CENWS-OD-ME-DM

MEMORANDUM FOR: RECORD April 4, 2013

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE CHRISTENSEN SHIPYARDS BOAT BASIN MAINTENANCE DREDGING FOR OPEN-WATER FLOWLANE DISPOSAL IN THE COLUMBIA RIVER OR AT AN APPROVED BENEFICIAL USE OR UPLAND 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 approximately 10,000 cubic yards (cy) of dredged material from the Christensen Shipyards Ltd. access channel for open water disposal. Proposed disposal is in a flowlane area of the Columbia River between river miles 108.2 and 108.3.

2. Project. Christensen Shipyards Ltd is located on the Washington side of the Columbia River at river mile 109 in Clark County, Washington. The channel is used as a launching site for completed yachts from the shipyard. The access channel was last dredged in 2008, when about 10,000 cy were removed and disposed upland on Ross Island. Proposed dredging would achieve a target depth of -10 feet below the Columbia River Datum (CDR). Dredging will take place with a clamshell dredge and material transported to the disposal area by bottom-dump barge. Proposed work will take place over a 5-year period.

Table 1. Christensen Shipyards project summary

Project ranking	Low
Proposed dredging volume	10,000 cubic yards over a 5-year period
Proposed dredging depth	-10 feet below CRD
Draft Final SAP received	March 19, 2012
SAP approved	March 29, 2012
Sampling date	September 12, 2012
Bioassay Holding Time expired	November 6, 2012
Final Report/Data received	March 11, 2013
DAIS Tracking number	CSBCR-1-A-F-317
USACE Public Notice Number	NWS-2006-576
Recency Determination (7 years)	September 2019

3. Project Ranking and Sampling Requirements. The Christensen Shipyard access channel was ranked "low" based on guidance from the Sediment Evaluation Framework (SEF 2009) and results from a previous sediment characterization. The characterization performed in 2006 was under the auspices of the guidance document used prior to the completion of the SEF, the DMEF (DMEF 1998). That sampling was designed to verify an "exclusionary" status under the DMEF, and only analyzed only for sediment conventionals. Since that time, "exclusionary" status has only been allowed pursuant to the regulations in the Marine Protection, Research, and Sanctuaries Act (MPRSA) (40 CFR 227.13) and Clean Water Act (40 CFR 230.60). Generally, relatively larger grained material (e.g., sand and gravel) from high energy

environments that are geographically removed from contaminant sources meet the exclusion criteria. In this case, the previous sediment conventional results showed that the material is largely sand and gravel. However, it is not entirely removed from contaminant sources or in a high-energy area, so a minimal amount of chemical testing was deemed appropriate and a "low" rank applied to the project.

In a low-ranked area the number of samples and analyses required by the 2008 DMMP User Manual are one sample for each 8,000 cy, and one characterization (sample composite) for every 48,000 cy. In this case three samples were taken and composited for one analysis.

4. Sampling. Field sampling took place September 12, 2012. Three core samples were collected by Vibracore equipped with a 4-inch stainless steel core, from locations designated in Table 2.

Table 2. Sample locations & depth

Sample	Latitude	Longitude	Dredge depth, incl. 1 ft overdepth (ft CRD)	Mudline elevation (ft CRD)	Sample bottom elevation	z layer bottom elevation	z layer ft. below mudline	entire core length (ft)	sample depth	z-sample depth
1	N 108919.76	E 1095871.12	mudline to -11	-6	-11	-13	7	7	-6 to -11	-11 to -13
2	N 108686.47	E 1095778.71	mudline to -11	-6.5	-11	-13	6.5	6.5	-6.5 to -11	-11 to -13
3	N 108596.32	E 1095787.11	mudline to -11	-7	-11	-13	6	6	-7 to -11	-11 to -13

5. Conventional & Chemical Analyses. All analyses were performed by Columbia Analytical Services, Inc. in Kelso, Washington. Conventional analyses verified previous findings for this project (Table 3), with only about 3% fines of silt or clay.

There were some departures from the approved SAP: the lab conducted analyses for dioxins, TBT and volatiles that were not required. In addition, reporting limits for several chemicals did not meet DMMP regulatory guidelines, and re-extraction and re-analysis were required for those chemicals. Reporting limits were improved in many cases (Table 4).

The final chemical results indicated that there were no detected exceedances of screening levels for the required DMMP chemicals of concern. With the reanalysis, the laboratory showed that they applied due diligence to lowering of reporting limits. They reported both MRL and MDL, as required. After reanalysis only 2 chemicals (2,4-Dimethylphenol and Hexachlorobutadiene) still had either MRL or MDLs above the regulatory guidelines. However, these chemicals were being compared to marine guidelines, as no freshwater guidelines currently exist for them, so the marine guidelines are only a general guideline. In most cases of exceedances of even a single detected or undetected COC, bioassays are used to determine whether the exceedances cause observable toxicity in benthic organisms. In this case, the DMMP agencies used best professional judgment to determine that bioassay testing was not required, and that all material was suitable for open water disposal.

Table 3. Sediment conventional results for Christensen Shipyards Ltd.

DMMU		1
Composite		C1
# samples in composite		3
Ammonia (mg/kg)		12.7
Total Solids (%)		98.9
Total Organic Carbon (%)		0.132
Total Volatile Solids (%)		--
Total Sulfides (mg/kg)		1.2 U
Grain Size	% Gravel	10.66
	% Sand	84.84
	% Silt	2.55
	% Clay	0.37
	% Fines	2.92

6. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the Christensen Shipyards, Ltd. Access channel for open-water flow-lane disposal. The approved sampling and analysis plan was adequately followed and the data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

Based on the results of the previously described testing, the DMMP agencies concluded that all 10,000 cubic yards of sediment are suitable for open-water flow-lane disposal on the Columbia River, as designated by the Portland District, Corps of Engineers.

This suitability determination does ***not*** constitute final agency approval of the 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.

Table 4. Chemical analysis results for Christensen Shipyards, Ltd.

Christensen Shipyards DY13	used for all marine dredged material w/in DMMP area, and for FW dredged material where there is no FW guideline			used for freshwater dredged material w/in DMMP area		Sample Results		Sample Results, Reanalysis, DMMU 1			
	DMMP			Interim FW (2006)		DMMU 1		MRL		MDL	
CHEMICAL	SL	BT	ML	SL1	SL2	conc	Q1	conc	Q1	conc	Q1
Total Organic Carbon (%)						0.132					
METALS (mg/kg dry wt.)											
Antimony	150	---	200	---	---	0.5	U				
Arsenic	57	507.1	700	20	51	1.9	J				
Cadmium	5.1	11.3	14	1.1	1.5	0.21	J				
Chromium (2)	260	260	---	95	100	7.9					
Copper	390	1,027	1,300	80	830	8.5					
Lead	450	975	1,200	340	430	4.4	J				
Mercury	0.41	1.5	2.3	0.28	0.75	0.015	J				
Selenium	---	3	---	---	---	0.7	U				
Silver	6.1	6.1	8.4	2.0	2.5	0.2	U				
Zinc	410	2,783	3,800	130	400	51.6					
Tributyltin ion (bulk; ug/kg)(2)	73	73	---	75	75	1.3	U				
ORGANICS (µg/kg dry wt.)											
Total LPAH	5,200	---	29,000	6,600	9,200	99	U				
Naphthalene	2,100	---	2,400	500	1,300	99	U				
Acenaphthylene	560	---	1,300	470	640	99	U				
Acenaphthene	500	---	2,000	1,100	1,300	99	U				
Fluorene	540	---	3,600	1,000	3,000	99	U				
Phenanthrene	1,500	---	21,000	6,100	7,600	99	U				
Anthracene	960	---	13,000	1,200	1,200	99	U				
2-Methylnaphthalene(3)	670	---	1,900	470	560	99	U				
Total HPAH	12,000	---	69,000	31,000	55,000	99	U				
Fluoranthene	1,700	4,600	30,000	11,000	15,000	99	U				
Pyrene	2,600	11,980	16,000	8,800	16,000	99	U				
Benz(a)anthracene	1,300	---	5,100	4,300	5,800	99	U				
Chrysene	1,400	---	21,000	5,900	6,400	99	U				
Benzofluoranthenes (b+j+k)	3,200	---	9,900	600 (5)	4000 (5)	99 --- 99	U --- U				
Benzo(a)pyrene	1,600	---	3,600	3,300	4,800	99	U				
Indeno(1,2,3-c,d)pyrene	600	---	4,400	4,100	5,300	99	U				
Dibenz(a,h)anthracene	230	---	1,900	800	840	99	U				
Benzo(g,h,i)perylene	670	---	3,200	4,000	5,200	99	U				
CHLORINATED HYDROCARBONS (µg/kg dry wt.)											
1,4-Dichlorobenzene	110	---	120	---	---	5.4	U				
1,2-Dichlorobenzene	35	---	110	---	---	5.4	U				
1,2,4-Trichlorobenzene	31	---	64	---	---	22	U				
Hexachlorobenzene (HCB)	22	168	230	---	---	99	U	49	U	16	U

Christensen Shipyards DY13	used for all marine dredged material w/in DMMP area, and for FW dredged material where there is no FW guideline			used for freshwater dredged material w/in DMMP area		Sample Results		Sample Results, Reanalysis, DMMU 1			
	DMMP			Interim FW (2006)		DMMU 1		MRL		MDL	
PHTHALATES (µg/kg dry wt.)											
Dimethyl phthalate	71	---	1,400	46	440	99	U	25	J		
Diethyl phthalate	200	---	1,200	---	---	99	U				
Di-n-butyl phthalate	1,400	---	5,100	---	---	200	U				
Butyl benzyl phthalate	63	---	970	260	370	99	U				
Bis(2-ethylhexyl) phthalate	1,300	---	8,300	220	320	990	U	490	U	43	U
Di-n-octyl phthalate	6,200	---	6,200	26	45	99	U	49	U	16	U
PHENOLS	µg/kg dry wt.			µg/kg dry wt.		µg/kg dry wt.					
Phenol	420	---	1,200	---	---	300	U				
2-Methylphenol	63	---	77	---	---	99	U	49	U	20	U
4-Methylphenol	670	---	3,600	---	---	99	U				
2,4-Dimethylphenol	29	---	210	---	---	500	U	250	U	31	U
Pentachlorophenol	400	504	690	---	---	990	U	490	U	26	U
MISCELLANEOUS EXTRACTABLES	µg/kg dry wt.			µg/kg dry wt.		µg/kg dry wt.					
Benzyl alcohol	57	---	870	---	---	200	U	97	U	24	U
Benzoic acid	650	---	760	---	---	2000	U	970	U	470	U
Dibenzofuran	540	---	1,700	400	440	99	U				
Hexachlorobutadiene	11	---	270	---	---	22	U	49	U	15	U
N-Nitrosodiphenylamine	28	---	130	---	---	99	U				
PESTICIDES & PCBs	µg/kg dry wt.			µg/kg dry wt.		µg/kg dry wt.					
4,4'-DDD	16	---	---	---	---	0.99	U				
4,4'-DDE	9	---	---	---	---	0.99	U				
4,4'-DDT	12	---	---	---	---	0.99	U				
sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT	---	50	69	---	---	2.97	U				
Aldrin	9.5	---	---	---	---	0.99	U				
Total Chlordane (sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane)	2.8	37	---	---	---	3.96	U				
				---	---	0.99	U				
				---	---	0.99	U				
				---	---	0.99	U				
				---	---	0.99	U				
Dieldrin	1.9	---	1,700	---	---	0.99	U				
Heptachlor	1.5	---	270	---	---	0.99	U				
Total Aroclor PCBs	130	38 (4)	3,100	60	120	0.99	U				
						7.5	U	OC			

(1) Chemical Abstract Service Registry Number
(2) Tributyltin is a Chemical of Special Concern, not a Standard Chemical of Concern.
(3) 2-Methylnaphthalene is not included in the summation for total LPAH.
(4) This value is normalized to total organic carbon, and is expressed in mg/kg carbon.
(5) Benzofluouranthes: for SMS & Interim FW, guidelines given = (b+k) benzoflouranthenes
--- = no numerical criterion for this chemical

values shaded in yellow indicate an undetected value that is higher than the regulatory value
values shaded in pink indicate an undetected value with an MRL higher than the regulatory value, but the MDL is lower
values shaded in blue have detected/undetected values that meet regulatory guidelines on reanalysis

7. References.

Thompson 2012. *Sediment Sampling and Analysis Report*. Prepared By Kathleen (Kat) Thompson, Environmental Compliance Coordinator, Christensen Shipyards, Ltd. November 2012

DMMP 2008. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 2008.

DMMP 2011. *Marine Sediment Quality Screening Levels: Adopting RSET Marine SLs for Use in DMMP.* A Clarification Paper prepared by Laura Inouye (Ecology) and David Fox (USACE) for the Dredged Material Management Program, June 2011.

Ecology 1995. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, December 1995.

8. Agency Signatures

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE CHRISTENSEN SHIPYARDS BOAT BASIN MAINTENANCE DREDGING FOR OPEN-WATER FLOWLANE DISPOSAL IN THE COLUMBIA RIVER OR AT AN APPROVED BENEFICIAL USE OR UPLAND SITE.

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

_____ _____
Date Lauran Cole Warner - Seattle District Corps of Engineers

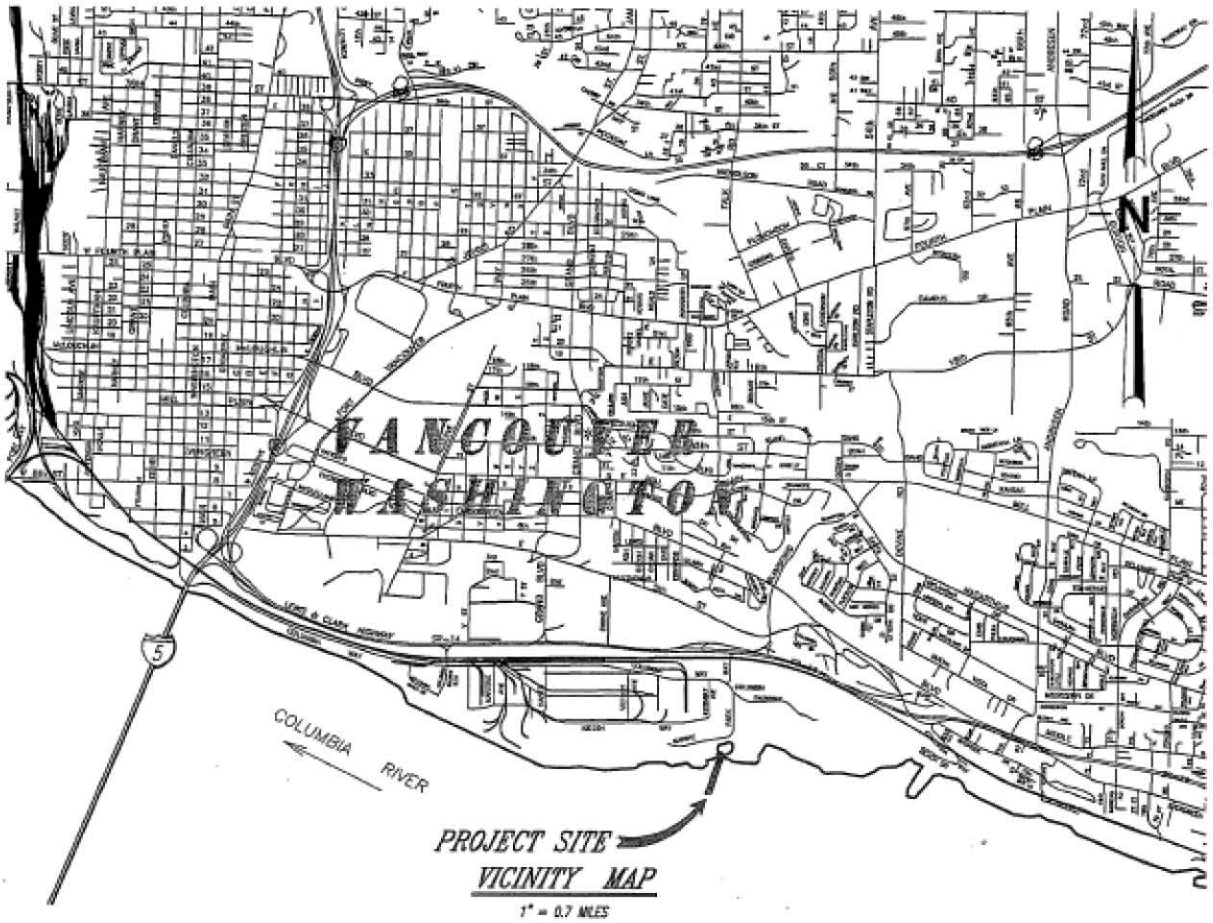
_____ _____
Date Justine Barton - Environmental Protection Agency

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

_____ _____
Date Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Steve Manlow, Regulatory
Kathleen Thompson, Christensen Shipyards Ltd.



VICINITY MAP

1" = 0.7 MILES

PURPOSE: Maintenance Dredging of Existing Marina Basin and Access Channel **DATUM:** Columbia River Datum (CRD) **ORDINARY HIGH WATER:** Elevation 16.3' Columbia River Datum (River Mile 109) **ADJACENT PROPERTY OWNERS:** 1. City of Vancouver 2. Columbia Land Trust	**APPLICANT:** Christensen Shipyards Ltd. **REFERENCE #:** **SITE LOCATION ADDRESS:** 1 SE Marine Park Way Vancouver, WA 98661 S36, T02N, R01E LAT: 45° 36' 17" N LONG: 122° 37' 36" W	**PROPOSED:** Maintenance dredging of access channel to existing marina basin. Dredge 10,000 c.y. of sand, gravel and silt from access channel. **IN:** Columbia River (River Mile 109) **AT:** Vancouver **COUNTY:** Clark **STATE:** Washington **DATE:** April, 2006

DISCLAIMER:

The topographic map used in this drawing is a combination of surveyed information done by MacKay & Sposito in 2006 and a peripheral background topography from the City of Vancouver, 2005. MacKay & Sposito Inc. does not provide assurances as to the completeness or accuracy of the topography provided from the City of Vancouver.

MBS DRAWING FILE: W:\14300\14348\4-DESIGN\DWGS\3-FINAL DESIGN\Cover Sheet PW.dwg

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Date	April, 2006	Job Number	
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Designed By	CM	Sheet	
Drawn By	BK		1 of 4
Checked By	XX		

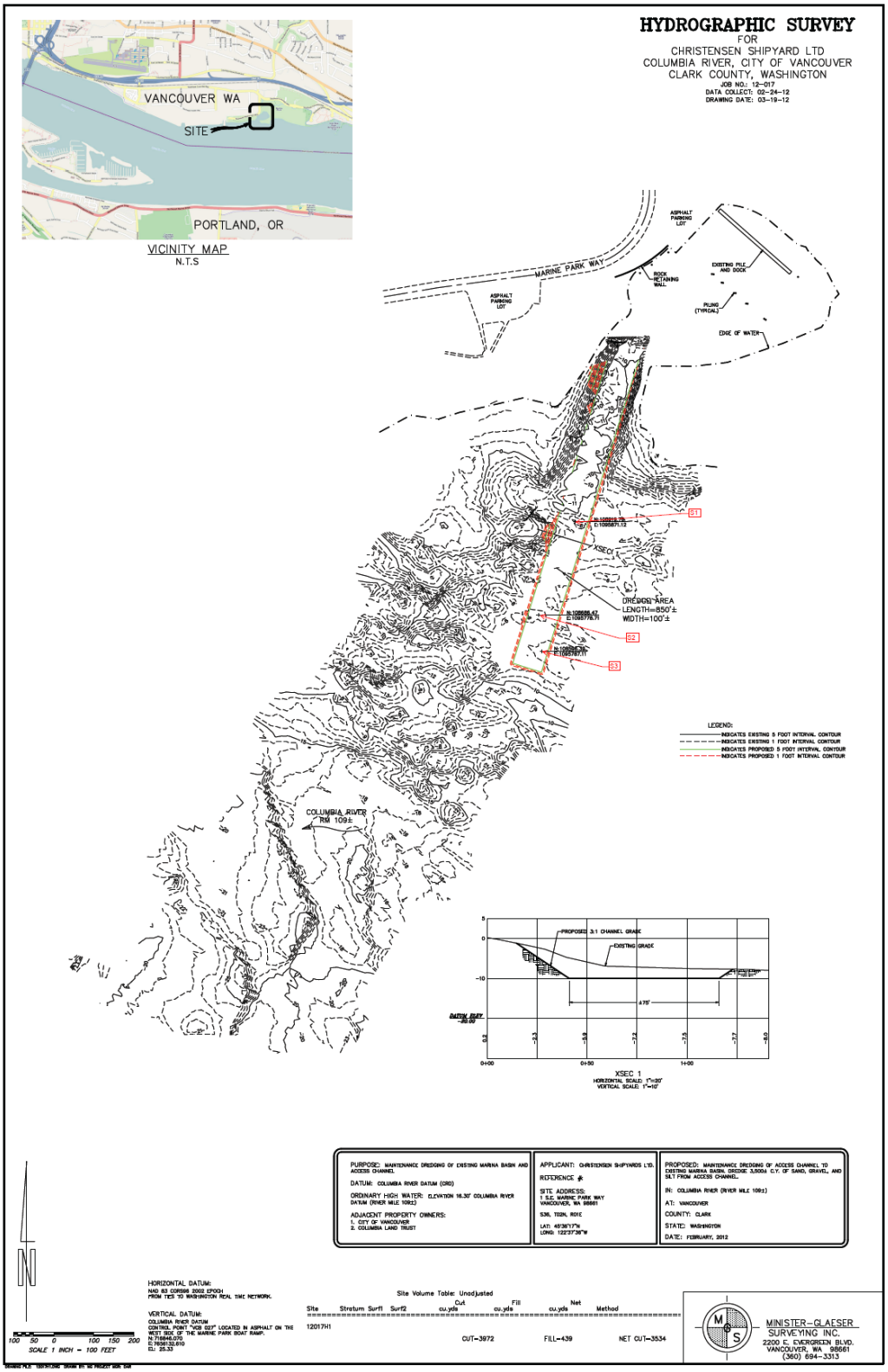

Figure 3. Christensen Shipyards Marina Access Channel Proposed Sediment Sampling Points

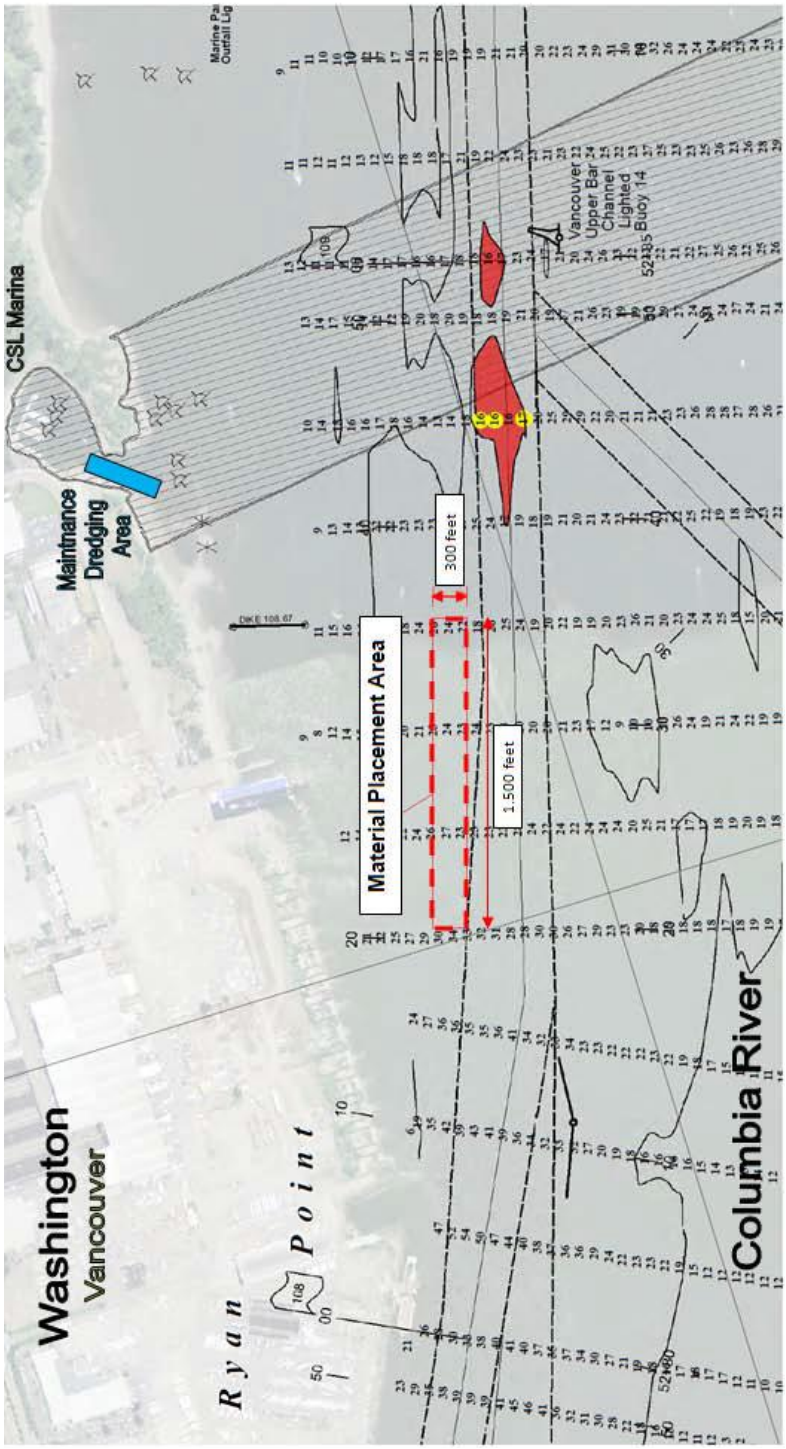

Figure 2. Dredging Zone & Material Placement Area for Christensen Shipyards, Ltd. Marina Maintenance Dredging