CENWS-OD-TS-NR

MEMORANDUM FOR: RECORD January 5, 2017

SUBJECT: EVALUATION OF PROPOSED POST-DREDGE MATERIAL TO EVALUATE COMPLIANCE WITH THE WASHINGTON STATE ANTIDEGRADATION POLICY, FOR THE PORT TOWNSEND PAPER COMPANY PECO AND WAREHOUSE DOCKS (NWS-2015-716), PORT TOWNSEND, WASHINGTON

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Department of Ecology, Washington State Department of Natural Resources, and the Environmental Protection Agency) regarding the suitability of the exposed sediment surface after removal of up to 7,250 cubic yards (cy) of accumulated sediment and wood chips from two berth areas at the Port Townsend Paper Company, on Port Townsend Bay. Proposed disposal is upland, with no return flow to waters of the US. Because the material is being disposed upland, with no return water, the only DMMP interest is insuring that the post-dredge surface meets State of Washington antidegradation policy.

2. Project. Port Townsend Paper Company (PTPC) operates a Kraft pulp and paper mill on their upland property near Glen Cove, Washington (Figure 1). The PECO Dock area is primarily used for unloading barges containing wood chips and hog fuel that PTPC uses to produce Kraft pulp, paper, containerboard and specialty products. The Warehouse Dock is used for loading of barges with paper rolls and/or pulp bales from the associated warehouse. PTPC last dredged its berthing areas in 2005. Since then, up to 8 ft. of sediment and wood chips have accumulated at the PECO dock and 9 ft. of sediment at the Warehouse Dock, limiting barge operations during low tidal stages. PTPC proposes to remove these accumulations to -18 ft. MLLW, which includes one foot of contractor tolerance beyond the operational berth depth of -17 ft MLLW. A minimum of 6 inches of clean sand would be placed over the post-dredge surface at the PECO dock.

   Table 1. Port Townsend Paper Company– Project Characterization Summary

Project ranking	Moderate
Proposed dredging volume	7,250 cy
Proposed dredging depth	-18 ft MLLW (-17 + 1 ft. overdepth)
Proposed disposal location	upland
Dredging Design Evaluation memo received	September 13, 2016
PTPC Sediment Data received	November 16, 2016
Public Notice	NWS-2015-716

3. Background. In 2014, PTPC submitted a sampling and analysis plan (SAP) to collect chemistry information to support upland disposal decisions, and to characterize the post-dredge surface in order to demonstrate compliance with state antidegradation policy. That SAP was approved on August 11, 2014. Unfortunately, the equipment deployed for core sampling under the 2014 SAP was unable to penetrate the dredge prism. At the time, some

grab samples were collected for potential future analysis, but no report was prepared and no decision document pursued.

The DMMP advised PTPC to determine the elevation of the native sediment interface and whether it would be feasible to dredge to that interface. If dredging could remove the entire wood/sediment prism, then the DMMP would not require further testing of the post-dredge surface in order to determine that it would meet state anti-degradation guidelines.

In 2015, Anchor QEA, LLC, submitted a permit package to the U.S. Army Corps of Engineers on behalf of PTPC with a proposed maintenance dredging design that included dredging to a depth of -17 feet MLLW, plus up to one foot of additional overdredge to accommodate placement of 6 inches of anti-degradation sand cover material (i.e., a target total dredge depth to -18 feet MLLW). In response to the proposed design, DMMP indicated that placement of a clean sand layer is not preferred compared to dredging deeper and exposing the clean, native sediment. The proponent subsequently performed a diver-assisted jet probe survey and a gas ebullition survey to evaluate the dredge prism. Those studies were described in a September 2016 memorandum (Anchor QEA 2016a) that also compared existing surface sediment conditions at the PTPC PECO Dock, anticipated surface sediment conditions after completion of the proposed dredging project, and described how PTPC proposed to meet antidegradation standards. Analytical data from the grab samples taken in 2014 was provided by Anchor QEA (2016b) in a transmittal memo dated November 16, 2016.

4. Tier 1: Review of Existing Information.

   a. *Jet Probe Survey*. To evaluate the extent and depth of wood chips, a diver-assisted jet probe survey was performed in early 2016 (Attachment A) in the two proposed dredge areas (the PECO Dock dredge area and Warehouse Dock dredge area). No wood chips were found at the Warehouse Dock dredge area. In front of the PECO dock, the jet probe data indicate wood debris from 3.5 to 10.5 ft. deeper than the proposed maintenance dredge elevation of -17 feet MLLW. Based on a review of the PECO Dock pile embedment as-builts, it was determined that dredging to native sediment elevations (up to -27.5 feet MLLW) would compromise the dock's structural integrity and potentially result in dock failure (Anchor QEA 2016a). It was thus determined that dredging to native material was not feasible for the PECO Dock area.

   b. *Site Condition Observations*. Site data and conditions were reviewed to assess how local conditions might affect decomposition rates of woody material, which would affect subsurface methane production. Aerobic conditions are not expected in sediments beneath the bioactive zone, because the PECO Dock area is located in a relatively deep subtidal area. Tidal exchange of seawater containing elevated oxygen levels is not expected to reach subsurface sediments beneath the bioactive zone. Decomposition rates are highest in warmer temperatures, where oxygen is present at least intermittently to support microbial activity that breaks down wood. The temperature and anaerobic conditions in the project area are not expected to support subsurface decomposition that could result in methane production. Sulfide odors typical of sulfide accumulations were not noted during the jet probe survey. Also, no chemotrophic bacterial mats were observed either during the diver surveys or during sediment sampling. Those mats are filamentous

chemotrophic bacteria that harvest energy from oxidation of hydrogen sulfide at the sediment/water interface. The absence of observable bacterial mats or sulfide accumulation point to low rates of woody material decomposition. Ecology's hesitance to approve sand cover on existing woody debris is due in part to the concern for potential for subsurface decomposition that would be inhospitable to benthic organisms or undermine cap integrity. In this case, site-specific conditions lessen this concern.

c. *Sediment Chemistry*. Four grab (0-10 cm) samples taken on September 11, 2014 during the failed core sampling event were submitted to Analytical Resources, Inc. (ARI) for chemical analysis. Two of the samples were from the PECO Dock dredge footprint, one was from the Warehouse Dock dredge footprint, and the other was from an area not included in this evaluation (Figure 2). Samples were analyzed for several—though not all—DMMP chemicals of concern (COCs). The data from the three relevant samples were compared to the SMS criteria for marine sediments (Ecology 2013). Marine SMS values are dry-weight normalized for metals and polar organics and normalized to total organic carbon for nonpolar organics. Dry weight normalized AETs can be used when total organic carbon is outside the recommended range for organic carbon normalization. The two samples from the PECO dock (PTPC01 and PTPC02) had total organic carbon content higher than the recommended range, so those were compared with dry weight AETs (Table 2). Only one of the limited number of DMMP COCs analyzed exceeded the SMS guidelines (fluoranthene in PTPC02). These data provide only partial information about the quality of the surface material in both the PECO Dock and Warehouse Dock areas, and tell us nothing about the proposed post-dredge surfaces.

d. *Gas Ebullition Survey*. An ebullition survey was conducted in May 2016 to test for the presence of methane bubbles that would indicate that methanogenesis is taking place within the sediments (Attachment 2). Generally, Ecology discourages the placement of sand cover on sediments containing wood waste due to concern that movement of methane bubbles may compromise cap function. However, no gas bubbles were observed at any location throughout the entire survey period.

5. Antidegradation Evaluation. The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) or the State's Antidegradation standard (Ecology 2013) as outlined by DMMP guidance (DMMP 2008). The only information we have about the post-dredge surface at the PECO dock comes from the jet probe survey which found wood chips underlying the dredge prism in this area. There is no information about the post-dredge surface sediment quality at the Warehouse dock. Because the Warehouse dock has been in use for several decades, there is reason to believe that subsurface sediment contamination may exist. Therefore, the DMMP must assume that the leave surface for this project will not comply with the state antidegradation policy unless a sand cover is placed over the entire post-dredge surface (both PECO and Warehouse dock areas). The sand cover must be a minimum of 6-inches thick (nominal 1-ft), with no areas of thinner coverage, though thicker coverage would be acceptable.

*This 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.*

6. References.

Anchor QEA, LLC, 2016a. PECO Dock Maintenance Dredging Design Evaluation Memorandum. September 2016.

Anchor QEA, LLC, 2016b. Transmittal of Port Townsend Paper Company Sediment Data Memorandum. November 16, 2016.

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 2015. Dredged Material Evaluation and Disposal Procedures (User Manual). Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, November 2015.

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

Table 2. Results of sediment analysis of 2014 grab samples compared to SMS 2013.

	SMS Marine		Marine AETs		PTPC01				PTPC02				PTPC04			
Analyte	SCO	CSL	SCO	CSL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TOC (%)					3.39		3.39		3.19		3.19		0.861		0.861	
Total Solids (%)					36.1		36.1		32.7		32.7		78.8		78.8	
Metals	mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw	
Arsenic	57	93	57	93	10		10		20		20		6.0	U	6.0	U
Cadmium	5.1	6.7	5.1	6.7	1.0		1.0		0.9		0.9		0.3		0.3	
Chromium	260	270	260	270	39		39		23		23		18.9		18.9	
Lead	450	530	450	530	15		15		8.0		8.0		3.0		3.0	
Mercury	0.41	0.59	0.41	0.59	0.07		0.07		0.05		0.05		0.03	U	0.03	U
Silver	6.1	6.1	6.1	6.1	0.8	U	0.8	U	0.9	U	0.9	U	0.4	U	0.4	U
PAHs	mg/kg OC		µg/kg dw		mg/kg OC		µg/kg dw		mg/kg OC		µg/kg dw		mg/kg OC		µg/kg dw	
LPAH	370	780	5,200	5,200	41.3		1,400		35		1,108		22.9		197	
Naphthalene	99	170	2,100	2,100	4.72		160		5.64		180		3.83		33	
Acenaphthylene	66	66	1,300	1,300	1.21		41		0.88		28		2.32	U	20	U
Acenaphthene	16	57		500	2.92		99		4.39		140		2.32		20	
Fluorene	23	79		540	4.72		160		3.76		120		2.67		23	
Phenanthrene	100	480	1,500	1,500	17.7		600		12.2		390		10.2		88	
Anthracene	220	1,200	500	960	10.0		340		7.84		250		3.83		33	
2-Methylnaphthalene	38	64	540	670	0.88		30		1.29		41		1.63	J	14	J
Total HPAH	960	5,300	12,000	17,000	215		7,283		179		5,696		84.5		728	J
Fluoranthene	160	1,200	1,700	2,500	41.3		1,400		56.4		1,800		20.9		180	
Pyrene	1,000	1,400	2,600	3,300	35.4		1,200		47.0		1,500		19.7		170	
Benz[a]anthracene	110	270	1,300	1,600	26.3		890		14.4		460		7.90		68	
Chrysene	110	460	1,400	2,800	35.4		1,200		28.8		920		12.8		110	
Total benzofluoranthenes	230	450	3,200	3,600	50.1		1,700		20.1		640		12.8		110	
Benzo[a]pyrene	99	210	1,600	1,600	13.9		470		6.58		210		4.76		41	
Indeno[1,2,3-c,d]pyrene	34	88	600	690	5.31		180		2.26		72		2.32		20	
Dibenzo[a,h]anthracene	12	33	230	230	2.15		73		0.82		26		0.79	J	6.8	J
Benzo[g,h,i]perylene	31	78	670	720	5.01		170		2.13		68		2.56		22	
Bulk Petroleum	mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw		mg/kg dw	
TPH-Diesel					190		190		340		190		32		190	
Chlorinated Organics	mg/kg OC		µg/kg dw		mg/kg OC		µg/kg dw		mg/kg OC		µg/kg dw		mg/kg OC		µg/kg dw	
1,2,4-Trichlorobenzene	0.81	1.8	31	51	0.38	U	13	U	0.47	U	15	U	0.66	U	5.7	U
1,2-Dichlorobenzene	2.3	2.3	35	50	0.08	U	2.6	U	0.09	U	3.0	U	0.13	U	1.1	U
1,4-Dichlorobenzene	3.1	9	110	110	0.08	U	2.6	U	0.09	U	3.0	U	0.13	U	1.1	U

NOTES:

- **Bold** = detected results
- U = Result below reported limit
- CSL = Cleanup Screening Level
- SQS = Sediment quality objectives
- SCO = Sediment cleanup objectives
- mg/kg dw = milligrams per kilogram dry weight
- OC = Organic carbon normalized
- Red font > SMS
- Blue shading = OC normalized results compared to Marine SCO
- Orange shading = dry wt. results compared to Marine AETs
- LPAH = sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene.
- HPAH = sum of Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3,-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene.
- TOTAL benzofluoranthenes = sum of B, J and K isomers

signed copy on file in Dredged Material Management Office, Seattle District Corps of Engineers

7. Agency Signatures

SUBJECT: EVALUATION OF PROPOSED POST-DREDGE MATERIAL TO EVALUATE COMPLIANCE WITH THE WASHINGTON STATE ANTIDEGRADATION POLICY, FOR THE PORT TOWNSEND PAPER COMPANY PECO DOCK (NWS-2015-716), PORT TOWNSEND, WASHINGTON.

Concur:

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

_____ _____
Date Erika Hoffman - Environmental Protection Agency

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

_____ _____
Date Celia Barton - Washington Department of Natural Resources

Attachments:
Figure 1 – Project Location
Figure 2 – Project Vicinity and Samples
Attachment A – jet probe survey report
Attachment B – gas ebullition survey report

Copies furnished:
DMMP signatories
Juliana Houghton, Corps Regulatory
Darren Wilson, PTPC
Anchor QEA

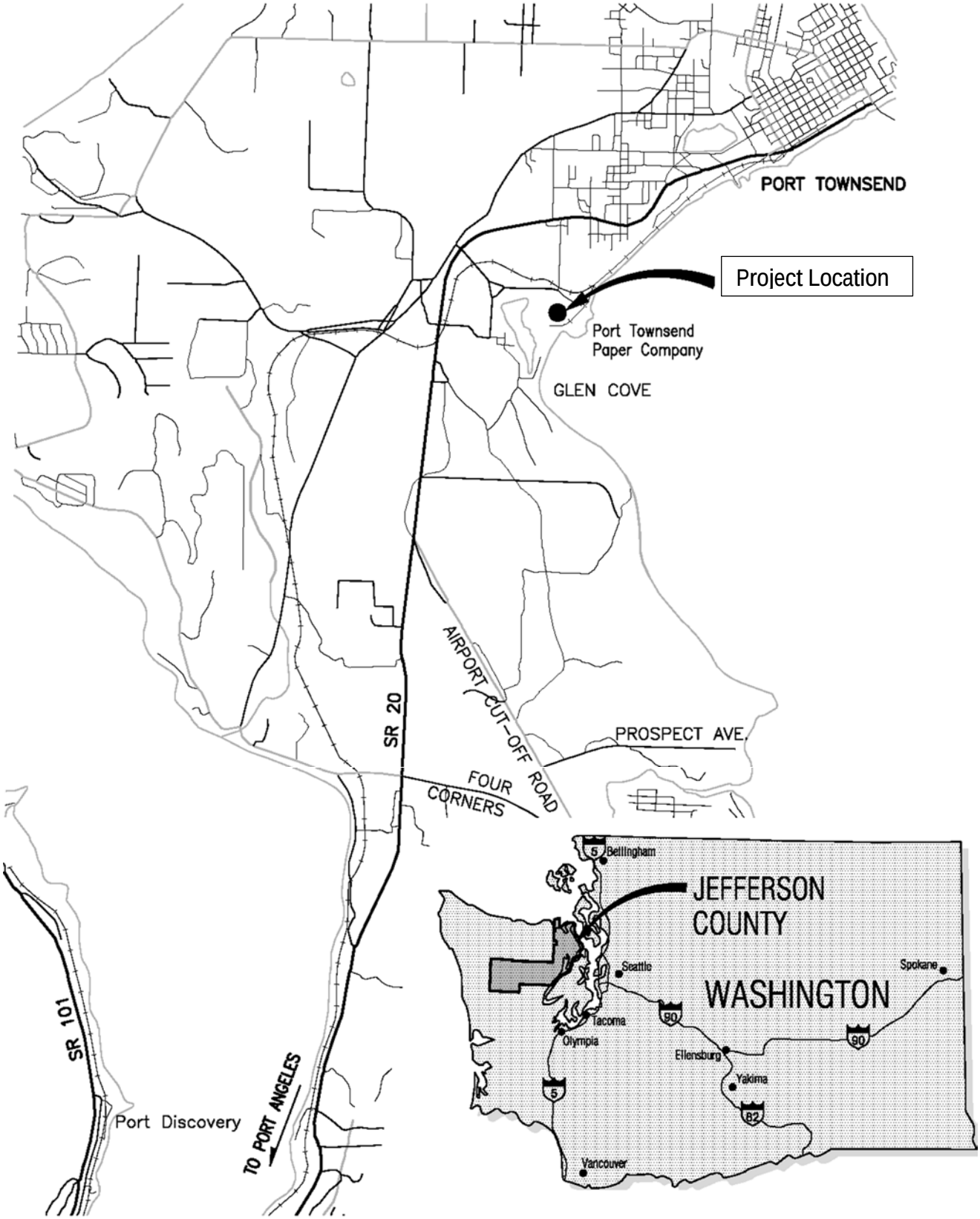


Figure 1. Project Location

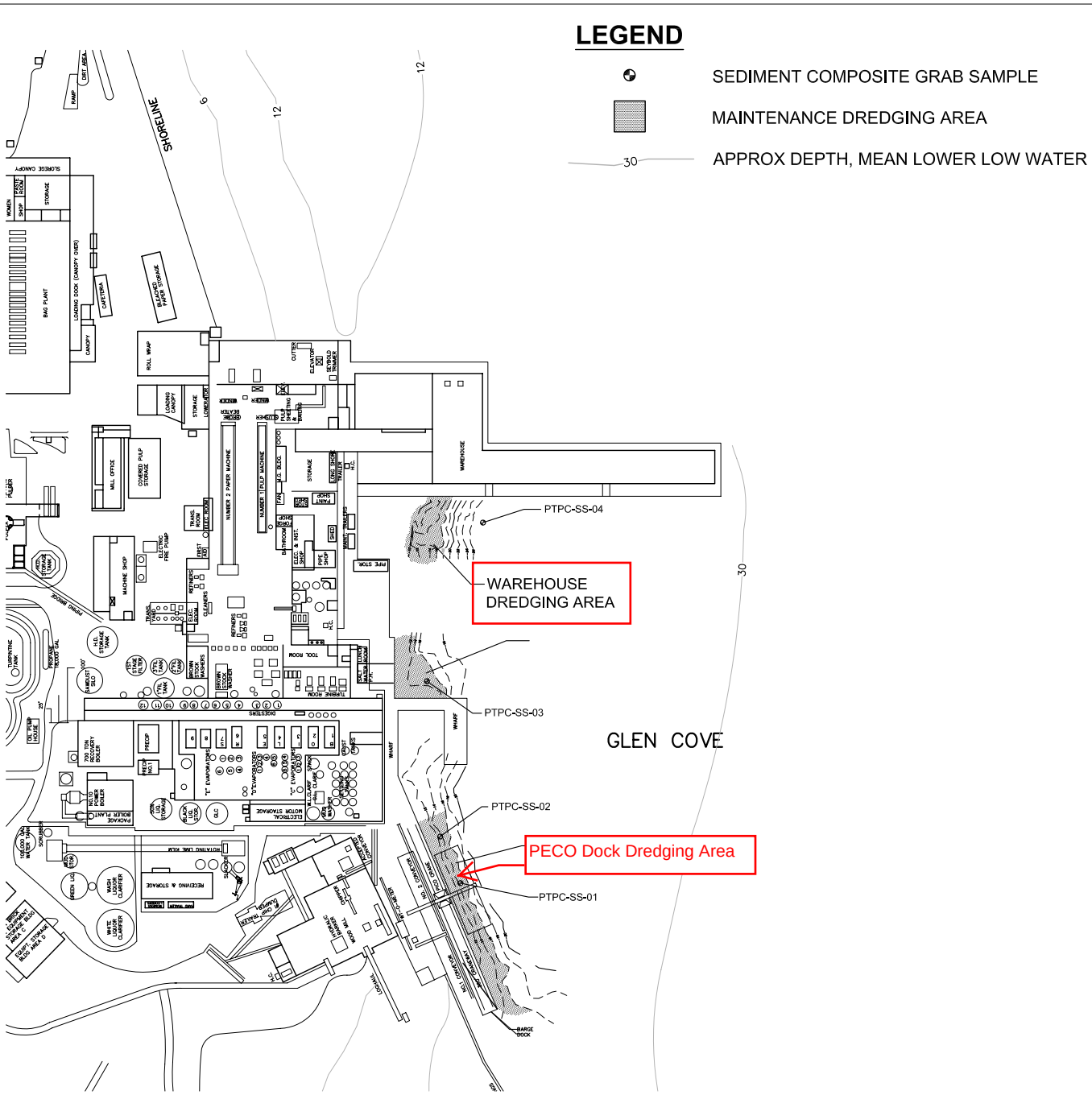


Figure 2. Project Vicinity and Samples

PURPOSE: MAINTENANCE DREDGING

DATUM: MLLW=0.0
MHHW=8.45

ADJACENT PROPERTY OWNERS

1 STATE OF WASHINGTON

SITE PLAN AND SAMPLING LOCATIONS

CORPS No. _____

0 300
SCALE IN FEET

Port Townsend Paper Corporation

Port Townsend Paper Corporation
Maintenance Dredging

IN: Port Townsend Bay
AT: Port Townsend, WA
COUNTY OF: JEFFERSON STATE OF: WA
APPLICATION BY: Port Townsend Paper Corp.
FIGURE 2 DATE: 3–15–04

DATE: 03/18/04 FILENAME: B1959002P01T01J-02 IMAGES: XREF'S: XB1959002P01T01-BA

SUNCHASERS

Attachment A

Mr. John Laplante
Anchor QEA
720 Olive Way, Suite 1900
Seattle, Washington 98101

January 16, 2016

Subject: Port Townsend Paper Company
Maintenance Dredging Site
Underwater Jet Probe Survey
Report

Dear Mr. Laplante,

Sunchasers appreciates the opportunity to have been able to offer our personnel and equipment to your project at the Port Townsend Paper Company.

At your direction Sunchasers performed a Diver Jet Probe Survey to attempt to define the limits of natural bottom below the accumulation of woody debris at the Peco Dock Dredging Area and at the Warehouse Dredging Area. The survey was conducted on January 7, 8, 9, 10, 11 and 12, 2016.

The survey involved the following tasks:

1) Initially Sunchasers set up positioning on both the Peco and Warehouse Docks. A total of 4 transects points were established on both the Peco Dock and the Warehouse Dock. The transects were run perpendicular to the Docks extending out past the Maintenance dredging areas and covering the full length of the designated areas as shown on your Dredge Plan Drawings. As survey control was unavailable at the time of the survey Sunchasers utilized corner points on the Docks and measured lineal distance to and between transect lines. The jet probe locations were positioned on the transects by measurement with a survey tape. I have included a copy of the dredge plan drawings showing the position of the transect lines. Vertical control was given to us from Peco as the top of the deck being: (+ 17.5'). Diver depths at jet probe locations were taken with a calibrated depth gauge and corrected to Mean Lower Low Water (MLLW).

2) The diver performed jet probes as necessary to penetrate the overburden and determine the elevation of the natural bottom. The jet probe locations were noted and the data collected were transcribed onto the attached data sheets. The method Sunchasers utilized to determine the type of materials was a diver visually inspecting and probing the bottom with a high pressure jet probe. The jet probe system utilized a 165 gpm/50psi pump and a 1 ½" diameter hose connected to a 10' to 15' length of ¾" pipe. The jet probe allowed the diver to penetrate through the woody debris and into the natural bottom, when possible, and determine the type of material present.

If you have any questions in regards to this information please do not hesitate to contact me.

Sincerely,

Robert Peraino
Field Operations Manager

Attachments

SUNCHASERS, INC.
PECO/ANCHOR QEA
PORT TOWNSEND PAPER COMPANY
Jet Probe Survey

Location: Warehouse Dock Date: 1/16/2016

Transect	Distance from Face of Pier	Corrected Bottom Depth	Depth of Probe	Type of Sediment/ Debris	COMMENTS
T-1	0.0’	- 3.5’	10.0’	Silty Sand and Mud (SSM)	No woody debris on surface of mudline or to 10.0’ probe depth.
	10.0’	- 5.5’	10.0’	SSM	No woody debris on surface of mudline or to 10.0’ probe depth.
	30.0’	- 8.5’	10.0’	SSM	Silty sand and mud, With shells and small Rock. Probe was silty sand and mud easily penetrated from mudline down to 5.0’. Encountered hard layer of silty sand from 5.0’ to 10.0’.
	60.0’	- 9.5’	10.0’	SSM	Silty sand and mud, With shells and small Rock. Probe was silty sand and mud easily penetrated from mudline down to 4.0’. Encountered hard layer of silty sand from 4.0’ to 10.0’.
	90.0’	- 7.5’	10.0’	SSM	Silty sand and mud, With shells and small Rock. Probe was silty sand and mud easily penetrated from mudline down to 4.0’. Encountered hard layer of silty sand from 4.0’ to 10.0’.
	120.0’	- 9.5’	12.0’	SSM	Silty sand and mud.
T-2	0.0’	- 4.5’	12.0’	SSM	Silty sand and mud, with shells.
	10.0’	- 11.5’	12.0’	SSM	Silty sand and mud, with shells from mudline to 7.0’. From 7.0’ to 9.0’ small Rock. From 9.0’ to 12.0’ silty sand and mud.
	30.0’	- 13.5’	12.0’	SSM	
	60.0’	- 16.5’	12.0’	SSM	Silty sand and Mud from 0.0’ to 5.0’. From 5.0’ to 12.0’ silty sand and mud with shells and small rock.
	90.0’	- 16.5’	12.0’	SSM	Silty sand and mud with some shells.
	120.0’	- 13.5’	12.0’	SSM	
T-3	0.0’	- 10.5’	12.0’	SSM	Silty sand and mud with some shells.
	10.0’	- 12.5’	12.0’	SSM	Silty sand and mud with some shells.
	30.0’	- 16.5’	12.0’	SSM	A few wood chips scattered on bottom. Silty sand and mud with some shells.
	60.0’	- 17.5’	10.0’	SSM	Silty sand and mud with some shells.
	90.0’	- 18.5’	12.0’	SSM	Silty sand and mud with some shells.
	120.0’	- 18.5’	12.0’	SSM	Silty sand and mud with some shells.

SUNCHASERS, INC.
PECO/ANCHOR QEA
PORT TOWNSEND PAPER COMPANY
Jet Probe Survey

Location: Warehouse Dock Date: 1/16/2016

Transect	Distance from Face of Pier	Corrected Bottom Depth	Depth of Probe	Type of Sediment/ Debris	COMMENTS
T-4	0.0’	- 15.5’	12.0’	SSM	Silty sand and mud with some shells.
	10.0’	- 18.5’	12.0’	SSM	Silty sand and mud with some shells.
	30.0’	- 23.5’	12.0’	SSM	Silty sand and mud with some wood debris.
	60.0’	- 24.5’	10.0’	SSM	Silty sand and mud with some shells.
	90.0’	- 24.5’	11.0’	SSM	Silty sand and mud with some shells.

SUNCHASERS, INC.
PECO/ANCHOR QEA
PORT TOWNSEND PAPER COMPANY
Jet Probe Survey

Location: PECO Dock Date: 1/16/2016

Transect	Distance from Face of Pier	Corrected Bottom Depth	Depth of Probe	Type of Sediment/ Debris	COMMENTS
T-1	0.0’	- 9.5’	12.0’	Wood Chips (WC), SSM	Wood Chips from mudline down to 4.0’. From 3.0’ to 12.0’ Silty sand and maud.
	10.0’	- 12.5’	12.0’	(WC), SSM	Wood chips from mudline down to 5.0’. From 5.0’ to 12.0’ Silty sand and mud.
	30.0’	- 15.5’	12.0’	WC	Wood chips from mudine to 12.0’.
	60.0’	- 19.5’	12.0’	WC, SSM	Wood chips from mudline to 3.0’. From 3.0’ to 12.0’ Silty sand and mud.
T-2	0.0’	- 8.5’	10.0’	WC	Wood chips from mudline down to 9.0’. From 9.0’ to 10’ Silty sand and mud
	10.0’	- 10.5’	9.0’	WC,SSM	Wood chips from mudline down to 7.0’. From 7.0’ to 9.0’ wood chips mixed with silty sand and mud. At 9.0’ refusal. Several attempts made but could not penetrate.
	30.0’	- 18.5’	12.0’	WC, SSM	Wood chips from mudline down to 6.0’. From 6.0’ to 12.0’ Silty sand and mud.
	60.0’	- 24.5’	12.0’	WC, SSM	Wood chips from mudline down to 5.0’. From 5.0’ to 12.0’ Silty sand and mud.
T-3	0.0’	- 7.5’	12.0’	WC, SSM	Wood Chips from mudline down to 10.0’. From 10.0’ to 12.0’ Silty sand and mud.
	10.0’	- 9.5’	9.0’	WC, SSM	Wood chips from mudline down to 8.0’. From 8.0’ to 9.0’ Silty sand and mud.
	20.0’	- 12.5’	8.0’	WC, SSM	Wood chips from mudline down to 7.0’. From 7.0’ to 8.0’ Silty sand and mud.
	30.0’	- 19.5’	12.0’	WC, SSM	Wood chips from mudline down to 5.0’. From 5.0’ to 12.0’ Silty sand and mud.
	45.0’	- 20.5’	12.0’	WC, SSM	Wood chips from mudline down to 4.0’. From 4.0’ to 12.0’ Silty sand and mud.
T-4	0.0’	- 16.5’	12.0’	WC, SSM	Wood chips from mudline down to 3.0’. From 3.0’ to 12.0’ Silty sand and mud.
	10.0’	- 17.5’	12.0’	WC, SSM	Wood chips from mudline down to 3.0’. From 3.0’ to 12.0’ Silty sand and mud.
	30.0’	- 17.5’	12.0’	WC, SSM	Wood chips from mudline down to 3.0’. From 3.0’ to 12.0’ Silty sand and mud.
	45.0’	- 17.5’	12.0’	WC, SSM	Wood chips from mudline down to 3.0’. From 3.0’ to 12.0’ Silty sand and mud.

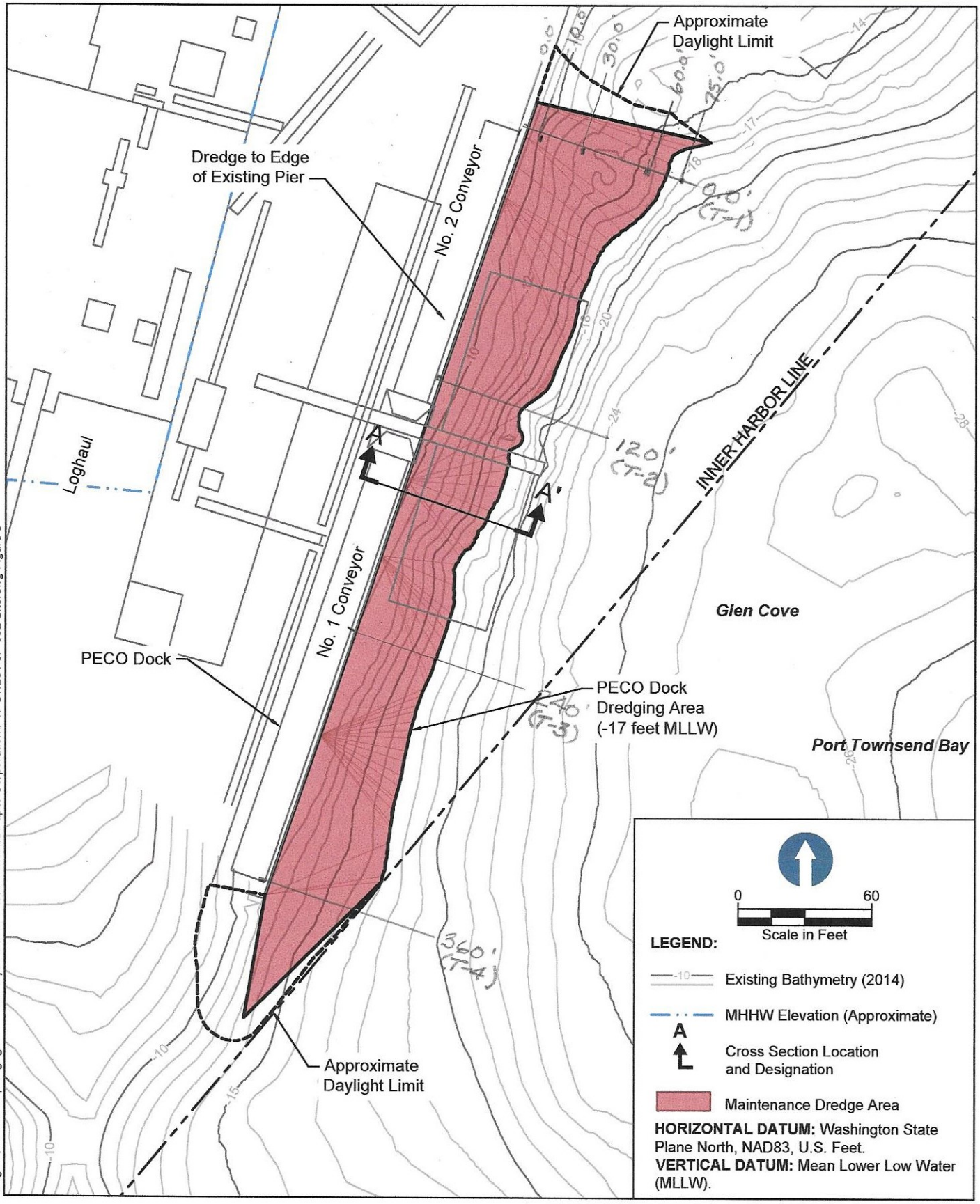
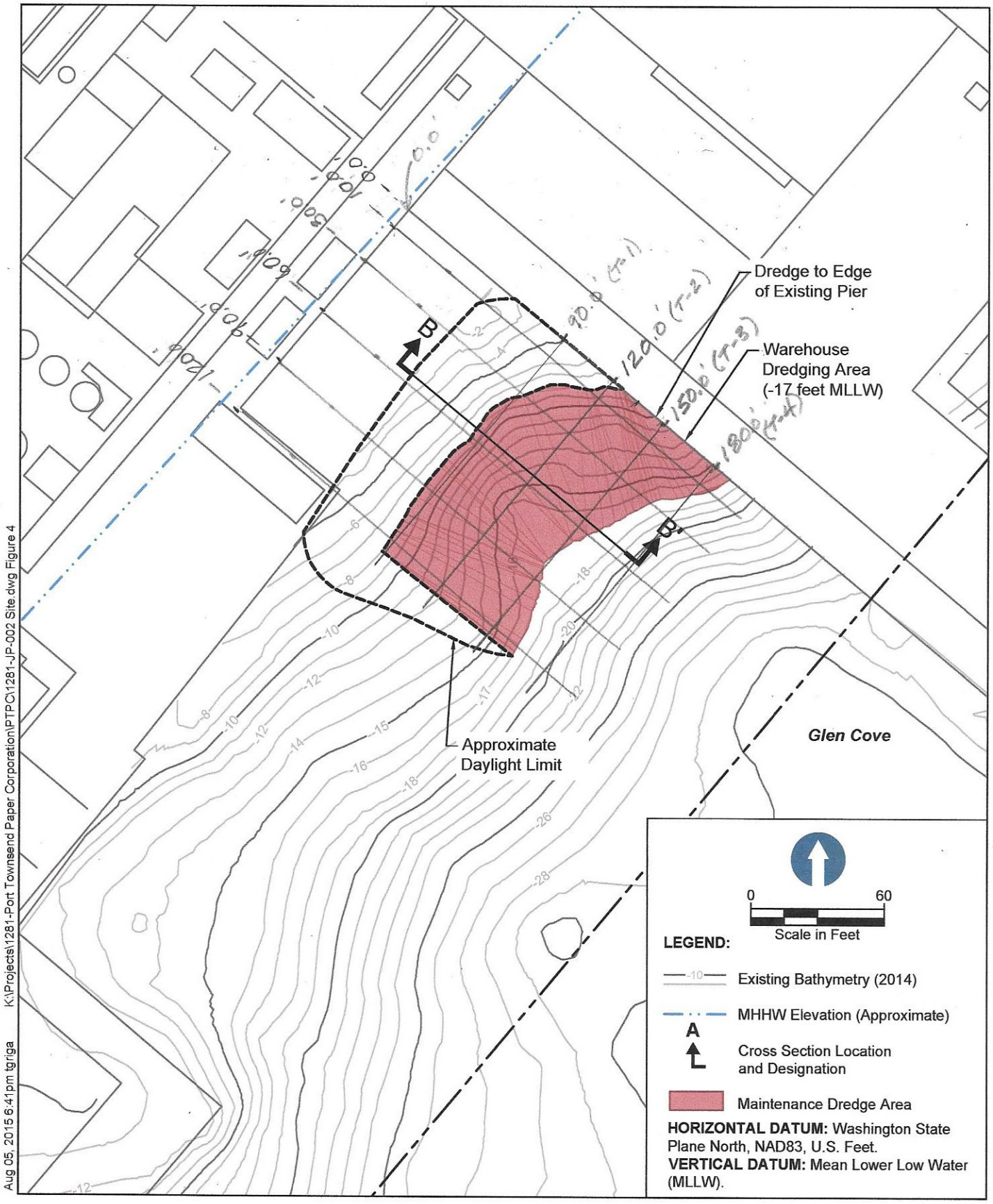


Figure 3
PECO Dock Dredge Plan
Biological Evaluation
Port Townsend Paper Corporation Maintenance Dredging

ANCHOR QEA



ANCHOR QEA

Figure 4
Warehouse Dredge Plan
Biological Evaluation
Port Townsend Paper Corporation Maintenance Dredging

Attachment 2

ANCHOR QEA

Gas Ebullition Survey Visual Observations Log

Project: PECO Dredging
Date: 5/24/16
Project Number: N/A
Survey Start Time: 06:40 am
Staff: DW, SM, Que, MG
Survey End Time: 10:40 am
Survey Area: PECO Dock
Time of Low Tide/High Tide: High: 05:21am Low: 12:17pm

CONDITIONS AT TIME OF OBSERVATION

Time of Observation: 06:40a - 10:40a		Location of Ebullition Relative to Coordinates: N/A
Northing/Lat: 48°05' 30.57" N & 48°05' 33.06" N	Easting/Long: 122°47' 46.11" W & 122°47' 44.96" W	
Anthropogenic Conditions: (circle, note if others present below) Vessel Movement — Vessel Wake — Anchoring Spudding — Pile Driving — Construction Aeration System Operation — Sampling Activities		Location and Proximity to Structures or Active Work Areas: Near active crane, at SE end of mall

Conditions: (circle)	Wind From:	N – NE – E – SE – (S) – SW – W – NW	(Light) – Medium – High	
	Weather:	Sunny – (Cloudy) – Rainy	Air Temp (F): 55	Wave Height (ft crest to trough): N/A
Wave Action Observations: (check)	☒ Calm (glassy or ripples without crests)			
	☐ Slight (wavelets not breaking)			
	☐ Moderate (crests begin to break, scattered whitecaps)			Vessel Traffic (describe): Stationary barge
	☐ Heavy (fairly frequent whitecaps)			
	☐ Vessel wake			

EBULLITION OBSERVATIONS

Is Ebullition Observed?	(No) — Yes	If yes, proceed completing this section of the form.	
Frequency (circle):	Moderate-high — Low-moderate — Trace-low		
Rate (bubbles/min):	Approximate Ebullition Area Dimensions (reference to landmarks if needed, ft):		
Spatial Distribution (circle):	Moderate-high — Low-moderate — Trace-low		
Coincident Sheen Observed?	No — Yes		
Ebullition Area Water Quality Measurements:	Temperature (°C)	Salinity (ppt)	Secchi Disk (feet)

SHEEN OBSERVATIONS - N/A for PTPC Survey

Is Sheen Observed?	No — Yes	If yes, proceed completing this section of the form.	
Sheen Type (circle)	Distribution:	Blossom — Small Spots — Spotty — Streaks — Contiguous	
	Color:	Silvery — Rainbow — Dark Rainbow — Dark	
	Structure:	Brittle — Non—brittle	
Approximate Sheen Area Dimensions (reference to landmarks if needed, ft):		Rate (for sheen blossoms only, blossoms/min):	
Potential Sheen Source(s) (if not coincident with gas ebullition, and if obvious): Vessel Movement — Vessel Wake — Anchoring — Spudding — Pile Driving — Construction Aeration System Operation — Sampling Activities — Unknown — Other (describe below)			

DOCUMENTATION

Photo Nos:	0210, 0211, 0213, 0214, 0215, 0217, 0218
Video File Names:	0212, 0216, 0219
GPS Point Names:	

COMMENTS/ADDITIONAL OBSERVATIONS

PECO crane was running from 06:40am to 07:10am and 08:50am to 10:40am
No ebullition was observed at the two observation locations.

Figure 1: Observation locations for 05/24/2016 ebullition survey. Location 1: 48°05’33.06”N, 122°47’44.96”W Location 2: 48°05’33.57”N, 122°47’46.11”W

Photo # 0210			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 1	**Time:**	06:52a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	East
Description:	Water near north end of PECO dock with island dock in upper left.		

Photo # 0211			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 1	**Time:**	06:52a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	Southeast
Description:	North end of barge during crane unloading activity.		

Photo # 0213			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 2	**Time:**	06:57a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	Northeast
Description:	South end of barge during crane unloading activity.		

Photo # 0214			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 2	**Time:**	06:58a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	East
Description:	Water in front of PECO dock with Indian Island in background		

Photo # 0215			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 2	**Time:**	06:58a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	South
Description:	End of PECO dock facing into Glen Cove.		

Photo # 0217			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 1	**Time:**	10:37a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	Northeast
Description:	Water with island dock in background		

Photo # 0218			
Project:	PTPC PECO Dock Dredging – Ebullition Survey	**Date:**	05/24/2016
Location:	Survey Location 1	**Time:**	10:37a
Photographer:	Darren Wilson - PTPC	**Direction of Photo:**	East
Description:	North end of barge at end of survey.		