Dakota Creek Industries
Shipyard Facility

Sediment Sampling Data Report

Appendix D
Figures presented in the Sediment Quality Analysis Report

FINAL

POA-DAKOTA.BADOC.19

Report
Sediment Quality Analysis
Dakota Creek Industries Shipyard Facility
Anacortes, Washington

February 21, 2003

Prepared for

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This report presents a summary and assessment of sediment quality in the Dakota Creek Industries (DCI) basin, located at the DCI shipyard facility (site) on Port of Anacortes (Port) property at 115 Q Avenue in Anacortes, Washington (Figure 1). The data evaluated herein were collected during four investigations completed from 1985 to 2001. This report also provides a general discussion of planned redevelopment of the DCI basin. This assessment supports a request for a finding of no further action with respect to sediments in the DCI basin under the Model Toxics Control Act (MTCA). Information presented below provides a basis for a finding of no further action within the context of the MTCA regulations and discusses the application of the Sediment Management Standards (SMS) program (Chapter 173-204 WAC) to the DCI basin.

1.1 GENERAL SITE HISTORY AND CONDITIONS

The site is an active shipyard currently used for construction and repair of vessels. Existing site features include a pier (Pier 1), two outfitting piers (the "L Dock" and the "East Dock"), a dry dock at the end of Pier 1, a marine railway, and a synchrolift elevator system used to raise or lower vessels into or out of water for transfer upland (Figure 2). Other upland site features include fabrication areas, shops, a sandblast grit storage shed, storage areas, a warehouse, and office buildings.

The site is located on property, portions of which have been used as a shipyard since 1879. In addition to the construction and repair of vessels, a ferry dock located near existing Pier 1 was used in the early 1900s. DCI began leasing portions of the property from the Port in 1976 and has continued to use the site as a shipyard since that time. Composite historical property uses are shown on Figure 3.

The site is largely unpaved except for an asphalt-paved area south of the synchrolift and main building complex, and concrete areas along Pier 1 and adjacent to the synchrolift. The site is relatively flat and ground surface elevation is approximately 15 ft Mean Lower Low Water (MLLW). Surface and subsurface soil consists of historical fill over native glacial sediments. The fill consists of silt, sand, and gravel. Explorations indicate that the thickness of the fill varies from 2.5 to 6.5 ft across the site. The glacial sediments consist of medium dense glaciomarine drift with varying silt, sand, and gravel over dense, compacted gravelly sands with siltier interbeds. Groundwater elevations beneath the site are influenced by tidal and seasonal variations. Tidal variations at the shoreline range from about -3 to 9 ft MLLW with a mean tidal range of 2.6 to 7.4 ft MLLW. Depth to groundwater at the site ranges from approximately 4 to 12 ft below ground surface (BGS). Groundwater flow is to the north toward Guemes Channel.

1.2 DCI BASIN HISTORY AND CONDITIONS

This report focuses on the DCI basin, which is located between the shoreline and the outer harbor line and the "L" Dock and Pier 2 (Figure 2). The DCI basin is approximately 440 ft by 500 ft (220,000 ft^2) in area. The elevation of the surface of sediments in the DCI basin ranges from approximately 10 ft mean lower low water (MLLW) to –35 ft MLLW. Sediment deposits above the native glacial sediments are roughly 4 to 5 ft thick. Measured currents in the DCI basin ranged up to 3.1 knots (UW 2002).

The synchrolift, which is shown on Figure 2, was constructed between 1986 and 1989 to allow DCI to elevate and return to water large vessels and transfer them to an uplands area for repair and maintenance. Vessels constructed at DCI are also launched by the synchrolift. Approximately 50,000 yd^3 of marine materials and sediments were dredged from the area adjacent to Pier 1 prior to construction of the synchrolift, as shown on Figure 4. Marine materials were dredged to a depth of –35 ft MLLW directly beneath the synchrolift and –15 ft MLLW in the area immediately to the east. Any portion of the former Scott Paper Company mill site outfall (discussed below) that still remained in the area shown on Figure 4 at the time of dredging was removed in conjunction with dredging activities.

Two marine railways, shown on Figure 3, were historically used to pull vessels out of the water for work in the uplands and to launch vessels. DCI has never used the westmost marine railway and only rarely used the eastmost marine railway before construction of the synchrolift. Neither of the historical marine railways are currently operational. The marine railway, located between the "L" Dock and the "East" Dock, was removed in the early 1990s. The second marine railway, located between the "East" Dock and Pier 2, still exists but has not been used since the early 1990s and is scheduled for removal with planned redevelopment activities. Soil around the uplands portion of the existing marine railway was removed and treated offsite during an independent cleanup action addressing uplands areas of the site (Landau Associates 2002).

The former Scott Paper Company mill site outfall was moved from Fidalgo Bay to Guemes Channel in 1964 and was reconstructed in 1970 to take advantage of the dispersive effects of the current in the channel and its physical characteristics. Currents in the channel range up to 4 knots (USC 2003) and the bottom of the channel are typically free of fine-grained sediments. The outfall originally passed through the shoreline area prior to discharging into Guemes Channel just above the surface of the sediments. The alignment and the points of discharge of the original outfall were not located in the DCI basin, as shown on Figure 2. The reconstructed outfall extended 680 ft beyond the outer harbor line. The position of the outfall diffuser was based on an evaluation of current patterns in Guemes Channel and was determined to be located such that the effluent would be discharged "in the channel current pattern beyond those currents which eddy back into shore" (Northwest Operations 1970).

2.0 SEDIMENT QUALITY ANALYSIS

Previous environmental sediment investigations at the site are described in the following reports:

- Results of Sediment Chemistry Testing (Hart Crowser 1985)
- Phase 2 Environmental Assessment (Otten Engineering 1997)
- Dredge Material Characterization (Hart Crowser 2000)
- U.S. Environmental Protection Agency (EPA) Site Inspection (WESTON 2002).

These investigations are summarized below. Table 1 provides a summary of analytical data from these investigations. Sample locations are shown on Figure 5.

2.1.1 HART CROWSER 1985

Sediment core samples were collected to characterize materials in proposed dredging areas. Three composite sediment samples were collected: one each from the DCI embayment, near Pier 1, and near Pier 2. Each composite sample was comprised of sediment from three discrete cores, labeled SSH-1 through SSH-9, as shown on Figure 5. The samples were identified as "Dakota Creek," "Pier 1," and "Pier 2." The Dakota Creek sample was a composite from cores SSH-6, SSH-7, and SSH-9, and was collected from approximately 0 to 2 ft below the surface of the sediments. The Pier 1 sample was a composite from cores SSH-2, SSH-5, and SSH-8, and was collected from approximately 0 to 2 ft below the surface of the sediments. The Pier 2 sample was a composite from cores SSH-1, SSH-3, and SSH-4, and was collected from approximately 0 to 4 ft below the surface of the sediments. The composite sediment samples were analyzed for metals, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, total organic carbon (TOC), total solids, and total volatile solids.

2.1.2 OTTEN ENGINEERING 1997

In 1997, Otten Engineering conducted an environmental assessment which included investigation of sediment quality. Ten surface (0 to 10 cm) sediment samples were collected at the site during the Phase 2 Environmental Assessment. The sample locations are shown on Figure 5 as DC-SED-01 through DC-SED-10, eight of which had sufficient recovery for analysis. The sediment samples were analyzed for some or all of the following constituents: metals, polycyclic aromatic hydrocarbons (PAHs), porewater tributyltin (TBT), PCBs, volatile organic compounds (VOCs), and TOC.

2.1.3 HART CROWSER 2000

Two composite core sediment samples were collected as part of the further characterization for dredge material management. The DCI basin was divided into two Dredge Material Management Units (DMMUs). One composite core sample was collected from each DMMU. Each composite sample was comprised of sediment from four discrete cores, labeled D1-01 through D1-04 and D2-01 through D2-04, as shown on Figure 5. The cores were composites from approximately 0 to 4 ft below the surface of the sediments in DMMU 1 [sample D1-Comp-(A)] and from about 0 to 5 ft below the surface of the sediments in DMMU 2 [sample D2-Comp-(A)]. The two samples were analyzed for metals, SVOCs, porewater TBT, PCBs, VOCs, pesticides, TOC, total solids, total volatile solids, ammonia, and total sulfide.

2.1.4 EPA SITE INSPECTION 2002

The EPA contractor, WESTON, conducted a site inspection in uplands and marine areas of DCI in 2001, with the report appearing in August 2002. As part of the site inspection, 15 surface (0 to 10 cm) sediment samples were collected in or very near to the DCI basin. Sediment samples were analyzed for metals, SVOCs, bulk TBT, PCBs, and pesticides. Sediment samples from the site inspection are labeled as IT001 through IT005, IH001 through IH004, and OH001 through OH006, as shown on Figure 5. The site inspection report (WESTON 2002) evaluated data against background samples collected from Deadman Bay in Guemes Channel.

2.1.5 SUMMARY OF DCI BASIN DATA

The four investigations described above resulted in the collection of samples from 42 locations in or immediately adjacent to the DCI basin and the analysis of 28 samples for a broad set of analytes, including metals, TBT (bulk and porewater), SVOCs, PAHs, VOCs, PCBs, pesticides, and TOC. The 28 samples consisted of 23 discrete surface sediment (0 to 10 cm) samples and 5 composite samples ranging in depth from 0 to 2 ft to 0 to 5 ft below the surface of the sediments. As shown on Figure 5, sediment sample locations are distributed throughout the DCI basin and provide an adequate characterization of sediment quality. Based on the number of samples collected and their distribution throughout the site, further sampling for characterization of sediment quality is not required as investigations to date "adequately characterize the areal and vertical distribution and concentrations of hazardous substances" [WAC 173-340-350(7)(c)(iii)(A)].

3.0 SEDIMENT QUALITY EVALUATION

This section compares sediment quality, based on the data from the four investigations, to chemical criteria presented in the SMS (Chapter 173-204 WAC). Composite samples collected for DMMP purposes are compared to the SMS chemical criteria for informational reasons only (i.e., showing the subsurface sediment quality), and are not used as a basis for determining compliance with the MTCA regulations, which typically use surface sediment data. The SMS chemical criteria include the Cleanup Screening Levels (CSL) and the Sediment Quality Standards (SQS), which are described in greater detail below. Detected concentrations were compared to the SMS chemical criteria. A comprehensive data compilation is presented in Table 1. Chemicals with any detected concentrations which exceeded the SMS chemical criteria were evaluated further; data for these chemicals were plotted on Figures 6 through 8. Trends observed on Figures 6 through 8 were used as a basis for identifying areas of potential interest in the DCI basin.

3.1 RELEVANT AND APPLICABLE SEDIMENT QUALITY CRITERIA

The CSL and SQS are used as sediment screening levels for comparison purposes in this report. The SMS identifies two levels of biological effects, which correspond to chemical concentrations in sediment identified as the CSL and the more protective SQS. According to the SMS, sediments that exceed the CSL criteria may require remedial action; however, the determination of whether remedial action is appropriate is typically based on an evaluation of "station clusters" of spatially and chemically similar sediments rather than simple identification of individual locations where chemical concentrations exceed the CSL. The station cluster evaluation identifies station clusters of "potential concern" if at least three stations exceed the SQS value and the three stations (sample locations) with the highest concentrations of each chemical have an average concentration that is greater than the CSL (WAC 173-204-500 and Ecology 1991). Otherwise, the station cluster is defined as a cluster of "low concern" and is no longer considered for potential remedial action.

Sediments that do not exceed the SQS criteria are considered by the Washington State SMS to have no adverse effect on biological resources. Sediment clusters that exceed the SQS criteria but not the CSL criteria are considered to have minor adverse effects on biological resources. Sediments that exceed the CSL criteria under a station cluster evaluation are considered to have potentially significant adverse effects on biological resources.

SMS criteria for most organic constituents (most SVOCs and total PCBs) are normalized to the organic carbon (OC) fraction of the sample. However, if a sample contains a low OC concentration (less than 0.5 percent), the organic results are compared to the dry weight-based Apparent Effects Thresholds

(AETs) (PTI 1988). There are four possible AETs (amphipod, oyster, benthic, and Microtox) for each compound. If the dry weight analytical results are below all four AETs, analytical results can be considered to be below the SQS.

SMS chemical criteria for TBT have not been promulgated. However, the Puget Sound Dredge Disposal Analysis (PSDDA) preliminary screening level for bulk TBT (i.e., 73 µg/kg) was used for comparison purposes for bulk sediment TBT measurements. In addition, the PSDDA evaluation criteria identifies a potential adverse effects sediment porewater TBT criteria of 0.15 µg/L (PSDDA 1996), which was used to screen porewater TBT data.

3.2 HART CROWSER 1985 RESULTS

Data for the three composite samples collected during the 1985 investigation are presented on Figures 6 through 8. Data for composite samples Dakota Creek, Pier 1, and Pier 2 are shown at discrete sample locations SSH-9, SSH-5, and SSH-1, respectively. All analytical data for these samples are presented in Table 1.

Metals and total PCBs concentrations were below the SQS and CSL values in all three composite samples. Concentrations of SVOCs were below the SQS and CSL values in the Dakota Creek and Pier 2 samples. Concentrations of dibenz(a,h)anthracene and butylbenzylphthalate in the Pier 1 sample exceeded the SQS, but not the CSL. There are no SMS screening levels for pesticides. The only pesticide detected was 4,4'-DDE, which was detected at a concentration slightly above the reporting limit in the Dakota Creek sample.

Based on the results of these three composite samples, sediment quality in these areas do not have an adverse effect on biological resources. Sediment from all three areas was approved for open-water disposal based on the results of these samples (Appendix A). The area adjacent to Pier 1 was dredged for construction of the synchrolift, as described in Section 1.2.2. Data from the samples in this investigation are included in the discussion of sediment quality in Section 3.6.

3.3 OTTEN ENGINEERING 1997 RESULTS

Only two of the eight samples collected during the 1997 investigation (DC-SED-03 and DC-SED-08) contained chemical detections exceeding the SMS chemical criteria. Data for the samples collected during the 1997 investigation are presented on Figures 6 through 8. All analytical data for these samples are presented in Table 1.

Sample DC-SED-03, near the existing marine railway, contained copper, zinc, and porewater TBT concentrations (1,240 mg/kg, 528 mg/kg, and 0.40 µg/L, respectively) above the SQS (390 mg/kg,

410 mg/kg, and 0.15 µg/L, respectively). Only the concentration of copper (1,240 mg/kg) in the sample was greater than the CSL (390 mg/kg). Due to the low level of TOC in the sample (0.372 percent), comparison to the dry weight-based AETs is appropriate for these organic compounds. Comparison of the dry weight concentrations of organic compounds to the AETs shows that only fluoranthene exceeds the four AETs. The concentration of fluoranthene in sample DC-SED-03 (1,710 µg/kg) does not exceed the amphipod, oyster, or benthic AETs and only slightly exceeds the Microtox AET (1,700 µg/kg).

Sample DC-SED-08, near the former marine railway, showed detected concentrations of total PCBs (32 mg/kg OC); phenanthrene (122 mg/kg OC); and high molecular weight PAHs (HPAHs) including fluoranthene (225 mg/kg OC), chrysene (121 mg/kg OC), indeno(1,2,3-cd)pyrene (44 mg/kg OC), dibenz(a,h)anthracene (14 mg/kg OC), and benzo(g,h,i)perylene (51 mg/kg OC) above the SQS (12, 100, 160, 110, 34, 12, and 31 mg/kg OC, respectively). However, the concentrations of all these compounds are below the CSL (65, 480, 1,200, 460, 88, 33, and 78 mg/kg OC, respectively).

Of the eight surface sediment samples analyzed during this investigation, only one (DC-SED-03) had a chemical concentration (of copper) indicative of potentially significant adverse effects on biological resources. Data from the samples in this investigation are included in the discussion of sediment quality in Section 3.6.

3.4 HART CROWSER 2000 RESULTS

Data in the two composite samples collected during the 2000 dredge material characterization are presented on Figures 6 through 8. All analytical data for these samples are presented in Table 1.

Concentrations of all detected compounds, including metals, SVOCs, porewater TBT, and total PCBs in composite sample D1-Comp-(A), from DMMU 1, were below SQS criteria. VOCs and pesticides were not detected except for 4,4'-DDD and 4,4'-DDT, which were detected at concentrations slightly above the reporting limit. There are no SQS or CSL screening levels for pesticides or VOCs.

In composite sample D2-Comp-(A), from DMMU 2, concentrations of HPAHs including pyrene (289 mg/kg OC), benzo(a)anthracene (167 mg/kg OC), chrysene (172 mg/kg OC), benzo(a)pyrene (133 mg/kg OC), indeno(1,2,3-cd)pyrene (67 mg/kg OC), and total HPAH (1,404 mg/kg OC) were above the SQS (65, 480, 1,200, 460, 88, 33, and 78 mg/kg OC, respectively). However, the concentrations of these compounds are below the CSL (1,200, 270, 460, 210, 88, and 5,300 mg/kg OC, respectively). Concentrations of all the remaining SVOCs, metals, PCBs, and porewater TBT were below the SQS. VOCs were not detected in the sample. Pesticides were not detected except for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT, which were detected at concentrations slightly above the reporting limit. Pesticides were not used at the site and the detected concentrations are likely the result of general sediment deposition in the

DCI basin from Guemes Channel and the well-known persistence of these compounds in the environment. Based on the results, VOCs and pesticides are not constituents of concern in the DMMP sediment samples.

Based on the data from these two composite samples, sediments in these areas do not have an adverse effect on biological resources because no chemical concentrations exceeded the CSL. DMMU 1 was approved for open-water disposal, as were the sediments below the contact with native till in DMMU 2. Preliminary plans for dredging are described in Section 4.0. Data from the samples in this investigation are included in the discussion of sediment quality in Section 3.6.

3.5 EPA SITE INSPECTION 2001 RESULTS

Two of the 15 sediment samples (IT004 and OH004) contained metals and/or SVOCs at concentrations exceeding the SQS; CSL values were exceeded only at one sample location (IT004). Eleven of the 15 sediment samples contained concentrations of bulk TBT above the preliminary screening level. Data for chemicals detected above the SQS in the samples collected during the 2001 site inspection are presented on Figures 6 through 8. All analytical data for these samples are presented in Table 1.

TOC was not reported for the sediment samples collected during the site inspection. SMS criteria for most SVOCs and total PCBs are normalized to organic carbon content of the sediments, as the chemical data for the samples also must be. Landau Associates collected two split sediment samples (at locations IT001 and IH002) during the site inspection and analyzed these two samples for TOC. For the purpose of comparing SVOC and total PCB data to SMS criteria, the TOC data from the Landau Associates split samples were used to normalize the site inspection SVOC and total PCB data. The TOC concentration in split sample IT001 (i.e., 0.8 percent), an intertidal sample, was used to normalize all site inspection intertidal samples (IT001 through IT004). The TOC concentration in split sample IH002 (2.45 percent), a subtidal samples, was used to normalize all the site inspection subtidal samples (IH001 through IH004 and OH001 through OH006).

Concentrations of arsenic (82.6 mg/kg), copper (1,140 mg/kg), mercury (0.43 mg/kg), and zinc (665 mg/kg) were above the SQS (57, 390, 0.41, and 410 mg/kg, respectively) in sample IT004, which is located near the current marine railway. Sample IT004 contained detected concentrations of individual and total LPAHs and HPAHs [total LPAH 384 mg/kg OC, total HPAH 1,987 mg/kg OC), bis(2-ethylhexyl)phthalate (BEP; 75 mg/kg OC)], and dibenzofuran (18 mg/kg OC) that exceeded the SQS (370, 960, 47, and 15 mg/kg OC, respectively). The concentrations of indeno(1,2,3-cd)pyrene (101 mg/kg OC) and benzo(g,h,i)perylene (104 mg/kg OC) in sample IT004 were also above the CSL (88 and 78 mg/kg OC, respectively).

Sample OH004 contained a detected concentration of fluoranthene (229 mg/kg OC) above the SQS (160 mg/kg OC), but below the CSL (1,200 mg/kg OC). A duplicate sample was analyzed for this sample location, and the detected value of fluoranthene (90 mg/kg OC) did not exceed the SQS.

Bulk TBT was detected at concentrations above the preliminary screening level (i.e., 73 µg/kg) in samples IT003 (137 mg/kg), IT004 (11,748 mg/kg), IT005 (378 mg/kg), IH001 (137 mg/kg), IH002 (1,344 mg/kg), IH003 (184 mg/kg), IH004 (182 mg/kg), OH001 (86.8 mg/kg), OH004 (121 mg/kg), OH005 (345 mg/kg), and OH006 (102 mg/kg). Low levels of pesticides were detected in some of the samples.

Of the 15 surface sediment samples analyzed during this investigation, only one (IT004) had chemical concentrations [of copper, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene] indicative of potentially significant adverse effects on biological resources. Data from the samples in this investigation are included in the discussion of sediment quality in Section 3.6.

3.6 SEDIMENT QUALITY CONCLUSIONS

This section summarizes conditions of the sediments in the DCI basin. Chemicals detected at concentrations exceeding the SQS for the 28 sediment samples analyzed in the four investigations are highlighted on Figures 6 through 8. Sediment quality results did not exceed SMS criteria and hence do not trigger requirements for a remedial action.

Metals concentrations greater than SQS values were observed in only two surface sediment samples. The samples were taken near the marine railway (DC-SED-03 and IT004). Copper was the only metal for which detected concentrations exceeded the CSL. As mentioned above and shown on Figure 6, only two sample locations had copper concentrations above the SQS. Under the station cluster screening process, the results meet the regulatory criteria for classification as a cluster of low concern with respect to metals. There were no exceedances of SMS criteria and hence no requirements for a remedial action were triggered.

Bulk sediment TBT concentrations, which are shown on Figure 7, exceeded the preliminary screening level at sample locations throughout the site. However, porewater TBT concentrations are widely considered to reflect the overall presence of TBT. The two composite sediment samples collected by Hart Crowser in 2000 [D1-Comp-(A) and D2-Comp-(A)] contained porewater TBT at concentrations less than the PSDDA screening level of 0.15 µg/L. There were no exceedances of SMS criteria and hence no requirements for a remedial action were triggered.

As shown on Figure 8, SVOCs were detected at concentrations above SQS values in three surface sediment samples located near the existing and former marine railways (DC-SED-03, DC-SED-08, and IT004). The total HPAH concentration in composite sample D2-Comp-(A) also exceeded the SQS, but

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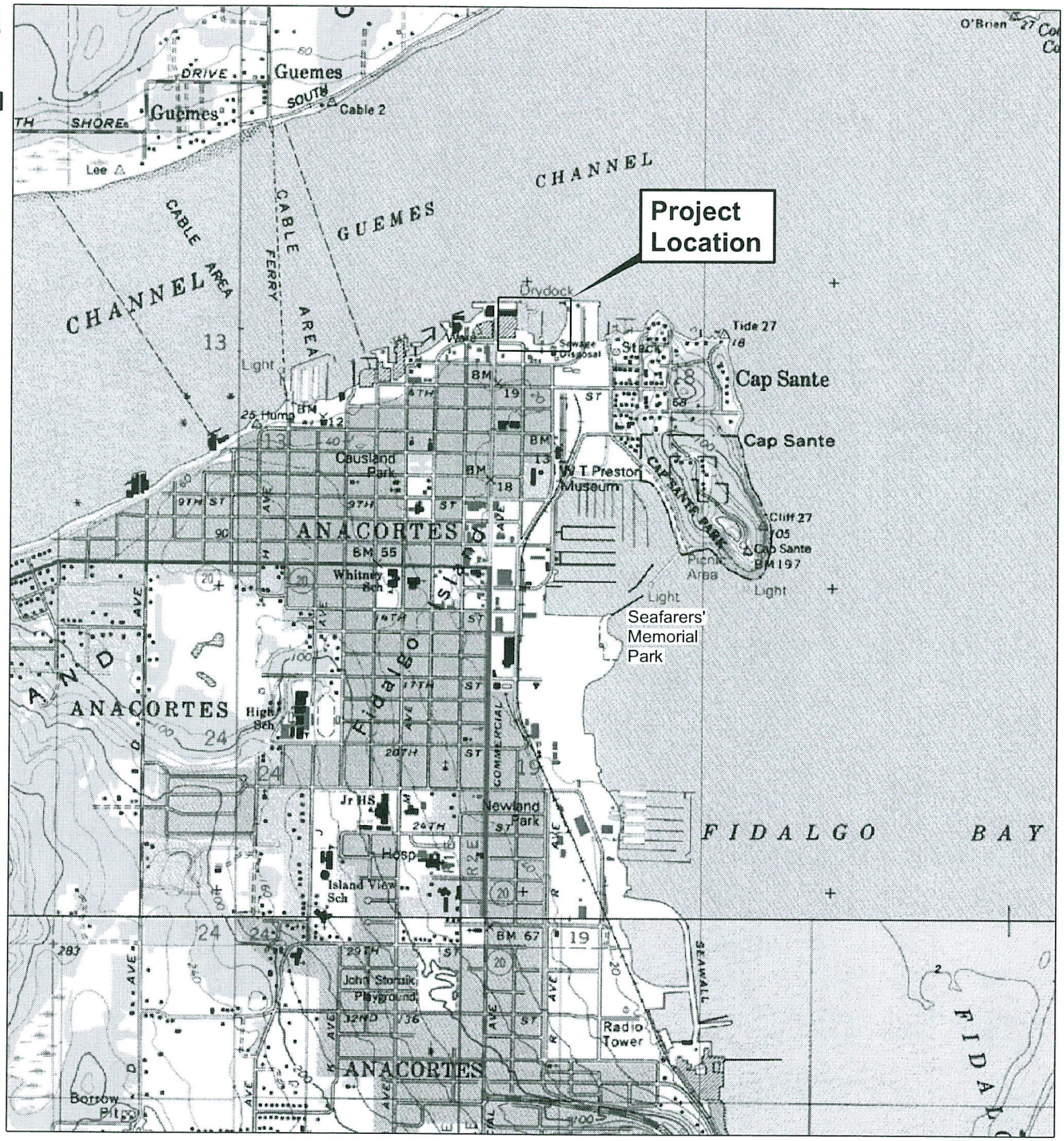
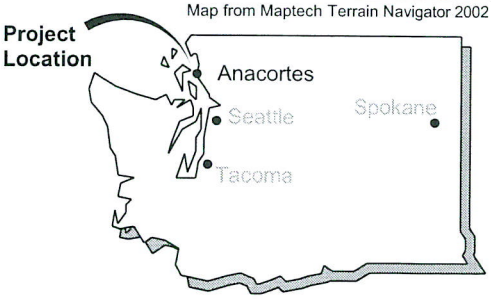


Map from Maptech Terrain Navigator 2002



0 2000 4000

Scale in Feet

PORT OF ANACORTES Est. 1926

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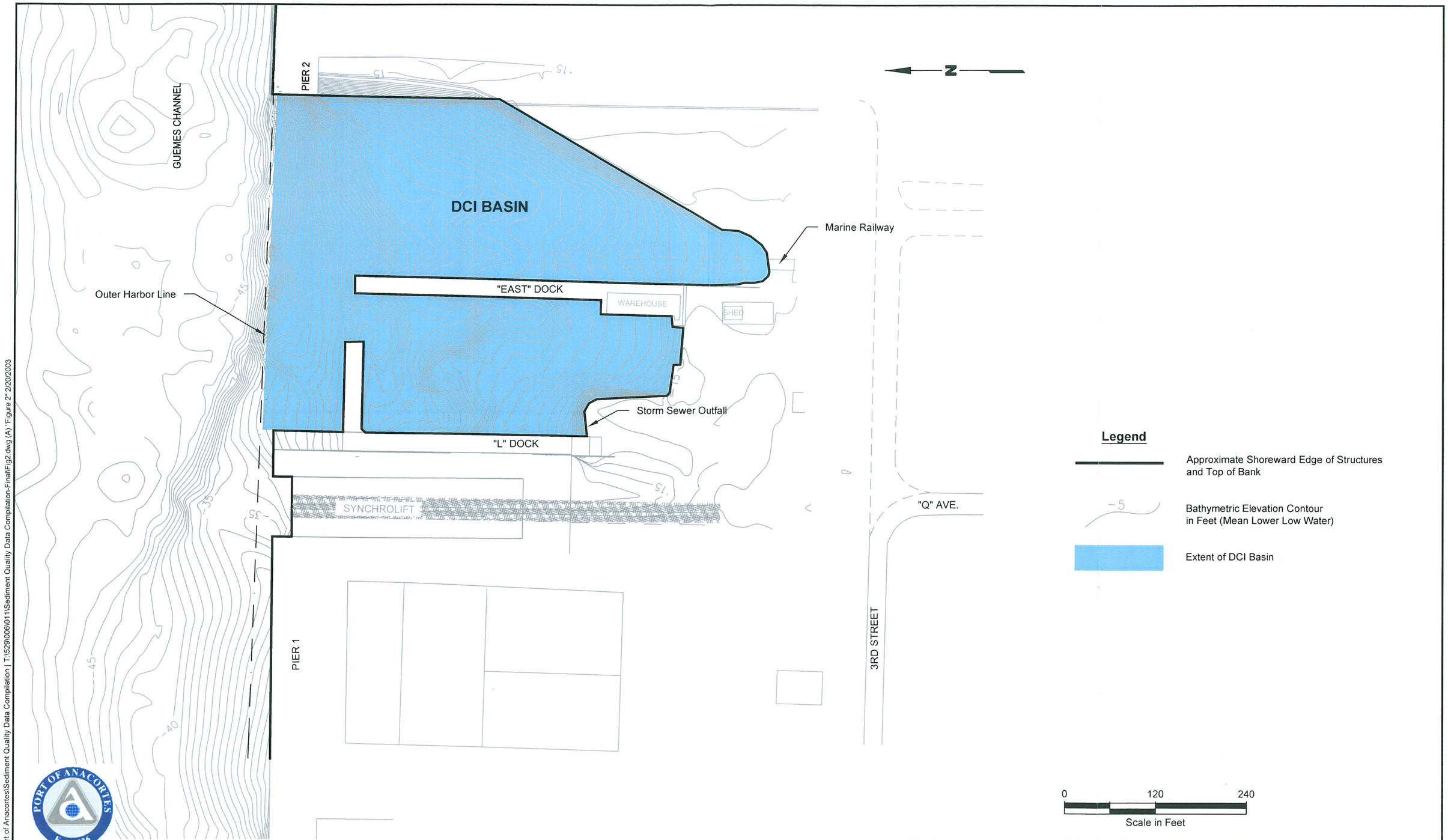
Port of Anacortes - DCI Basin Anacortes, Washington	**Vicinity Map**	Figure 1

Port of Anacortes\Sediment Quality Data Compilation | T:\529\006\011\Sediment Quality Data Compilation-Final\Fig1.dwg (A) "Figure 1" 2/20/2003



Port of Anacortes\Sediment Quality Data Compilation | T:\529006\011\Sediment Quality Data Compilation-Final\Fig2.dwg (A) "Figure 2" 2/20/2003

PORT OF ANACORTES Est. 1926

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Port of Anacortes - DCI Basin Anacortes, Washington	**Dakota Creek Industries Basin**	Figure 2

N

PORT OF ANACORTES LOG YARD

PIER 2

CATWALK

MUNICIPAL SANITARY SEWER OUTFALL

Truck Wash

Existing Waterfront

Marine Railway Winch

Marine Railway

"EAST" DOCK

Wood Working (1960–1980s)

Paint House (1925–1950s)

Steel Shop and Welding (1960s)

GUEMES CHANNEL

Marine Railway Early 1990s

Municipal Storm Sewer Outfall

Wood Working (Post 1925–1950s)

"L" DOCK

USTs (Removed 1991)

EQUIPMENT MAINTENANCE SHED

Former Scott Paper Outfall (1973–1978)

Steel Oil Tanks (Post 1925–1960s)

"Q" AVE.

Great Northern RR

Machine Shop

1975 Earth Fill Area

(Post 1925–Pre 1950s)

Welding

3RD STREET

PIER 1

Original Scott Paper Outfall (1964–1973)

0 120 240

Scale in Feet

PORT OF ANACORTES Est. 1926

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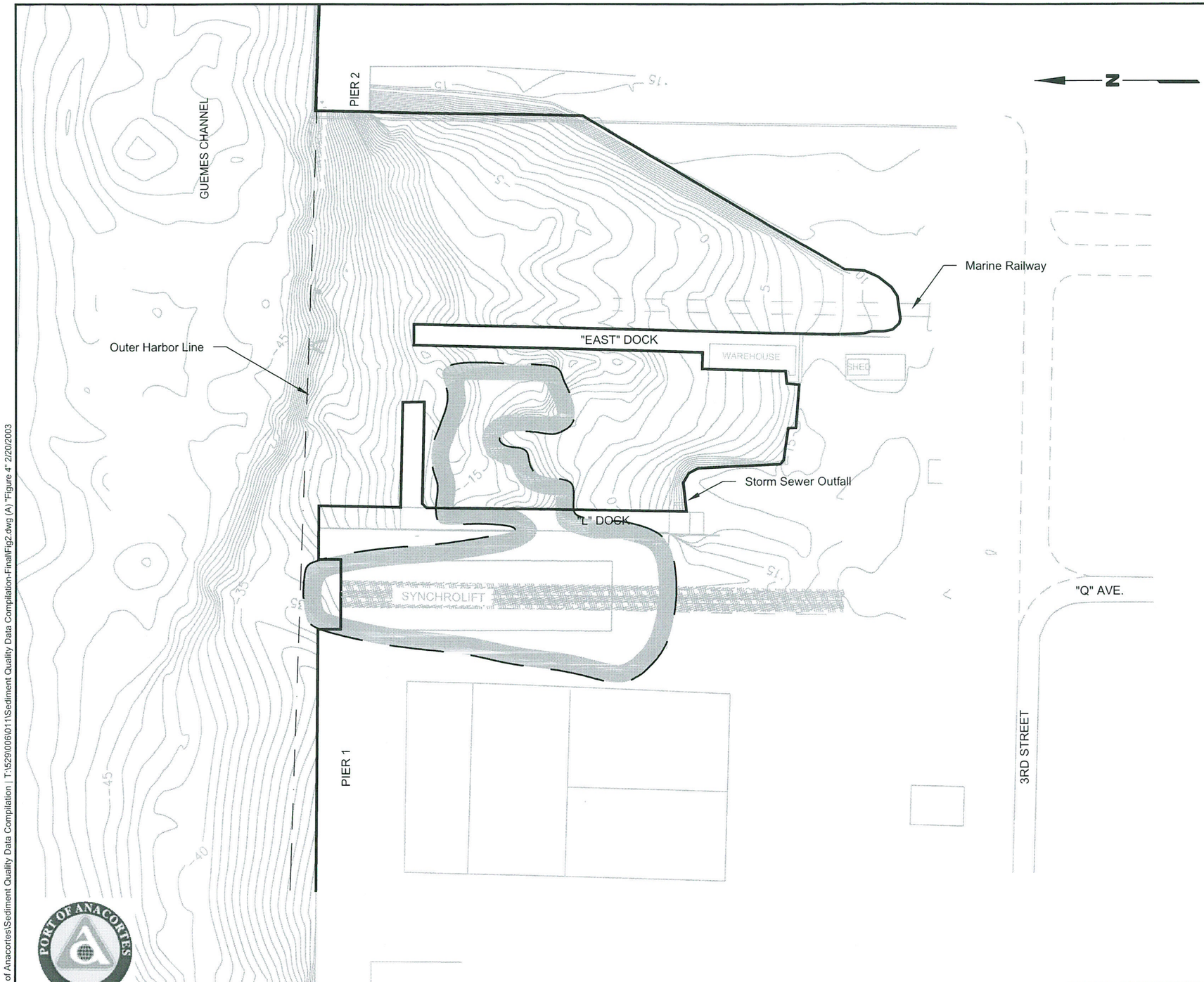
Port of Anacortes - DCI Basin Anacortes, Washington	**Composite Historical Use**	Figure 3

Port of Anacortes\Sediment Quality Data Compilation | T:\529\006\011\Sediment Quality Data Compilation-Final\Fig3.dwg (A) "Figure 3 (2)" 2/20/2003



Legend

Approximate Shoreward Edge of Structures and Top of Bank

Bathymetric Elevation Contour in Feet (Mean Lower Low Water)

Approximate Syncrolift Dredging Limits (Late 1980s)

Note

Approximate dredging limits based on plan view drawing dated September 9, 1986, titled "Proposed Dredging, Slope Protection, Boat Lift, Piers, and Boat Holding Basin, Outfall, and Mitigation, No. 071-043-2-010357 (Dakota Creek Industries, Applicant; Port of Anacortes, Owner)."

0 120 240

Scale in Feet

Port of Anacortes\Sediment Quality Data Compilation | T:\529\006\011\Sediment Quality Data Compilation-FinalFig2.dwg (A) "Figure 4" 2/20/2003

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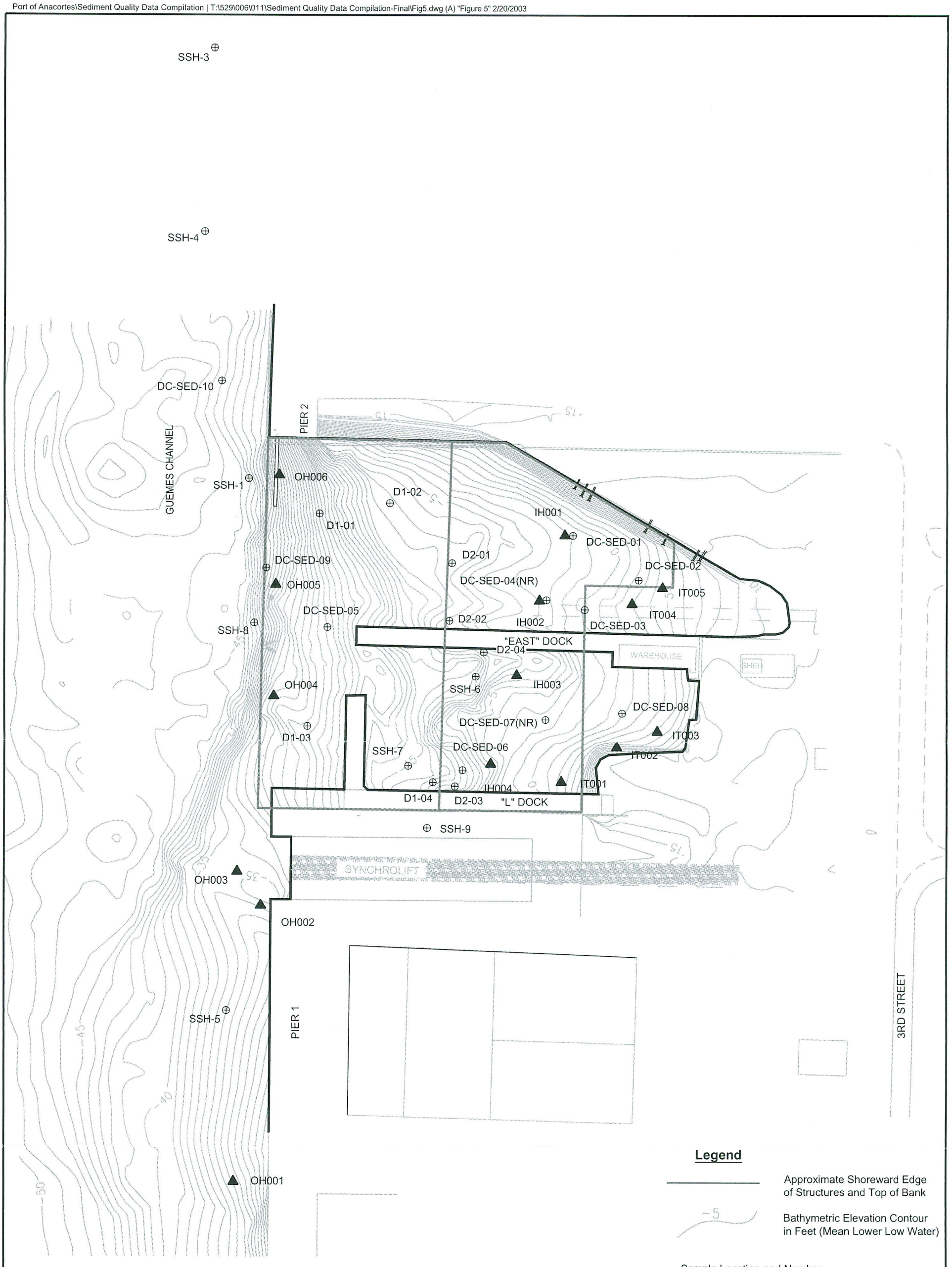
Port of Anacortes - DCI Basin Anacortes, Washington	**Historical Synchrolift Dredge Area**	Figure 4



Legend

Approximate Shoreward Edge of Structures and Top of Bank

-5 Bathymetric Elevation Contour in Feet (Mean Lower Low Water)

Sample Location and Number

⊕ D1-01	Sediment Core (Hart Crowser, 2000)
⊕ SSH-6	Sediment Core (Hart Crowser, 1985)
⊕ DC-SED-01	Surface Sediment (Otten Engineering, 1997)
▲ IT001	Surface Sediment (WESTON, 2001)

N

0 120 240
Scale in Feet

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Port of Anacortes - DCI Basin
Anacortes, Washington

Sediment Sampling Locations

Figure 5

DC-SED-10, 0-10 cm	
As	NA
Cu	16.2
Hg	NA
Zn	NA

OH006, 0-10 cm	
As	4
Cu	30
Hg	ND
Zn	43.9

D1-Comp-(A), ~0-4 ft	
As	5.5
Cu	37.4
Hg	0.20
Zn	82.7

D2-Comp-(A), ~0-5 ft	
As	12.4
Cu	174
Hg	0.22
Zn	257

IH001, 0-10 cm	
As	8.1
Cu	62.8
Hg	0.14
Zn	81.6

DC-SED-01, 0-10 cm	
As	NA
Cu	55.4
Hg	NA
Zn	52.3

DC-SED-09, 0-10 cm	
As	2.1
Cu	15.3
Hg	NA
Zn	21.3

Pier 2, ~0-4 ft	
As	1.8
Cu	16
Hg	0.1
Zn	35

IH002, 0-10 cm	
As	10
Cu	129
Hg	ND
Zn	104

DC-SED-02, 0-10 cm	
As	6.94
Cu	42.8
Hg	ND
Zn	48.9

OH005, 0-10 cm	
As	5.3
Cu	25.9
Hg	ND
Zn	63.1

DC-SED-03, 0-10 cm	
As	37.6
Cu	1,240
Hg	NA
Zn	528

IT005, 0-10 cm	
As	35.1
Cu	223
Hg	0.13
Zn	195

IT004, 0-10 cm	
As	82.6
Cu	1,140
Hg	0.43
Zn	665

IH003, 0-10 cm	
As	11.5
Cu	46
Hg	ND
Zn	92.8

DC-SED-05, 0-10 cm	
As	5.88
Cu	42.7
Hg	NA
Zn	78.1

DC-SED-06, 0-10 cm	
As	5.86
Cu	50.1
Hg	NA
Zn	80

DC-SED-08, 0-10 cm	
As	5.86
Cu	374
Hg	ND
Zn	171

OH004, 0-10 cm	
As	3.8
Cu	16.4
Hg	ND
Zn	36.2

IT003, 0-10 cm	
As	26
Cu	199
Hg	ND
Zn	142

IT002, 0-10 cm	
As	5
Cu	74.8
Hg	ND
Zn	51.3

IH004, 0-10 cm	
As	5
Cu	26.3
Hg	0.11
Zn	54.7

IT001, 0-10 cm	
As	5
Cu	93.6
Hg	0.39
Zn	78.3

OH003, 0-10 cm	
As	8.7
Cu	23.2
Hg	ND
Zn	31.2

OH002, 0-10 cm	
As	5.3
Cu	31.2
Hg	ND
Zn	46

Dakota Creek, ~0-2 ft	
As	6.5
Cu	63
Hg	0.4
Zn	120

Pier 1, ~0-2 ft	
As	4.2
Cu	2.2
Hg	0.1
Zn	59

OH001, 0-10 cm	
As	4.5
Cu	27.5
Hg	ND
Zn	44.1

GUEMES CHANNEL
PIER 2
PIER 1
SSH-1
SSH-5
SSH-6
SSH-7
SSH-8
SSH-9
D1-01
D1-02
D1-03
D1-04
D2-01
D2-02
D2-03
D2-04
"EAST" DOCK
"L" DOCK
SYNCHROLIFT
SHED
"Q" AVE.
3RD STREET
N
-5
-35
-45
-40

Legend

Approximate Shoreward Edge of Structures and Top of Bank

Bathymetric Elevation Contour in Feet (Mean Lower Low Water)

NR No Recovery

ND Not Detected

NA Not Analyzed

Concentration Greater than SQS

IT005, 0-10 cm	
Arsenic	35.1
Copper	223
Mercury	0.13
Zinc	195

Sample Location, Depth Metal, and Concentration in mg/kg

D1-Comp-(A) = Composite Sample of D1-01 Through D1-04

D2-Comp-(A) = Composite Sample of D2-01 Through D2-04

Dakota Creek = Composite Sample of SSH-6, SSH-7, and SSH-9

Only Metals that Exceed the SQS are Shown

Metal	SQS (mg/kg)	CSL (mg/kg)
Arsenic	57	93
Copper	390	390
Mercury	0.41	0.59
Zinc	410	960

Sample Location and Number

- ⊕ D1-01 — Sediment Core (Hart Crowser, 2000)
- ⊕ SSH-6 — Sediment Core (Hart Crowser, 1985)
- ⊕ DC-SED-01 — Surface Sediment (Otten Engineering, 1997)
- ▲ IT001 — Surface Sediment (WESTON, 2001)

0 120 240

Scale in Feet

Port of Anacortes - DCI Basin
Anacortes, Washington

Metal Concentrations in Sediments

Figure 6

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Port of Anacortes\Sediment Quality Data Compilation | T:\529\006\011\Sediment Quality Data Compilation-Final\Fig6.dwg (A) "Figure 6" 2/20/2003

DC-SED-10, 0-10 cm
Porewater TBT NA

D1-Comp-(A), ~0-4 ft
Porewater TBT 0.1

D2-Comp-(A), ~0-5 ft
Porewater TBT 0.13

PIER 2

GUEMES CHANNEL

OH006, 0-10 cm
BulkTBT 102

SSH-1

D1-01

D1-02

Pier 2, ~0-4 ft
Porewater TBT NA

DC-SED-09, 0-10 cm
Porewater TBT NA

OH005, 0-10 cm
BulkTBT 345

D2-01

IH001, 0-10 cm
BulkTBT 137

DC-SED-01, 0-10 cm
Porewater TBT NA

DC-SED-02, 0-10 cm
Porewater TBT NA

IT005, 0-10 cm
BulkTBT 378

IH002, 0-10 cm
BulkTBT 1,344

DC-SED-05, 0-10 cm
Porewater TBT NA

SSH-8

D2-02

IT004, 0-10 cm
BulkTBT 11,748

"EAST" DOCK

DC-SED-03, 0-10 cm
Porewater TBT 0.4

D2-04

OH004, 0-10 cm
BulkTBT 121

SSH-6

IH003, 0-10 cm
BulkTBT 1.84

DC-SED-08, 0-10 cm
Porewater TBT 0.08

D1-03

IH004, 0-10 cm
BulkTBT 182

IT003, 0-10 cm
BulkTBT 137

SSH-7

D1-04

D2-03

IT002, 0-10 cm
BulkTBT 14.9

"L" DOCK

IT001, 0-10 cm
BulkTBT 25.3

SSH-9

DC-SED-06, 0-10 cm
Porewater TBT 0.07

OH003, 0-10 cm
BulkTBT 9.1

SYNCHROLIFT

OH002, 0-10 cm
BulkTBT 12.8

Dakota Creek, ~0-2 ft
Porewater TBT NA

SSH-5

Pier 1, ~0-2 ft
Porewater TBT NA

PIER 1

"Q" AVE.

3RD STREET

OH001, 0-10 cm
BulkTBT 86.8

N

Legend

Approximate Shoreward Edge of Structures and Top of Bank

-5 Bathymetric Elevation Contour in Feet (Mean Lower Low Water)

NR No Recovery

NA Not Analyzed

IT001, 0-10 cm	
Compound	Concentration

Sample Locations, Depth
TBT, and Concentration
Bulk TBT Concentration in µg/kg
Porewater TBT Concentrations in µg/L

D1-Comp-(A) = Composite Sample of D1-01 Through D1-04

D2-Comp-(A) = Composite Sample of D2-01 Through D2-04

Sample Location and Number

⊕ D1-01 Sediment Core (Hart Crowser, 2000)

⊕ SSH-6 Sediment Core (Hart Crowser, 1985)

⊕ DC-SED-01 Surface Sediment (Otten Engineering, 1997)

▲ IT001 Surface Sediment (WESTON, 2001)

0 120 240
Scale in Feet

Port of Anacortes\Sediment Quality Data Compilation | T:\529\006\011\Sediment Quality Data Compilation-Final\Fig7.dwg (A) "Figure 7" 2/20/2003

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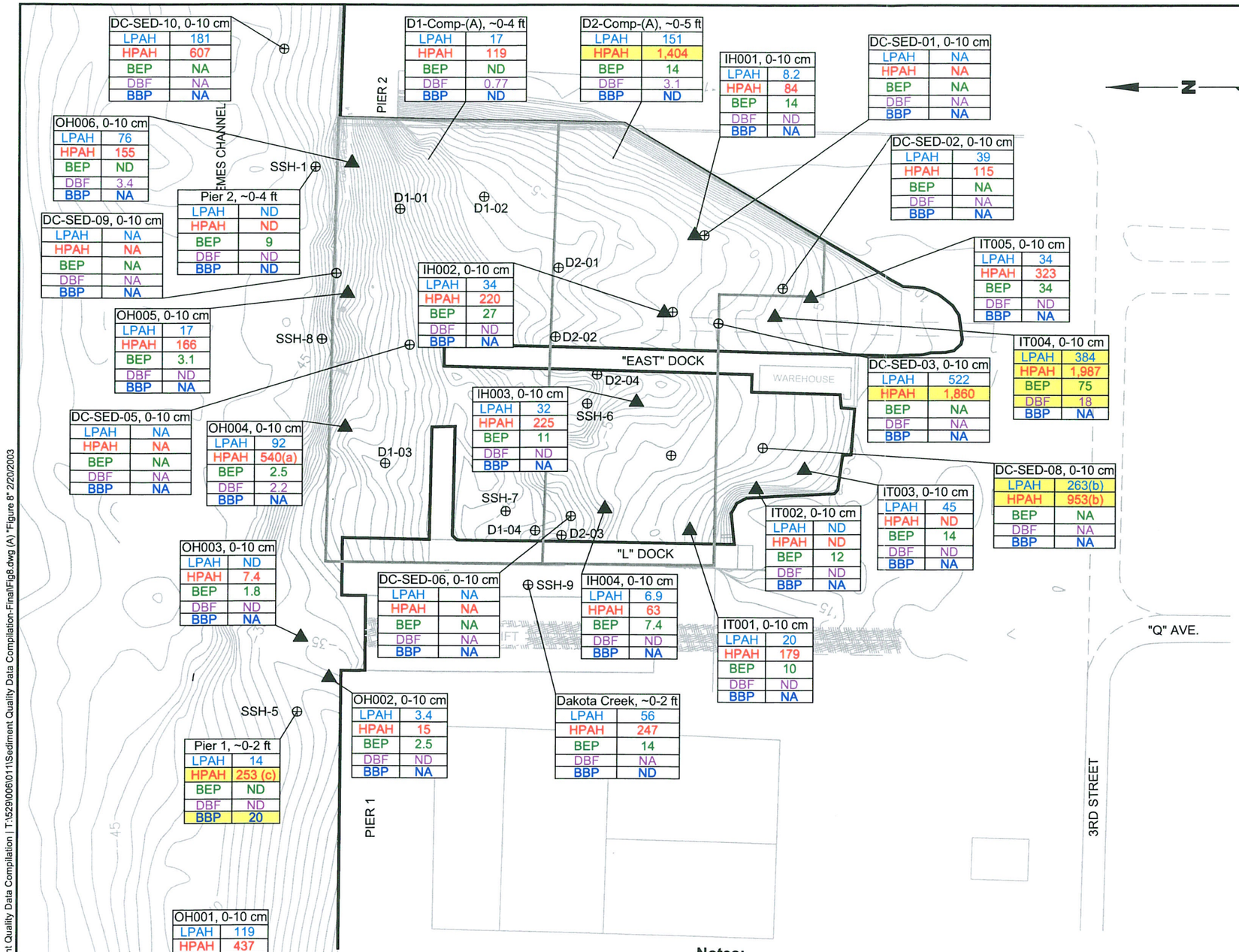
Port of Anacortes - DCI Basin Anacortes, Washington	**Bulk and Porewater TBT Concentrations in Sediment**	Figure 7



Legend

Approximate Shoreward Edge of Structures and Top of Bank

-5 Bathymetric Elevation Contour in Feet (Mean Lower Low Water)

NR No Recovery

ND Not Detected

NA Not Analyzed

Concentration Greater than SQS

IT005, 0-10 cm	
LPAH	34
HPAH	323
BEP	34
DBF	ND
BBP	NA

Sample Location, Depth Compound, and Concentration in mg/kg - OC

LPAH Low Molecular Weight Polycyclic Aromatic Hydrocarbon

HPAH High Molecular Weight Polycyclic Aromatic Hydrocarbon

BEP Bis(2-ethylhexyl)phthalate

DBF Dibenzofuran

BBP Butylbenzylphthalate

Metal	SQS (mg/kg)	CSL (mg/kg)
LPAH	370	780
HPAH	960	5300
BEP	47	78
DBF	15	58
BBP	4.9	64

D1-Comp-(A) = Composite Sample of D1-01 Through D1-04

D2-Comp-(A) = Composite Sample of D2-01 Through D2-04

Dakota Creek = Composite Sample of SSH-6, SSH-7, and SSH-9

Only Semivolatile Organic Compounds that Exceed the SQS are Shown

Sample Location and Number

⊕ D1-01 Sediment Core (Hart Crowser, 2000)

⊕ SSH-6 Sediment Core (Hart Crowser, 1985)

⊕ DC-SED-01 Surface Sediment (Otten Engineering, 1997)

▲ IT001 Surface Sediment (WESTON, 2001)

Notes:

(a) Concentration of fluoranthene in OH004 is greater than the SQS; however, the detected concentration in the duplicate sample is less than the SQS.

(b) Concentrations of phenanthrene, fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene in DC-SED-08 are greater than the SQS.

(c) Concentrations of dibenz(a,h)anthracene in Sample Pier 1 is greater than the SQS.

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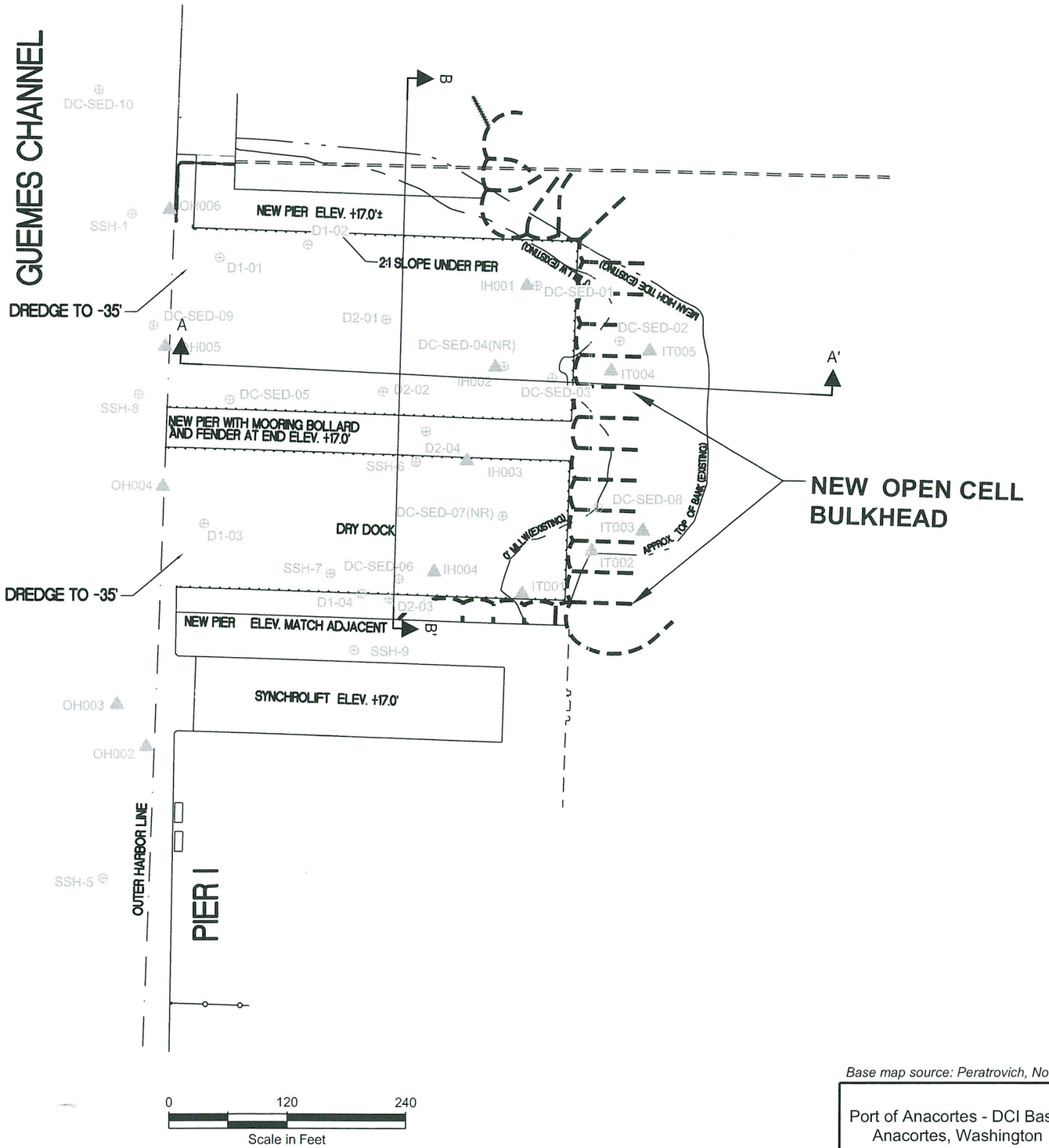
Port of Anacortes - DCI Basin Anacortes, Washington	**Semivolatile Organic Compound Concentrations in Sediment**	Figure 8

Port of Anacortes\Sediment Quality Data Compilation | T:\529\006\011\Sediment Quality Data Compilation-Final\Fig8.dwg "Figure 8" 2/20/2003



Base map source: Peratrovich, Nottingham & Drage 2003.

Port of Anacortes - DCI Basin Anacortes, Washington	**Selected Redevelopment Features**	Figure 9

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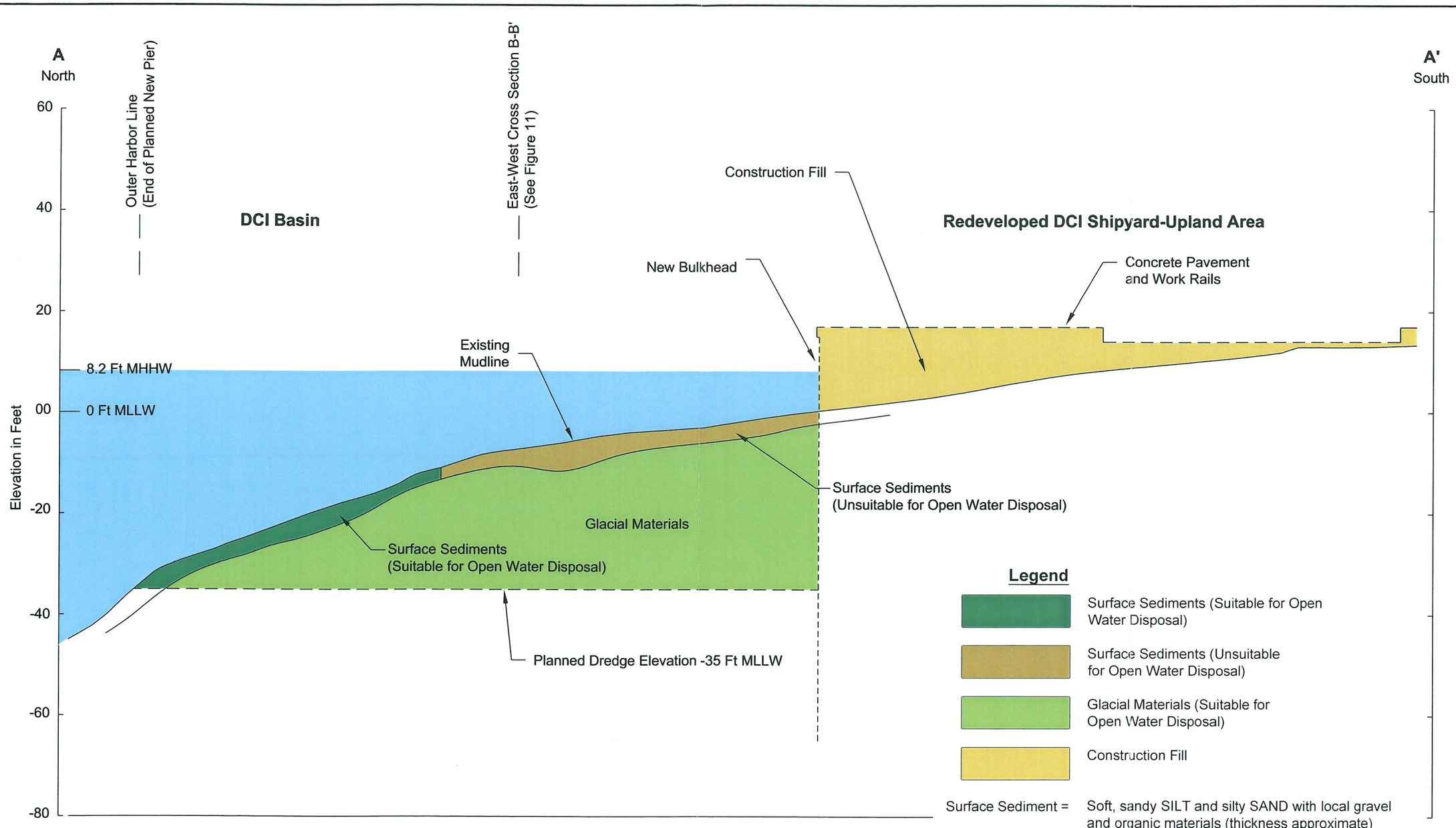

Legend

- Surface Sediments (Suitable for Open Water Disposal)
- Surface Sediments (Unsuitable for Open Water Disposal)
- Glacial Materials (Suitable for Open Water Disposal)
- Construction Fill

Surface Sediment = Soft, sandy SILT and silty SAND with local gravel and organic materials (thickness approximate)

Glacial Material = Dense SAND, silty SAND, and SILT/CLAY with varying amounts of gravel

Note

Drawing prepared from cross section profile provided by Peratrovich, Nottingham & Drage, dated February 10, 2003.

Horizontal Scale in Feet
0 60 120
0 20 40
Vertical Scale in Feet
Vertical Exaggeration x 3

Adapted from Hart Crowser 2003

PORT OF ANACORTES Est. 1926

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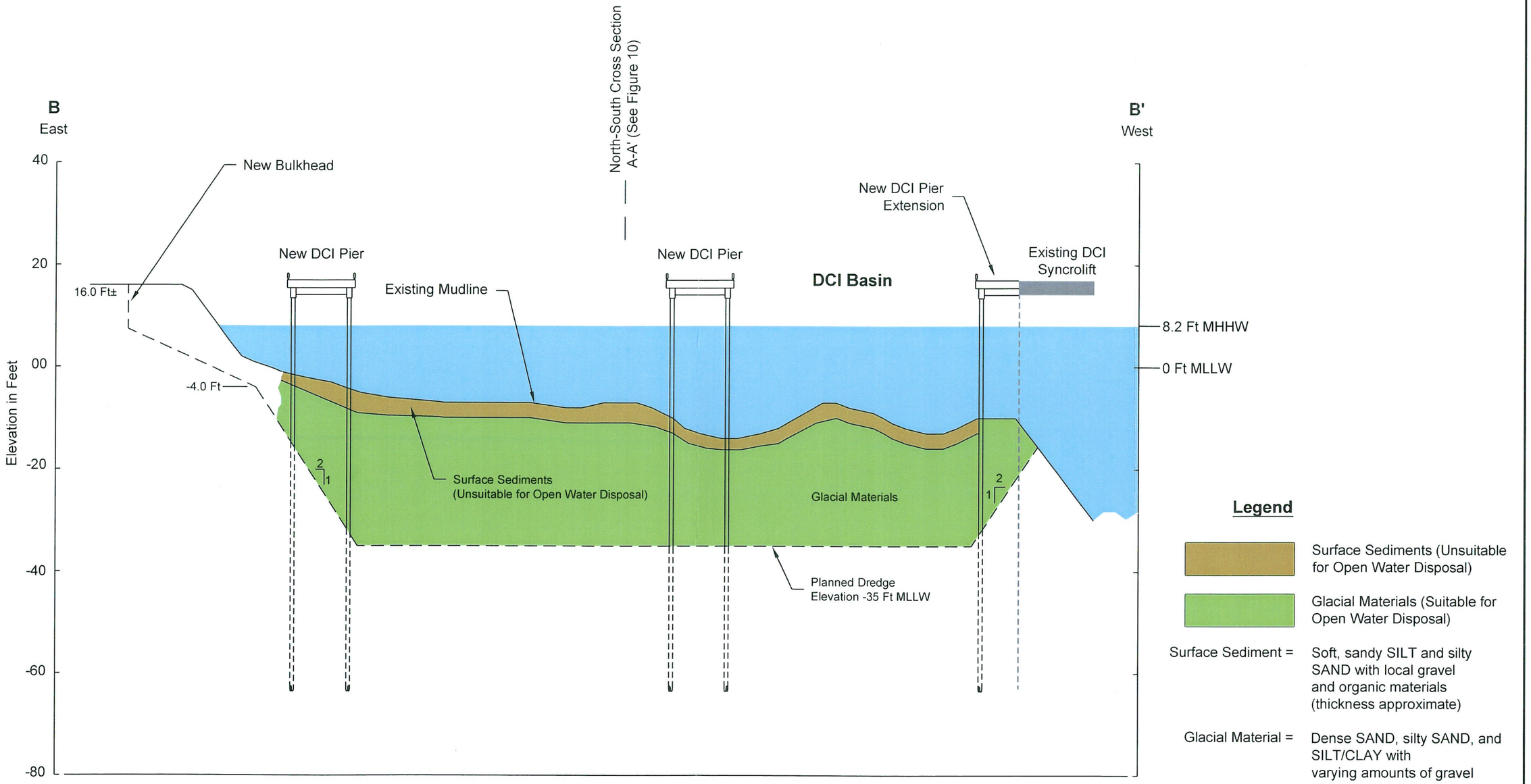
Port of Anacortes - DCI Basin Anacortes, Washington	**Planned Dredge Area Cross Section A-A'**	Figure 10

Port of Anacortes\Sediment Quality Data Compilation | T:\529006\011\Sediment Quality Data Compilation-Final\Fig10.dwg (A) 'Figure 10' 2/20/2003



Note

Drawing prepared from cross section profile provided by Peratrovich, Nottingham & Drage, dated February 10, 2003.

Horizontal Scale in Feet
0 60 120
0 20 40
Vertical Scale in Feet
Vertical Exaggeration x 3

Adapted from Hart Crowser 2003

Port of Anacortes - DCI Basin Anacortes, Washington	**Planned Dredge Area Cross Section B-B'**	Figure 11

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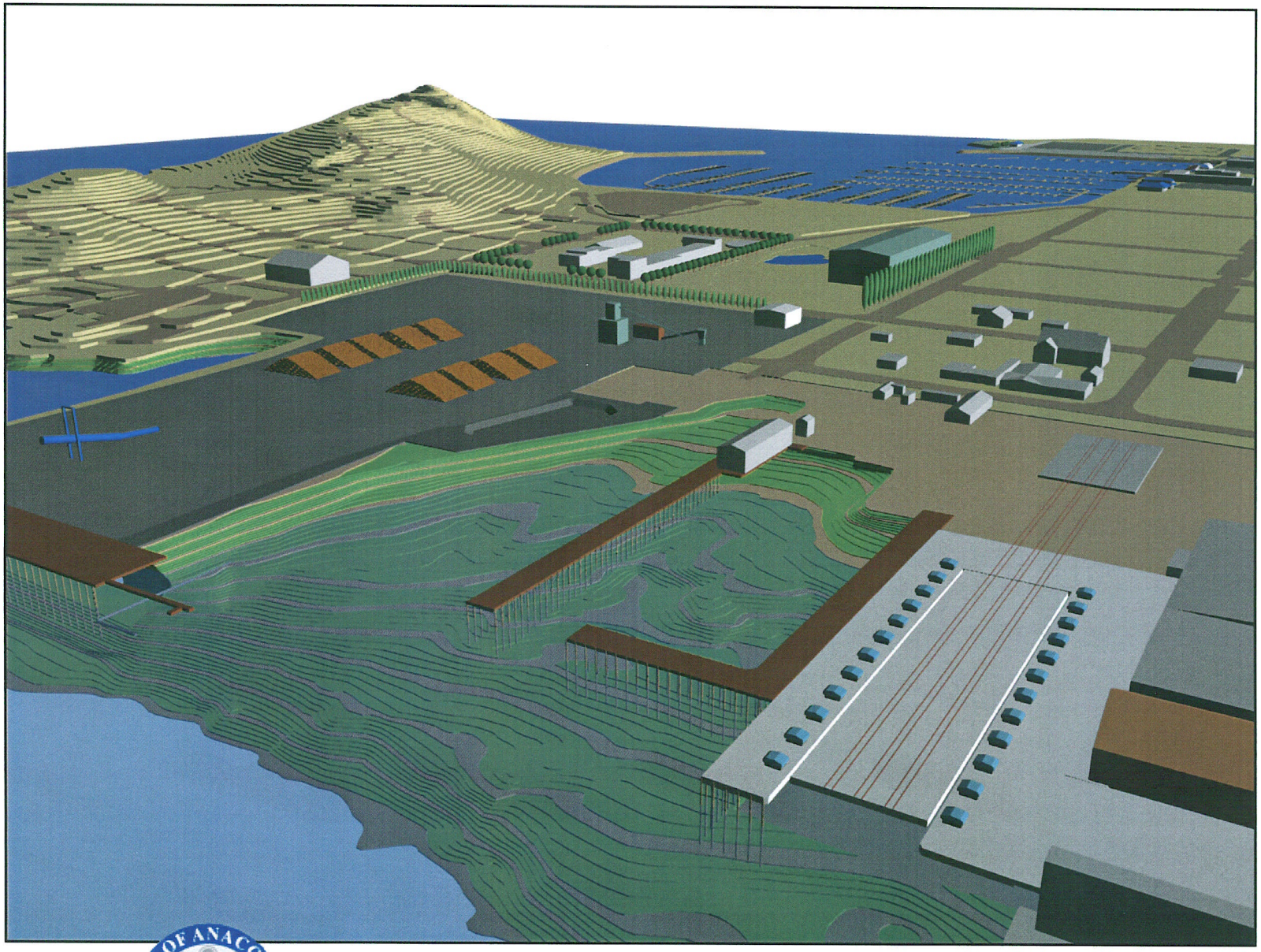

Source: The Johnson Partnership, 2002

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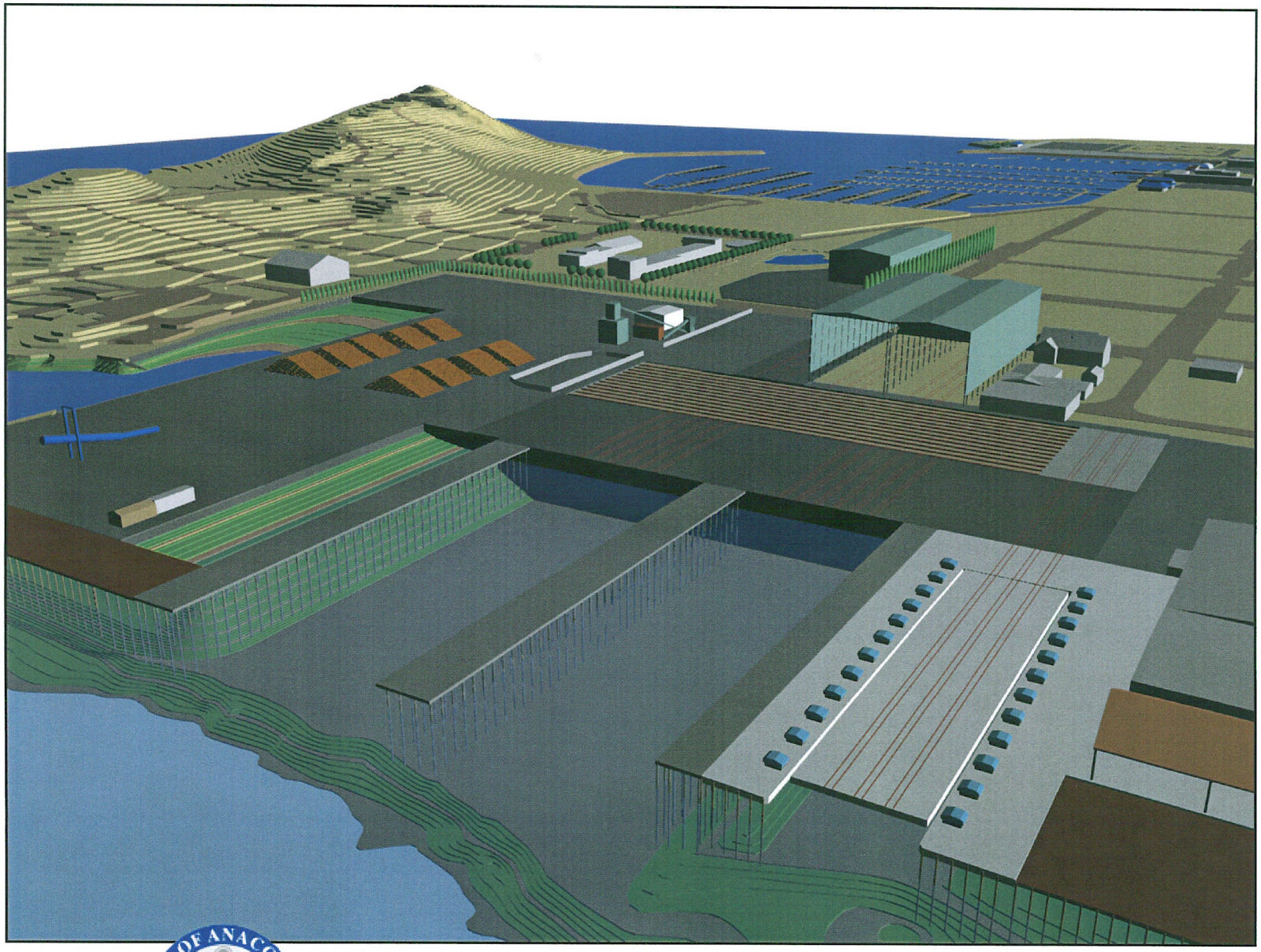
PORT OF ANACORTES Est. 1926

Port of Anacortes – DCI Basin
Anacortes, Washington

**Pier 1 Redevelopment:
Existing Conditions**

Figure
12

Source: S:\SHAREDOC\529\006\061\Presentation 1-14-03.ppt



Source: The Johnson Partnership, 2002

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PORT OF ANACORTES Est. 1926

Port of Anacortes – DCI Basin
Anacortes, Washington

Pier 1 Redevelopment:
Proposed Redevelopment

Figure
13

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			IT001	IT002	IT003	IT004	IT005	IH001	IH002
Depth (centimeters):			0-10	0-10	0-10	0-10	0-10	0-10	0-10
Description:	SQS (a)	CSL (b)	Intertidal	Intertidal	Intertidal	Intertidal	Intertidal	Inner Harbor	Inner Harbor
Metals (mg/kg)									
Aluminum	NA	NA	6140	4270	5880	15400	7220	12300	9800
Antimony	NA	NA	1.4 BJL	1.7 BJL	7.2 BJL	8.6 BJL	6.3 BJL	1.9 BJL	1.6 BJL
Arsenic	57	93	6.9 JH	5 JH	26 JH	82.6 JH	35.1 JH	8.1 JL	10 JL
Barium	NA	NA	58	36.3 B	36.6 B	215	50.5	42.4 B	44.1 B
Beryllium	NA	NA	0.03 U	0.03 U	0.04 U	0.22 B	0.06 U	0.09 B	0.07 B
Cadmium	5.1	6.7	0.28 B	0.05 U	0.06 U	1.3 B	0.04 U	0.26 U	0.31 U
Calcium	NA	NA	22000	14300	11000	64500	17400	5330	5610
Chromium	260	270	18.6	10.1	21.9	53.8	18.1	33.6 JH	27.1 JH
Cobalt	NA	NA	3.7 B	4.6 B	7.6 B	21.7	8.6 B	6.1 B	5.5 B
Copper	390	390	93.6 JH	74.8 JH	199 JH	1140 JH	223 JH	62.8 JK	129 JK
Iron	NA	NA	13100	11000	17400	62500	20900	24400	19000
Lead	450	530	27.8	11.1	46	172	65.2	23 JH	16.6 JH
Magnesium	NA	NA	4710	3660	5430	10100	4360	8580	7130
Manganese	NA	NA	204	152	223	1180	326	257	192
Mercury	0.41	0.59	0.39	0.06 U	0.07 U	0.43	0.13	0.14 B	0.11 U
Nickel	NA	NA	18.4	19.6	27.8	25.7	15.8	29.4 JH	24.6 JH
Potassium	NA	NA	1080 B	615 B	983 B	2310	930 B	2930	2360
Selenium	NA	NA	0.95 U	0.83 U	0.94 U	0.95 U	0.74 U	1.7 U	1.4 U
Silver	6.100	6.100	0.51 B	0.39 B	0.65 B	1.7 B	0.67 B	0.9 U	0.66 U
Sodium	NA	NA	4040	2370	4870	4600	1270	16500 JL	13300 JL
Vanadium	NA	NA	22.5	16.2	21.4	56.7	26.6	42.1	35.3
Zinc	410	960	78.3 JK	51.3 JK	142 JK	665 JK	195 JK	81.6	104
PCBs (mg/kg OC) (c)									
Aroclor 1016	NA	NA							
Aroclor 1242	NA	NA							
Aroclor 1248	NA	NA							
Aroclor 1254	NA	NA	56 U	5.1 U	5.3 U	54 U	4.4 U	3.2 U	8.6
Aroclor 1260	NA	NA	56 U	5.1 U	5.3 U	54 U	4.4 U	3.2 U	2.7 U
Aroclor 1221	NA	NA							
Aroclor 1232	NA	NA							
Total PCBs (d)	12	65	56 U (h)	5.1 U	5.3 U	54 U (h)	4.4 U	3.2 U	8.6

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	IT001 0-10 Intertidal	IT002 0-10 Intertidal	IT003 0-10 Intertidal	IT004 0-10 Intertidal	IT005 0-10 Intertidal	IH001 0-10 Inner Harbor	IH002 0-10 Inner Harbor
PAHs (mg/kg OC) (c)									
Naphthalene	99	170	56 U	51 U	53 U	9.1 JQ	44 U	32 U	2.9 JQ
Acenaphthylene	66	66							
Acenaphthene	16	57	56 U (h)	51 U (h)	53 U (h)	33 JQ	44 U (h)	32 U (h)	27 U (h)
Fluorene	23	79	56 U (h)	51 U (h)	53 U (h)	28 JQ	44 U (h)	32 U (h)	2.9 JQ
Phenanthrene	100	480	20 JQ	51 U	45 JQ	263	29 JQ	8.2 JQ	22 JQ
Anthracene	220	1200	56 U	51 U	53 U	53 JQ	4.8 JQ	32 U	6.9 JQ
2-Methylnaphthalene	38	64	56 U (h)	51 U (h)	53 U (h)	18 JQ	44 U (h)	32 U	27 U
LPAH (d)(e)	370	780	20 JQ	51 U	45 JQ	384	34 JQ	8.2 JQ	34 JQ
Fluoranthene	160	1200	35 JQ	51 U	121	500	55	11 JQ	36
Pyrene	1000	1400	43 JQ	51 U	118	375	46	21 JQ	53
Benzo(a)anthracene	110	270	16 JQ	51 U	25 JQ	188	28 JQ	7.8 JQ	20 JQ
Chrysene	110	460	21 JQ	51 U	50 JQ	225	36 JQ	12 JQ	33
Benzo(b)fluoranthene	NA	NA	18 JQ	51 U	30 JQ	163	35 JQ	8.6 JQ	22 JQ
Benzo(k)fluoranthene	NA	NA	14 JQ	51 U	26 JQ	175	39 JQ	6.5 JQ	17 JQ
Total Benzofluoranthenes (f)	230	450	31	51 U	56	338	74 JQ	15 JQ	39 JQ
Benzo(a)pyrene	99	210	16 JQ	51 U	21 JQ	150	30 JQ	7.3 JQ	18 JQ
Indeno(1,2,3-c,d)pyrene	34	88	7.5 JQ	51 U (h)	8.9 JQ	101	26 JQ	4.1 JQ	9.8 JQ
Dibenz(a,h)anthracene	12	33	56 U (h)	51 U (h)	53 U (h)	6.50 JQ	44 U (h)	32 U (h)	27 U (h)
Benzo(g,h,i)perylene	31	78	8.6 JQ	51 U (h)	8.4 JQ	104	28 JQ	4.9 JQ	11 JQ
HPAH (d)(g)	960	5300	179	51 U	409	1987	323	84	220
SVOCs (mg/kg OC) (c)									
1,2-Dichlorobenzene	2.3	2.3							
1,3-Dichlorobenzene	NA	NA							
1,4-Dichlorobenzene	3.1	9							
1,2,4-Trichlorobenzene	0.81	1.8							
Hexachlorobenzene	0.38	2.3							
Dimethylphthalate	53	53	56 U (h)	51 U	53 U	16 JQ	44 U	32 U	27 U
Diethylphthalate	61	110							
Di-n-Butylphthalate	220	1700	56 U	51 U	53 U	5.8 JQ	44 U	32 U	27 U
Butylbenzylphthalate	4.9	64							
bis(2-Ethylhexyl)phthalate	47	78	10 JQ	12 JQ	14 JQ	75	34 JQ	14 JQ	27
Di-n-octyl phthalate	58	4500							
Dibenzofuran	15	58	56 U (h)	51 U (h)	53 U (h)	18 JQ	44 U (h)	32 U (h)	27 U (h)
Hexachlorobutadiene	3.9	6.2							
N-Nitrosodiphenylamine	11	11							
Hexachloroethane	NA	NA							
SVOCs (ug/kg)									
Phenol	420	1200							
3 & 4-Methylphenol	NA	NA							
2-Methylphenol	63	63							
4-Methylphenol	670	670	450 U	410 U	420 U	430 U	350 U	790 U (h)	660 U
2,4-Dimethylphenol	29	29							
Pentachlorophenol	360	690							
Benzyl Alcohol	57	73							
Benzoic Acid	650	650							
1,1-Biphenyl	NA	NA	450 U	410 U	420 U	54 JQ	350 U	790 U	660 U
Acetophenone	NA	NA	450 U	410 U	420 U	110 JQ	350 U	790 U	660 U
Carbazole	NA	NA	450 U	410 U	420 U	200 JQ	350 U	790 U	660 U

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			IT001	IT002	IT003	IT004	IT005	IH001	IH002
Depth (centimeters):			0-10	0-10	0-10	0-10	0-10	0-10	0-10
Description:	SQS (a)	CSL (b)	Intertidal	Intertidal	Intertidal	Intertidal	Intertidal	Inner Harbor	Inner Harbor
Organotins (ug/kg)									
Butyl Tin (as chloride)	NA	NA	13.8	12.5	53.5	453	90.8	42.7	101
Dibutyl Tin (as chloride)	NA	NA	11.5	11.2	105	1880	192	56.6	313
Tetrabutyl Tin	NA	NA	5.4 U	4.9 U	3.5 JQ	114	5.8	7.4 JQ	25.4
Tributyltin (as chloride)	NA	NA	28.4	16.7	154	13200	425	154	1510
Tributyltin (as TBT ion)	73 (i)	NA	25.3	14.9	137	11748	378	137	1344
Porewater Organotins (ug/L)									
Butyl Tin (as chloride)	NA	NA							
Dibutyl Tin (as chloride)	NA	NA							
Tetrabutyl Tin	NA	NA							
Tributyltin (as chloride)	NA	NA							
Tributyltin (as TBT ion)	0.15 (j)	NA							
Conventionals									
Total Organic Carbon (percent)	NA	NA	0.8 (k)	0.8 (k)	0.8 (k)	0.8 (k)	0.8 (k)	2.45 (l)	2.45 (l)
Solids, Total (percent)	NA	NA							
Solids, Total Volatile (percent)	NA	NA							
Ammonia as Nitrogen (mg-N/kg)	NA	NA							
Sulfide, Total (mg/kg)	NA	NA							
Pesticides (ug/kg)									
4,4'-DDD	NA	NA	45 U	4.1 U	0.75 JQ	43 U	3.5 U	7.9 U	6.6 U
4,4'-DDE	NA	NA							
4,4'-DDT	NA	NA	45 U	4.1 U	1.2 JQ	43 U	3.5 U	7.9 U	15 JNK
Total DDT	NA	NA							
Aldrin	NA	NA							
Alpha-BHC	NA	NA							
Alpha-chlordane	NA	NA	23 U	2.1 U	2.2 U	22 U	1.8 U	4 U	3.4 U
Beta-BHC	NA	NA	23 U	2.1 U	2.2 U	22 U	3.8 JK	4 U	3.4 U
Delta-BHC	NA	NA							
Dieldrin	NA	NA							
Endosulfan I	NA	NA							
Endosulfan II	NA	NA	45 U	4.1 U	4.2 U	43 U	3.5 U	7.9 U	6.6 U
Endosulfan Sulfate	NA	NA							
Endrin	NA	NA							
Endrin Aldehyde	NA	NA							
Endrin Ketone	NA	NA	45 U	4.1 U	4.2 U	43 U	3.5 U	7.9 U	6.6 U
Gamma-BHC (Lindane)	NA	NA							
Gamma-Chlordane	NA	NA	23 U	2.1 U	2.2 U	22 U	1.8 U	4 U	3.4 U
Heptachlor	NA	NA	23 U	2.1 U	2.2 U	22 U	1.8 U	4 U	3.4 U
Heptachlor Epoxide	NA	NA	23 U	2.1 U	2.2 U	22 U	1.9 JNK	4 U	3.4 U
Methoxychlor	NA	NA							
Toxaphene	NA	NA	2300 U	210 U	220 U	2200 U	180 U	400 U	340 U

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	IT001 0-10 Intertidal	IT002 0-10 Intertidal	IT003 0-10 Intertidal	IT004 0-10 Intertidal	IT005 0-10 Intertidal	IH001 0-10 Inner Harbor	IH002 0-10 Inner Harbor
VOCs (ug/kg)									
Ethylbenzene	NA	NA							
Tetrachloroethene	NA	NA							
Trichloroethene	NA	NA							
m,p-Xylenes	NA	NA							
o-Xylene	NA	NA							
Total Xylenes	NA	NA							

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			IH003	IH004	OH001	OH002	OH003	OH004	OH004
Depth (centimeters):			0-10	0-10	0-10	0-10	0-10	0-10	0-10
Description:	SQS (a)	CSL (b)	Inner Harbor	Inner Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor
Metals (mg/kg)									
Aluminum	NA	NA	11100	8000	4440	8290	5730	5660	5330
Antimony	NA	NA	2.3 BJL	1.7 UJK	0.97 UJK	0.8 UJK	1.5 BJL	0.91 UJK	0.88 UJK
Arsenic	57	93	11.5 JL	5 JL	4.5 JL	5.3 JL	8.7 JL	3.8 JL	3.4 JL
Barium	NA	NA	39.1 B	27.5 B	41.3 B	36.1 B	31.8 B	30.1 B	46.6 B
Beryllium	NA	NA	0.1 B	0.07 B	0.03 U	0.07 B	0.04 B	0.05 B	0.05 B
Cadmium	5.1	6.7	0.23 U	0.31 U	0.25 U	0.06 U	0.05 U	0.16 U	0.07 U
Calcium	NA	NA	5630	4010	138000	44700	34200	89100	54000
Chromium	260	270	29.3 JH	20.9 JH	10.2 JH	20.5 JH	16.3 JH	14.8 JH	15.7 JH
Cobalt	NA	NA	6 B	4.4 B	2.5 B	6 B	4.7 B	3.1 B	3.2 B
Copper	390	390	46 JK	26.3 JK	27.5 JK	31.2 JK	23.2 JK	16.4 JK	18.9 JK
Iron	NA	NA	20700	14900	8380	15400	12500	10400	9990
Lead	450	530	15.9 JH	7.8 JH	7.6 JH	3.7 JH	4.9 JH	3.9 JH	6.2 JH
Magnesium	NA	NA	7980	6300	4640	6760	5230	5300	4960
Manganese	NA	NA	201	145	114	235	167	144	129
Mercury	0.41	0.59	0.12 U	0.11 B	0.08 U	0.07 U	0.06 U	0.08 U	0.07 U
Nickel	NA	NA	27.2 JH	19.7 JH	10.7 BJH	24.9 JH	18.5 JH	15.4 JH	16.3 JH
Potassium	NA	NA	2680	2280	1190 B	1800	1050 B	1280 B	1280 B
Selenium	NA	NA	1.6 U	1.5 U	1.1 U	0.94 U	0.84 U	1.9	1 U
Silver	6.100	6.100	0.7 U	0.63 U	0.14 UJK	0.43 U	0.33 B	0.17 UJK	0.28 U
Sodium	NA	NA	15300 JL	15100 JL	9710 JL	5720 JL	4460 JL	7370 JL	7330 JL
Vanadium	NA	NA	38	26.9	15.5 B	29.5	23.3	19.2	17.9
Zinc	410	960	92.8	54.7	44.1	46	31.2	36.2	41.1
PCBs (mg/kg OC) (c)									
Aroclor 1016	NA	NA							
Aroclor 1242	NA	NA							
Aroclor 1248	NA	NA							
Aroclor 1254	NA	NA	32 U	2.9 U	1.9 U	1.8 U	1.6 U	1.8 U	1.9 U
Aroclor 1260	NA	NA	32 U	2.9 U	1.9 U	1.8 U	1.6 U	1.8 U	1.9 U
Aroclor 1221	NA	NA							
Aroclor 1232	NA	NA							
Total PCBs (d)	12	65	32 U (h)	2.9 U	1.9 U	1.8 U	1.6 U	1.8 U	1.9 U

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			IH003	IH004	OH001	OH002	OH003	OH004	OH004
Depth (centimeters):			0-10	0-10	0-10	0-10	0-10	0-10	0-10
Description:	SQS (a)	CSL (b)	Inner Harbor	Inner Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor
PAHs (mg/kg OC) (c)									
Naphthalene	99	170	32 U	29 U	3.3 JQ	18 U	16 U	18 U	19 U
Acenaphthylene	66	66							
Acenaphthene	16	57	32 U (h)	29 U (h)	6.9 JQ	18 U (h)	16 U	3.6 JQ	4.5 JQ
Fluorene	23	79	32 U (h)	29 U (h)	6.1 JQ	18 U	16 U	3.6 JQ	3.0 JQ
Phenanthrene	100	480	24 JQ	6.9 JQ	82	3.4 JQ	16 U	78	32
Anthracene	220	1200	7.8 JQ	29 U	21	18 U	16 U	6.9 JQ	3.1 JQ
2-Methylnaphthalene	38	64	32 U	29 U	19 U	18 U	16 U	18 U	19 U
LPAH (d)(e)	370	780	32 JQ	6.9 JQ	119	3.4 JQ	16 U	92	43
Fluoranthene	160	1200	41	12 JQ	102	6.1 JQ	3.2 JQ	229	90
Pyrene	1000	1400	53	16 JQ	82	6.9 JQ	2.5 JQ	139	61
Benzo(a)anthracene	110	270	21 JQ	6.9 JQ	49	18 U	16 U	27	9.8 JQ
Chrysene	110	460	31 JQ	11 U	90	2.4 JQ	1.7 JQ	73	25
Benzo(b)fluoranthene	NA	NA	21 JQ	7.3 JQ	38	18 U	16 U	31	11 JQ
Benzo(k)fluoranthene	NA	NA	18 JQ	5.7 JQ	28	18 U	16 U	22	7.3 JQ
Total Benzofluoranthenes (f)	230	450	39 JQ	13 JQ	65	18 U	16 U	52	18 JQ
Benzo(a)pyrene	99	210	19 JQ	6.9 JQ	32	18 U	16 U	13 JQ	4.5 JQ
Indeno(1,2,3-c,d)pyrene	34	88	10 JQ	3.4 JQ	7.8 JQ	18 U	16 U	3.6 JQ	19 U
Dibenz(a,h)anthracene	12	33	32 U (h)	29 U (h)	19 U (h)	18 U (h)	16 U (h)	18 U (h)	19 U (h)
Benzo(g,h,i)perylene	31	78	11 JQ	3.9 JQ	9.8 JQ	18 U	16 U	3.8 JQ	19 U
HPAH (d)(g)	960	5300	225	63	437	15	7.4	540	209
SVOCs (mg/kg OC) (c)									
1,2-Dichlorobenzene	2.3	2.3							
1,3-Dichlorobenzene	NA	NA							
1,4-Dichlorobenzene	3.1	9							
1,2,4-Trichlorobenzene	0.81	1.8							
Hexachlorobenzene	0.38	2.3							
Dimethylphthalate	53	53	32 U	29 U	19 U	18 U	16 U	18 U	19 U
Diethylphthalate	61	110							
Di-n-Butylphthalate	220	1700	32 U	29 U	19 U	18 U	16 U	18 U	19 U
Butylbenzylphthalate	4.9	64							
bis(2-Ethylhexyl)phthalate	47	78	11 JQ	7.3 JQ	6.1 JQ	2.4 JQ	1.8 JQ	2.5 JQ	19 U
Di-n-octyl phthalate	58	4500							
Dibenzofuran	15	58	32 U (h)	29 U (h)	4.1 JQ	18 U (h)	16 U (h)	2.2 JQ	2.5 JQ
Hexachlorobutadiene	3.9	6.2							
N-Nitrosodiphenylamine	11	11							
Hexachloroethane	NA	NA							
SVOCs (ug/kg)									
Phenol	420	1200							
3 & 4-Methylphenol	NA	NA							
2-Methylphenol	63	63							
4-Methylphenol	670	670	790 U (h)	700 U (h)	66 JQ	430 U	75 JQ	48 JQ	460 U
2,4-Dimethylphenol	29	29							
Pentachlorophenol	360	690							
Benzyl Alcohol	57	73							
Benzoic Acid	650	650							
1,1-Biphenyl	NA	NA	790 U	700 U	460 U	430 U	390 U	450 U	460 U
Acetophenone	NA	NA	790 U	700 U	460 U	430 U	390 U	450 U	460 U
Carbazole	NA	NA	790 U	700 U	160 JQ	430 U	390 U	150 JQ	83 JQ

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			IH003	IH004	OH001	OH002	OH003	OH004	OH004
Depth (centimeters):			0-10	0-10	0-10	0-10	0-10	0-10	0-10
Description:	SQS (a)	CSL (b)	Inner Harbor	Inner Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor
Organotins (ug/kg)									
Butyl Tin (as chloride)	NA	NA	25.7	20.3	13.9	27.8 U	1 JQ	7.5	6.9
Dibutyl Tin (as chloride)	NA	NA	65.4	38.1	26.7	10 U	4.9 U	14.7	6.4
Tetrabutyl Tin	NA	NA	5.6 JQ	4.6 JQ	12.6	10 U	4.9 U	5.2 JQ	5.3 U
Tributyltin (as chloride)	NA	NA	207 JL	204	97.5	14.4	10.2 JL	136	44.8
Tributyltin (as TBT ion)	73 (i)	NA	184	182	86.8	12.8	9.1	121	40
Porewater Organotins (ug/L)									
Butyl Tin (as chloride)	NA	NA							
Dibutyl Tin (as chloride)	NA	NA							
Tetrabutyl Tin	NA	NA							
Tributyltin (as chloride)	NA	NA							
Tributyltin (as TBT ion)	0.15 (j)	NA							
Conventionals									
Total Organic Carbon (percent)	NA	NA	2.45 (l)	2.45 (l)	2.45 (l)	2.45 (l)	2.45 (l)	2.45 (l)	2.45 (l)
Solids, Total (percent)	NA	NA							
Solids, Total Volatile (percent)	NA	NA							
Ammonia as Nitrogen (mg-N/kg)	NA	NA							
Sulfide, Total (mg/kg)	NA	NA							
Pesticides (ug/kg)									
4,4'-DDD	NA	NA	79 U	7 U	3.6 JQ	4.3 U	3.9 U	4.5 U	4.6 U
4,4'-DDE	NA	NA							
4,4'-DDT	NA	NA	79 U	7 U	4.6 U	4.3 U	3.9 U	4.5 U	4.6 U
Total DDT	NA	NA							
Aldrin	NA	NA							
Alpha-BHC	NA	NA							
Alpha-chlordane	NA	NA	40 U	3.6 U	2.4 U	2.2 U	2 U	3.1 JNK	2.4 U
Beta-BHC	NA	NA	40 U	3.6 U	2.4 U	2.2 U	2 U	2.3 U	2.4 U
Delta-BHC	NA	NA							
Dieldrin	NA	NA							
Endosulfan I	NA	NA							
Endosulfan II	NA	NA	79 U	7 U	4.6 U	4.3 U	3.9 U	4.5 U	4.6 U
Endosulfan Sulfate	NA	NA							
Endrin	NA	NA							
Endrin Aldehyde	NA	NA							
Endrin Ketone	NA	NA	79 U	7 U	4.6 U	4.3 U	3.9 U	5.6 JNK	4.6 U
Gamma-BHC (Lindane)	NA	NA							
Gamma-Chlordane	NA	NA	40 U	3.6 U	2.4 U	2.2 U	2 U	2.3 U	2.4 U
Heptachlor	NA	NA	40 U	3.6 U	2.4 U	2.2 U	2 U	2.3 U	2.4 U
Heptachlor Epoxide	NA	NA	40 U	3.6 U	2.4 U	2.2 U	2 U	2.3 U	2.4 U
Methoxychlor	NA	NA							
Toxaphene	NA	NA	4000 U	360 U	240 U	220 U	200 U	230 U	240 U

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			IH003	IH004	OH001	OH002	OH003	OH004	OH004
Depth (centimeters):			0-10	0-10	0-10	0-10	0-10	0-10	0-10
Description:	SQS (a)	CSL (b)	Inner Harbor	Inner Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor	Outer Harbor
VOCs (ug/kg)									
Ethylbenzene	NA	NA							
Tetrachloroethene	NA	NA							
Trichloroethene	NA	NA							
m,p-Xylenes	NA	NA							
o-Xylene	NA	NA							
Total Xylenes	NA	NA							

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	OH005 0-10 Outer Harbor	OH006 0-10 Outer Harbor	D1-Comp-(A) (m)	D2-Comp-(A) (n)	DC-SED-01	DC-SED-02	DC-SED-03
Metals (mg/kg)									
Aluminum	NA	NA	8540	6630					
Antimony	NA	NA	1.6 BJL	1.4 BJL	0.39 J	12.4 J			
Arsenic	57	93	5.3 JL	4 JL	5.5	28.8		6.94	37.6
Barium	NA	NA	47.3 B	25.1 B					
Beryllium	NA	NA	0.07 B	0.05 B					
Cadmium	5.1	6.7	0.16 U	0.12 U	0.45	1			
Calcium	NA	NA	5410	5580					
Chromium	260	270	24.5 JH	19.7 JH	31.7 J	36.1 J	21.4 J	6.98 J	32.8 J
Cobalt	NA	NA	5.4 B	4.3 B					
Copper	390	390	25.9 JK	30 JK	37.4 J	174 J	55.4	42.8	1240
Iron	NA	NA	15700	11900					
Lead	450	530	23.4 JH	17.4 JH	14.5 J	48.8 J	9.87	94.6	63.8
Magnesium	NA	NA	6610	5620					
Manganese	NA	NA	172	142					
Mercury	0.41	0.59	0.09 U	0.08 U	0.20	0.22			
Nickel	NA	NA	27.6 JH	23.2 JH	35.5 J	34.6 J	25.2 J	17.0 J	15.3 J
Potassium	NA	NA	1950	1380 B					
Selenium	NA	NA	1.3 U	1.1 U					
Silver	6.100	6.100	0.58 U	0.40 U	0.12	0.26	0.0720	0.0699 J	0.421 J
Sodium	NA	NA	10200 JL	7970 JL					
Vanadium	NA	NA	30.9	22.7					
Zinc	410	960	63.1	43.9	82.7	257	52.3	48.9	528
PCBs (mg/kg OC) (c)									
Aroclor 1016	NA	NA			0.36 U	0.56 U			
Aroclor 1242	NA	NA			0.36 U	0.56 U			
Aroclor 1248	NA	NA			0.36 U	0.56 U			
Aroclor 1254	NA	NA	4.2	1.9 U	0.51	1.3			
Aroclor 1260	NA	NA	2.2 U	5.7	0.36 U	0.56 U			
Aroclor 1221	NA	NA			0.73 U	1.1 U			
Aroclor 1232	NA	NA			0.36 U	0.56 U			
Total PCBs (d)	12	65	4.2	5.7	0.51	1.3			20 (p)

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	OH005 0-10 Outer Harbor	OH006 0-10 Outer Harbor	D1-Comp-(A) (m)	D2-Comp-(A) (n)	DC-SED-01	DC-SED-02	DC-SED-03
PAHs (mg/kg OC) (c)									
Naphthalene	99	170	22 U	2.0 JQ	2.3	5.1		12	
Acenaphthylene	66	66			0.84	12			
Acenaphthene	16	57	22 U	4.9 JQ	0.73 U	6.1			
Fluorene	23	79	22 U	4.9 JQ	1.4	6.7		2.8	56 (p)
Phenanthrene	100	480	13 JQ	57	8.4	78		19	363 (p)
Anthracene	220	1200	4.0 JQ	7.3 JQ	3.6	44		5.4	104
2-Methylnaphthalene	38	64	22 U	2.2 JQ	0.73 U	2.0		16	
LPAH (d)(e)	370	780	17	76	17	151		39	522 (p)
Fluoranthene	160	1200	49	57	22	289		8.0	460
Pyrene	1000	1400	45	49	33	356		13	414
Benzo(a)anthracene	110	270	12 JQ	11 JQ	14	167		14	187 (p)
Chrysene	110	460	25	16 JQ	15	172		16	221 (p)
Benzo(b)fluoranthene	NA	NA	12 JQ	9.8 JQ	11	89			
Benzo(k)fluoranthene	NA	NA	11 JQ	6.1 JQ	7.7	94			
Total Benzofluoranthenes (f)	230	450	24 JQ	16 JQ	19	183		11	245 (p)
Benzo(a)pyrene	99	210	8.6 JQ	5.3 JQ	9.5	133		16	138 (p)
Indeno(1,2,3-c,d)pyrene	34	88	22 U	19 U	4.4	67		7.8	97 (p)
Dibenz(a,h)anthracene	12	33	22 U (h)	19 U (h)	0.73 U	9.4		12	
Benzo(g,h,i)perylene	31	78	2.4 JQ	19 U	2.8	28		19	97 (p)
HPAH (d)(g)	960	5300	166	155	119	1404		115	1860 (p)
SVOCs (mg/kg OC) (c)									
1,2-Dichlorobenzene	2.3	2.3			0.11 U	0.22			
1,3-Dichlorobenzene	NA	NA			0.11 U	0.17 U			
1,4-Dichlorobenzene	3.1	9			0.11 J	0.17 J			
1,2,4-Trichlorobenzene	0.81	1.8			0.18 U	0.28 U			
Hexachlorobenzene	0.38	2.3			0.15 U	0.22 U			
Dimethylphthalate	53	53	22 U	19 U	0.73 U	1.1 U			
Diethylphthalate	61	110			0.73 U	1.1 U			
Di-n-Butylphthalate	220	1700	22 U	19 U	0.73 U	1.1 U			
Butylbenzylphthalate	4.9	64			0.73 U	1.1 U			
bis(2-Ethylhexyl)phthalate	47	78	3.1 JQ	8.6 U	7.30 U	14			
Di-n-octyl phthalate	58	4500			0.73 U	1.1 U			
Dibenzofuran	15	58	22 U (h)	3.3 JQ	0.77	3.1			
Hexachlorobutadiene	3.9	6.2			0.73 U	1.1 U			
N-Nitrosodiphenylamine	11	11			0.73 U	1.1 U			
Hexachloroethane	NA	NA			0.73 U	1.1 U			
SVOCs (ug/kg)									
Phenol	420	1200			20 U	20 U			
3 & 4-Methylphenol	NA	NA							
2-Methylphenol	63	63		53 JQ	60 U	60 U			
4-Methylphenol	670	670	540 U	62 JQ	30	34			
2,4-Dimethylphenol	29	29			20 U	20 U			
Pentachlorophenol	360	690			60 U	60 U			
Benzyl Alcohol	57	73			50 U	50 U			
Benzoic Acid	650	650			600 U	600 U			
1,1-Biphenyl	NA	NA	540 U	460 U					
Acetophenone	NA	NA	540 U	460 U					
Carbazole	NA	NA	540 U	81 JQ					

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	OH005 0-10 Outer Harbor	OH006 0-10 Outer Harbor	D1-Comp-(A) (m)	D2-Comp-(A) (n)	DC-SED-01	DC-SED-02	DC-SED-03
Organotins (ug/kg)									
Butyl Tin (as chloride)	NA	NA	72.4 U	7.5					
Dibutyl Tin (as chloride)	NA	NA	16.2 U	14					
Tetrabutyl Tin	NA	NA	16.2 U	3.9 JQ					
Tributyltin (as chloride)	NA	NA	388	115					
Tributyltin (as TBT ion)	73 (i)	NA	345	102					
Porewater Organotins (ug/L)									
Butyl Tin (as chloride)	NA	NA			0.05 U	0.05 U			
Dibutyl Tin (as chloride)	NA	NA			0.05 U	0.05 U			
Tetrabutyl Tin	NA	NA			0.05 U	0.05 U			
Tributyltin (as chloride)	NA	NA			0.11	0.15			0.45
Tributyltin (as TBT ion)	0.15 (j)	NA			0.10	0.13			0.40
Conventionals									
Total Organic Carbon (percent)	NA	NA	2.45 (l)	2.45 (l)	2.74	1.80	0.658	26.2	0.372
Solids, Total (percent)	NA	NA			58.3	56.7			
Solids, Total Volatile (percent)	NA	NA			6.04	4.96			
Ammonia as Nitrogen (mg-N/kg)	NA	NA			30.9	34.2			
Sulfide, Total (mg/kg)	NA	NA			1140 J	554 J			
Pesticides (ug/kg)									
4,4'-DDD	NA	NA	5.4 U	4.6 U	1	1.5			
4,4'-DDE	NA	NA			1.1	2.4			
4,4'-DDT	NA	NA	5.4 U	4.6 U	1 U	1.4			
Total DDT	NA	NA			2.1	5.3			
Aldrin	NA	NA			1 U	1 U			
Alpha-BHC	NA	NA			1 U	1 U			
Alpha-chlordane	NA	NA	2.8 U	2.4 U	1 U	1 U			
Beta-BHC	NA	NA	2.8 U	2.4 U	1 U	1 U			
Delta-BHC	NA	NA			1 U	1 U			
Dieldrin	NA	NA			1 U	1 U			
Endosulfan I	NA	NA			1 U	1.2 U			
Endosulfan II	NA	NA	5.4 U	4.6 U	1 U	3 U			
Endosulfan Sulfate	NA	NA			1 U	1 U			
Endrin	NA	NA			1 U	1 U			
Endrin Aldehyde	NA	NA			1 U	1.5 U			
Endrin Ketone	NA	NA	5.4 U	4.6 U	1 U	1 U			
Gamma-BHC (Lindane)	NA	NA			1 U	1 U			
Gamma-Chlordane	NA	NA	2.8 U	2.4 U	1 U	1 U			
Heptachlor	NA	NA	2.8 U	2.4 U	1 U	1 U			
Heptachlor Epoxide	NA	NA	2.8 U	2.4 U	1 U	1 U		9	
Methoxychlor	NA	NA			1 U	1 U			
Toxaphene	NA	NA	280 U	240 U	50 U	70 U			

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID:			OH005	OH006	D1-Comp-(A)	D2-Comp-(A)	DC-SED-01	DC-SED-02	DC-SED-03
Depth (centimeters):			0-10	0-10	(m)	(n)			
Description:	SQS (a)	CSL (b)	Outer Harbor	Outer Harbor					
VOCs (ug/kg)									
Ethylbenzene	NA	NA			8.1 U	6 U			
Tetrachloroethene	NA	NA			8.1 U	6 U			
Trichloroethene	NA	NA			8.1 U	6 U			
m,p-Xylenes	NA	NA			8.1 U	6 U			
o-Xylene	NA	NA			8.1 U	6 U			
Total Xylenes	NA	NA			8.1 U	6 U		1220	

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	DC-SED-05	DC-SED-06	DC-SED-08	DC-SED-09	DC-SED-010	Dakota Creek (o)	Pier 1 (q)	Pier 2 (r)
Metals (mg/kg)										
Aluminum	NA	NA								
Antimony	NA	NA			1.85 J					
Arsenic	57	93	5.88 J	5.86 J	22.1 J	2.10 J		6.5	4.2	1.8
Barium	NA	NA								
Beryllium	NA	NA								
Cadmium	5.1	6.7	0.315	0.300	0.195			0.6	0.1 U	0.1 U
Calcium	NA	NA								
Chromium	260	270	23.7	26.2	21.9	13.4	12.6			
Cobalt	NA	NA								
Copper	390	390	42.7	50.1	374	15.3	16.2	63	22	16
Iron	NA	NA								
Lead	450	530	12.6 J	15.5 J	75.0 J	6.32 J	5.23 J	24	19	3
Magnesium	NA	NA								
Manganese	NA	NA								
Mercury	0.41	0.59						0.4	0.1	0.1
Nickel	NA	NA		27.3	21.6	13.6	14.7			
Potassium	NA	NA								
Selenium	NA	NA								
Silver	6.100	6.100	0.0772	0.0962	0.0984	0.0562				
Sodium	NA	NA								
Vanadium	NA	NA								
Zinc	410	960	78.1	80.0	171	21.3		120	59	35
PCBs (mg/kg OC) (c)										
Aroclor 1016	NA	NA						3 U	3 U	3 U
Aroclor 1242	NA	NA						3 U	3 U	3 U
Aroclor 1248	NA	NA						3 U	3 U	3 U
Aroclor 1254	NA	NA						3 U	3 U	3 U
Aroclor 1260	NA	NA						3 U	3 U	3 U
Aroclor 1221	NA	NA						3 U	3 U	3 U
Aroclor 1232	NA	NA						3 U	3 U	3 U
Total PCBs (d)	12	65			32			3 U	3 U	3 U

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	DC-SED-05	DC-SED-06	DC-SED-08	DC-SED-09	DC-SED-010	Dakota Creek (o)	Pier 1 (q)	Pier 2 (r)
PAHs (mg/kg OC) (c)										
Naphthalene	99	170			11		36	9	6 U	6 U
Acenaphthylene	66	66			7.1			6 U	6 U	6 U
Acenaphthene	16	57			12		5.4	6 U	6 U	6 U
Fluorene	23	79			12			6 U	6 U	6 U
Phenanthrene	100	480			122		65	18	14	6 U
Anthracene	220	1200			30		19	11	6 U	6 U
2-Methylnaphthalene	38	64			6.4		49 (p)	6 U	6 U	6 U
LPAH (d)(e)	370	780			263		181	56	14	6 U
Fluoranthene	160	1200			225		190 (p)	35	12	6 U
Pyrene	1000	1400			261		131	76	24	6 U
Benzo(a)anthracene	110	270			96		53	23	19	6 U
Chrysene	110	460			121		79	34	19	6 U
Benzo(b)fluoranthene	NA	NA						18	24	6 U
Benzo(k)fluoranthene	NA	NA						14	20	6 U
Total Benzofluoranthenes (f)	230	450			158		50	31	44	6 U
Benzo(a)pyrene	99	210			77		37	24	26	6 U
Indeno(1,2,3-c,d)pyrene	34	88			44		15	9	23	6 U
Dibenz(a,h)anthracene	12	33			14		16 (p)	6 U	20	6 U
Benzo(g,h,i)perylene	31	78			51		34	10	24	6 U
HPAH (d)(g)	960	5300			953		607	247	253	6 U
SVOCs (mg/kg OC) (c)										
1,2-Dichlorobenzene	2.3	2.3						6 U (h)	6 U (h)	6 U (h)
1,3-Dichlorobenzene	NA	NA						6 U	6 U	6 U
1,4-Dichlorobenzene	3.1	9						6 U (h)	6 U (h)	6 U (h)
1,2,4-Trichlorobenzene	0.81	1.8						6 U (h)	6 U (h)	6 U (h)
Hexachlorobenzene	0.38	2.3						6 U (h)	6 U (h)	6 U (h)
Dimethylphthalate	53	53			16			6 U	6 U	6 U
Diethylphthalate	61	110						6 U	6 U	6 U
Di-n-Butylphthalate	220	1700						33	6 U	89
Butylbenzylphthalate	4.9	64						6 U (h)	20	6 U (h)
bis(2-Ethylhexyl)phthalate	47	78						14	6 U	9
Di-n-octyl phthalate	58	4500						8	16	6 U
Dibenzofuran	15	58						6 U	6 U	6 U
Hexachlorobutadiene	3.9	6.2						6 U (h)	6 U (h)	6 U (h)
N-Nitrosodiphenylamine	11	11						6 U	6 U	6 U
Hexachloroethane	NA	NA						6 U	6 U	6 U
SVOCs (ug/kg)										
Phenol	420	1200			150		98.2			
3 & 4-Methylphenol	NA	NA			164					
2-Methylphenol	63	63								
4-Methylphenol	670	670								
2,4-Dimethylphenol	29	29								
Pentachlorophenol	360	690								
Benzyl Alcohol	57	73								
Benzoic Acid	650	650								
1,1-Biphenyl	NA	NA								
Acetophenone	NA	NA								
Carbazole	NA	NA								

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: / Depth (centimeters): / Description:	SQS (a)	CSL (b)	DC-SED-05	DC-SED-06	DC-SED-08	DC-SED-09	DC-SED-010	Dakota Creek (o)	Pier 1 (q)	Pier 2 (r)
Organotins (ug/kg)										
Butyl Tin (as chloride)	NA	NA								
Dibutyl Tin (as chloride)	NA	NA								
Tetrabutyl Tin	NA	NA								
Tributyltin (as chloride)	NA	NA								
Tributyltin (as TBT ion)	73 (i)	NA								
Porewater Organotins (ug/L)										
Butyl Tin (as chloride)	NA	NA								
Dibutyl Tin (as chloride)	NA	NA								
Tetrabutyl Tin	NA	NA								
Tributyltin (as chloride)	NA	NA		0.08	0.09					
Tributyltin (as TBT ion)	0.15 (j)	NA		0.07	0.08					
Conventionals										
Total Organic Carbon (percent)	NA	NA	1.52	1.87	0.893	0.167	0.262	0.8	9.7	0.5
Solids, Total (percent)	NA	NA						72.4	80.7	79.4
Solids, Total Volatile (percent)	NA	NA						2.7	2.0	1.2
Ammonia as Nitrogen (mg-N/kg)	NA	NA								
Sulfide, Total (mg/kg)	NA	NA						0.001 U	0.001 U	0.001 U
Pesticides (ug/kg)										
4,4'-DDD	NA	NA						1 U	1 U	1 U
4,4'-DDE	NA	NA						1	1 U	1 U
4,4'-DDT	NA	NA						1 U	1 U	1 U
Total DDT	NA	NA						1	1 U	1 U
Aldrin	NA	NA						1 U	1 U	1 U
Alpha-BHC	NA	NA						1 U	1 U	1 U
Alpha-chlordane	NA	NA								
Beta-BHC	NA	NA						1 U	1 U	1 U
Delta-BHC	NA	NA						1 U	1 U	1 U
Dieldrin	NA	NA						1 U	1 U	1 U
Endosulfan I	NA	NA						1 U	1 U	1 U
Endosulfan II	NA	NA						1 U	1 U	1 U
Endosulfan Sulfate	NA	NA						1 U	1 U	1 U
Endrin	NA	NA						1 U	1 U	1 U
Endrin Aldehyde	NA	NA						1 U	1 U	1 U
Endrin Ketone	NA	NA								
Gamma-BHC (Lindane)	NA	NA						1 U	1 U	1 U
Gamma-Chlordane	NA	NA								
Heptachlor	NA	NA						1 U	1 U	1 U
Heptachlor Epoxide	NA	NA						1 U	1 U	1 U
Methoxychlor	NA	NA								
Toxaphene	NA	NA						50 U	50 U	50 U

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

Sample ID: Depth (centimeters): Description:	SQS (a)	CSL (b)	DC-SED-05	DC-SED-06	DC-SED-08	DC-SED-09	DC-SED-010	Dakota Creek (o)	Pier 1 (q)	Pier 2 (r)
VOCs (ug/kg)										
Ethylbenzene	NA	NA								
Tetrachloroethene	NA	NA								
Trichloroethene	NA	NA								
m,p-Xylenes	NA	NA								
o-Xylene	NA	NA								
Total Xylenes	NA	NA								

TABLE 1
SEDIMENT DATA SUMMARY
PORT OF ANACORTES - DCI BASIN

B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
N = Analyte was tentatively identified in the sample.
Q = Associated sample result is greater than method detection limit but less than the sample reporting limit.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
A blank entry indicates testing was not performed.
OC = Organic Carbon.
NA = Not available.
U = Indicates compound was analyzed for, but was not detected at the given detection limit.
J = Estimated value.
M = Indicates an estimated value of analyte detected and confirmed by analyst with low spectral match parameters.
Boxed results exceed the SQS.
Shaded results exceed the CSL.
(a) SMS sediment quality standard (Chapter 173-204 WAC).
(b) SMS cleanup screening level (Chapter 173-204 WAC).
(c) All organic data (except phenols, benzyl alcohol, and benzoic acid) are normalized to total organic carbon; this involves dividing the dry weight concentration of the constituent by the fraction of total organic carbon present.
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
  (i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compounds/isomers.
  (ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The LPAH criterion represents the sum of the following "low molecular weight polynuclear aromatic hydrocarbon" compounds: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene. The LPAH criterion is not the sum of the criteria values for the individual LPAH compounds listed.
(f) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(g) The HPAH criterion represents the sum of the following "high molecular weight polynuclear aromatic hydrocarbon" compounds: fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. The HPAH criterion is not the sum of the criteria values for the individual HPAH compounds as listed.
(h) Method detection limits exceed the SQS or CSL criteria.
(i) TBT bulk sediment screening level established by Ecology, which is conceptually equivalent to the SQS.
(j) TBT porewater screening level established by PSDDA.
(k) TOC was not reported for these samples. An assumed TOC of 0.8% was used to normalize organic data to OC.
(l) TOC was not reported for these samples. An assumed TOC of 2.45 % was used to normalize organic data to OC.
(m) D1-Comp-(A) is a composite of samples D1-01 through D1-04.
(n) D2-Comp-(A) is a composite of samples D2-01 through D2-04.
(o) Dakota Creek is a composite of SSH-6, SSH-7, and SSH-9.
(p) OC normalized concentration is above SQS. However, because the TOC concentration in the sample is less than 0.5%, the dry weight result was compared to the dry weight AETs and was below all four AETs.
(q) Pier 1 is a composite of SSH-2, SSH-5, and SSH-8.
(r) Pier 2 is a composite of SSH-1, SSH-3, and SSH-4.

APPENDIX A

PSDDA Dredge Approval

CENWS-OD-TS
Dredged Material Management Office

12 April 2001

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER DMMP EVALUATION PROCEDURES FOR THE PORT OF ANACORTES DAKOTA CREEK DREDGING PROJECT WITH PROPOSED DISPOSAL AT THE ROSARIO STRAIT OPEN WATER DISPOSAL SITE.

1. The Port of Anacortes proposes to dredge in the vicinity of Dakota Creek, located on the northern shoreline of the City of Anacortes. The estimated volume of material proposed for dredging is 246,000 cubic yards. The following summary reflects the DMMP agencies (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data to make a determination of suitability for the disposal of the material at a PSDDA open-water disposal site.

2. The ranking for this area is "moderate" based on the guidance found in the PSDDA User's Manual (1998).

3. A sampling and analysis plan was completed for this project and approved by the DMMP agencies on 14 December 1998. Sampling for this project was performed on 25 April 2000.

SAP approval date	14 December 1998
Sampling date	25 April 2000
Data Report submittal date	June 2000
Recency determination dates	April 2005 to April 2007

4. Samples were taken from eight surface locations and composited for two analyses (D1-A and D2-A). Samples were also taken for analysis of subsurface sediments to confirm the presence of native sediments. Analysis was completed for all chemicals of concern. In addition, pore-water analysis for tributyltin was completed on both surface composites Two subsurface samples were composited in area D1 (composite D1-B). In area D-2, the sampling device was unable to penetrate the native subsurface and insufficient material was available for analysis. Subsurface samples of native material from D1-B were archived, with testing dependent on the results of the surface samples, and the suitability of the surface material for open-water disposal.

5. There were no exceedances of 1998 DMMP screening levels for the standard list of chemicals of concern in DMMU D1-A. DMMU D2-A had exceedances of screening levels for seven HPAHs as well as for total HPAH. (Table 2 lists the screening level exceedances). TBT was detected in both samples, but well below the screening level. All detection limits were below screening level. The archived native sediment samples for D1-B were not analyzed, based on these results.

6. The Port of Anacortes chose to not pursue bioassay testing for the sediment represented by D2-A. Based on the chemistry data alone, the 16,000 cubic yards of sediment represented by this sample is not suitable for open water disposal. Native subsurface samples were not analyzed due to sampler refusal in the consolidated native sediment. Since chemistry data is not available for this material, a 1-2 foot buffer of native material must be removed with the overlying unsuitable material to assure that only suitable material is left exposed at the surface and only suitable material is placed at the open-water disposal site.

7. In summary, the DMMP-approved sampling and analysis plan was followed, and quality assurance, quality control guidelines specified by the DMMP were followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program. Based on the results of the chemical testing, the consensus determination of the DMMP agencies is that approximately 230,000 cubic yards (16,000 surface, 214,000 native subsurface) from the Port of Anacortes Dakota Creek dredging project are suitable for open-water disposal at either a dispersive or nondispersive site. Approximately 16,000 cubic yards of material from Dakota Creek is not suitable for open-water disposal.

8. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open water disposal site or for beneficial use. It does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final project approval process, including both vertical and horizontal buffers for the unsuitable material. A final decision will be made after full consideration of agency and public input, and after an alternatives analysis is done under section 404 (b) 1 of the Clean Water Act.

Port of Anacortes
Dakota Creek

Concur:

5/1/01
Date

Stephanie Stirling
Seattle District Corps of Engineers

5-17-01
Date

Justine Barton
Environmental Protection Agency, Region 10

5/22/01
Date

Rick Vining
Washington Department of Ecology

5/16/01
Date

Robert Brenner
WA Department of Natural Resources

Copies Furnished:

EPA/Justine Barton
DOE/Rick Vining
DNR/Robert Brenner
CENWS/OD-RG/Olivia Romano

Table 1. Sediment Conventional Parameters

Parameter	DMMU D1-A	DMMU D2-A
Total Solids (%)	58.3	56.7
Total Organic Carbon (%)	2.74	1.8
Bulk Ammonia (mg/kg)	30.9	34.2
Total Sulfides (mg/kg)	1140	554
Grain-size gravel sand silt clay	 11 56 25 8	 1 48 36 15

Table 2. Screening Level Exceedances

Analyte (in µg/kg)	DMMP Screening Level (in µg/kg)	DMMU D2-A
Benzo(a)anthracene	1300	3000
Benzo(a)pyrene	1600	2400
Total Benzofluoranthenes	3200	3300
Benzo(g,h,I)perylene	1400	3100
Fluoranthene	1700	5200
Indeno(1,2,3-cd)pyrene	600	1200
Pyrene	2600	6400
Total HPAHs	12000	25270

CENWS-OD-TS
Dredged Material Management Office

12 April 2001

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER DMMP EVALUATION PROCEDURES FOR THE PORT OF ANACORTES PIER 1 DREDGING PROJECT WITH PROPOSED DISPOSAL AT THE ROSARIO STRAIT OPEN WATER DISPOSAL SITE.

1. The Port of Anacortes proposes to dredge in the vicinity of Pier I, located on the northern shoreline of the City of Anacortes. The estimated volume of material proposed for dredging is 32,000 cubic yards. The following summary reflects the DMMP agencies (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data to make a determination of suitability for the disposal of the material at a PSDDA open-water disposal site.

2. The ranking for this area is "moderate" based on the guidance found in the PSDDA User's Manual (1998).

3. A sampling and analysis plan was completed for this project and approved by the DMMP agencies on 14 December 1998. Sampling for this project was performed on 25 April 1999.

SAP approval date	14 December 1998
Sampling date	24 April 2000
Data Report submittal date	June 2000
Recency determination dates	April 2005 to April 2007

4. Samples were taken from a total of 8 surface locations and composited for two analyses. Analysis was completed for all chemicals of concern. In addition, pore-water analysis for tributyltin was completed on both composites. Subsurface samples of native material were collected and archived, with testing dependent on the results of the surface samples, and the suitability of the surface material for open-water disposal.

5. There were no exceedances of 1998 DMMP screening levels for the standard list of chemicals of concern. TBT was detected in both samples, but well below the screening level. All detection limits were below screening level. The archived native sediment samples were not analyzed, based on these results.

6. In summary, the DMMP-approved sampling and analysis plan was followed, and quality assurance, quality control guidelines specified by the DMMP were followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program. Based on the results of the chemical testing, the consensus determination of the DMMP agencies is that all 32,000 cubic yards from the Port of Anacortes Pier 1 dredging project are suitable for open-water disposal at either a dispersive or non-dispersive open-water disposal site.

7. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open water disposal site or for beneficial use. It does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final project approval process. A final decision will be made after full consideration of agency and public input, and after an alternatives analysis is done under section 404 (b) 1 of the Clean Water Act.

Concur:

5/1/01
Date

Stephanie Stirling
Seattle District Corps of Engineers

5/7/01
Date

Justine Barton
Environmental Protection Agency, Region 10

5/22/01
Date

Rick Vining
Washington Department of Ecology

5/18/01
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