier	N2 N2-A-COMP 6/16/14	Validated Qualifier	Lab Qualifier	S1 S1-A-COMP 6/17/14	Validated Qualifier	Lab Qualifier	S2 S2-A-COMP 6/18/14	Validated Qualifier	Lab Qualifier
Conventionals														
Total Organic Carbon (%)	--	--	0.9			1.1			0.8			1.0		
Metals (mg/kg dw)														
Arsenic	7440-38-2	57	10			10			14			13		
Cadmium	7440-43-9	5.1	0.6			0.6			0.6			0.6		
Chromium	7440-47-3	260	63			68			63			63		
Copper	7440-50-8	390	47			54			50			53		
Lead	7439-92-1	450	8			9			8			9		
Mercury	7439-97-6	0.41	0.09			0.09			0.08			0.08		
Silver	7440-22-4	6.1	0.6	U	U	0.6	U	U	0.5	U	U	0.5	U	U
Zinc	7440-66-6	410	87			93			86			88		
LPAHs (mg/kg oc)														
Naphthalene	91-20-3	99	2.0	U	U	1.7	U	U	1.2	J	J	1.5	J	J
Acenaphthylene	208-96-8	66	2.0	U	U	1.7	U	U	2.5	U	U	2.0	U	U
Acenaphthene	83-32-9	16	2.0	U	U	1.7	U	U	2.5	U	U	1.5	J	J
Fluorene	86-73-7	23	2.0	U	U	1.9			3.0			2.0		
Phenanthrene	85-01-8	100	2.0	U	U	4.9			4.5			3.4		
Anthracene	120-12-7	220	2.0	U	U	1.6	J	J	1.5	J	J	2.0	U	U
2-Methylnaphthalene[3]	91-57-6	38	2.0	U	U	1.7	U	U	2.5	U	U	2.0	U	U
Total LPAH	--	370	2.0	UT		8.5	T		10.2	T		8.4	T	
HPAHs (mg/kg oc)														
Fluoranthene	206-44-0	160	10.5			10.0			12.4			12.0		
Pyrene	129-00-0	1,000	8.4			10.0			10.4			10.0		
Benz(a)anthracene	56-55-3	110	2.7	J		3.4	J		3.3	J		4.4	J	
Chrysene	218-01-9	110	4.9			6.3			5.5			7.6		
Benzofluoranthenes (b, j ,k)	205-99-2/205-82-	230	5.7			6.7			7.6			11.0		
Benzo(a)pyrene	50-32-8	99	1.7	J	J	1.9	J		2.6	J		1.8	J	J
Indeno(1,2,3-c,d)pyrene	193-39-5	34	2.0	UJ	U	1.2	J	J	2.5	UJ	U	1.1	J	J
Dibenz(a,h)anthracene	53-70-3	12	2.0	U	U	1.7	U	U	2.5	U	U	2.0	U	U
Benzo(g,h,i)perylene	191-24-2	34	1.2	J	J	1.3	J	J	2.5	U	U	1.4	J	J
Total HPAH	--	960	35.1	T		40.7	T		41.8	T		49.3	T	
Chlorinated Hydrocarbons (mg/kg oc)														
1,4-Dichlorobenzene[4]	106-46-7	3.1	0.5	UJ	U	0.4	UJ	U	0.6	UJ	U	0.5	UJ	U
1,2-Dichlorobenzene[4]	95-50-1	2.3	0.5	U	U	0.4	U	U	0.6	U	U	0.5	U	U
1,2,4-Trichlorobenzene[4]	120-82-1	0.81	0.5	U	U	0.4	U	U	0.6	U	U	0.5	U	U
Hexachlorobenzene (HCB)	118-74-1	0.38	0.40	U	Y	0.25	U	Y	0.70	U	Y	0.36	U	Y
Phthalates (mg/kg oc)														
Dimethyl phthalate	131-11-3	53	2.0	U	U	1.7	U	U	2.5	U	U	2.0	U	U
Diethyl phthalate[4]	84-66-2	61	3.9	U	B	2.1	U	B	3.4	U	B	2.8	U	B
Di-n-butyl phthalate	84-74-2	220	2.0	U	U	1.7	U	U	6.3			2.0	U	U
Butyl benzyl phthalate	85-68-7	5	2.0	U	U	1.7	U	U	2.5	U	U	2.0	U	U
Bis(2-ethylhexyl) phthalate	117-81-7	47	3.2	J	J	2.9	J	J	4.3	J	J	3.0	J	J
Di-n-octyl phthalate	117-84-0	58	2.0	U	U	1.7	U	U	2.5	U	U	2.0	U	U

TABLE 5

Chemical Results Compared to State of Washington Sediment Quality Standards (Ecology, 2013)

La Conner Marina Maintenance Dredging Project

La Conner, Washington

Analysis	CAS Number[1]	Sediment Quality Standard[2]	DMMU ID/Sample ID/Sample Date											
			N1 N1-A-COMP 6/17/14	Validated Qualifier	Lab Qualifier	N2 N2-A-COMP 6/16/14	Validated Qualifier	Lab Qualifier	S1 S1-A-COMP 6/17/14	Validated Qualifier	Lab Qualifier	S2 S2-A-COMP 6/18/14	Validated Qualifier	Lab Qualifier
Phenols (µg/kg dw)														
Phenol	108-95-2	420	76			61			35			57		
2-Methylphenol	95-48-7	63	19	U	U	19	U	U	20	U	U	20	U	U
4-Methylphenol	106-44-5	670	40			30			32			34		
2,4-Dimethylphenol[4]	105-67-9	29	24	U	U	24	U	U	24	U	U	24	U	U
Pentachlorophenol	87-86-5	400	95	U	U	95	U	U	97	U	U	98	U	U
Miscellaneous Extractables (µg/kg dw)														
Benzyl alcohol[4]	100-51-6	57	**180**			**140**			**130**			**140**		
Benzoic acid	65-85-0	650	410			430			170	J	J	270		
Miscellaneous Extractables (mg/kg oc)														
Dibenzofuran	132-64-9	15	2.0	U	U	1.7	U	U	1.8	J	J	1.6	J	J
Hexachlorobutadiene	87-68-3	4	0.1	U	U	0.1	U	U	0.1	U	U	0.1	U	U
N-Nitrosodiphenylamine	86-30-6	11	2.0	U	U	1.7	J	U	2.5	U	U	2.0	U	U
Polychlorinated Biphenyls (mg/kg oc)														
Total PCBs	--	12	0.06	UT		0.08	T		0.10	UT		0.05	UT	

Notes:

[1]Chemical abstracts service registry number.

[2]Marine Sediment Quality Standards from Table I of Ecology, 2013.

[3]2-Methylnaphthalene is not included in the summation for total LPAH.

[4]Analyzed using both SW8270 and SW8270-SIM methods. The results of SW8270-SIM method are presented in this table.

DMMU = Dredged Material Management Unit

LPAH = Low Molecular weight polycyclic aromatic hydrocarbons

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J = The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

B = The analyte was detected in associated laboratory method blank

T = Total

mg/kg = miligrams per kilogram

µg/kg = micrograms per kilogram

oc = organic-carbon normalized

dw = dry-weight normalized

☐ Red bordering and bolding indicates analyte was detected at a concentration above SQS.