

July 26, 2013

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE KITTITAS COUNTY BOAT RAMP RECREATIONAL IMPROVEMENT PROJECT (NWS-2012-944) EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR IN-WATER BENEFICIAL USE.

1. **Introduction.** This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Natural Resources, and the Environmental Protection Agency) regarding the suitability of up to 12,280 cubic yards (cy) of dredged material from the Kittitas County Boat Ramp Recreational Improvement Project for in-water beneficial use.

2. **Background.** This project is being performed by Grant County PUD to provide and maintain public access to support relicensing for the Federal Energy Resources Commission. The site (Figure 1) is owned by Grant County PUD and leased to Kittitas County. The project area encompasses the existing boat ramps, navigation channel, and south jetty. Planned improvements include demolition of the two existing boat ramps, construction of a new replacement boat ramp, rehabilitation of the south jetty and dredging of the navigation channel and approach to the boat ramp.

The boat ramp facility was developed sometime after 1963, when the Wanapum Dam reservoir was created. According to background provided in the applicant's Sampling and Analysis Plan, dredging of the area north of the boat ramps occurred approximately every two years between the 1970s and 1986. The dredged material was placed in an area located west of the parking lot. Additional dredging of approximately 100 cy occurred in 1985 as a result of deposition from a flash flood. No dredging has occurred since 1986, when the northern boat ramp was established in its current position.

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

Table 1. Project Summary

Project ranking	Moderate
Proposed dredging volume	12,280 cy
Proposed dredging depth (NAVD88)	559.5 ft (including 1 ft of overdepth)
1 st draft SAP received	October 18, 2012
Comments provided on 1 st draft SAP	November 5, 2012
2 nd draft SAP received	November 28, 2012
Comments provided on 2 nd draft SAP	December 3, 2012
Final SAP received	February 4, 2013
SAP approved	February 4, 2013
Sampling dates	February 12, 2013
Draft data report received	May 30, 2013

Comments provided on draft report	June 19, 2013
Final data report received	July 24, 2013
EIM Study ID	DMMP-KITCO-B-339-13
USACE Permit Application Number	NWS-2012-944
Recency Determination (moderate = 5 years)	February 2018

4. **Project Ranking and Sampling Requirements.** This project was ranked moderate by the DMMP agencies according to the guidelines set out in the User's Manual. In a moderate-ranked area the number of samples and analyses are calculated using the following guidelines (DMMP, 2008a):
- Maximum volume of sediment represented by each field sample = 4,000 cubic yards
 - Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) = 16,000 cubic yards
 - Maximum volume of sediment represented by each analysis in the subsurface portion of the dredging prism = 24,000 cubic yards

Previous borings within the project area showed that native gravel outburst flood deposits exist within the subsurface of the project area (GeoEngineers, 2012). These gravel outburst flood deposits are the result of repeated outburst floods from glacial Lake Missoula. They consist of sand to boulder-sized sediments that constitute a "native" layer of material deposited prior to the potential for contamination from anthropogenic sources.

Therefore, the project was divided into two DMMUs: a surface DMMU (DMMU 1) requiring characterization and a subsurface DMMU (DMMU 2) requiring confirmation of the presence of gravel outburst flood deposits.

5. **Sampling.** Sampling took place February 12, 2013 using a Vibracore, and followed the approved SAP, with one minor deviation. Cores from three stations were collected to a depth of 2.5 to 3 feet and were terminated due to refusal or because the underlying coarse-grained native deposits were encountered, see Figure 2 for core photos and Figure 3 for sample locations. Table 2 and Figure 3 show the depths of each core, depths of dense outburst flood deposits and boundary between surface and subsurface DMMUs. Two cores were collected from sample station DMMU1-1 – the first core penetrated to 3 feet, but the percent recovery was below the acceptance criteria so a second core was also collected. The second core penetrated to 2.0 feet and the percent recovery was acceptable, so sediment from the second core was included in the composite. However, a core log was only completed for the first core from station DMMU1-1. Material collected from the three stations was composited into a single analytical sample representing DMMU 1.
6. **Chemical Analysis.** The approved sampling and analysis plan (GeoEngineers, 2012) was followed and quality control guidelines specified by the DMMP program were generally met. Chemical testing was performed by Analytical Resources Inc. of Tukwila, WA. For the analysis of dredged material suitability, results (Table 3) are compared to the 2006 Interim Freshwater guidelines for those chemicals that have freshwater values, and to marine guidelines for those chemical that do not have freshwater values. Comparison to the 2013 Freshwater values is also presented in Table 3; however these values won't be implemented until September 2013, so this comparison is presented for information only.

Results of the conventional analysis showed that the material is a sandy loam or medium loam, with 45.5% fines and 1% total organic carbon (TOC). The only chemical found at elevated concentrations in the dredged material was cadmium; all other chemicals were found at levels below screening levels. Cadmium was quantified at 1.5 mg/kg dry weight, which is equal to the 2006 Interim Freshwater SL2 guideline. Due to the cadmium exceedance in DMMU 1, this material was subjected to freshwater bioassays in order to determine if the material would be suitable for in-water beneficial use.

- 7. Biological Analysis.** Archived DMMU 1 material was subjected to toxicity testing with the *Chironomus dilutus* 10-day growth and survival bioassay and the *Hyalella azteca* 10-day survival bioassay (USEPA, 2000 and ASTM, 2000). Selection of a sediment reference site was coordinated with the DMMP agencies. A reference sample was collected from Quilomene Bay Wildlife Refuge Area (Figure 4), on March 30, 2013. Wet sieving of the reference sediment was performed immediately after collection, and the percent fines was estimated to be between 30-50%. Subsequent grain size analysis at the analytical laboratory determined the percent fines was 49%, a good match for the test sediment with 45.5% fines.

Bioassay tests were conducted by Newfields Northwest, LLC and were initiated on April 5, 2013, within the 56-day holding time requirement. The negative controls and reference sediment met the Sediment Evaluation Framework (SEF, 2009) performance criteria for both bioassays. There were minor exceptions to the quality control criteria for temperature in the *H. azteca* bioassay, and for temperature, dissolved oxygen and conductivity in the *C. dilutus* bioassay, see the Bioassay Testing Report for more info (GeoEngineers, 2013, Appendix E). These deviations were small and did not adversely impact the results of the tests. The results of the reference toxicant tests were within two standard deviations of the laboratory mean for both organisms.

Interpretations of the bioassay results compared to the bioassay test criteria outlined in the SEF are presented in Tables 4 - 6. These results show that DMMU 1 exhibited no-hit responses for both the *H. azteca* survival and *C. dilutus* growth and survival bioassays. DMMU 1 passed the freshwater bioassay tests and the material is suitable for in-water beneficial use or open-water disposal at an approved site.

- 8. Sediment Exposed by Dredging.** The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 1995) or the State's antidegradation standard (DMMP, 2008b). The presence of the anticipated subsurface native outburst flood deposits were confirmed within the dredge prism, and the proposed dredging will remove all overlying surface material as characterized in DMMU 1 (which was found suitable for in-water beneficial use in any case). Therefore the DMMP agencies conclude that this project is in compliance with the State of Washington anti-degradation policy.
- 9. Suitability Determination.** This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the Kittitas County Boat Ramp Recreational Improvements Project for in-water beneficial use. The approved sampling and analysis plan was followed and the data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

In summary, based on the results of the previously described testing, the DMMP agencies conclude that **all 12,280 cy of dredged material are suitable** for in-water beneficial use. The proposed use of the dredged material is as fill for the rehabilitation of the south jetty. A finding on the suitability of this material for upland placement or re-use should be made separately by the local health jurisdiction or landfill receiving the material.

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.

10. References.

American Society for Testing and Materials (ASTM) 2005. *Standard Test Method for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates*. ASTM Section 11, Volume 11.05: E 1706-05. Philadelphia, PA. 2005.

DMMP, 2008a. *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, 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.

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

GeoEngineers, 2012. *Dredged Material Characterization Sampling and Analysis Plan: Kittitas County Boat Ramp Recreational Improvements Project, Vantage, WA*. December 18, 2012.

GeoEngineers, 2013. *Dredged Material Characterization Report: Kittitas County Boat Ramp Recreational Improvements Project, Vantage, WA*. May 20, 2013.

SEF, 2009. *Sediment Evaluation Framework for the Pacific Northwest*. May 2009.

United States Environmental Protection Agency (USEPA) 2000. *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates*. EPA/600/R-99/064. EPA Office of Water. March 2000.

11. Agency Signatures.

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

Concur:

Date Kelsey van der Elst - 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

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DMMP signatories

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Table 2. Sampling and Compositing.

		Coordinates (WGS 83)		Mudline Elevation (ft NAVD88)	DMMU 1	Subsurface DMMU ²	Total
		Latitude	Longitude				
SAP volume (CY):					8,340	3,940	12,280
revised volume (CY):					7,490	4,790	12,280
Station	DMMU1-1	46° 56' 29.405"	119° 58' 57.618"	564.75	0 - 2.0 ft	---	
	DMMU1-2	46° 56' 28.969"	119° 59' 00.131"	566.84	0 - 2.7 ft	---	
	DMMU1-3	46° 56' 28.448"	119° 59' 02.485"	568.0	0 - 2.8 ft	---	

Notes:

- 1) chemical testing of the subsurface DMMU was not required so no sediment was collected
- 2) Design depth is 559.5 feet, including 1 foot of overdepth (NAVD88)

Table 3. Chemical results compared to DMMP regulatory guidelines.

CHEMICAL	2013 Freshwater Guidelines		Marine Guidelines			Interim Freshwater		DMMU 1	
	SQS/SL1	CSL/SL2	SL	BT	ML	SL1	SL2	conc	LQ
CONVENTIONALS									
Gravel, %								15.87	
Sand, %								38.64	
Silt, %								38.97	
Clay, %								6.57	
Fines (Silt + Clay), %								45.47	
Total Solids, %								66.8	
Volatile Solids, %								---	
Total Organic Carbon, %								1	
Total Sulfides, mg/kg	39	61						196	
Total Ammonia, mg N/kg	230	300						42.1	
METALS (mg/kg dry)									
Antimony			150	---	200			7	U
Arsenic	14	120				20	51	7	U
Cadmium	2.1	5.4				1.1	1.5	1.5	
Chromium	72	88				95	100	14.2	
Copper	400	1,200				80	830	23.7	
Lead	360	>1300				340	430	14	
Mercury	0.7	0.8				0.3	0.8	0.03	U
Selenium	11	>20	---	3	---			0.7	U
Silver	0.57	1.7				2.0	2.5	0.4	U
Zinc	3,200	>4200				130	400	109	
PAHs (ug/kg dry)									
Total PAHs	17,000.00	30,000.00						222	J
Total LPAH						6,600	9,200	17	J
Naphthalene						500	1,300	19	U
Acenaphthylene						470	640	19	U
Acenaphthene						1,100	1,300	19	U
Fluorene						1,000	3,000	19	U
Phenanthrene						6,100	7,600	17	J
Anthracene						1,200	1,600	19	U
2-Methylnaphthalene						470	560	19	U
Total HPAH						31,000	55,000	94	J
Fluoranthene						11,000	15,000	22	
Pyrene						8,800	16,000	19	
Benzo(a)anthracene						4,300	5,800	19	U
Chrysene						5,900	6,400	12	J
Total benzofluoranthenes						600	4,000	17	J
Benzo[a]pyrene						3,300	4,800	10	J
Indeno(1,2,3-c,d)pyrene						4,100	5,300	19	U
Dibenzo(a,h)anthracene						800	840	19	U
Benzo(g,h,i)perylene						4,000	5,200	14	J
BULK PETROLEUM HYDROCARBONS (mg/kg dry)									
TPH - Diesel	340	510						19	U
TPH - Residual	3,600	4,400						19	U
CHLORINATED BENZENES (ug/kg dry)									
1,2-Dichlorobenzene			35	---	110			19	U
1,4-Dichlorobenzene			110	---	120			19	U
1,2,4-Trichlorobenzene			31	---	64			19	U
Hexachlorobenzene			22	168	230			1.8	U

	SQS/SL1	CSL/SL2	SL	BT	ML	SL1	SL2	DMMU 1	
PHTHALATE ESTERS (ug/kg dry)									
Dimethyl phthalate						46	440	19	U
Diethyl phthalate			200	---	1,200	---	---	37	J
Di-n-butyl phthalate	380	1,000	1,400	---	5,100	---	---	19	U
Butyl benzyl phthalate						260	370	19	U
Bis(2-ethylhexyl)phthalate	500	22,000				220	320	25	
Di-n-octyl phthalate	39	>1100				26	45	19	U
PHENOLS (ug/kg dry)									
Phenol	120	210	420	---	1,200	---	---	23	B
2 Methylphenol			63	---	77	---	---	19	U
4 Methylphenol	260	2,000	670	---	3,600	---	---	17	J
2,4-Dimethylphenol			29	---	210	---	---	19	UJ
Pentachlorophenol	1,200	>1200	400	504	690	---	---	190	U
MISCELLANEOUS EXTRACTABLES (ug/kg dry)									
Benzoic acid	2,900	3,800	650	---	760	---	---	210	J
Benzyl alcohol			57	---	870	---	---	19	U
Dibenzofuran	200	680				400	440	19	U
Hexachlorobutadiene			11	---	270	---	---	1.8	U
N-Nitrosodiphenylamine			28	---	130	---	---	19	U
Beta-Hexachlorocyclohexane	7.2	11						---	
PESTICIDES (ug/kg dry)									
Carbazole	900	1100						---	
Endrin ketone	8.5	****						---	
Aldrin			10	---	---			0.92	U
Total Chlordane			3	37	---			1.8	U
Dieldrin	4.9	9.3	2	---	---			1.8	U
Heptachlor			2	---	---			0.92	
p,p'-DDE			9	---	---			2	
Total DDE	21	33						---	
p,p'-DDD			16	---	---			1.8	U
Total DDD	310	860						---	
p,p'-DDT			5	---	---			1.8	U
Total DDXs (sum of p,p' isomers)				50	69			2	
Total DDXs (sum of o,p' and p,p' isomers)	100	8,100						---	
PCBs (ug/kg dry)									
Total PCBs	110	2,500	130	---	3,100			18	U
Total PCBs (mg/kg OC)			---	38	---			1.8	U
DMMP DETERMINATION									
DMMU volume								7,490 cy	
Rank								moderate	
Mean sample depth								1.4	
Maximum sampling depth								3.0	

J = estimated concentration

U = undetected

B = evidence of blank contamination present

OC = organic carbon

SL = screening level

BT = bioaccumulation trigger

ML = maximum level

**** No SOV could be set due to limited data above the SQS/SL1 concentration

SL1 exceedance

exceedance of 2013 FW standards

Table 4. *Hyallolela azteca* mortality results

Sample	Mean mortality (%)	Control Performance Standard C ≤ 20%	Reference Performance Standard R ≤ 25%	1-Hit Criteria: T-R >25% and T vs. R SS	2-Hit Criteria: T-R >10% and T vs. R SS
SW Control (C)	12.5	acceptable			
Reference Sediment (R)	21.2		acceptable		
DMMU 1 (T)	23.7			2.5%, not SS = pass	2.5%, not SS = pass

Table 5. *Chironomus dilutus* mortality results

Sample	Mean mortality (%)	Control Performance Standard C ≤ 30%	Reference Performance Standard R ≤ 30%	1-Hit Criteria: T-R >25% and T vs. R SS	2-Hit Criteria: T-R >10% and T vs. R SS
SW Control (C)	12.5	acceptable			
Reference Sediment (R)	21.3		acceptable		
DMMU 1 (T)	23.8			2.5%, not SS = pass	2.5%, not SS = pass

Table 6. *Chironomus dilutus* growth results

Sample	Growth - mean AFDW per survivor (mg)	Control Performance Standard C ≥ 0.48 mg/ind	Reference Performance Standard R/C ≥ 0.8	1-Hit Criteria: T/R < 0.7 and T vs. R SS	2-Hit Criteria: T/R < 0.8 and T vs. R SS
SW Control (C)	2.165	acceptable			
Reference Sediment (R)	2.444		1.13; acceptable		
DMMU 1 (T)	2.436			1.00, not SS = pass	1.00, not SS = pass



Notes:

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Data Sources: ESRI Data & Maps, Street Maps 2005.
 Transverse Mercator, Zone 10 N North, North American Datum 1983
 North arrow oriented to grid north

Vicinity Map

Kittitas County Boat Ramp Recreational Improvements Project
 Vantage, Washington



Figure 1

Figure 2.
Core Photographs of Core 1-1



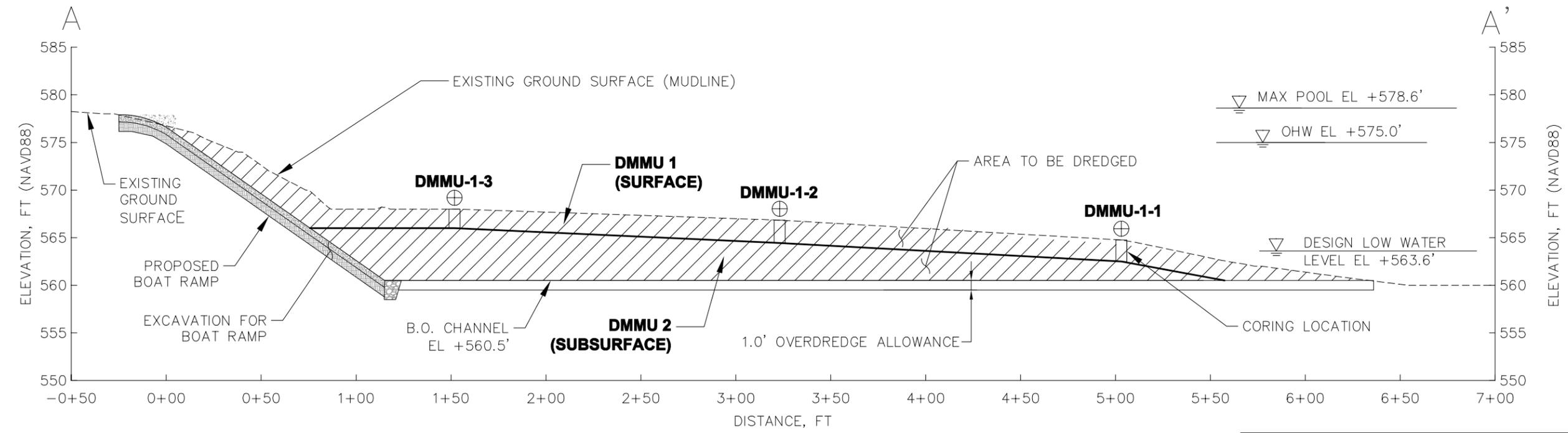
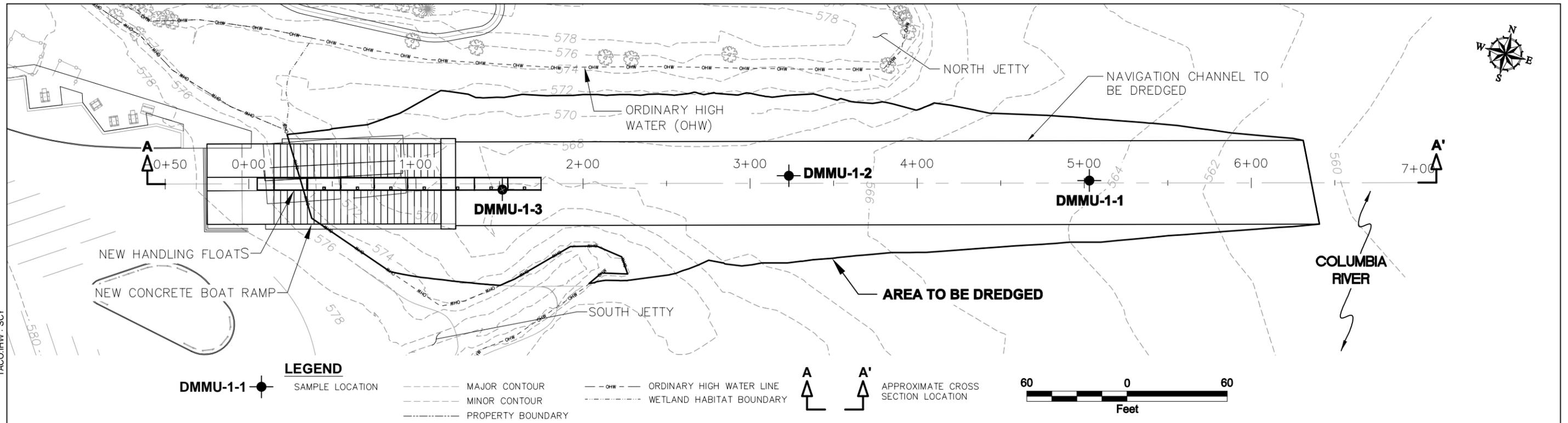
Surface, fine-grained material observed at coring locations



Underlying coarse-grained material (gravel with sand /silt) observed
at coring locations

TACO:HW - SCY

W:\Tacoma\Projects\216402501\CAD\216402501_T500_F3.dwg\TAB:F3 modified on Mar 21, 2013 - 8:53am

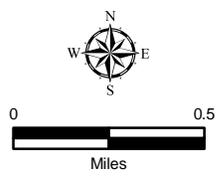
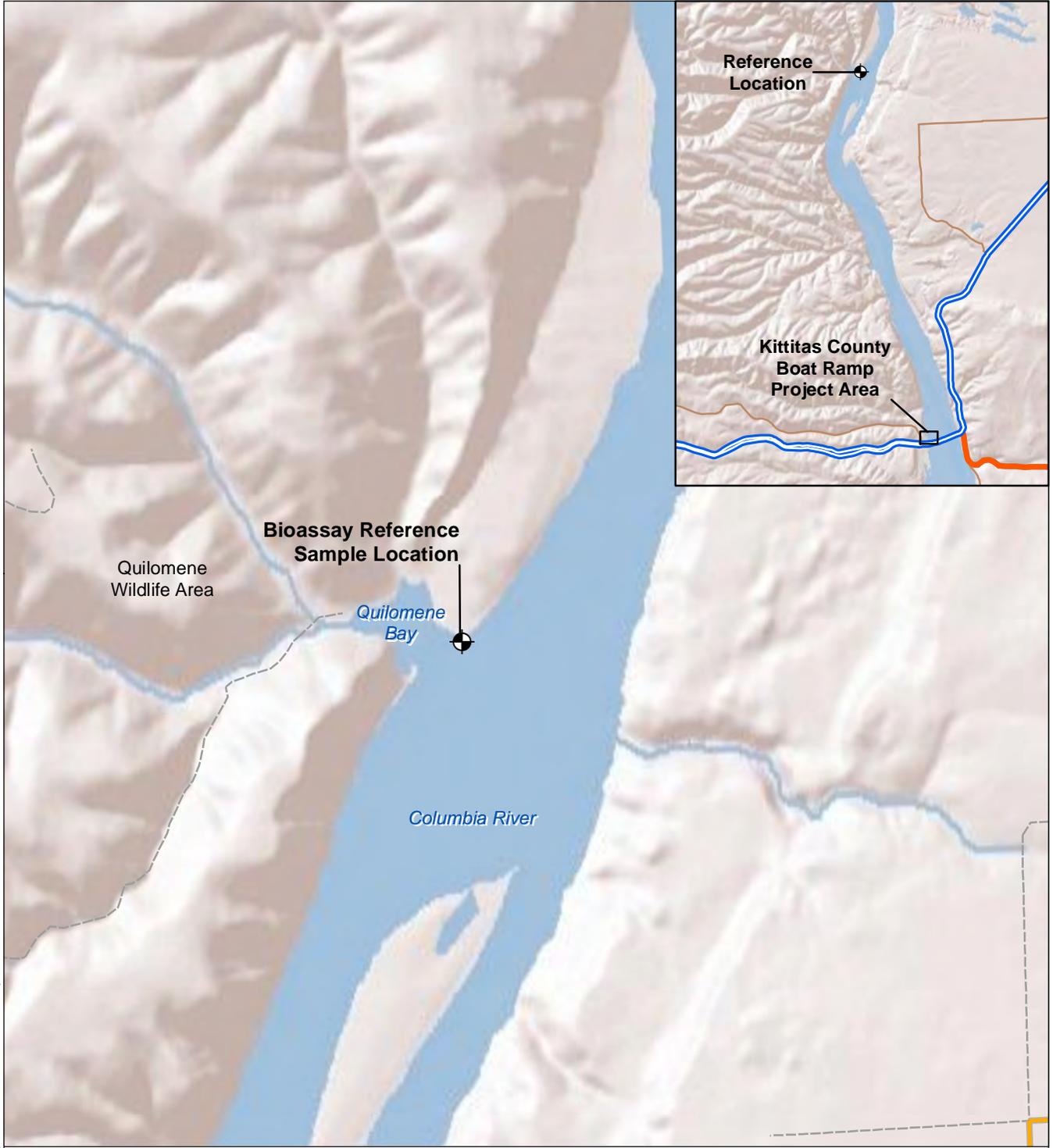


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Reference: Drawing provided by Coast & Harbor Engineering, Inc.

Dredge Material Sampling Locations and Management Units	
Kittitas County Boat Ramp Recreational Improvements Project Vantage, Washington	
GEOENGINEERS	Figure 3

Path: \\nac\Projects\2164025\GIS\216402501_T400_Bioassay.mxd Map Revised: 16 May 2013 amanza



Reference: NAD 1983 UTM Zone 10N
 Data Source: ESRI Shaded Relief, 2009, ESRI Street Map

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Bioassay Reference Sample Location	
Kittitas County Boat Ramp Recreational Improvements Project Vantage, Washington	
	Figure 4