REMEDIAL INVESTIGATION REPORT

Industrial Container Services, WA, LLC [Former NW Cooperage Site)

Seattle, Washington

Public Review Draft: February 2020 (revised June 2024)

Prepared For:

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Volume 1: Text, Tables and Figures

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AET	Apparent Effects Threshold
AO	Agreed Order
bgs	Below ground surface
BaPEq	Benzo(a)pyrene equivalent concentration
BNSF	Burlington Northern – Santa Fe Railroad
cfs	Cubic feet per second
CLARC	Cleanup Levels and Risk Calculations (Ecology on-line database)
CMP	Corrugated Metal Pipe
COPC	Constituent of Potential Concern
cPAHs	Carcinogenic PAH
CPF	Carcinogenic Potency Factor
CSL	Cleanup Screening Level (sediment)
CUL	Cleanup Level
CWA	Clean Water Act
DCE	Dichloroethene
DL	Detection Limit
DNAPL	Dense Non-Aqueous Phase Liquid
DOF	Dalton, Olmsted & Fuglevand, Inc.
DRO	Diesel Range Organics
Ecology	Washington State Department of Ecology
EF	Exceedance Factor
EPA	Environmental Protection Agency
FOE	Frequency of Exceedance
FS	Feasibility Study
gpd	Gallons per day
gpm	Gallons per minute
GPR	Ground Penetrating Radar
GW	Groundwater
HH	Human Health
ICS	Industrial Container Services, WA LLC
Kg	Kilogram
LDW	Lower Duwamish Waterway
LNAPL	Light (Less Dense) Non-Aqueous Phase Liquid
mg/kg	Milligrams per kilogram
mg/l	Milligrams per liter
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MOU	Memorandum of Understanding
msl	Mean Sea Level
N	Number of samples (included w/ some tables)
NAVD88	North American Vertical Datum 1988
ng/l	Nanogram per liter
MTCA	Model Toxics Control Act (Chapter 173-340 WAC)
NTR	National Toxics Rule
NWC	Northwest Cooperage

OCN	Organic Carbon Normalized
PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenyls
PCDD/PCDF	Polychlorinated dibenzo-p-dioxins/dibenzofurans
PCE	Tetrachloroethene
PLP	Potentially Liable Person (or entity)
POC	Point of Compliance
PQL	Practical Quantitation Limit
PSE	Puget Sound Energy
RL	Reporting Limit
RI	Remedial Investigation
ROD	Record of Decision
RRO	Residual Range Organics (heavy oils)
SED	Sediment
SL	Screening Level
SMS	Sediment Management Standards (WAC 172-204-320)
SQS	Sediment Quality Standards (in SMS)
SVOCs	Semivolatile Organic Compounds
TCE	Trichloroethene
TEE	Terrestrial Ecologic Evaluation
TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalency Quotient
ug/l	Micrograms per liter
VC	Vinyl chloride
VOCs	Volatile Organic Compounds
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

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REMEDIAL INVESTIGATION REPORT
Industrial Container Services, WA, LLC
Seattle, Washington

1.0 INTRODUCTION

This Remedial Investigation (RI) report for the Industrial Container Services, WA, LLC (ICS) property (formerly known as Northwest Cooperage Inc. herein NWC) was prepared to meet the requirements of Task 2 (Exhibit B) of Agreed Order (AO) DE5668, effective date May 18, 2010. The purpose of an RI is to "*collect, develop, and evaluate sufficient information regarding a site to select a cleanup action under WAC 173-340-360 through 173-340-390*" (WAC 173-340-350[1]).

1.1 AGENCY OVERSIGHT AND PROJECT CONTACTS

The Department of Ecology (Ecology) is the lead agency for completion of the RI and Feasibility Study (FS). Contact information of those primarily involved with the RI are listed in Table 1.1 below.

TABLE 1.1 - Project Contacts

Contacts	Role	Affiliation
Beau Johnson	Ecology Project Coordinator	Department of Ecology
Matt Dalton	PLP Project Coordinator	Dalton, Olmsted & Fuglevand, Inc.
Ralph Palumbo	Attorney for Trotsky Family (PLP)	Yarmuth Wilsdon PLLC
Steve Thiele	Attorney for ICS-WA (PLP)	Thiele Law Firm PLLC

The RI covers both upland and intertidal areas as defined in the Lower Duwamish Waterway (LDW) Record of Decision (ROD). Under an interagency Memorandum of Understanding (MOU 2004), Ecology is generally responsible for completing upland source control cleanups while the U.S. Environmental Protection Agency (EPA) is responsible for in-water remediation. The dividing line for source control vs. sediment remediation is mean higher high water (MHHW; +12 feet mean lower low water or MLLW). However, the MOU provides flexibility in apportioning responsibility and, in this case, Ecology has assumed the lead with respect to intertidal sediments within a tidally affected embayment located within the site.

1.2 LOCATION AND GENERAL DESCRIPTION

The Site consists of two properties located on the west side of the LDW near the 1st Ave. South Bridge (Figure 1-1) as described below.

1.2.1 ICS/NWC PROPERTY

The primary focus of this RI is the former NWC property, now operated by ICS, located at 7152 1st. Avenue South, Seattle, Washington (herein termed *"ICS/NWC property"*) (Figure 1-2). The property is owned by Herman and Jacqualine Trotsky and consists of three King County tax parcels with the following parcel identification numbers - 2924049108, 2924049030 and 2924049004 (Figures 1-3 and 1-4). The property has the following Ecology site identifier numbers:

- Facility (FS) ID – 2154
- Cleanup Site ID – 62

The ICS/NWC property is approximately 7.1 acres in size and includes two general areas:

- Upland Area (main facility and paved storage yard – Figure 1-4), and
- Portion of an embayment (north of main facility – Figures 1-4, 1-5 and 1-6). The embayment is located at approximate river mile 2.2 of the LDW.

The upland area comprises approximately 6.3 acres and the embayment portion is approximately 0.8 acre in size. The property is zoned IG1/IG2 General Industrial. King County's tax assessment web page indicates the current use (manufacturing) being the highest and best use.

The upland land surface slopes gently downward in a northerly direction from an elevation of approximately 20 feet MLLW[1] at the southern property line to approximately 15 feet MLLW adjacent to the embayment[2]. The head of the embayment lies at an elevation of approximately 10 feet MLLW and slopes downward to approximately -1.0 feet MLLW at the mouth (based on LDW core log SC-40).

1.2.2 DOUGLAS PROPERTY

The Douglas property is located at 7100 1st Ave. South, Seattle, Washington, adjacent to the LDW and north of the ICS/NWC property (Figures 1-2 and 1-6). The property includes the north portion of the embayment. Discussion of this property is included because there is evidence (discussed later in this report) that past releases from the ICS/NWC property migrated beneath what is now the Douglas property footprint. A separate RI and FS are being completed by the property owner under Agreed Order DE 8258. A draft RI report (Geoengineers 2016) was submitted to Ecology and pertinent information contained in the Douglas RI draft report have been incorporated into this RI.

The Douglas property is owned by 7100 1st Ave. S. Seattle LLC and consists of one King County tax parcel with the following parcel identification number 2924049090 (Figures 1-2, 1-3 and 1-6). Alaska Marine Lines currently operates on the property as a freight management facility for the transfer of shipping containers between barge and truck, and for container and equipment storage. The property has the following Ecology site identifier numbers:

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[1] In this report elevations are referenced to two datum's: Mean Lower Low Water (MLLW) and North American Vertical Datum 1988 (NAVD88). MLLW = NAVD88 plus 2.435 feet.

[2] Property lines were surveyed in December 2009 by Continental Survey Company and site topography was determined from aerial photogrammetric mapping by David C. Smith Associates in March 2010.

- Facility (FS) ID – 97573251
- Cleanup Site ID – none

The Douglas property is approximately 3.1 acres in size and includes two general areas:

- Upland Area (transfer facility and paved storage yard), and
- Portion of an embayment (south of main facility)

The upland area comprises approximately 2.5 acres and the embayment portion is approximately 0.55 acre in size. The upland land surface ranges in elevation from +20 feet MLLW on west to approximately +18 feet MLLW on the north and east.

Alaska Marine Lines leases property owned by the Washington State Department of Transportation (WSDOT). The property is generally located between the Douglas west property line and 1st Ave. South and includes the head of the embayment as illustrated on Figure 1-6.

2.0 SITE DEVELOPMENT AND FACILITY OPERATIONS

As part of planning the RI field investigations and development of the RI Work Plan (DOF 2012), the site history was compiled to identify the type of materials handled on the property and how and where these materials might have been released to soil, groundwater and sediment. A summary of the upland activities, possible release mechanisms/locations and changes to facility practices that reduced the potential for potential releases are presented in attached Table A2.1[3] and are discussed in more detail below. A description of the embayment is also presented with respect to past facility operations on the ICS/NWC and Douglas properties.

2.1 HISTORICAL SITE USE

The ICS/NWC property has been used for drum reconditioning since at least the 1930s, prior to the Trotsky family involvement. The 1943-44 Polk directory listed George Mitzel & Co., Steel Drum Reconditioning, and Pacific Drum Co. at 7152 1st Ave. South. The Polk directory for 1948-49 listed the Duwamish Welding and Construction Company (steel boating building) at 7122 1st Ave. S. Northwest Cooperage first appeared in the Polk directory in 1948. Members of the Trotsky family operated the facility from about 1948 to 1995. From 1995 to 2002 Consolidated Drum Reconditioning Company, Inc., Palex Container Systems and IFCO ICS-Washington, Inc., successively, operated the facility. In 2002, Industrial Container Services - WA, LLC (ICS) purchased the business and began operating the facility and is the current operator of the Site. The upland area and most of the embayment are still owned by the Trotsky family who purchased various land parcels between approximately 1953 and 1976.

2.2 HISTORICAL SITE DEVELOPMENT

Historical aerial photographs were reviewed to generally assess how the property was developed. Aerial photographs for the following years were reviewed and are presented in Appendix P.

1936	1969	1985	2004
1946	1974	1990	2010
1956	1977	1995	2018
1960	1980	2002	

- **1936** (Figure 2-1). Structures on the ICS/NWC property consisted of a single building and a wharf that extended into the LDW. Most of the surrounding area was undeveloped and a waterway turning basin was present to the north. Log rafts are visible on the 1936 air photograph. Filling to create the north side of the embayment (current Douglas Property) had not been completed. A drainage ditch that flowed into the LDW was present southeast of the facility.

- **1946 to 1960**. The facility had expanded to the current footprint by 1956. General facility features present in June 1960 are shown on Figure 2-2 and included the original building, a

[3] In this RI report both embedded and attached tables are included. Embedded tables follow sequentially by section (e.g. Table 2.2, 2.3, 3.1 etc.). Attached tables are also sequential by section with an "A" prefix to indicate they are attached.

storage shed, new drum plant, a building now used for maintenance, and boiler and electrical/compressor rooms (identified on Figures 2-4a and 2-4b). Most of the property appears to have been unpaved and the southern and eastern portions were used for drum storage. The drainage ditch remained unfilled. Much of the wharf had been removed and a platform, possibly used as a low tide dry-dock, had been constructed. The waterway north of the property was a turning basin and continued to be used for log-rafting based on review of historic aerial photographs. The western portion of the turning basin was filled in 1955-56 as part of construction of the 1st Ave. South Bridge.

Property to the east appears to be residential in nature. A wrecking yard was established south of the property between 1946 and 1956, the eastern edge of which was located along the drainage ditch visible in the 1936 aerial photograph (Figure 2-2).

- **1969 to present**. The current property layout and property lines are illustrated on air photographs as Figure 1-4 (March 2010) and Figure 1-6 (May 2017). The approximate position of the 1936 shoreline and wharf are superimposed on the April 2004 air photograph shown on Figure 2-3. Several additional structures had been constructed/expanded during this period including the Upstairs Reconditioning Plant, Inside Wash Plant, drum furnace, office, locker/rest rooms, and breakroom. The property was bermed with concrete in 1973 and was paved with concrete in the late 1980s or early 1990s.

  Filling of the eastern portion of the turning basin to create the Douglas Property and embayment appears to have been accomplished during the late 1960s and is shown on Figures 1-6 and 2-3. Filling of the ditch mouth and northern portion of the drainage ditch and some filling along the facility shoreline had also been completed by 1969. Property to the east appears to be in commercial use as a storage yard. Most of the structures formerly located along the southeast embayment shoreline, east of the ICS/NWC property, had been removed.

2.3 CURRENT AND PAST UPLAND SITE OPERATIONS

The ICS/NWC upland area is where drums were/are cleaned, reconditioned, and stored (Figures 2-4a and 2-4b). The facility's EPA I.D. number is WAD000066084 (SAIC 2007a). The facility operates under a King County industrial wastewater discharge permit (No. 7130-04) and Puget Sound Clean Air Agency (PSCAA) Air Permit No. 11683.

Historically (before and during World War II when the wharf was present), drums arrived on-site by barge or truck. Sources of drums included bakeries (used for lard), chemical companies, paint companies, oil companies and U.S. military. Both closed-top (tight-head) and open-head drums were handled. Currently used drums arrive by truck and need to be empty or are sent back to the sender.

2.3.1 DRUM MANUFACTURING AND REFURBISHING

2.3.1.1 Site Operations Before Mid- to Late-1960s

Details on the operation of the facility prior to the mid-to late 1960s are not available. Similar operations occurred as in later times, but in the 1960s the Upstairs Reconditioning Plant was constructed which expanded site operations and changed where they occurred. In the late 1960s, there were several significant changes to how wastes were handled including:

- Prior to 1968, liquid wastes generated during the drum cleaning operations were pumped to a settling tank or lagoon (see 2.3.4 Filled in Drainage Ditch and Former Lagoon/Slough), where oils were skimmed off and water was discharged to the LDW. Oils from the drums or skimmed from the settling operation were used as fuel (e.g. in the drum furnace).

- In 1968 the remaining portions of the drainage ditch (lagoon/slough) were filled and liquid wastes were treated on-site and discharged to the King County sanitary sewer (see Section 2.3.3).

2.3.1.2 Site Operations After Mid- to Late-1960s

By the mid- to-late 1960s, new drum manufacturing and drum refurbishing occurred in three buildings including the: 1) New Drum Plant, 2) Upstairs Reconditioning Plant, and 3) Inside Wash Plant as shown on Figure 2-4a and 2-4b. Operations that occurred in these buildings are described below based on site observations and input from the site owner and operator.

- **New Drum Plant**. New drums are manufactured in the New Drum Plant located within the southwestern portion of the property. Drum stock is welded and cleaned in this building. Wastewater is produced by the cleaning of the new drums with a solution of mildly alkaline (pH 10.5 to 11.3) cleaner followed by a mildly acidic (pH 2 to 3) rinse. Spent washing solution is pumped through overhead piping to storage and the wastewater pre-treatment plant.

- **Upstairs Reconditioning Plant**. Used open-head drums are reconditioned in this plant that is located within the central portion of the facility. Activities that occur in this plant include removing the tops of some tight-head drums (creating open-head drums) and burning open-head drums in the drum reclamation furnace (drum furnace) plus re-shaping cleaned drums. The drum furnace is located on the east side of the plant. New and refurbished drums are also painted in this building. To prepare the refurbished drums for painting, drums are shot-blasted. Shot blasting occurs in an area north of the burner (Figure 2-4b). Paint storage and painting operations occur within the southern portion of the plant.

  Wastes produced in this plant include drum furnace ash, shot blast dust (baghouse), and paint filters. No wastewater is generated in this portion of the facility. Samples of furnace ash and baghouse dust were collected and analyzed in 2012. The results are summarized in attached Table A2.2. The drum furnace generates a coarse granular ash residue and is not likely to produce fugitive emissions during handling and placement into temporary storage drums. Baghouse dust is discharged into drums by gravity.

Drums are periodically emptied into roll-off boxes for off-site disposal. In addition, there are sumps located at the drum furnace and shot blaster that are connected through overhead piping to the storm water holding tanks, should any water be collected. These tanks collect primarily storm water.

The PSCAA air permit requires that there be no visible emissions from the permitted emission sources which include a paint curing oven and drum furnace. Emissions from the paint curing oven are controlled by a Regenerative Thermal Oxidizer (RTO) while emissions from the drum furnace are controlled by a secondary combustion chamber (thermal oxidizer). Both of these control units have passed source tests and are operated within the parameters of their respective operating permits. Blasting occurs in a closed chamber and emissions are controlled by two bag houses located north of the drum furnace as shown on Figure 2-4b.

- **Inside Wash Plant (also known as Downstairs Building)**. The primary activity that occurred in this plant was the flushing and washing of tight-head drums. Petroleum drums were flushed with an 8% caustic solution followed by washing and rinsing with water and hot water. Other tight-head drums were flushed and rinsed with water and hot water. Hard to clean drums were washed with muriatic acid and rinsed with a caustic solution. After cleaning, the tight-head drums went to the Upstairs Reconditioning Plant for testing, blasting and painting. Wastes produced in the Inside Wash Plant included flushing, cleaning and rinsing process wastewaters. Process wastewater was directed to the water pre-treatment facility via above ground pipes.

  The Inside Wash Plant was shut down in January 2015. The plant was shut down because of market conditions and to reduce the amount of wastewater discharged to the sanitary sewer as required by King County. The plant equipment was cleaned, dismantled, and removed from the production area.

2.3.2 DRUM AND TANK STORAGE

2.3.2.1 Drum Storage

Historically used and refurbished drums were stored in the areas south and east of the drum manufacturing and cleaning operations as illustrated on Figures 2-2 and 2-4a. Prior to the late 1980s, most of the property was unpaved and any releases from uncleaned drums potentially would occur to soil. Furthermore, spilled drum residues could be transported to groundwater via infiltration of precipitation or to surface water with migrating storm water. As noted above, in 1968 process and storm water began to be pre-treated and discharged to the King County sanitary sewer. In 1973, a berm was constructed along the embayment shoreline to prevent direct discharges to the embayment, and in the late 1980s, the drum storage areas were paved with concrete preventing releases to soil. After the property was paved, storm water and any spillage were collected, pre-treated and discharged to the sanitary sewer.

2.3.2.2 Tank Storage

Prior to closure of the Inside Wash Plant, there were twenty-eight above ground tanks on the facility that stored a variety of materials including acid, caustic, diesel, propane and waters. Currently, there are six 22,000-gallon tanks used to store storm water prior to treatment/discharge and two propane tanks (one 200 gallon and one 1,000 gallon located south of the Upstairs Drum Reconditioning Plant). Paints are also stored in drums in an area located on the south side of the Upstairs Drum Reconditioning Plant. All tanks are located on paved surfaces.

2.3.3 MANUFACTURING WASTES, TREATMENT AND DISPOSAL

2.3.3.1 Wastewater

Wastewater generated at the facility historically included spent wash water and rinse solutions from the New Drum Plant and the Inside Wash Plant that were pre-treated and discharged to the sanitary sewer after 1968. The wastewater pre-treatment system was located within the northeastern portion of the facility (Figure 2-4b). Wastewater flowed from the drum manufacturing/refurbishing and tote cleaning operations to the primary settling tank where the pH was lowered and a coagulant injected (Metro 2009). From there the wastewater entered an oil skimmer. The wastewater then flowed into the mix tank where the pH was raised and a flocculent injected. Wastewater then flowed into one of two 10,000-gallon holding tanks where further solids settling took place. Finally, wastewater flowed through a 4,000-gallon, 7,500-gallon, and an 8,000-gallon tank before being discharged to the sewer. Up to 25,000 gallons per day (gpd) of treated wastewater was discharged to the King County sanitary sewer, although typical discharges ranged between approximately 5,000 and 7,000 gpd.

In mid-2014 King County's Industrial Waste Program informed ICS that the facility would have to reduce the amount of effluent it discharged to the sanitary sewer. King County advised ICS that the facility could discharge no more than 1.05 cubic feet per second (cfs), even during peak flow periods (primarily related to storm water). Prior to this time there was no discharge limit. With closure of the Inside Wash plant, typical industrial discharges were reduced to 200 to 300 gpd. In addition, the facility discharges an average of up to 1,540 gpd of storm water and 420 gpd of sanitary waste to the sanitary sewer.

Since the shutdown of the Inside Wash Plant, it has not been necessary to run the pre-treatment system to meet the parameters of the facility's discharge permit. While there is no active treatment, passive solids settling occurs as the effluent passes through the system on its way to discharging to the sanitary sewer.

2.3.3.2 Solid Wastes

Solid wastes generated at the facility include drum furnace ash, baghouse blast dust, wastewater treatment sludge, oils, scrap metal and plastic drums. Pre-treatment system tank solids (sludges) were collected periodically, dewatered and comingled with ash from the drum furnace and dust from the facility's blasting operation. Testing of these solids indicate that they do not constitute a dangerous or hazardous waste under State and Federal regulations. These solid wastes are transported offsite and disposed in a Subtitle D, non-hazardous waste landfill. Skimmed oils are transported off-site by a recycler.

2.3.3.3 ICS Storm Water

In 1973, NW Cooperage bermed the facility with concrete to prevent sheet flow to the embayment. A large portion of the facility was paved beginning in 1988 (SAIC 2007a). The extent of paving is shown on Figure 2-6 and storm water is collected by a series of sumps at the locations (A to G) shown on Figure 2-4b. Except for a small buried pipe between the water tanks and the southeast corner of the Upstairs Reconditioning Plan, all water flows in overhead pipes to the pre-treatment/storage system. There are no ICS connections to the 2nd Ave. Outfall storm sewer.

Although eliminating the tight-head drum operation (Inside Wash Plant) effectively eliminated generation of most process wastewater, storm water generated by heavy rain events could still exceed new volume discharge limits. As a result, several 20,000-gallon Baker tanks were brought on site as holding tanks for storm water so the discharge rate could be maintained during heavy rain events. Storm water collected by the Baker tanks is discharged directly to the sanitary sewer.

The roofs of a number of small sheds located on the west side of the site drain off-site (Figure 2-4b)(DOF 2010a). The small amount of roof drainage is to surrounding areas, outside of the area where drums are (or were) recycled. The roof drainage co-mingles with off-site storm water outside of the plant periphery. The roofs of these small buildings are constructed of typical commercial composite rolled roofing.

2.3.4 FILLED IN DRAINAGE DITCH AND FORMER LAGOON/SLOUGH

The drainage ditch running along the eastern property line shown on Figures 2-1 and 2-2 was filled in the 1960s and is no longer evident on historic air photographs by 1969 (see Appendix P). Available documents (Parametrix et al 1991) refer to a lagoon that was present along a portion of the eastern property line. A 1963 survey drawing (Horton Dennis 1963) indicates the presence of a former lagoon and slough, the locations of which are shown on Figure 2-4b. These features were most likely the visible remnants of the filled-in drainage ditch that now flows in a buried storm water drainage pipe to the 2nd Avenue Outfall (DOF 2010).

The property owner suggested that a concrete tank (used as a settling tank) may have been present in the general area of the former drainage ditch. However, this feature is not shown on the 1963 survey map and there is no physical evidence that a buried concrete tank actually existed. Long-time facility employees (back to the early 1970s) have no recollection of a buried concrete tank. The 1991 hazard ranking summary score sheet (Ecology 1991) indicates that prior to about 1970 wastewaters were discharged to an impoundment that was filled following installation of a pretreatment system and treated water discharged to the sanitary sewer in 1968. It seems a reasonable inference that the impoundment Ecology was referring to was the lagoon shown on the 1963 Horton Dennis drawing. The score sheets indicated sludges were likely not removed from the impoundment prior to filling. The hazard ranking summary score sheet did indicate the use of an on-site settling tank after the impoundment was filled.

A 1962 drawing by Dodd & Millegan (DOF 2013b) indicates that an *"outlet box"* was present at the south end of the lagoon (Figure 2-5). The outlet box was connected to the buried storm water pipeline. The function of the outlet box was to prevent overflow of the lagoon. The outlet box connection to the sewer line is further discussed below (Section 2.4 Embayment Outfalls).

2.4 EMBAYMENT OUTFALLS

Two public outfalls discharge into the embayment (Ecology 2007a) including a storm water outfall (2nd Ave. Outfall) and a reservoir overflow outfall. The outfall locations are shown on Figure 2-4b.

2.4.1 – 2ND AVE. OUTFALL

A City of Seattle storm water outfall (2nd. Ave. storm drain) discharges to the embayment within the central portion of the southern shoreline. The outfall drains an area generally south and east of the ICS/NWC property that is served by a system of ditches and culverts, with a piped outfall to the embayment. The approximate drainage area for the 2nd Ave. outfall is shown on Figure 2-7. It was reported a tide gate was installed in the drainage system in 2000, however no tide gate was observed during completion of this RI. There are no catch basins or other drainage features connecting the ICS/NWC property to the 2nd Ave. Outfall based on review of City of Seattle Engineering archives (Sewer Card No. 5340-79 – see DOF 2010a in Appendix A). This was confirmed by a robotic visual survey discussed below.

The 2nd Ave. Outfall drainage pipeline extends from the southeast property corner to the embayment (Figures 2-4b and 2-8), a distance of approximately 520 feet. Two control structures (MH-1 and MH-2) are located near the property corner. The location and condition of the storm sewer beneath the ICS/NWC property was evaluated in September 2013 using a robotic camera during a low tide when the pipe was essentially empty (DOF 2013b, included in Appendix A). As illustrated on Figure 2-8, the pipeline consists of approximately 120 feet of 30-inch corrugated metal pipe from the property corner to MH-2 and approximately 400 feet of 24-inch reinforce concrete pipe from MH-2 to the embayment. The robotic video observations are summarized below for each pipe segment.

- **Corrugated Metal Pipe (CMP)**
    - The CMP appeared to be in good condition with no discernible perforations or indications of collapse.
    - A low-spot was observed in the line at station +50 feet (50 feet north of MH-1).
    - The pipe had standing water throughout, and up to 6 inches of sediment at the low point.
    - A slight flow to the north was observed, estimated to be less than 1 gallon per minute (gpm).
    - The CMP segment ended at station +80 feet at MH 2.

- **Reinforced Concrete Pipe (RCP)**
    - The RCP was observed to be generally free of sediment.
    - A low spot with standing water was observed from station +25 to +115 feet (as measured from MH-2). Two lower slip-joints of one six-foot long pipe section appeared to have partially pulled apart 1 to 2 inches, but still overlapped. No

voids or surrounding soil were observed. The pulled apart pipe joints are located approximately 34 to 40 feet north of manhole MH-2.
  - The remainder of the RCP appeared to be in good condition with no discernible cracks or collapse. No additional joint separations were observed.
  - 6-8 inches of debris consisting of gravel, cobbles and shells was observed from station +42 to +50 feet.
  - An 8-inch diameter lateral pipeline connection was observed on the west side at station +97 to +98 feet. This likely represents the connection to the former outlet box (Figure 2-5). Horizontal coordinates of this feature are included in DOF 2013b (Appendix A).
  - A similar northward flow of water was observed in the RCP as was observed in the CMP.
  - No tide gates or weirs were observed in the pipes or control structures on the ICS Site.

Control structure invert elevations were estimated using the surveyed rim elevations and the low tide depth of water. The low tide depth of water in each structure was subtracted from the rim elevation to determine the invert elevations as follows:

- Invert Elevation MH1 - +7.2 feet NAVD88 (9.6 feet MLLW)
- Invert Elevation MH2 - +7.05 feet NAVD88 (9.4 feet MLLW)
- Invert Elevation Outfall - +0.83 feet NAVD88 (3.3 feet MLLW)

2.4.2 SEATTLE RESERVOIR OUTFALL

A second public outfall is present near the head of the embayment. Seattle Public Utilities (SPU) operates an overflow pipeline from the West Seattle reservoir that discharges excess potable water to the embayment (Sewer Card No. 5340-79). Sewer Card No. 916-10B indicates no storm drains are connected to the outfall pipe, at least in the vicinity of the ICS/NWC property (DOF 2010a – see Appendix A).

2.5 EMBAYMENT RECONNAISSANCE

An embayment site reconnaissance was made by Dalton, Olmsted & Fuglevand, Inc. (DOF) in early September 2010. The results of the reconnaissance (including photographs) are documented in a technical memorandum (DOF 2010b) included in Appendix A. There have been no significant changes to the observed embayment conditions since the reconnaissance was completed. Embayment features described below are shown on Figure 1-5.

- The embayment is approximately 600 feet long and ranges in width from approximately 35 feet at the west end (head of embayment) to 120 feet (east end near embayment mouth) (Figure 1-5). A “*neck*” approximately 60 feet wide is located within the central portion.

- The embayment consists of approximately 1.0 to 1.2 acres; measured from the top of slope (approximate elevation 15 feet MLLW). Elevations in the embayment range from approximately 15 feet MLLW along the top of slope to less than -1.0 feet MLLW near the eastern mouth. Bottom elevations at the head of the embayment range between an elevation of approximately 4 and 5 feet MLLW. The mudline elevation at the location of sediment core (LDW-SC40) at the mouth of the Embayment was noted as -1.0-foot MLLW. Most of the bottom of the embayment is exposed during periods of relatively low tide. All of the embayment lies within the intertidal zone (above -4 feet MLLW) as defined in the LDW ROD (EPA 2014).

- A Seattle reservoir outfall discharges overflow water into the embayment. Adjacent to the outfall broken concrete, rebar, wood and other debris were observed. The broken concrete appears to have been placed as a scour protection apron for discharges from the outfall. The relatively steep bank walls are covered with blackberries and other vegetation. Flow from the outfall has the potential to cause sediment erosion and eastward transport during lower tides.

- East of the reservoir outfall area the northern shoreline includes several features such as a partially pile supported wood-frame structure[4] and an ecology block wall (composed of at least five levels of blocks – rising eight to ten feet above bottom sediment) that transitions to a shoreline composed of concrete debris, bulkheads and piling. A shallow shelf extends 50 to 70 feet out from the steeper northern bank walls. The shelf is composed of relatively hard erosion resistant cap materials. Near the mouth, it appears that waste concrete was deposited from the upland (Douglas Property) shoreline. Within the central and upper portions of the embayment the relatively harder surface appears to be a precipitate that cemented sand and other particles together. Exploration in a number of locations indicated the deposit to be 8 to 10 inches in thickness.

  Waste concrete and chemical precipitate are not associated with typical drum recycling operations. The source of these materials was likely Seattle Ready Mix, a ready-mix plant that operated on the southern portion of the Douglas Property from at least 1969 to 1977 (SAIC 2008; Geoengineers 2016). Waste concrete from cement trucks appears to have been directly deposited to a portion of the northern embayment shoreline. The chemical precipitate appears to be related to the dissolution (at high pH) and precipitation (at lower pH) of silica associated with the former cement plant. A small amount of asphalt-like material was observed within the neck area on the north bank.

- The remains of pilings and other features (ruins – small boats) are visible in the embayment during periods of lower tide. Exposed pilings are likely associated with the former wharf (Figure 2-1). The north-south lineal features evident on the 2010 air photograph (Figure 1-4) are large, pile supported, milled timbers that were likely associated with former construction of large wooden vessels (SAIC 2008). The milled timbers could also be associated with the Duwamish Welding and Construction Company (steel boating building). The timbers are at the same location of the platform-like structure shown on the 1960 historic aerial photograph (Figure 2-2). Outside of the harder capping layer described above, the soft sediment thickness was greater than three

[4] The above floor portions of this structure have been removed by the Douglas property owners. The floor and piling remain.

feet based on probing with a steel rod. When the rod was extracted, petroleum sheens were observed at some locations within the central portion of the embayment.

- The south shoreline east of the neck is relatively gentle in slope. Cobbles, concrete slabs, wire and wood debris were observed during the reconnaissance. Within and west of the neck, the south shoreline is covered with fine grained sediment, cobbles, concrete slabs, wire and wood debris. Blackberries and other vegetation obscure the upper portions of the southern embayment bank. The remains of drum tops and metal debris are exposed at the intertidal mudline surface (scattered along the south shoreline west of the neck by the former wharf). The 2nd Ave. Outfall discharges to the middle portion of the embayment. The pile supported remains of the land access point to the former wharf is present on the north side of the ICS/NWC property (noted as "*platform*" on Figure 1-5).

  An asphalt-like material was observed on the west side of the neck and east of the 2nd Ave. Outfall, along the southern shoreline. The deposit appeared to be a localized surface feature. Plastic sheeting/bag material was observed to be entrained in the matrix.

A survey of seeps was conducted as part of the Phase 2 RI for the LDW (Ecology 2007). Four seeps were identified; three from the south bank and one from the north bank. Pertinent details are summarized below in Table 2.1.

Table 2.1 – Embayment Seep Observations

Seep No.	Easting (x)	Northing (y)	Location Description	Observations
Seep 53	122º19.988	47º32.357	South side of inlet; near old yellow building	Seep within very black muck; chemical sulfide odor; located bottom of channel, adjacent to horizontal timber/ties within channel
Seep 54	122º20.013	47º32.358	South side inlet near dock	Grey, foamy, very small seep; embankment has moderate slope with pier columns and construction/metal debris; seep located mid-bank, below decayed pier/platform; trace very light flow
Seep 55	122º20.035	47º32.360	North side of inlet; near cement truck barrel	No odor, no sheen; trace fine brown sediments located mid-bank at base of former cement truck tumbler, in asphalt concrete rubble with gravel; steep riprap and construction debris bank adjacent to pier/dock with structure.
Seep 56	122º19.959	47º32.364	South side of inlet; near mouth	No odor, no sheen; located mid-bank in steep riprap in Trotsky channel; below vegetation and stacked drums.

In 2007 and 2008, SAIC sampled three seeps within the embayment (SAIC 2009). These included two seeps emanating from the south bank (Seep 1 and Seep 2) and one seep from the north bank (SP-1). Approximate seep sample locations are shown on Figure 1-5. Seep 2 is reportedly the same seep as Seep 56 described above. In early September 2010, no seeps were observed along the north bank and only one seep was observed along the south bank in the neck area (Seep 2).

3.0 SUMMARY OF ENVIRONMENTAL INVESTIGATIONS

Previous environmental investigations associated with the site included assessment of property history and operation, hydrogeologic characterization, as well as soil, sediment, seep, storm water and groundwater sampling/analysis. Surface soil, sediment, seep and storm water samples were collected from accessible locations (e.g. unpaved areas) while subsurface samples were collected from sediment cores, soil probes and well bores. Sediment core, probe and monitoring well geologic/well logs are presented in Appendix D. Analytical results are presented in appendices F, G, H and I as summarized in attached Table A3.1. These investigations/documents are briefly summarized below.

3.1 EARLY SITE INVESTIGATIONS AND DOCUMENTS (1985 TO 2006)

3.1.1 ECOLOGY PRELIMINARY ASSESSMENT (1985)

A preliminary assessment (PA) was completed by SAIC for Ecology in 1985 (Ecology 1985). The PA noted that much of the site was unpaved and, in the past, there had been heavy metal exceedances of discharge criteria to the Metro sanitary sewer and that oil and grease limits were still being exceeded. Air emissions were judged to potentially contain heavy metals. It was recommended that soil sampling be conducted and that the process area be paved. Based on this assessment, NW Cooperage retained Hart Crowser to complete a soil and groundwater quality evaluation of the drum re-conditioning area. No sampling was performed as part of the 1985 assessment.

3.1.2 GROUNDWATER AND SOIL QUALITY ASSESSMENTS (MID-1980S)

In 1986 and 1987, Hart Crowser completed an assessment of the environmental conditions beneath the NWC property to respond to the preliminary assessment described above. Sample locations are shown on Figure 3-1. The assessment work was completed in two phases that included the following:

1st. Quarter 1986

- Sampling surface soils (0 to 2 feet) at 30 locations. The samples were composited into six samples representative of various areas within the NWC property, for laboratory analysis.
- Drilling and sampling of three soil borings. Subsurface soil samples were obtained and analyzed from two of the borings (HC-B1 and HC-B2).
- Installing monitoring wells in the three borings (HC-B1 to HC-B3).
- Assessing groundwater flow directions.
- Analyzing soil and groundwater samples for metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), chlorinated pesticides (pesticides), PCBs and cyanide.

3rd. Quarter 1986 and 1st Quarter 1987

- Installed two additional monitoring wells (HC-B4 and HC-B5).
- Conducted a tidal fluctuation study to assess possible impacts on groundwater flow directions.

- o Conducted in-situ hydraulic conductivity tests in the five monitoring wells (HC-B1 to HC-B5).
- o Collected groundwater samples from the five wells and measured pH, electrical conductivity and temperature. The groundwater sample from well HC-B2 was submitted for laboratory analysis.
- o During the drilling, representatives of EPA collected split soil samples from four borings and selected samples for analysis of metals, VOCs, SVOCs, pesticides and PCBs.

The 1986 sample locations are shown on Figure 3-1 and the analytical results are summarized in Appendix H (Table H.1 - soil) and Appendix G (Table G.1 - groundwater). The hydraulic conductivity results are discussed in Section 4.6. Metals, VOCs, SVOCs, PCBs, total cyanide and a number of pesticides (e.g. DDT), were detected in one or more of the samples. The soil results were used in developing the RI work plan (DOF 2012). The discrete sample metals results from the EPA analyses were used for site characterization purposes. The Hart-Crowser boring results (HC-B1 and HC-B2) were not used because of their long sample interval (6.5 to 9.5 feet) and the sample intervals were included in the EPA sample results. The metal composite sample results (samples 1 to 6) were qualitatively incorporated into the site characterization analysis[5]. The composite sample total cyanide results were used for characterization purposes because this compound was not analyzed in other samples. The VOC, SVOC, PCBs and pesticide results were not used for site characterization purposes because reporting limits for these analyses were not generally available and the quality of the data is unknown. The 1986 groundwater data were used in developing the RI work plan but were not used in characterizing the site conditions because the data are not representative of current conditions and more recent data are available.

3.1.3 SITE HAZARD ASSESSMENT (1991)

In 1991 Parametrix and SAIC completed a Site Hazard Assessment for Ecology. As part of the assessment, four surface soil samples [1(91) to 4(91)] and sediment (MH91) from a manhole were collected from within the southeastern portion of the Site. Sample locations are shown on Figure 3-1. The surface soil samples were mixed into one sample (SC-1) and analyzed for PAHs, VOCs, SVOCs, pesticides, PCBs, total metals and polychlorinated dibenzo-p-dioxin/dibenzofurans (PCDDs/PCDFs). The results are summarized in Appendix H (Table H.2). Metals (near background concentrations) and low concentrations of PCDDs/PCDFs were detected. These data were used to develop the RI work plan and were qualitatively incorporated into the site characterization analysis.

The storm water sediment sample from MH-2 was analyzed for metals, VOCs, PAHs, chlorinated pesticides and PCBs, the results of which are summarized in Appendix I (Table I.1). None of the analyzed compounds were detected, except for several metals including chromium (27.7 mg/kg), copper (40 mg/kg), lead (93.3 mg/kg), nickel (26.6 mg/kg), and zinc (90.6 mg/kg).

[5] Composite soil sample data were used qualitatively. The composite sample results for identified COPCs were plotted on figures with the discrete sample results to generally compare soil concentrations (e.g. Figure 6-16a for lead).

In addition, three surface sediment samples were collected from the embayment (SS-1 to SS-3). Sample locations are shown on Figure 3-1. Analyses were completed for PAHs, VOCs, pesticides, PCBs, organotins and total metals as summarized in Appendix F (Table F.1). Metals and PCBs were detected. These data were used to develop the RI work plan but were not used to characterize site conditions because an extensive amount of more recent data was collected as part of this RI.

Based on the hazard assessment, Ecology assigned a hazard ranking of 4 for this site in 1991. The ranking scale is from 1 to 5, where a ranking of 1 indicates the greatest risk to human health and the environment relative to other sites in Washington State (SAIC 2007a).

3.1.4 ADDITIONAL GROUNDWATER SAMPLING (1991)

In June 1991, NW Cooperage collected a groundwater sample from Well HC-B2 (SAIC 2007a). The sample was analyzed for total and dissolved metals, VOCs, SVOCs, the results of which are summarized in Appendix G (Table G.1). These data were used to develop the RI work plan but were not used to characterize site conditions because the data are not representative of the current site conditions and an extensive amount of more recent data were collected as part of this RI.

3.1.5 SIP REPORT BY SAIC (1993)

SAIC for EPA reviewed available data for the NWC property and prepared a summary. Data used was included in reports by Hart-Crowser (for NW Cooperage in 1986/87) and the Site Hazard Assessment (for Ecology in 1991) completed by Paramterix/SAIC discussed above. The SAIC SIP report noted that VOCs and pesticides were detected in site soils and groundwater, and that metals and VOCs were detected in embayment sediment. The report also noted that the site is located adjacent to the Duwamish River.

3.1.6 EPA OPINION LETTER (1994*)*

On May 23, 1994, EPA issued a letter to Herman Trotsky that stated based on review of "*files and other pertinent information for the referenced site*" [NW Cooperage], "*EPA does not anticipate further investigation under the Federal Superfund Program*".

3.1.7 EMBAYMENT SEDIMENT SAMPLING (1998 TO 2006*)*

As part of planning for and completing the LDW RI, sediment samples were obtained and analyzed from within and near the mouth of the embayment (Windward 2007a,b). Sample locations are shown on Figure 3-1. Surface sediment samples DR138, DR139 and DR157 were collected in August 1998 as part of EPA's site investigation (SI). Sample B5a-2 was collected in September 2004 as part of benthic studies while sample LDW-SS84 was collected in January 2005 as part of the Round 1 sampling. The samples were analyzed for metals, SVOCs, PCBs, and total organic carbon. Samples LDW SS84, DR139 and B5a-2 were also analyzed for pesticides while sample DR139 was analyzed for VOCs and sample LDW-SS84 was analyzed for PCDDs/PCDFs. The results are summarized in Appendix F (Table F.1). Metals, a number of SVOCs (including PAHs), PCBs, organic tin, and PCDDs/PCDFs were detected. These data were used to develop the RI work plan but were not used to characterize site conditions because an extensive amount of more recent data was collected as part of this RI.

Core LDW-SC40 located near the mouth of the embayment (Figure 3-1), was sampled in February 2006. The core was advanced to a depth below mudline of approximately 13 feet. The upper portion of the sediment core (0 to 4 feet) was divided into three samples and the samples were analyzed for metals, SVOCs, pesticides, PCBs and PCDDs/PCDFs. The results are summarized in Appendix F (Table F.5). Metals, several SVOCs (including PAHs), PCBs, and PCDDs/PCDFs were detected in a sample collected from a depth of 0 to 1.3 feet. Only low concentrations of PCDDs/PCDFs were detected in two deeper samples (1.3' to 2'; 2 to 4'). These data were used to develop the RI work plan and were incorporated into the site characterization analysis because this core is located at the mouth of the embayment. The LDW-SC40 data are included on sediment sections to illustrate subsurface constituent concentration patterns.

3.2 SITE INVESTIGATIONS AND DOCUMENTS (2007 TO 2009)

3.2.1 DATA COMPILATION AND IDENTIFICATION OF DATA GAPS - FEB. 2007

SAIC for Ecology compiled available information to identify data gaps for Early Action Area -2 (EAA-2)[6]. The results of the compilation and analysis are summarized in SAIC (2007a). This report provides a summary of the regulatory and sampling history of sites potentially associated with EAA-2. Available embayment sediment, upland soil, groundwater, embayment seep, storm water, and sediment data were summarized.

3.2.2 SOIL, SEDIMENT, SEEP AND GROUNDWATER ASSESSMENT - APRIL AND MAY 2007

As part of the LDW source control work, Ecology contracted SAIC to complete sampling on the ICS/NWC Upland Area and in the embayment (SAIC 2007b). Sample locations on shown on Figure 3-1. The work consisted of the following and was completed consistent with work plans approved by Ecology.

Sediment

- Four intertidal surface (0 to 10 cm) sediment samples (SED1 to SED 4) were collected from the embayment and were analyzed for metals, SVOCs, pesticides, and PCBs. These data are summarized in Appendix F (Table F.1). Metals, SVOCs, (including PAHs), pesticides (e.g. DDT) and PCBs were detected. These data were used to develop the RI work plan but were not used to characterize site conditions because an extensive amount of more recent data was collected as part of this RI.

Soil and Groundwater

- Three soil borings (herein SA-MW-1, SA-MW-2 and SA-MW-3) were drilled and sampled adjacent to the embayment along the northern boundary of the upland. Monitoring wells were installed in the three borings.

[6] The inlet (embayment) was formerly identified as an early action area. The inlet no longer has this designation.

- o The new wells and four existing wells (HC-B1, HC-B2, HC-B4 and HC-B5) were surveyed to a common elevation datum.
- o Groundwater flow directions and the effects of tidal fluctuations were assessed. The tidal level measurements are discussed later in this report (Section 4.4.1).
- o Six subsurface soil samples were collected from the three borings. The data are summarized in Appendix H (Tables H.3a and H.3b). These soil data were used to characterize the site conditions.
- o Five groundwater samples were collected from wells SA-MW-1 to SA-MW-3, HC-B1 and HC-B2 and two seep samples (Seep 1 and Seep 2) emanating from the south shore of the embayment at low tide. The samples were analyzed for metals, SVOCs (including PAHs), pesticides, and PCBs, the results of which are summarized in Appendix G (Table G.1-wells and G.2-seeps). Metals, several SVOCs (including PAHs), pesticides and PCBs were detected in one or more of the samples. These data were used to develop the RI work plan but were not used to characterize site conditions because an extensive amount of more recent groundwater data were collected as part of this RI.

Storm Water

- o One 2nd Ave. Outfall sediment sample (SED 5) from one foot inside the outfall pipe and one 2nd Ave. Outfall water sample were collected. The samples were analyzed for petroleum hydrocarbons, metals, SVOCs (including PAHs), chlorinated pesticides and PCBs. The results are summarized in Appendix I (Tables I.1 and I.2). Metals, several SVOCs, pesticides (e.g. DDT), and PCBs were detected in the outfall solids sample while metals, several SVOCs and pesticides were detected in the storm water sample. These data were used to develop the RI work plan. The results of the outfall solids sample were not used to characterize the site conditions because of the proximity of the sample to the outfall mouth where sediment from the embayment could wash into the pipe during flood tides. The storm water results were used to characterize discharges to the embayment.

3.2.3 EAA-2 SOURCE CONTROL ACTION PLAN - JUNE 2007

Using the results of the SAIC data compilation report (SAIC 2007a), Ecology prepared a "*Source Control Action Plan for Early Action Area 2*." This plan summarizes potential sources and contaminants of concern (as of 2007). The results of some previous sample analyses are described and "*Source Control Actions*" for properties with the potential to contribute contamination to EAA-2 were outlined.

PCBs, bis(2-ethylhexyl)phthalate[BEHP], mercury, lead, zinc, DDT and dieldrin were considered to be the major COCs in EAA-2 sediments. Sources of contaminants to EAA-2 were identified to potentially be associated with historic and/or on-going activities and included the ICS/Trotsky Property, Douglas Property, 2nd Ave. Outfall, Boyer properties and atmospheric deposition (via direct deposition or migration in storm water). In-line sediment samples from the 2nd Ave. outfall system indicated the presence of arsenic, zinc, phthalates, PAHs and other contaminants.

3.2.4 SOIL PROBE SAMPLING - JULY 2008

In July 2008, DOF completed ten soil probes (P-1 to P-10) on the upland portion of the Trotsky property to depths of generally twenty feet to further characterize the site conditions. Sample locations are shown on Figure 3-1. The results are summarized in Appendix H (Tables H.3a and H.3b). Soil conditions encountered by the probes were logged and soil samples were obtained for laboratory analysis of petroleum hydrocarbons, lead and PCBs[7]. Petroleum hydrocarbons, lead and PCBs were detected in the soil samples. The results of the soil probing were used, in part, to characterize soil conditions near the embayment shoreline.

3.2.5 DOUGLAS MANAGEMENT CO. PROPERTY - SUPPLEMENTAL DATA GAPS REPORT – DEC. 2008

SAIC for Ecology compiled available historic and testing data on the Douglas Property. Available surface and subsurface sediment data in the LDW adjacent to the property, and upland soil and groundwater data were summarized. No data on sediment quality in the embayment were presented in the report.

The results of a number of sediment samples collected from the LDW near and northwest of the mouth of the embayment were compared to sediment criteria contained in the Washington State Sediment Management Standards (SMS). The referenced sediment sample locations are shown on Figure 1-2. Two PAHs (benzo[ghi]perylene and indeno[1,2,3-cd]pyrene) were found to marginally exceed sediment quality standards (SQS) in a sample collected in the waterway northwest of the embayment mouth (DR136) and PCBs were found to exceed the SQS by a factor of less than 2 except at a location northwest of the embayment mouth (LDW-SC39) where the SQS was exceeded by 5.8 times and the cleanup screening level (CSL) was exceeded by 1.1 times.

3.2.6 ADDITIONAL SITE CHARACTERIZATION ACTIVITIES - TROTSKY AND DOUGLAS MANAGEMENT CO. PROPERTIES - MAY 2009

This report prepared by SAIC (2009) summarized the results of testing completed on the Trotsky and Douglas properties in 2007 and 2009. The results of soil, sediment, outfall solids, groundwater, seep water and 2nd Ave. Outfall water sample analyses are summarized in tables. Some data interpretation and discussion of migration pathways were presented in the report. No new field data were presented in this report.

3.3 SITE INVESTIGATIONS/DOCUMENTS (2010 TO PRESENT)

Work described in the following bullets were completed based on work plans approved by Ecology and form the primary basis for the site characterization analysis documented in this RI report. The purpose of the work and general summaries are provided. The work and analytical results are summarized in the attached appendices, as referenced in later sections of the report.

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[7] A report was not prepared to document this sampling. The results are included in this RI report.

3.3.1 EMBAYMENT SITE RECONNAISSANCE – SEPT. 2010

A low tide (-0.45 feet MLLW) site reconnaissance was made of the embayment on September 7, 2010. The purpose of the reconnaissance was to document surface conditions in the embayment and to provide data to fine tune the sediment sampling program. The results of the reconnaissance are documented in a DOF technical memorandum (DOF 2010b) which is included in Appendix A. The results of the reconnaissance were used to generally describe the embayment conditions and access for sediment sampling.

3.3.2 UPLAND SITE RECONNAISSANCE – SEPTEMBER 2010

An upland site reconnaissance was made on September 7, 2010. The field reconnaissance was supplemented with research of City of Seattle engineering archives concerning the 2nd Ave. Outfall. The purpose of the work was to address a number of issues including the following:

- Conditions along the filled in drainage ditch (see Figures 2-1 and 2-2; Section 2.3.4) associated with the existing storm water sewer pipeline and former lagoon/slough,
- Location of roof drains that do not discharge to the sanitary sewer,
- Assess possible storm water contributions to the reservoir overflow outfall at the head of the embayment,
- Determine location coordinates for previously drilled push-probes and monitoring wells,
- Field mark upland sampling locations and complete utility checks for additional sampling.

The results of the reconnaissance are documented in a DOF technical memorandum (DOF 2010a) that is included in Appendix A. The results of the reconnaissance were used to generally describe the upland conditions and access for soil and groundwater sampling.

3.3.3 REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) WORK PLAN - FEBRUARY 2012

DOF prepared an RI/FS Work Plan to further characterize the ICS/NWC site. This plan summarized available data collected during earlier environmental investigations and presented a field work program to collect additional site characterization data. The field investigation and sampling/analysis results are described in the November 2014 Data Gap Memorandum (DOF 2014) and in later sections of this RI report. As summarized in data tables included with this report, laboratory analyses were completed for a wide range of potential constituents including metals, petroleum hydrocarbons, VOCs, SVOCs (including PAHs), chlorinated pesticides, PCDDs/PCDFs, organotin (sediment), organic carbon (sediment) and several conventional parameters (pH, electrical conductivity, temperature, turbidity, dissolved oxygen, chloride, sulfate, and hardness) in groundwater. The work plan and subsequent work included the following.

Site Reconnaissance

- Site reconnaissance (completed in 2010, described above and presented in Appendix A),

Sediment Sampling

- Sampling/analysis of bank and sediment samples, collected from within the embayment to provide a current characterization of the embayment conditions. Surface sediment samples were collected from thirty-two locations (July and December 2012) and sediment cores were collected from twelve locations (November 2012). Surface sediment sample locations are shown on Figure 3-2 and the locations of sediment cores are shown on Figure 3-3.

Soil and Groundwater Sampling

- Sampling and analysis of two seep samples (Seep 1 and Seep 2) observed during the site reconnaissance and previously sampled in 2007.
- Collection and analysis of soil probe soil samples (LP1 to LP4) to provide soil data within the former drainage ditch alignment (and lagoon). Sample locations are shown on Figure 3-4a.
- Installation of monitoring wells (DOF-MW1 to DOF-MW8) to supplement data from existing wells (HC-B1, SA-MW2 and SA-MW3). Well locations are shown on Figure 3-4a. Soil and groundwater samples were collected and analyzed from these locations. Groundwater samples were not obtained from SA-MW1 because lighter (less dense) non-aqueous phase liquid (LNAPL) was detected in this well.

Storm Water

- Observe the relative volumes of water flowing from upstream manholes and outfall mouth to assess possible infiltration of groundwater into the conveyance system.
- Sample storm water solids from one of the upstream manholes to assess upstream contributions to the embayment.
- Sample storm water flowing through an upstream manhole and outfall mouth to assess possible contributions from groundwater infiltration.

Waste Materials

- Analysis of waste materials (baghouse dust/drum furnace ash – see Table A2.2).

3.3.4 DATA GAP MEMORANDUM – FEBRUARY 2013

The results of the sampling and analysis outlined in the RI work plan were documented in a draft memorandum submitted to Ecology (DOF 2013a). The memorandum presented a description of the site geology, hydrogeology and a potential receptor/migration pathway analysis. Preliminary contaminants of potential concern (COPCs) were identified including LNAPL, chromium, nickel, vinyl chloride, benzene, ethylbenzene, pentachlorophenol, 1,2-dichlorobenzene and PCBs. High concentrations of petroleum hydrocarbons, PCBs and other constituents were detected in embayment sediment and buried lagoon bottom sediments. Storm water conveyance testing indicated that groundwater infiltration was not having an adverse impact on water discharging from the 2nd Ave. outfall, as discussed in Section 5.6.3 later in this report A stormwater sediment sample from the upstream manhole (MH-1) had a PCB concentration of 0.105 mg/kg.

Based on the testing, a number of data gaps were identified and work to fill these data gaps was proposed as follows:

Sediment

- The bottom of contaminated sediment needed to be refined. During the previous sediment core sampling, sediment samples not analyzed were archived for possible later analysis. Ten archived samples were identified for analysis of PCBs, PAHs and a number of other constituents (depending on the sample). Samples were removed from archived storage in August 2013 for analysis.

Soil and Groundwater

- The extent of buried residuals along the former drainage ditch alignment needed to be refined. It was recommended an archived sample from probe LP3 be analyzed for PCBs to define the bottom of former lagoon sediments. Seven additional soil probes were also recommended to assess the lateral extent of buried ditch residues. Analyses for metals, petroleum hydrocarbons and PCBs were conducted on three soil samples from each probe. The probes were drilled and sampled in November and December 2014.
- Four additional monitoring wells were proposed to refine groundwater flow gradients and assess possible contaminant migration to the embayment and adjacent Boyer property. Collected groundwater samples from available wells and analyze the samples for dissolved metals, petroleum hydrocarbons, VOCs, SVOCs and PCBs. Wells were ultimately installed at locations MW-D, HC-B2 (replacement well), MW-G and MW-F. The wells were installed in October 2015 and groundwater sampling rounds occurred in November 2015, March 2016 and October 2016.
- Advance four to five soil probes upgradient of wells DOF-MW7 and DOF-MW8 to assess the source of constituents detected in these wells. The probes were drilled and sampled in November 2014.
- Further assess the presence of LNAPL detected in well SA-MW1. The presence of LNAPL in SA-MW1 was assessed during water level measurement and groundwater monitoring rounds.
- Further assess an apparent buried container at location LP-4, including completing a ground penetrating radar (GPR) survey to assess the nature of the container and a means of removing the oily material from the container. The GPR survey was completed in September 2013 (see Appendix A).
- Drill and sample three off-site push probes located downgradient of a former wrecking yard and drainage ditch south of the ICS/NWC property. The probes were drilled and sampled in June 2015.

Storm Water

- Collect storm water samples during a low tide and seasonal high-water table when groundwater levels would potentially be above the pipe invert. Analyze the samples for the same constituents outlined in the RI work plan. Storm water samples were obtained and analyzed in March and September 2015 (see Appendix I).

Embayment Water Samples

- Collect embayment water samples and analyze the samples for conventional constituents (chloride, sulfate, hardness). This sampling was recommended to provide data to assess mixing of fresh groundwater with embayment estuarine water along the ICS/NWC property shoreline. Embayment water samples were obtained/analyzed in October 2015.

3.3.5 GPR AND SEWER VIDEO SURVEY – SEPTEMBER 2013

GPR and sewer video surveys were completed to address a number of data gaps primarily associated with the filled in drainage ditch, lagoon outlet box and buried pipeline leading to the 2nd Ave. Outfall, and a buried "*container*" potentially containing an oily fluid at probe location LP4 (DOF 2013a). The results are documented in DOF (2013b) which is included in Appendix A. GPR was not successful in locating any of these features. However, the robotic video survey was successful in providing the ground trace of the buried pipeline (in conjunction with differential GPS), locating the likely connection of the outlet box to the buried sewer pipeline, confirming that there were no other connections to the sewer on the ICS/NWC property, and showing the condition of the pipeline. The survey indicated a partial separation of one concrete pipeline section raising the possibility of groundwater leakage into the storm water system. The DOF technical memorandum also presents the results of a professional survey of existing monitoring wells, locations and rim elevations of the sewer manholes, and 2nd Ave. Outfall.

3.3.6 DOF TECH. MEMORANDUM – ARCHIVE SAMPLE AND SEDIMENT ANALYSES - MARCH 2014

DOF (2014) submitted a technical memorandum to Ecology that presented an updated analysis of embayment sediment conditions based on analysis of archived sediment samples (collected in November 2012) and analyzed in September 2013 and data collected by consultants working on the Douglas Property. The results are summarized in Appendix F (Table F.4). A refined characterization of sediment conditions (discussed and summarized later in this report in Section 5.3) was presented including a preliminary identification of sediment contaminants of potential concern (COPCs). The memorandum concluded the following:

> "*The results of the surface and subsurface sediment sampling provide sufficient data as to the nature and extent of Embayment sediment contamination for purposes of completing the FS. However, the presence of PCBs and other constituents above SLs* [screening levels] *in deeper soil beneath the Douglas Property upland raise a concern about constituent migration in groundwater that discharges to the Embayment.*"

3.3.7 DOF DATA GAP MEMORANDUM – NOVEMBER 2014

This technical memorandum (DOF 2014b) supplemented the draft data gap memorandum submitted to Ecology in February 2013. The memorandum presents a summary of data collected as part of implementing the 2012 Work Plan (DOF 2012) and outlines additional work necessary to fill additional identified data gaps. The remaining work was generally divided into two phases (Phase 2a and Phase 2b):

Phase 2a

Sediment

- Surface sediment re-sampling to assist in assessing possible sediment disposal options as part of the FS because of high metals and PCB concentrations. In September 2014, surface samples were collected from previous locations SED-1, SED-2 and LDW-SS84 for analysis of PCBs. Previous analyses indicated total PCB concentrations in SED-1 and SED-2 exceeded 50 ppm, which affects possible disposal options. In addition, samples from SED-1, SED-2, SED-4, LDW-SS-84, DSS-26 and B5a-2 were collected for total metals and TCLP analysis because of high lead contents in previously collected samples. The results of the TCLP analyses will determine how sediment is designated for disposal purposes. Sample locations are shown on Figure 3-2 and the data are summarized in attached Table A5.8 and Table F.2a in Appendix F.

Soil and Groundwater

- Install and sample three deeper wells on the Douglas Property (DMC-MWA to DMC-MWC) to supplement testing completed by consultants for the Douglas property owners. Well locations are shown on Figures 3-4a and 3-5. The purpose of the wells was to assess possible deeper contaminant migration in groundwater to the embayment. The wells were installed in February 2015. Sampling was delayed until November 2015 to be coordinated with groundwater sampling on the ICS/NWC property.
- Collect soil and groundwater samples from twenty-three push probes (P11 to P33B). Sample locations are shown on Figure 3-4a. Soil and groundwater analytical results are summarized in Tables G.2 and H.4. The purpose of this work was to provide data to determine the locations of additional monitoring wells to complete the site characterization. The push probes were sampled in November/December 2014 and included the analysis of seventy-seven soil samples and twenty-three groundwater grab samples. Soil samples not analyzed were placed in frozen storage. Based on these results, additional well locations were determined that were installed and sampled as part of Phase 2b.
- Sample off-site push-probes (P34 to P36) downgradient of a former wrecking yard. Because of arranging for access, this work was shifted to Phase 2b.

Storm Water Sampling

- Wet weather storm water system sampling/analysis to assess storm water discharges to the embayment during high water table conditions. This sampling was shifted to Phase 2b. and was completed on March 23, 2015 and was not reported in the Phase 2a data report. The results are presented in Appendix I.

A Phase 2a data report (DOF 2015) was submitted to Ecology in April 2015 and presents an updated site characterization analysis that was used to recommend new monitoring well locations, primarily based on the analysis of soil and groundwater push-probe samples and data from existing wells.

Phase 2b

Mobile LNAPL

- As noted above, LNAPL was detected in well SA-MW1. Based on soil concentrations of petroleum hydrocarbons, LNAPL was possibly present in areas adjacent to SA-MW1. To further assess the possible wider distribution of mobile LNAPL, two additional wells (LNAP-1 and LNAP-2) with screens spanning the water table were installed at the locations shown on Figure 3-4a. Observations made in these and other wells indicate mobile LNAPL is limited to the vicinity of SA-MW1. The presence of mobile LNAPL is discussed further in Section 5.4.3 below.

Groundwater

- Three off-site push-probes were sampled in June 2015. Probe locations are shown on Figure 3-4b while the results are summarized in Table G.3. As noted above, the purpose of these wells was to assess conditions downgradient of a former wrecking yard and filled drainage ditch located south of the ICS/NWC property.
- Based on the Phase 2a push-probe sampling and data from existing wells, the hydrogeology of the site was further refined including the presence of a perched groundwater zone beneath the western portion of the ICS/NWC property. Additional wells were recommended to provide data concerning conditions in the perched zone and possible contaminant migration to the embayment and adjacent (Boyer) property. Four wells (MW-Ap to MW-Dp) were installed within the perched zone and an additional twelve wells (upper zone wells MW-B2[R], -Du, -Eu, -Fu, -Gu, Ju, and Ku, and deeper zone wells MW-FL, -GL, -HL, -IL and –KL) within the upper and lower portions of the groundwater zone of interest. The wells were installed in October 2015. Well locations are shown on Figure 3-4a and well construction data are summarized in attached Table A4.1.
- Groundwater samples were obtained from the wells in November 2015, March 2016, and September 2016 and submitted for laboratory analysis, the results of which are summarized in Table G.2. These data provide the primary basis for assessing groundwater conditions at the site.
- Six in-situ hydraulic conductivity tests were completed in September 2016 to supplement the Hart-Crowser data collected in 1986. Hydraulic conductivity is one of several measures used to estimate groundwater flow rates. The hydraulic conductivity data is supplemented with nine grain size analyses of soil samples collected from probes P28, P31 and P32. These data are summarized in Appendix E.
- Groundwater flow measurements were made at low and high tides in April 2016 and February 2018. The February 2018 data include measurements made on both the ICS/NWC and Douglas properties. These data were used to assess groundwater flow direction gradients and the impact of tidal fluctuations on flow directions. The data are summarized in Tables A4.2 and A4.3.

Storm Water

- A third set of storm water samples were obtained September 2015 to supplement the two previous sampling rounds completed in August 2012 and March 2015. The analytes and results are summarized in Appendix I (Table I.3).

Phase 2b data are reported and discussed in this RI report.

3.3.8 DOUGLAS PROPERTY RI

An RI is being completed for the Douglas Property under an agreed order with Ecology. A draft RI (Geoengineers 2016) was prepared and submitted to Ecology in December 2016. The report presents a site history and hydrogeologic characterization, as well as soil, seep, and groundwater analytical data that are summarized in Appendix G (Table G.5). Douglas property sample locations are shown on Figure 3-5. Pertinent Douglas RI data are incorporated into the ICS/NWC RI as discussed below.

4.0 HYDROGEOLOGY

4.1 GEOLOGY

The project area subsurface conditions were interpreted from available boring, push-probe, sediment core and well logs. Subsurface exploration locations are shown on Figures 3-1 to 3-5. Other information and data are presented in this report as follows:

- Location coordinates, monitoring well elevations and other pertinent information are summarized in Appendix B.
- Monitoring well construction data are summarized in attached Table A4.1.
- Field procedures used to collect media samples, drill the push-probes, collect sediment cores and install monitoring wells are summarized in Appendix C.
- Geologic and well construction logs are presented in Appendix D.

4.1.1 REGIONAL GEOLOGY

The facility is located within the Duwamish River valley (Figure 1-1). Glacial uplands that rise to elevations of approximately 100 feet mean sea level (msl), define the eastern and western walls of the valley. Elevations in the valley are less than 10 feet msl. The glacially carved valley was filled with alluvial (river) sediments consisting predominately of silts and sands. Filling along the northern ICS/NWC property shoreline and placement of dredge fills that created the Douglas Property (on the north side of the embayment) formed the existing embayment (Figure 1-2). Historical aerial photographs and facility survey maps (discussed above) indicate that a drainage ditch (now filled) was present along the eastern boundary of the facility. A portion of this ditch was used as a wastewater settling lagoon as shown on Figures 2-4b.

4.1.2 PROJECT SITE GEOLOGY

Interpretative geologic sections were prepared to illustrate the subsurface conditions along the section trends shown on Figures 4-1a and 4-1b. Sections A-A’ to I-I’ illustrate site geology (Figures 4-2 to 4-10) beneath the ICS/NWC property. Sections C-C’ and F-F’ (Figures 4-4a and 4-7a) were extended to illustrate conditions beneath the Douglas Property (Figures 4-4b and 4-7b).

The general geologic sequence beneath the project area is interpreted as follows:

- **ICS/NWC Upland Property**
  - **Upper Sand**. Seven to ten feet of silty, fine sand underlies most of the ICS/NWC property. Along the northern shoreline area, the soils may be coarser consisting of fine to medium sand; silty, fine to coarse sand; and sandy gravel to gravelly sand (Section G-G’ – Figure 4-8). Some to most of this material is fill and variable interbedded conditions are likely present.

    Beneath a portion of the former drainage ditch alignment, there are buried bottom sediments within the Upper Sand unit (Figure 4-7a). The bottom sediments are associated with a former settling lagoon described as a black silt with wood, glass, tar-like layers, and rubber pieces.

- **Fine Grained Unit**. Underlying the upper sand deposits beneath the western portion of the ICS/NWC property is a fine-grained deposit consisting of silt; very fine sandy silt; and clay. Decomposed grass like plants, roots and pieces of wood are indicated on a number of the logs. The unit ranges in thickness (where present) from approximately 1.5 to 8 feet and appears to thin in an easterly direction. The unit lies at an elevation of between -1 to +7 feet NAVD88. This fine grained unit does not appear to underlie the approximately eastern third of the facility as illustrated on Sections A-A' (Figure 4-2), B-B' (Figure 4-3), D-D' (Figure 4-5) and G-G' (Figure 4-8), although discontinuous fine grained strata are present beneath the eastern half of the site. The estimated extent of this fine-grained unit is shown on Figure 4-11.

- **Lower Sand**. Below the ICS/NWC property and fined grained unit and elsewhere beneath the property, deeper deposits (up to 50 feet) generally consist of fine sand and fine to medium sand with interbedded silt layers as illustrated on the geologic sections.

- **Embayment**
  - **Upper Sand**. Surface deposits in the embayment generally consist of up to eight feet of silty fine sand, fine sandy silt, and sandy gravel (Section I-I' – Figure 4-10). Along the north wall a precipitate or cement layer mantles the surface deposits as discussed above (see Figure 3-2). Near the embayment mouth the more granular deposits thin and disappear.

  - **Fine Grained Unit**. Underlying the granular deposits, is a fine-grained silt layer ranging in thickness from approximately 3 to 6 feet. Some of the silts appeared banded.

  - **Lower Sand**. Below the fine-grained layer that underlies the embayment, deeper deposits (up to 50 feet) consist of similar materials as those that underlie the ICS/NWC upland property (fine sand and fine to medium sand).

- **Douglas Property**
  - **Dredged Sand**. As discussed above, the Douglas Property was created using dredge fill that was placed on top of existing river bottom sediments. Well logs and interpretative geologic sections C'-C" (Figure 4-4b), F"-F' (Figure 4-7b) and H'-H (Figure 4-9) indicate that 15 to 25 feet of dredged fill was placed. The fills primarily consist of silty fine sand and fine to medium sand.

  - **Fine Grained Unit**. On the north side of the embayment the dredge fills appear to have been placed over finer grained silt deposits. The estimated northward extent is shown on Figure 4-11 and sections C'-C" (Figure 4-4b), F"-F' (Figure 4-7b) and H'-H (Figure 4-9).

- **Lower Sand**. Below the fine-grained unit, where present, and elsewhere beneath the Douglas Property, deeper deposits (up to 50 feet) likely consist of similar materials as those that underlie the ICS/NWC upland property and embayment areas (fine sand and fine to medium sand).

4.1.3 GRAIN SIZE ANALYSES

Grain size analyses were completed on the soil samples summarized below in Table 4.1. The grain size analytical results are presented in Appendix E. Overall, the analyses confirm the field classifications that indicated soils beneath the site consist predominately of relatively finer grained materials classified as fine sand, fine to medium sand, silty fine sand, fine sandy silt and silt.

TABLE 4.1 - Summary of Grain Size Analyses – ICS/NWC Upland Area Samples (a)

Location	Depth (feet)	Field Classification	Grain Size Classification	Percent Medium Sand (425-2000 microns)	Percent Fine Sand (75 to 425 microns)	Percent Silt/Clay (<75 microns)
P28	12.5-13.5	Fine sand w/ trace silt	Fine sand	14.2	71.7	14
	21-23	Fine to medium sand	Fine to medium sand	20.6	74.3	5.1
	41-43	Fine sand (dense)	Fine sand	7.9	81.9	10
P31	12-14	Fine sand w/ silty sand interbeds	Fine sandy silt	0.4	49.6	50
	21-23	Fine to medium sand	Fine sand	15.6	75.2	9.2
	41-43	Fine sand w/ silty fine sand interbeds	Silty fine sand	2.8	77.5	19.4
P32	12-14	Fine sand w/ trace of silt	Fine sandy silt	0.3	33.4	66.4
	21-22	Fine to medium sand	Fine to medium sand	28.5	66.8	4.8
	41-43	Fine sand	Silty fine sand	0.2	55.7	44.1

Note: (a) Soils beneath the site were classified in general accordance with ASTM-D2488.

4.2 GROUNDWATER ZONES

The geologic strata were combined into the following groundwater zones for analytical and discussion purposes.

- **ICS/NWC Property**
  Water Table Zone - Consists of water saturated portions of the sandy deposits that lie above the fine-grained unit that underlies the western portion of the ICS/NWC

property and the upper saturated portions of the upper sand beneath the eastern portion of the property. Thirteen monitoring wells were installed in this zone and screened across the water table as shown on Figures 4-12a[8] and 4-13 (page 1 of 2, upper figure). The top of the zone is defined by the water table while the bottom of the zone is generally defined herein as the top of the underlying aquitard, where present, and at an approximate elevation of approximately -3 feet NAVD88 (or approximately fifteen feet below ground level) where the aquitard is not present. Water levels in wells installed above the aquitard did not fluctuate with tidal levels while those in wells to the east of where the aquitard is not present fluctuated to some degree with tides.

Aquitard - As noted above, the western portion of the ICS/NWC property is underlain by a fine-grained stratum that behaves as an aquitard[9]. Where present (Figure 4-11), this zone ranges in thickness from approximately 1.5 to 8 feet. Groundwater is present above this zone. An evaluation of water levels in wells screened immediately below the aquitard indicates the zone behaves as a confining layer as water levels in wells DOF-MW2 to DOF-MW6 and MW-Du rise above the bottom of the aquitard. For example, at well DOF-MW2, the aquitard lies between an elevation of approximately 5.1 and 2.6 feet NAVD88 (see log). High and low tide groundwater elevations in April 2016 and February 2018 ranged between elevations of 4.96 and 5.85 feet NAVD88. The water level elevations are above the bottom of the aquitard elevation (2.6 feet) so the aquitard is a confining layer. The aquitard, where present, reduces the interconnection between the groundwater zones that lie above and below.

As illustrated on several of the geologic sections (e.g. Sections D-D', E-E', and G-G', Figures 4-5, 4-6, and 4-8, respectively) there are discontinuous fine-grained strata. These discontinuous aquitards locally affect groundwater flow.

Upper Groundwater Zone. The upper groundwater zone lies immediately below the aquitard, where present, and below the water table zone to an approximate depth of 20 to 25 feet (between elevations of approximately 2 and -6.5 feet NAVD88). Nine wells were installed in this zone as shown on Figure 4-12b and 4-13. The bottom of the zone roughly corresponds with the bottom of the screens in wells SA-MW1 to SA-MW3. It includes the zone immediately beneath the aquitard (western portion of the ICS/NWC property) and below the water table zone (eastern portion of ICS/NWC property). Wells installed in this zone are screened below the water table and water levels fluctuate with tides

Lower Groundwater Zone - This zone lies directly beneath the upper groundwater zone between approximately 20 to 25 feet and 50 feet below ground surface (elevations -3 to -22 feet NAVD88). Seven wells are screened in this zone as shown

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[8] While wells SA-MW1, SA-MW2 and SA-MW3 are screened across the water table, they are not designated as water table wells because of their long well screens (20 feet long). These wells are screened through the water table and upper groundwater zones.

[9] Less permeable beds in a stratigraphic sequence (Freeze and Cherry 1979).

on Figures 4-12c and 4-13 (page 1 of 2, lower figure). Water levels within this zone fluctuate with tidal levels.

- **Douglas Property –**
  Water Table and Upper Zone – The water table and upper groundwater zones are not differentiated on the Douglas property. This combined zone consists of water saturated portions of sandy deposits that lie at and below the water table to an elevation of -3 feet NAVD88 as shown on Figures 4-13 (page 2 of 2 upper figure) and 4-14. Most wells on the Douglas Property split the water table at high and low tidal levels. The lower portion of the wells are screened within the upper zone as identified on the ICS/NWC property. Water levels within this zone fluctuate with tidal levels to some degree.

  Lower Groundwater Zone – This zone lies directly beneath the upper zone between approximately 20 to 33 feet below ground surface (elevations -1 to -15 feet NAVD88). Wells screened in this zone are shown on Figures 4-12c and 4-13 (page 2 of 2, lower figure) and water levels fluctuate with tidal levels.

4.3 GROUNDWATER FLOW DIRECTIONS AND GRADIENTS

Two sets of groundwater level measurements were made during high and low tide levels as follows:

- **April 11, 2016**. Measurements were made on the south side of the embayment near a predicted high tide of +10.8 feet MLLW and near a predicted low tide of -1.3 feet MLLW. Depth to water measurements and groundwater level elevations are summarized in attached Table A4.2. Figure 4-15 shows the portion of the predicted tidal cycle when the measurements were made.

- **February 6, 2018**. A second set of measurements were made to obtain synoptic measurements on both sides of the embayment. Measurements were made near a predicted high tide of +11.8 feet MLLW and a low tide of +2.5 feet MLLW. Depth to water measurements and groundwater level elevations are summarized in attached Table A4.3. Figure 4-15 shows the portion of the predicted tidal cycle when the measurements were made.

Water level elevations were plotted on base maps by groundwater zone and contoured to estimate groundwater flow directions and hydraulic gradients. Figure 4-13 shows the well screen elevations and how the wells were grouped for contouring purposes to minimize the effect of vertical hydraulic gradients.

- **ICS/NWC Property**
  Water Table Zone. Figures 4-16a and 4-18a show estimated groundwater flow directions in the water table zone at high tide while figures 4-16b and 4-18b show estimated flow directions at low tide. Higher tide flow patterns are similar where

groundwater flows towards a groundwater low located along the central embayment shoreline. Flow patterns during lower tides are also similar where groundwater gradients are towards the embayment within the northwestern portion of the property and towards the LDW within the southwestern and eastern portions of the property.

Upper Zone. Figures 4-17a and 4-19a show estimated groundwater flow directions in the upper zone at high tide and figures 4-17b and 4-19b show estimated flow directions at low tide. During higher tides groundwater generally flows into the ICS/NWC property. As tides fall, a reversal of groundwater flow occurs. In April 2016, a groundwater divide formed with flow beneath the western portion of the property being towards the embayment and flow beneath the eastern portion of the site being towards the waterway. In February 2018 flows reversed, but with flow being towards the head of the embayment. The differences in the two flow patterns is likely related to differences in the tidal levels (-1.3 feet vs +2.5 feet MLLW) for each measurement period.

Lower Zone. Sufficient data is not available to estimate flow directions in the lower zone. Flow directions in the lower zone likely are similar to those in the upper groundwater zone.

- **Douglas Property**

  Water Table/Upper Zone. Figure 4-18a shows estimated groundwater flow directions in the combined water table/upper zone at high tide while Figure 4-18b shows estimated flow directions at low tide. During high tides flow is inward into the property from the embayment and LDW. As tidal levels decline, flow directions reverse. Flow within the southern portion of the property are to the embayment, while flow within the eastern portion of the property is towards the LDW.

  Lower Zone. Sufficient data is not available to estimate flow directions in the lower zone. However, the flow directions are likely similar to those estimated for the water table/upper zone beneath the Douglas property.

4.4 GROUNDWATER FLUCTUATION PATTERNS AND VERTICAL GRADIENTS

Available data indicate that there is a hydraulic barrier along the central embayment shoreline. This barrier appears to restrict flow directly to the embayment along this portion of the shoreline and likely consists of bulkhead and other structures used to construct the shoreline. This finding is based on the groundwater contours discussed above and changes to well water levels between high and low tides.

4.4.1 WATER LEVEL FLUCTUATIONS

To interpret water level fluctuations, the water table and upper zone well data were combined. Figure 4-20a shows the change in water levels between low and high tides on April 11, 2016 beneath the ICS/NWC property. Water levels in wells screened above the aquitard (MW-Ap to MW-Dp) do not appear to fluctuate with tides. In other wells, two types of trends are noted in the data set. As expected, generally smaller changes occur with increasing distance from the embayment shoreline and LDW in upper zone wells. However, the smallest changes occurred immediately adjacent to the central portion of the ICS/NWC embayment shoreline in water table zone wells MW-Eu, and MW-Ju and in multiple zone wells SA-MW1 to SA-MW2. Water levels in these wells only declined between 0.25 to 0.56 feet. This compares to a change of approximately 2 feet along the western embayment shoreline in upper zone wells and between approximately 5.3 and 7.8 feet along the eastern boundary in water table zone wells and multiple zone well SA-MW3. Similar changes were observed in most of the lower zone wells as shown on Figure 4-20b. While the changes were similar, the changes were slightly higher in the lower zone wells suggesting the zone has a higher hydraulic conductivity as compared to the upper zone, which appears to be generally consistent with the geologic descriptions.

Figures 4-21a and 4-21b illustrate water level changes that occurred beneath the ICS/NWC and Douglas properties in February 2018. Beneath the ICS/NWC property, the changes showed a similar pattern as that described above for April 2016. There was little change in water levels beneath the central portion of the embayment shoreline and the greatest changes occurred along the eastern property line.

Beneath the Douglas property, greater changes occurred within the water table/upper zone along the embayment shoreline (approximately 1.0 to 2.6 feet) as compared to the interior (less than 0.1 feet). Water levels declined about 0.6 feet along the LDW shoreline. Water levels changes in the lower zone along the embayment shoreline ranged between 0.44 and 3.7 feet.

The findings above are generally consistent with time-series water level measurements made during tidal changes in a number of wells. In May 2007, SAIC (2007b) for Ecology measured water levels in wells SA-MW1 to SA-MW3 and HC-B1, -B2, -B4, and –B5 over a tidal change of approximate 11 feet. Well locations are shown on Figure 3-4a and the time series plots are presented on Figure 4-22. Well SA-MW1 showed the least change, even though this well lies immediately adjacent to the embayment shoreline and is screened in both the water table and upper zones. Progressively greater changes were measured in an eastward direction in wells HC-B1 and SA-MW3. Changes in water levels measured in SA-MW2 were much lower in April 2016 (0.15 feet) as compared to those measured in 2007 (approximately 5.5 feet). Measurements made in SA-MW2 in September 2016 were similar to those made the previous April. Water levels declined only 0.13 feet over a period when the tide declined approximately 9.0 feet.

Water level changes in HC-B1 (5.15 feet in April 2016) appear anomalous as compared those in MW-Eu (0.51 feet) and SA-MW2 (0.15 feet). The relative positions of the well screens are shown on Section G-G’ (Figure 4-8). The top of the HC-B1 well screen is just one to two feet lower than the bottom the MW-Eu screen. Both the HC-B1 and MW-Eu screens are within the screen interval of SA-MW2. The cause of the water level change difference may be related to the HC-B1 location compared to the other wells. HC-B1 is located closest to the embayment and may be more directly connected to the embayment. The hydraulic connection of wells to surface water can vary even between short distances because of subsurface bulkheads and other features.

Figures 4-23a and 4-23b illustrate a comparison of tidal fluctuations and water level fluctuations in wells SA-MW1, DOF-MW8 and MW-IL. Water levels in the indicated wells were measured using transducers and data loggers over approximately four days. Water levels in wells DOF-MW8 and SA-MW1 fluctuated in a similar manner with the time lag between tidal lows and groundwater lows ranging between 129 and 157 minutes. Water levels in MW-IL fluctuated over a much greater range with the lag being much shorter (between 6 and 16 minutes). The time lags at high tides were similar to those at low tides (well SA-MW1/DOF-MW8 109 to 156 minutes; MW-IL 28 to 33 minutes). MW-IL is located adjacent to SA-MW3 where water levels also fluctuated over a greater range compared to other wells.

4.4.2 VERTICAL GRADIENTS

Comparison of water level elevations in well pairs screened at different depths indicates that vertical gradients are present and vary with tidal fluctuation. Vertical gradients were evaluated by comparing water level elevations at high and low tides to determine their presence and direction (note equal elevations indicate horizontal flow). The magnitude of the gradients was calculated by determining the difference in elevation and dividing this difference by the distance between the mid-points of the well screens. Vertical gradients are shown on Figure 4-24. Similar gradients and directions were determined using both the April 2016 and February 2018 data sets.

Along the ICS/NWC east site boundary and central embayment shoreline, upward gradients are present during high tide and downward gradients are present during low tide. Along the east site boundary, the magnitudes of the gradients were similar with upward gradients ranging between 0.011 and 0.099 and downward gradients ranging between 0.007 and 0.095. Higher gradients were observed at the MW-Eu/HC-B1 well pair which may be caused by the wells being installed in a variably constructed shoreline.

At well pairs MW-6/MW-IL (screened below the aquitard) and MW-Lu/MW-LL downward gradients were observed for both high and low tides. The low tide gradients were greater than the high tide gradients.

Along the Douglas property shoreline downward gradients were determined for both high and low tides. The gradients ranged between 0.066 and 0.187.

4.5 GROUNDWATER/SURFACE WATER MIXING PATTERNS

Concentrations of conventional parameters (major ions) were used to evaluate the mixing of groundwater and saline estuarine LDW water beneath the ICS/NWC property using a two end-point mixing model. The mixing patterns provided additional insight to the hydraulic connection of the groundwater system to the embayment and whether groundwater beneath the ICS/NWC property should be classified as potable.

Groundwater data used in the analysis were from push-probe and monitoring well sampling events completed in November 2012, November 2014, September to November 2015 and March 2016. Conventional parameter groundwater data are summarized in attached Table A4-4 (and Appendix G). Embayment surface water samples were collected from two depth levels in October 2015 during a predicted tidal level of 8 feet MLLW. One sample was collected from the upper two feet below the water surface and the second sample from two feet above the mudline (approximately six feet below the water surface). Surface water data are summarized in attached Table A4-5. The upper estuarine sample was less saline than the lower level and exhibited slightly less than half the dissolved solids concentration as the lower sample.

The conventional parameters used in the analysis included sodium, chloride, sulfate, calcium and magnesium which represent approximately 98% of the dissolved solid concentration of sea water (Mason 1966). Pair-wise correlations of major constituents in estuarine water were determined to be high, indicating relatively high dependence and associations. Pearson correlation coefficients (R) were calculated as follows:

Table 4.2- Conventional Parameter Correlations

Parameter Pairs	Correlation (R)
Chloride vs. sodium	0.97
Dissolved solids vs. chloride	0.99
Dissolved solids vs. sodium	0.98

Note: Dissolved solids = sum of sodium, chloride, sulfate, calcium and magnesium.

Chloride, sodium and dissolved solids were selected to evaluate the mixing of groundwater with estuarine water. The strong correlation and dependence between sodium, chloride and dissolved solids allows the use of either of these parameters to generally describe the others. As one or more of these parameters were not analyzed in all samples, the use of these three parameters allowed estimates to be made for all the groundwater samples. Binary graphical plots show a strong linear relationship between the major ions for site ground and estuarine water (Figure 4-25). Least square line fit plots indicate that the line fits account for more than 95% to 99% of the variability in the samples. The high correlations and binary plots indicate that the predominant source of chloride, sodium and dissolved solids is estuarine surface water.

The two end points used in the mixing model included the following (mean concentrations used in the analysis are presented in attached Table A4-4):

- Relatively fresh groundwater represented by the mean concentration of well samples DOF-MW-2, -MW-3 and -MW-4. Samples from these wells have relatively low electrical conductivity and dissolved solids concentrations.

- Saline embayment water samples represented by the mean concentration of the upper and lower samples.

The end points are highlighted on the plots shown in Figure 4-25.

Increases in groundwater concentrations of sodium, chloride and dissolved solids indicate that a particular sample contains an increasing proportion of estuarine water. It was assumed that the fresh groundwater end point contained 0% estuarine water and that the estuarine end point contained 100 % estuarine water. The mixing calculations were made as follows and are illustrated using sodium data from well DOF-MW1 collected in November 2015:

1) The freshwater end point constituent concentration was subtracted from the DOF-MW-1 sample result [2030 mg/l – 409 mg/l = 1,621 mg/l].
2) The adjusted sample concentration was divided by the difference in the constituent end point concentrations and multiplied by 100 to convert to a percentage of estuarine water [{1,621 mg/l / (3680 mg/l – 409 mg/l)} x 100 = 49.6%].
3) A calculation was made for each of the three constituents (using available data).
4) The available results were averaged to provide an overall estimate of the proportion of estuarine water in the sample.

The estimated estuarine water contents of the groundwater samples are summarized in attached Table A4-4 and are illustrated on Figures 4-26a and 4-26b[10].

The combined water table and upper zone monitoring well samples generally exhibited low dissolved solids content reflecting less than 5% estuarine water content (Figure 4-26a). Estuarine influence in upper zone well samples is evident in nearshore stations such as MW-Eu, SA-MW2, and SA-MW3. The percentage estuarine water was fairly consistent between sampling rounds and generally ranged less than +/- 10% to15% of the average values. Samples from SA-MW3 showed a greater range (<5% to 63%) as generally indicated by the differences in electrical conductivity (Table A4.4). These changes likely reflect groundwater flow direction changes associated with changing tidal levels. Of all the wells on the site, SA-MW3 showed the greatest change in water levels with fluctuating tides.

It is noteworthy that samples from DOF-MW1, P26 and P27A showed estuarine water contributions that ranged between 49% and 87%. These locations are surrounded by locations showing low estuarine contribution (<5%). The source of the higher estuarine water content of these samples may be a relic of the tidal influxes to the drainage ditch before the ditch was filled or leakage (when the pipe is filled with estuarine water) from the previously discussed outlet box connection to the 2nd Ave. storm sewer (Figure 2-5). As shown on Figure 2-8, most of the pipe, including the outlet box, lies below higher tide levels that occur in the embayment, so estuarine water could potentially leak from the pipe.

Lower zone monitoring well samples exhibited generally higher dissolved solids content and estuarine contribution as compared to most upper zone wells as illustrated on Figures 4-26b and 4-27. Estimated estuarine contributions to lower zone groundwaters ranged from 13% to 100%. Data from push-probe samples collected from depths of 45 to 50 feet below ground surface are summarized below in Table 4-3 and Figure 4-27.

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[10] Conventional parameters were not analyzed in samples from wells MW-Ap to MW-Dp because water level measurements indicate these wells are not tidally influenced. The percent estimated estuarine water content (<5%) was estimated based on relatively low electrical conductivity measurements.

Table 4.3 - Estuarine Water Content – Deeper Push-Probe Samples

Location	Depth (feet)	Estuarine Water Content (%)	Dissolved Solids (mg/l)
P-18B	45-50	100	13,646
P-21B	45-50	88	10,608
P-27B	45-50	67	8,366

Note: Dissolved solids = sum of Na, Cl, SO4, Ca, Mg

The change in the estuarine water content with depth is illustrated below in Table 4-4 using data from two locations; one location adjacent to the embayment shoreline and a second location interior to the site. These locations are highlighted on Figure 4-27, with the exception of well HC-B2R, as conventional parameters were not analyzed in samples from this well. Electrical conductivity measurements indicate the estuarine water content to be less than 5% in samples from well HC-B2R.

Table 4-4. Estuarine Water Content with Increasing Depth

Location	Depth (feet)	Estuarine Water Content (%)	Dissolved Solids (mg/l)
Shoreline			
MW-Eu	4.5-14.5	78	8,755
HC-B1	16-21	58	6,219
P30	25-30	44	5,275
Interior Site Wells			
HC-B2R	4.5-9.5	<5	-----
P18A	25-30	10	1,715
P18B	45-50	100	13,646

Note: Dissolved solids = sum of Na, Cl, SO4, Ca, Mg

With the exception of MW-IL, dissolved solids contents were consistent between the initial two monitoring events (R1 and R2). The estuarine content of samples from MW-IL, located adjacent to the embayment, ranged between 31% and 59% indicating a hydraulic connection to the embayment.

The lower zone well samples on the Douglas Property showed an increasing estuarine influence closer to the LDW. The estimated average percentage influence ranged from <5% (DMC-MWA) to approximately 57% (DMC-MWC). The pattern reflects the relative distances from upland freshwater recharge sources and estuarine river sources and the presence of the underlying silt (aquitard) layer beneath the embayment.

4.6 HYDRAULIC CONDUCTIVITY TESTING AND RESULTS

Hart Crowser completed five in-situ hydraulic conductivity tests in 1986 (Hart Crowser 1987). Test values ranged between 2 and 113 feet per day (ft/day). Based on field observations, well recovery rates and site hydrogeology, they concluded that a representative value for the site conditions was on the order of 15 ft/day (5.3x10-3 cm/sec). This estimated value is typical for a silty sand (Freeze and Cherry 1979).

In January 2016, six in-situ falling head slug tests were completed in six wells using a transducer connected to a data logger. Tests were completed in wells HC-B1, MW-6, MW-7, MW-Eu, MW-HL and MW-IL. Water level recovery in well MW-HL occurred too rapidly to provide a reliable data set. Data from other wells were analyzed using the software program Aqtesolv (v. 4.50 Std) by HydroSOLVE, Inc. The Hvorslev and Bouwer-Rice (Kruseman and de Ridder 1990) methods were used to analyze the data. Data plots and other information are included in Appendix E. The results are summarized below in Table 4.5.

Table 4.5 - Hydraulic Conductivity Test Results

Location	Groundwater Zone	Bouwer-Rice (cm/sec)	Hvorslev (cm/sec)	Average (cm/sec)	Material Type
HC-B1	Shallow Zone	3.2E-4	4.0E-4	3.6E-4	Silty to very silty, fine to coarse sand
MW-6	Shallow Zone	1.1E-2	1.4E-2	1.3E-2	Fine to medium sand
MW-7	Shallow Zone	1.3E-2	1.8E-2	1.6E-2	Fine sand
MW-Eu	Water Table Zone	8.4E-5	5.3E-5	6.7E-5	Gravelly sand
MW-IL	Deeper Zone	2.4 E-3	3.0 E-3	2.7E-3	Fine to medium sand

Overall the results are consistent with the material types with the exception of MW-Eu. A gravelly sand would typically have a hydraulic conductivity higher than the test value of 6.7E-5 cm/sec. The value is more typical for the material encountered in HC-B1 that is located just a few feet from MW-Eu. The differences are likely caused by the variable fills used to construct the shoreline.

4.7 BENEFICIAL USES OF GROUNDWATER

According to WAC 173-340-720, groundwater cleanup levels must be based on the highest beneficial use of groundwater, which is human ingestion, unless the criteria outlined in 173-340-720(2) subsections (a) through (c) are met. Otherwise, WAC 173-340-720(2) defines groundwater as potable. In this section, groundwater beneath the site is evaluated against these criteria, which are discussed below.

(a) The groundwater does not serve as a current source of drinking water.

There are no water supply wells located on the property. A check of Ecology's well log and water rights databases indicate there are no water supply wells in the vicinity of the Site.

(b) The groundwater is not a potential future source of drinking water for any of the following reasons:

> ***(i) The groundwater is present in insufficient quantity to yield greater than 0.5 gallon per minute on a sustainable basis to a well constructed in compliance with chapter 173-160 WAC and in accordance with normal domestic water construction practices for the area in which the site is located.***

The water table groundwater zone above the aquitard likely would not yield sustainable amounts of groundwater especially during the drier portions of the year. It would also not be possible to construct a water supply well in accordance with Chapter 176-160 WAC as an 18-foot thick surface seal is typically required and the bottom of the water table groundwater zone lies at a depth of less than ten to fifteen feet. Wells could be installed in the upper and lower groundwater zones in accordance with applicable drilling regulations that would yield more than 0.5 gpm.

> ***(ii) The groundwater contains natural background concentrations of organic or inorganic constituents that make use of the water as drinking water source as not practical. Groundwater containing total dissolved solids at concentrations greater than 10,000 mg/l shall normally be considered to have fulfilled this requirement.***

Total dissolved solids (TDS) concentrations for groundwater beneath the Site are not available. However, chloride, sulfate, calcium, magnesium and sodium were analyzed in push-probe and monitoring well groundwater samples. The sum of these naturally occurring constituents (Table A4.4) provides an indication, but understates, the TDS concentration of groundwater beneath the site (herein termed dissolved solids – DS). These data indicate that Site groundwater ranges from relatively fresh (shallower groundwater) to relatively saline (deeper groundwater) as illustrated on Figure 4-27. Shallower groundwater DS concentrations range from 121 mg/l (water table zone at P11) to 6,979 mg/l (P27A at a depth of 15 to 20 feet below ground surface). Deeper groundwater samples (45 to 50 feet) from P-18B (13,646 mg/l), P-21B (10,608 mg/l), and P-27B (8,366 mg/l) had DS concentrations above or close to the 10,000 mg/l threshold. Samples from the upper portion of the lower zone (P28, P30, MW-GL, and MW-IL), collected at depths between approximately 20 and 35 feet, had dissolved solids concentrations ranging between 5,060 and 6,211 mg/l. These relatively high dissolved solids concentrations indicate the transition from overlying fresher groundwater (DS<10,000 mg/kg) to more saline groundwater (DS>10,000 mg/kg) occurs at depths of approximately 40 to 45 feet.

To meet Washington state well construction standards, wells would need to be installed at depths greater than 18 feet within the fresh-saline groundwater transition mixing zone. Groundwater pumpage from such wells would cause the upward migration of saline water into fresh water. Furthermore, as illustrated on Figures 4-26a and 4-26b, relatively high DS concentrations 5,275 to 8,755 mg/l were detected along a portion of the embayment shoreline which indicates the influence of marine water. Significant groundwater pumpage would cause intrusion of marine water into groundwater zones beneath the site.

(c) The department determines it is unlikely that hazardous substances will be transported from the contaminated ground water to groundwater that is a current or potential future source of drinking water, as defined in (a) and (b) of this subsection, at concentrations which exceed groundwater criteria published in chapter 173-200 WAC. In making this determination, the department shall consider site-specific factors including:

(i) The extent of affected groundwater

Affected groundwater is limited to the upland area and potentially to a small area between the ICS/NWC property and to the east towards the LDW[11]. Conditions between the east site boundary and waterway are expected to be similar to those beneath the upland area with the salinity of groundwater increasing towards the river.

(ii) The distance to water supply wells

No water supply wells are located in the vicinity of the Site. The Site is also located on the downgradient side of the river valley where groundwater discharges to the river.

(iii) The likelihood of interconnection between the contaminated groundwater that is a current or potential future source of drinking water due to well construction practices in the area of the state where the site is located:

Groundwater zones beneath the site are not connected with current or potential future sources of drinking water. The site and impacted groundwater zones lie at the downgradient end of the flow system adjacent and connected to a marine water body that is not suitable for use as a drinking water supply. Furthermore, the DS concentrations of naturally occurring constituents increases with depth to above 10,000 mg/l which indicates the deeper groundwater (below 45 to 50 feet) is not potable. There is little potential for any groundwater contamination to migrate upgradient into potentially useable aquifers.

Washington State water well standards require setbacks for drinking-water wells. Setbacks that may affect the theoretical drilling of a drinking water well in the site vicinity include the following: (1) Wells shall not be located in a floodway, or in a location not protected from a 100-year flood; and (2) Wells shall not be less than 50 feet from septic tanks and sewer lines, or 100 feet from contaminated sites. Also as noted above, the standards require an 18-foot surface seal of bentonite or similar material for all drilled drinking-water wells. As such, most wells in Washington are drilled to a minimum depth of 20 feet and do not use shallower waters for groundwater production. A theoretical drinking or industrial well would likely be drilled to depths that would encounter, or cause upward migration of, saline groundwater with TDS concentrations approaching or exceeding 10,000 mg/l.

[11] It is expected the salinity conditions beneath the Douglas Property will be similar to those beneath the ICS/NWC property.

(iv) The physical and chemical characteristic of the hazardous substance

Site groundwater is contaminated with metals, a number of volatiles and PCBs. These constituents will migrate downgradient with groundwater towards the embayment and LDW. They will not migrate upgradient into groundwater zones potentially useable for drinking water supplies.

(v) The hydrogeologic characteristic of the site

The groundwater zones beneath and in the vicinity of the site are hydraulically connected to the LDW where flow reversals and saltwater intrusion occur during higher tidal levels. This finding is based on the previously discussed groundwater flow directions, changes in groundwater levels caused by tidal fluctuations and groundwater/surface water mixing patterns.

(vi) The presence of discontinuities in the affected geologic stratum

The groundwater zones are truncated by the navigation channel of the LDW where groundwater discharges to the river.

(vii) The degree of confidence in any predictive modeling performed

Not applicable as no predictive modeling has yet been performed.

(d) Even if groundwater is classified as a potential future source of drinking water under (b) of this subsection, the department recognizes that there may be sites where there is an extremely low probability that the groundwater will be used for that purpose because of the site's proximity to surface water that is not suitable as a domestic water supply. An example of this situation would be shallow groundwater in proximity to marine waters such as on Harbor Island in Seattle. At such sites, the department may allow groundwater to be non-potable for purposes of this section if each of the following conditions can be demonstrated. These determinations must be for reasons other than that the groundwater or surface water has been contaminated by a release of a hazardous substance at the site.

(i) The conditions specified in (a) and (c) of this subsection have been met.

The conditions of (a) and (c) are met. Groundwater is not a current source of drinking water and it is unlikely that contaminated groundwater would migrate to areas (or zones) where groundwater is a current or future source of drinking water at concentrations that would exceed groundwater-quality criteria published in Chapter 173-200 WAC.

(ii) There are known or projected points of entry of the groundwater into the surface water

Groundwater beneath the site is discharging to the embayment and LDW.

(iii) The surface water is not classified as a suitable water supply source under Chapter 173-201A

The reach of the LDW adjacent to the site is a brackish to saline marine waterway that is not classified as a suitable water supply. Samples of embayment water (Table A4.5) had an average dissolved solids concentration greater than 10,000 mg/l.

(iv) The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source.

Groundwater beneath the site is sufficiently connected to the LDW so that sustained pumping of wells in the site vicinity will likely result in the intrusion of brackish to saline surface water into the aquifers and wells screened in the aquifers. This groundwater could be treated to reduce salinity, however because of the cost of such treatment, a water purveyor or other entity would avoid installing wells into these aquifers.

Beneficial Use Summary. Groundwater beneath the Site can be classified as nonpotable. Groundwater is not used as a drinking water source and is not suitable for future use as a potential source because of existing saline conditions and pumping would cause saline water intrusion into the groundwater zones beneath the site. Furthermore, the groundwater does not discharge to a potential source of drinking water as the LDW is not a suitable source. The highest beneficial use of groundwater beneath the site is protection of the LDW (i.e. surface water). Furthermore, the site is industrial and municipal water supplies are available. A restrictive covenant is also anticipated that will prohibit use of groundwater from the site as drinking water.

5.0 CONSTITUENTS OF POTENTIAL CONCERN (COPCS)

5.1 EXPOSURE PATHWAY ANALYSIS

As part of the process of identifying constituents of potential concern (COPCs), an exposure pathway analysis was prepared based on review of site data and land use. The purpose of the analysis was to identify the media and relevant exposure pathways to assist in developing appropriate screening levels (SLs) to identify COPCs. This analysis addressed media, possible exposure/receptor pathways and transport pathways. Completed pathways were carried forward for evaluation and development of SLs.

Figure 5-1 illustrates possible exposure/receptor pathways for various media present at the site. Possible media include in-door air, soil, groundwater, surface water, and sediment. Possible receptors include those who work on the site, wildlife, others who visit the embayment to collect shellfish and beach play, and marine aquatic life. Other possible receptors are those who might consume drinking water or seafood impacted by the site. As noted above, the highest beneficial use of groundwater beneath the site is protection of the LDW (i.e. surface water).

Releases at a site in one area/media can be transported to other media/locations. Figure 5-2 illustrates possible transport pathways that can result in exposure to other receptors. For example, contaminants can leach from soil and be transported to surface water by groundwater. Figure 5-3 summarizes the results of the exposure pathway analysis which are discussed below.

5.1.1 POTENTIAL SOIL/SEDIMENT RECEPTORS AND EXPOSURE PATHWAYS

Three potential receptors and three exposure pathways (ingestion, dermal contact and inhalation) were identified for soil and sediment as summarized below in Table 5.1.

Table 5.1 - Potential Soil/Sediment Receptors and Exposure Pathways

Receptor	Pathway
Humans	Ingestion and dermal contact – upland soil (all site visitors assuming an unrestricted site use and subsurface utility workers assuming an industrial site use))
	Inhalation of soil/sediment particles
	Ingestion and dermal contact - embayment sediments (recreational exposure – shellfish harvesting, beach play)
Terrestrial Organisms	Exposure to upland area soils
Aquatic Organisms	Exposure to embayment sediments

5.1.1.1 Human Exposure to Upland Area Soils and Embayment Sediments

The ICS/NWC property upland area is mostly covered (98%) with buildings, paving or quarry spalls (Figures 2-6 and 5.4) and the remainder (estimated 0.10-0.13 acre) is covered with grasses/blackberry vines. There are no plans to change the property use or remove buildings/paving or spalls. Incidental dermal contact, ingestion, and inhalation with/of soil is highly unlikely. However, as required by Ecology, for purposes of identifying Soil-Contact (SC) COPCs, an unrestricted site land use (e.g. residential land use) was assumed and this pathway was assumed to be complete. Site workers could, more realistically, be exposed to soils if the existing pavement is disturbed or installation/repair of subsurface utilities is required. Therefore, the soil dermal contact/ingestion pathway was also assumed to be complete for site workers, working with subsurface utilities.

Access to the upper portion of the embayment (west of the neck) is restricted by surrounding land use, sediments in the embayment are covered with marine water during most times and the sediments are wet when temporarily exposed. Human contact with sediments is possible via recreational shellfish harvesting, however the probability of such exposure is considered remote and, if it did occur, would be very infrequent. However, the LDW ROD (beach 4 on page 36) indicates the outer portion of the embayment to be a potential clamming and beach play area. Therefore, the sediment contact exposure pathway is considered complete.

5.1.1.2 Terrestrial Ecologic Contact

WAC 173-340-7494(1) presents criteria for determining when no further terrestrial ecological evaluation is required. If any one of the listed criteria are satisfied, then the MTCA regulation provides an exclusion for further evaluation. The upland area portion of the ICS/NWC property is zoned industrial and is mostly covered by buildings, paving and quarry spalls. There are no plans to remove any of these features. However, a small portion of the property is not paved (0.10 to 0.15 acre) so does not meet the criteria for exclusion. Therefore, this exposure pathway was considered complete and the TEE process moved forward

WAC 173-340-7492(2) presents procedures to complete a simplified terrestrial ecologic evaluation (TEE) and when this evaluation may be ended as listed below:

- The first criterion is whether the total area of soil contamination is not more than 350 square feet (roughly 19 by 19 feet in size). Soil contamination exceeds this area, so the TEE was continued.

- The second criterion is whether land use at the site and surrounding area makes substantial wildlife exposure unlikely using the procedure outlined in MTCA Table 749-1. This evaluation is presented in Table 5.2 below. In this analysis, the listed criteria are assigned points per MTCA and a comparison of the points in box 1 are made to the sum of the points in boxes 2 to 5 (box 6). As presented below, the number in box 1 is larger than the number in box 6, therefore the simplified TEE continued.

Table 5.2 – TEE Exposure Analysis (after Table 749-1)

Criteria	Points
1) The area of contiguous (connected) undeveloped land on or within 500 feet is greater than 4 or more acres.	12
2) Is this an industrial property (yes)	3
3) Quality of habitat (low)	3
4) Will undeveloped land likely attract wildlife (yes)	1
5) Are there any bioaccumulative compounds such as PCBs present in soil at the site (yes)	1
6) Sum of numbers in boxes 2 to 5	8

Simplified TEE. Figure 5.4 shows soil sample locations and the extent of paving, quarry spalls and uncovered site area. The paving and spalls provide a barrier to wildlife exposure. A small portion of the site is unpaved, so this pathway was considered complete. As required by Ecology, in identifying ecologic COPCs, an unpaved, industrial land use was assumed with a point of compliance fifteen feet below ground surface. Additional information provided by Ecology regarding the TEE is presented in Appendix M.

Aquatic Organism Contact with Embayment Sediments. Embayment sediment provides habitat for aquatic organisms. Therefore, this exposure pathway is considered complete.

5.1.2 POTENTIAL GROUNDWATER RECEPTORS/EXPOSURE PATHWAYS

Two potential receptors and five exposure pathways were identified for groundwater as summarized below in Table 5.3:

Table 5.3 - Potential Groundwater Receptors and Exposure Pathways

Receptor	Pathway
Humans	Ingestion of groundwater as drinking water
	Dermal contact and incidental ingestion of groundwater by subsurface utility workers
	Groundwater discharge to surface water and consumption of marine organisms
	Evaporation of VOCs in shallow groundwater to soil vapor with potential in-door inhalation exposure
Aquatic Organisms	Groundwater discharge to surface water and sediment

- **Use of Groundwater for Drinking Water.** As discussed in Section 4.7 above, groundwater is not classified as potable for drinking water purposes. Therefore, this pathway is incomplete.

- **Dermal Contact/Incidental Ingestion of Groundwater.** Groundwater lies at depths less than 15 feet deep. Subsurface utility workers could possibly contact or ingest groundwater during installation or repair of subsurface utilities. Therefore, this pathway is complete.

- **Groundwater Discharge to Surface Water.** Groundwater beneath the site discharges to surface water. Therefore, this exposure pathway is considered complete for protection of aquatic organisms and humans, via the consumption of marine organism's exposure pathway.

- **Volatilization from Groundwater with Vapor Intrusion into Closed Spaces**. Volatile organic chemicals (VOCs) have been detected in shallow groundwater and there are buildings on the site. However, VOCs are only present in a small area (discussed later in Section 5.4.3.5) below a ventilated industrial use building. Therefore, this pathway incomplete.

5.2 DATA AND APPROACH TO IDENTIFICATION OF PROPOSED COPCS

An extensive amount of groundwater, sediment, soil and storm water data were collected to identify COPCs. Samples collected by DOF were supplemented with previously collected data by others (identified and discussed by each media in following sections of this RI report). Samples collected for this RI by DOF were analyzed by Analytical Resources Inc. (ARI), an Ecology certified environmental laboratory. The laboratory methods used to analyze the samples are discussed at the beginning of each media section.

Analytical data were reviewed and validated by DMD Inc. (Raleigh Farlow). In some instances, the same compound was analyzed by several methods and resulted in several concentrations being reported for the same sample. For example, naphthalene concentrations were reported in groundwater samples based on EPA Methods 8260, 8270D and 8270D-SIM. The data reported and used in this RI are those recommended by DMD as being most reliable based on their review of laboratory data. For additional information, the reader is referred to DMD's validation reports that are included on CD in Appendix J. Laboratory data sheets are included on CD in Appendix L. The validation reports include a tabulated summary for each set of validated data reviewed. Data collected as part of this RI have been uploaded to Ecology's Environmental Information System (EIM). Tabulated data summarizes are included in the following appendices:

- Appendix F – Sediment Analytical Data
- Appendix G – Groundwater Analytical Data
- Appendix H – Soil Analytical Data
- Appendix I – Storm System Sample Analyses

COPCs were identified using a stepwise process that is described within each media section. In general, screening levels were obtained from the "*Lower Duwamish Waterway, Preliminary Cleanup Level Workbook*" (Ecology 2018).

Carcinogenic PAHs (cPAHs) were evaluated using the toxicity equivalency factor (TEF) methodology adopted by Ecology in October 2007 (Ecology 2007). This method assesses the combined toxicity of seven cPAHs into a single value (Toxicity Equivalent Quotient or TEQ) that is compared to the SL or CUL for benzo(a)pyrene (BaP). The TEFs listed below in Table 5.4 were used to calculate sample BaPEq-TEQs. BaPEq-TEQ calculations for each set of data are included in the appendices, as appropriate.

Table 5.4 - CPAH Toxicity Equivalency Factors (TEF)

CPAH	TEF (unit less)
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenzo(ah)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

5.3 SEDIMENT DATA AND PROPOSED COPCS

Data Used in Characterization Analysis. Data used to characterize sediment within the embayment included the results of surface and core sediment analyses of samples collected by DOF in 2012 and 2014 (Appendix F, Tables F.2 and F.4). This information was supplemented with the LDW-SC40 sediment core data (Appendix F, Table F.5), as this core was located at the mouth of the embayment and was collected as part of the LDW RI.

Older surface sediment data are summarized in Appendix F, Table F.1 and are provided for completeness. Sediment sampling completed by DOF in 2012 and 2014 covers the areas where these older surface samples were collected and provides a more current basis to characterize surface sediment conditions.

5.3.1 SAMPLE LOCATIONS AND ANALYTICAL PROGRAM

During implementation of the Ecology approved work plans, surface and subsurface sediment samples were collected and analyzed for a wide range of constituents to supplement previous analyses completed by others. Thirty-eight surface (0 to 10 cm) sediment samples were obtained by DOF from the locations shown on Figure 3-2. Samples DSS-2 to DSS-32 were collected on July 2 and 3, 2012. DSS-1 was collected on December 10, 2012 and seven additional samples were collected on September 19, 2014. The analytical results are summarized in Appendix F (Table F.2). Grain size analyses of selected surface samples are presented in Appendix F, Table F.3.

Twelve sediment cores were obtained by DOF from the embayment on November 20 and 21, 2012 from the locations shown on Figure 3-3. Core “E” was not obtained because of an obstruction. The primary purpose of the cores was to define the bottom of sediment that exceed SLs, as a remedy (sediment removal/capping) has already been selected for the embayment by EPA (EPA 2014).

After the cores were extracted from the core tubes, the materials were logged and segmented to approximately 1.0-foot sample intervals. Core logs are presented in Appendix D. Sixty-nine samples (including duplicates) were collected for possible analysis. Forty-eight subsurface samples (including duplicates and archived samples) were analyzed. The analytical results are summarized in Appendix, Table F.4. In addition, the results of the analysis of samples from core LDW-SC40, collected as part of the LDW RI, are summarized in Appendix F, Table F.5. Surface and subsurface sediment samples were analyzed for the constituents listed below in Table 5.5.

Table 5.5 - Sediment Laboratory Analyses

Analysis Class	Surface Samples	Subsurface Samples	Methods
Conventional Parameters (Moisture and TOC)	X	X	ASTM D2216 Plumb, 1981 (TOC)
Metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn)	X	X	SW846-M.8081 and M7471A (Hg)
Petroleum Hydrocarbons	X	X	NWTPH-Dx
Semivolatile Organics	X	X	SW846-M8270
Chlorinated Pesticides	X		SW846-M8081
PCBs (Aroclors)	X	X	SW846-8082
Tributyltin	X (N=6)	X (N=2)	Krone/8270-SIM
PCDD/PCDF	X (N=3)	Not analyzed	EPA 1613B
Selected Engineering Properties	X	X	ASTM Methods: Sp. Gravity – D854 Grain Size – D422/D421 Atterberg limits – D4318 Bulk Density – D7263

N=Number of samples

5.3.2 SEDIMENT SCREENING LEVELS (SLS).

In November 2014, EPA issued a Record of Decision (ROD) for the LDW Superfund Site. Section 8.2.1 of the ROD summarizes cleanup levels (CULs) for sediment in the LDW (Tables 19 and 20 of the ROD). The LDW CULs provided the primary basis for the sediment SLs used to identify COPCs in the embayment. The ROD based SLs were supplemented with Washington State Sediment Management Standards - SMS (Chapter 173-204 WAC). Specifically, SMS Sediment Cleanup Objectives (SCOs) were used (Ecology 2017c) when ROD based SLs were not available. The SLs are summarized in attached Table A5.1 and include SLs to be applied on a dry wt. basis and those that are applied on a carbon normalized basis (i.e. the sample result is divided by the carbon content).

CULs in the ROD address the following exposure pathways and receptors:

- Human consumption of seafood

- Human direct contact
- Ecological (wildlife) food source (river otter)
- Aquatic organism contact (benthic invertebrates)

CULs for PCBs, arsenic, cPAHs and PCDD/PCDF are to be applied based on specific conditions using the points of compliance (POC) and compliance measures listed below in Table 5.6. The deeper POC (0 to 45 cm) applies to the human direct contact pathway.

Table 5.6 - ROD Sediment Compliance Requirements

Basis	Point of Compliance (cm)	Possible Receptor	Compliance Measure
LDW-Wide	0 to 10 (4-inches)	Human	UCL95%
LDW-Wide	0 to 10 (4-inches)	Benthic Organisms	Discrete point by point
Clamming Areas	0 to 45 (18-inches)	Human	UCL95%
Individual Beach	0 to 45 (18-inches)	Human	UCL95%

Note: UCL95% – 95% upper confidence level on the mean (a statistical measure)

5.3.3 SEDIMENT PROPOSED COPCS

Sediment (SED) SLs listed in attached Table A5-1 were compared to surface and subsurface sediment constituent concentrations detected in samples collected in 2012. Surface sediment concentration comparisons with SLs are summarized in attached Tables A5.2 and A5.3, while subsurface sediment concentrations are compared to SLs in attached Tables A5.4 and A5.5. Comparisons were made based on dry-weight and organic carbon normalized (OCN) values, as appropriate. When the total organic carbon content (TOC) was not in the range of 0.5 to 3.5% for OCN constituents, an Apparent Effects Threshold (AET) value was used consistent with Ecology guidance (Ecology 2017c). This was the case in two surface sediment samples (DSS-09 and DSS-12).

First-cut SED-COPCs were identified using the following approach:

- Non-detects were eliminated from further evaluation.
- Constituents with no SL were eliminated from further evaluation.
- Constituents whose maximum concentration was less than the SED-SL listed in Table A5.1 were eliminated from further evaluation.

First-cut SED-COPCs carried forward for additional evaluation are summarized in Tables A5.6 and A5.7. To identify proposed SED-COPCs, the following criteria were used:

- If the exceedance occurred in more than two samples (frequency of exceedance – FOE +6.7%) the constituent was identified as a proposed SED-COPC, and/or

- If the maximum exceedance factor was greater than ten (EF>10) the constituent was identified as a proposed SED-COPC.

The indicated criteria were adjusted for the surface sediment samples if the maximum EF occurred in sample DSS-12 which was a sample of a small asphalt deposit that is not representative of the embayment as a whole. In this case, the next highest EF was used, which is noted on Table A5.6 and one sample was subtracted from the FOE (which is also noted). Proposed SED-COPCs are listed below in Table 5.7.

Table 5.7 - Embayment Sediment Proposed COPCs

Constituent	Surface Sediment			Subsurface Sediment		
	COPC in Surface Sediment	Highest EF	% EF>1	COPC in Subsurface Sediment	Highest EF	% EF>1
Arsenic	X	8.7	83	X	4.4	54
Total Chromium	X	2.4	10	No	1.7	2.2
Lead	X	13	23	X	9.8	11
Mercury	X	35	33	X	95	20
Zinc	X	3.3	10	No	7.9	8.7
DRO/RRO	X	11	10	X	11	17
1,4-Dichlorobenzene	No	69	3.3	X	9.5	12
Benzyl alcohol	X	11	17	X	3.3	32
1-2-Dichlorobenzene	X	343	6.7	X	1.9	12
2,4-Dimethylphenol	X	29	6.7	X	31	18
1,2,4-Trichlorobenzene	X	45	3.3	X	10	10
2-Methynaphthalene	X	19	3.3	X	52	2.9
Acenaphthene	No	9.2	3.3	X	34	12
Fluorene	X	12	6.7	No	6.9	5.9
N-Nitrosodiphenylamine	X	143	3.3	No	8.8	2.9
Pentachlorophenol	X	18	23	No	2.4	5.9
Anthracene	X	17	3.3	No	1.9	2.9
Butylbenzylphthalate	X	17	13	No	1.9	2.9
B(a)PEq. (TEQ)	X	50	60	X	8	32
Total PCBs (dry wt.)	X	97000	100	X	22055	61
Total PCBs (OCN)	X	89	90	X	109	40
PCDD/PCDF (n=3)	X	396	100	not analyzed	-----	-----

Notes: X – Identified COPC in sediment; EF – Exceedance Factor; See attached Tables A5.7 and A5.8 for more detailed summaries; n=Sample number.

Review of the EFs and percentages of sediment samples where the EF were exceeded indicate that total PCBs (dry wt. concentrations) will likely drive the embayment sediment cleanup. PCBs exceeded SLs in 60 to 100 percent of the sediment samples analyzed. Cleanup of PCBs will also address other constituents that exceed SLs. This will be confirmed during development of the interim/cleanup action plan. As noted earlier, the remedy for the embayment has already been selected and will include sediment removal and capping. Sufficient information is available to complete a preliminary design. Design and permitting of a proposed interim action are underway.

PCBs, lead, mercury and petroleum hydrocarbons (DRO/RRO) concentrations were plotted on base maps to illustrate the general concentration patterns of constituents in embayment sediment. Figures 5-5a to 5-5d show surface (0 to 10 cm) sediment/bank soil concentrations of PCBs, lead, mercury and petroleum hydrocarbons, respectively. Surface sediment PCB concentrations exceeded the SL most frequently and over most of the embayment. The highest concentrations of PCBs were detected within the upper portion of the embayment along the south shore (Figure 5-5a) beneath the former dock area.

Surface sediment concentrations of lead, mercury and petroleum hydrocarbons showed generally similar concentration patterns, in that the highest concentrations and most frequent exceedances occurred within the upper portion of the embayment along the south shoreline (Figures 5-5b to 5-5d). Concentrations of lead and mercury also exceeded SLs within the lower portion of the embayment along a portion of the south shoreline while concentrations of mercury exceeded the SL along the north shoreline adjacent to the mouth. Petroleum hydrocarbons did not exceed the SL in the central and lower portions of the embayment.

As discussed in Section 4.1 and illustrated on Section I-I’ (Figure 4-10), sediment cores indicate near surface sediments generally consist of sandy silts to gravels that range in thickness from approximately 1.5 to 5.0 feet. Underlying the surficial sediments is a more consistent silt layer with interbedded pockets of fine sand. The silt ranges in thickness from 2 to 6.5 feet. Underlying the silt strata is fine sand, which appears to grade coarser towards the LDW.

Figures 5-6a to 5-6d show subsurface concentrations of PCBs, lead, mercury and petroleum hydrocarbons, respectively. Similar to the surface sediments, PCB concentrations exceeded the SL most frequently.

- **PCB** concentrations above the SL are present in the upper layer and extend into the upper portion of the silt layer at core locations H, I, J and M. Sediment with PCB concentrations significantly above the SL extend to depths of 2.5 to 6.0 feet.

- **Lead** exceeds the SL in subsurface sediment beneath the upper portion of the embayment (Cores D, F and H) to depths of 2.5 to 4 feet. Lead exceedances are co-located with elevated PCB concentrations.

- **Mercury** exceeds the SL beneath most of the embayment but at generally shallower depths as compared to PCBs. Mercury exceeds its SL to depths of 1 to 3 feet and are co-located with PCBs.

- **DRO/RRO** concentrations above the SL show a generally similar pattern as for lead. In contrast to lead, concentrations above the SL were also detected in Core J where a concentration of 3,000 mg/kg was detected at a depth of 2 to 3 feet and are co-located with PCBs.

5.3.4 DESIGNATION TESTING OF SEDIMENT

Relatively high metals concentrations were detected in sediment. In September 2014, six additional sediment samples were collected for testing using the Toxicity Characteristic Leaching Procedure (TCLP)(DOF 2014c). This testing was completed to assess whether the sediment would designate under the Washington State Dangerous Waste Regulations (Chapter 173-303 WAC). Testing was done for total and leachable Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). Sample locations are shown on Figure 3-2 and the results are summarized in Table A5-8. The TCLP test results indicate that embayment sediment would not designate as a characteristic dangerous waste (DW) if disturbed.

5.4 GROUNDWATER DATA AND PROPOSED COPCS

Data Used in Characterization Analysis. Data used to characterize groundwater conditions beneath the ICS/NWC property were collected between November 2012 and September/early October 2016 and are summarized in Appendix G (Tables G.2 and G.3). Older groundwater data collected between 1986 and 2007 are summarized in Appendix G (Table G.1) and are provided for completeness. These earlier data were used to develop the RI work plan but were not used in site characterization because they are not representative of the current site conditions and adequate more recent data are available to support an FS.

Data from monitoring wells samples are considered most reliable and were collected during four sampling events completed in November 2012, November 2015, March 2016 and September/early October 2016. Monitoring well sample data were supplemented with groundwater data collected in November/December 2014 and June 2015 from soil push-probes (using temporary screens). Push-probes sampled on the ICS/NWC property provided screening level data that were primarily used to assist in determining additional monitoring well locations. Three off-site push-probes (Figure 3-4b and Appendix, Table G.3) were sampled downgradient of the former wrecking yard located south of the site to assess possible contaminant migration.

Push-probe data are likely biased high, especially for hydrophobic constituents such as lead and PCBs, because of the presence of soil particles entrained in the samples submitted to the laboratory. Never-the-less, the push-probe results provide insight to the groundwater conditions, if properly interpreted. Appendix K discusses the effect of turbidity/particles entrained in the samples for metals. The effects would be similar for hydrophobic constituents such as PCBs, cPAHs, and heavier oils.

As noted elsewhere in this report, available data suggest releases from the ICS/NWC property impacted deeper soil and groundwater beneath the Douglas property. Data used to characterize these potential impacts are summarized in Appendix G (Table G.4). Three wells were installed by DOF in February 2015 to assess potential for deeper groundwater constituent migration into the embayment. Wells DMC-MWA, DMC-MWB and DMC-MWC were sampled in November 2015, March 2016 and September 2016. Data from these wells are supplemented with data (Appendix G, Table G.5) collected as part of an RI (Geoengineers 2016) by consultants for the Douglas property owners as discussed later in this section.

5.4.1 SAMPLE LOCATIONS AND ANALYTICAL PROGRAM

During implementation of the Ecology-approved work plans, push-probe and monitoring well groundwater samples were collected and analyzed for a wide range of constituents. Sample locations are shown on Figure 3-4a. Well locations are shown by zone on Figures 4-12a to 4-12c. Analytical methods are summarized below in Table 5.8 and the validated data are summarized in Appendix G.

Twenty-three push-probe groundwater samples were obtained in November and December 2014. Monitoring well groundwater samples were obtained in November 2012 (11 wells), November 2015 (31 wells), March 2016 (31 wells) and September 2016 (31 wells). The 2015 and 2016 sample analyses were designated Rounds 1, 2 and 3 and included three lower zone wells (DMC-MWA, DMC-MWB, and DMC-MWC) installed on the Douglas property.

Table 5.8 - Groundwater Laboratory Analyses

Analysis Class	Push-Probes	Monitoring Wells	Methods
Field Parameters	pH, conductivity, temperature, turbidity	pH, conductivity, temperature, turbidity, Dissolved Oxygen, ORP, Fe+2	See Appendix C – Field Procedures
Total/Dissolved Metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn)	X (w/Cr+6)	X	EPA 200.8; SW846-M7470A (Hg-Low Level); M7196A (Cr+6)
Petroleum Hydrocarbons	X	X	NWTPH-G & Dx
Volatile Organics	X	X	SW846-M8260C
Semivolatile Organics	X	X	SW846-M8270D; M8270-SIM (PAHs); M8041A (chlor. phenols)
Chlorinated Pesticides	X	X	SW826-M8081A
PCB (Aroclors)	X	X	SW846-M8082A
Conventionals (Cl, Na, Ca, Mg, SO4, Hardness)	X	X	SW846-M6010C (Ca, Mg); EPA 200.8(Na); 300.0 (Cl, SO4)

5.4.2 GROUNDWATER SCREENING LEVELS (GW-SLS).

Groundwater screening levels (GW-SLs) were compared to site data to identify proposed GW-COPCs. GW-SLs were obtained from the *"Lower Duwamish Waterway, Preliminary Cleanup Level Workbook"* (Ecology December 2018) and are summarized in attached Table A5.9. In addition, the practical quantitation limits (PQLs) from the workbook and those achieved by the RI analytical program (Project PQLs) are listed. In most cases, the project PQLs achieved as part of the RI analytical program were similar to or lower than the workbook PQLs (e.g. see chlorinated pesticides in attached Table A5.9).

The primary GW-SLs used herein were those listed in the workbook as most stringent for non-potable water. These include GW-SLs to protect surface water via groundwater transport to the embayment and LDW, groundwater constituent partitioning to protect sediment, and in-door air as illustrated on Figure 5-2. GW-SLs to protect indoor air were used if other criteria were not available even though indoor air is not a complete exposure pathway. For constituents where a non-potable water GW-SL was not available, the workbook GW-SL to protect potable (drinking) water was used, if available. The proposed SLs are considered to also be projective of subsurface utility works who may come in contact with groundwater during utility installation/repair. For constituents whose SLs were below the PQL, the GW-SL was adjusted to the project PQL listed in Table A5.9.

Table A5.9 also lists the conventional parameters chloride, sulfate, hardness, calcium, magnesium, and sodium. These parameters were included to provide a complete list of laboratory analytical constituents. They are naturally occurring constituents in groundwater and were analyzed as part of project geochemical evaluations. GW-SLs were not developed for these constituents, as site groundwater is not potable and discharges into estuarine/marine waters where high concentrations of these constituents are naturally present.

5.4.3 GROUNDWATER COPCS – ICS/NWC PROPERTY

First cut GW-COPCs were identified as follows, based on guidance provided by Ecology:

- Constituents with no SL were eliminated from further consideration.

- Non-detects were eliminated from further consideration.

- Frequency of Detection – Less Than 5% - Constituents detected at less than 5% were eliminated from further consideration, except as a final check as discussed below.

- Frequency of Detection – Greater Than 5% – Constituents detected at a frequency greater than 5% were carried forward to compare maximum concentrations to the GW-SLs (the next step).

- Maximum Concentration and Exceedance Factor (EF) – Constituents with detection frequencies greater than 5% and whose maximum concentration was less than two times the GW-SL (EF<2) were eliminated from further consideration.

- Metal GW-SLs were applied to the total metal (unfiltered) fraction as part of the first cut screening process.

The results of this initial first-cut screening are summarized in attached Table A5.9 and included thirty-one groundwater constituents that were carried forward as preliminary GW-COPCs associated with the ICS/NWC property. Mobile LNAPL was also carried forward because it was detected in well SA-MW1.

Preliminary COPCs whose frequency of exceedance (FOE) were greater than 10% were identified as proposed GW-COPCs. Those constituents whose FOE were greater than 5% and less than or equal to 10% were further evaluated on a constituent by constituent basis. The factors that were considered were as follows and results are summarized in Table A5.10a.

- **Exceedance Factor** - EF (maximum concentration divided by SL). Constituents whose maximum EF were generally less than 10 (in most cases less than 5) were not identified as a GW-COPCs, unless the location of the exceedances suggested possible migration to surface water (e.g. TPH-Gasoline Range hydrocarbon migration from push-probe P15 to SA-MW1).

- **Exceedance Confirmed in Multiple Samples** – Whether the exceedances were confirmed in multiple samples from the same well – potentially reducing the maximum EF and the number of locations where the exceedances occurred. In our experience, the first sample from a well often has the highest constituent concentration caused by drilling disturbance that is not confirmed by later sampling after the well has had an opportunity to stabilize. Three to four rounds of monitoring were available to apply this criterion.

- **Exceedance Confirmed by Monitoring Well Samples** – As noted above, the first samples from monitoring wells often display the highest constituent concentration because of drilling disturbance. There is no opportunity to collect multiple samples from push probes which are generally considered to provide screening level data which were used in this RI to locate monitoring wells. Data from monitoring wells were used to evaluate push-probe data if the wells and screens were located to allow such an evaluation.

- **Metal Fraction**. First-cut screening compared total (unfiltered) metal concentrations. Additional screening used dissolved metal concentrations for a number of reasons:

    - SLs to protect surface water are generally based on the dissolved (filtered) metal fraction. The dissolved fraction is defined by EPA (1993) as a filtered sample run through a 0.45-micron filter. The dissolved vs total recoverable metal issue was addressed by EPA in 1993 (EPA 1993) to protect aquatic life. In this document EPA stated the following:

      "It is now the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach,

because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. This conclusion regarding metal bioavailability is supported by a majority of the scientific community within and outside the Agency. One reason is that a primary mechanism for water column toxicity is adsorption at the gill surface which requires metals to be in the dissolved form."

Both EPA's National Recommended Water Quality Criteria (EPA 2016) and Washington State's surface water quality standards continue to express most metals criteria to protect aquatic life as the dissolved fraction in the water column, with the exception of mercury.

Total metal concentrations in groundwater are often higher than dissolved concentrations because of soil particles that are entrained in the samples and do not represent metals actually migrating in groundwater. The use of dissolved metal concentrations minimizes the potential impact of this issue which is further discussed in Appendix K.

- **Constituent Degradation**. Site data indicate that several chlorinated organic constituents are degrading to vinyl chloride. While the "*parent*" and intermediate constituents may pose little risk to potential receptors, degradation may increase vinyl chloride concentrations that may pose an unacceptable risk.

The results of the second step screening for preliminary GW-COPCs are discussed below. Preliminary (those carried forward) and proposed GW-COPCs are summarized in Table A5.10a.

5.4.3.1 Mobile LNAPL

Lighter (less dense) non-aqueous phase liquids or LNAPLs are fluids that do not readily mix with water and "*float*" on the water table. Mobile LNAPL will enter well screens that extend across the water table. Wells where LNAPL will enter the screens, if present, are shown on Figure 5-7. The presence of LNAPL is based on field observations of sheens on water level probes, equipment used to collect groundwater samples, and the samples themselves. Observations were made during water level measurement rounds completed in April 2016 and February 2018, as well as sampling rounds completed in November 2012, November 2015, March 2016 and September 2016. If such sheens were noted, an interface probe was used to determine the LNAPL thickness in the well casing. LNAPL has only been detected in one well (SA-MW1) at thicknesses between 0.37 and 2.1 feet (as documented in attached Tables A4.2 and A4.3).

A LNAPL sample was obtained from well SA-MW1 for analysis in November 2012. The sample was analyzed to assess the type of product present using method NWTPH-HCID (GC-FID) and possible presence of PCBs. The results are summarized below in Table 5.9. The LNAPL chromatographic profile resembled mineral oil used in dielectric applications. The high concentration of gasoline range organics (GRO) indicated other types of petroleum products are mixed with the dielectric fluid.

Table 5.9 - Analytical Results – LNAPL from Well SA-MW-1

Constituents	Analytical Results	ARI Delivery Group
Gasoline-Range Organics (GRO)	>10,000 mg/l	VU21
Diesel-Range Organics (DRO)	>25,000 mg/l	VU21
Heavy-Oil Range Organics (RRO)	>25,000 mg/l	VU21
GC-FID Chromatographic Pattern	Suggests presence of dielectric fluid (a)	VU21
Aroclor 1248	1,000 mg/kg	VU99
Aroclor 1254	470 mg/kg	VU99
Aroclor 1260	200 mg/kg	VU99

(a) Based on DMD, Inc. interpretation of chromatographic trace (personal communication – Jan. 2013)

COPC Status and Basis. Mobile LNAPL is identified as a proposed GW-COPC because it was detected in well SA-MW1 and contains high concentrations of PCBs and other constituents.

Evaluation of first cut groundwater COPCs are summarized below. Detected concentrations and SLs are summarized in attached Table A5.10a, A5.11 to A5-13. The tables highlight those concentrations that exceed available SLs (yellow shading).

5.4.3.2 Total Aroclor PCBs

Total PCB (GW-SL=7E-06 ug/l; PQL =0.01 ug/l) was the most frequently detected constituent above its SL. Groundwater analytical data area summarized in attached Table A5.12. Concentrations are plotted on Figures 5-8a to 5-8c. PCBs were detected in 58 of 107 samples (54%) and exceeded SLs in one or more samples collected from thirty-two locations, including along the embayment shoreline. The first sample from wells MW-HL and MW-IL exceeded the SL but the exceedance was not confirmed in two later sample analyses.

The SL exceedances in groundwater occur generally within the area where soil concentrations greater than 100 ug/kg have been detected as illustrated on the figures and discussed below in Section 5.5.3.1 of this report. The sample concentrations are likely biased high, especially in the probe samples, because of particles entrained in the samples submitted to the laboratory. PCBs are highly hydrophobic.

COPC Status and Basis. Total PCB is identified as a proposed GW-COPC. Total PCB had the greatest frequency of detection above its SL as compared to other constituents. Most of the groundwater detections occurred in areas where PCBs were detected in soil, including along the embayment shoreline.

5.4.3.3 Gasoline-Range Organics or GRO

GRO (GW-SL=0.8 mg/l) concentrations are plotted on Figures 5-9a to 5-9c and are summarized in attached Table A5.11. While GRO was detected in 29% of the groundwater samples, the SL was exceeded in samples from only two locations; shallow soil probe P15 (1.8 mg/l) and well SA-MW1 (1.4 to 2.8 mg/l).

COPC Status and Basis. GRO is identified as a proposed GW-COPC. While the frequency of exceedance (3.7%) and maximum EF (3.5) are relatively low, GRO exceeded the SL at location P15 which appears to be generally upgradient of well SA-MW1. GRO appears to be migrating to the SA-MW1 area adjacent to the embayment shoreline.

5.4.3.4 Diesel/Heavy Oil-Range Organics

Diesel- and heavy-oil-range (DRO/RRO) organics (GW-SL=0.5 mg/l) groundwater concentrations are summarized in attached Table A5.11. The sum of DRO/RRO are plotted on Figures 5-10a to 5-10c. SL exceedances are highlighted in yellow in attached Table A5.11.

DRO/RRO concentration exceedances were not confirmed in multiple samples from MW-Eu and MW-Ju. Exceedances occurred in samples from SA-MW1 (0.77 to 2.0 mg/l) where LNAPL is present. Apparent exceedances also occurred in four lower zone push-probe locations (0.83 to 3.0 mg/l at P21A, P29, P30 and P31). At locations P30 and P31 the push-probe sample results were not confirmed by adjacent wells SA-MW3 and MW-IL (for P31) and HC-B1 and SA-MW2 (for P30). In our opinion, sample concentrations are biased high because soils at these locations contain oily materials and some of these oily materials were likely entrained in the samples submitted to the laboratory. The turbidities of the push probe samples ranged from 65 to 401 NTUs, while those from the referenced monitoring wells ranged from 3.3 to 64 NTUs (most well samples had turbidities less than 10 NTUs).

COPC Status and Basis. DRO/RRO (sum of) is identified as a proposed GW-COPC because of its extensive presence in soil beneath the ICS property. It is anticipated DRO/RRO would be included in future post-remedy monitoring to ensure protectiveness.

5.4.3.5 Volatile Organic Compounds (VOC)

Ten VOC compounds were carried forward as first cut GW-COPCs. These are discussed below.

- **Benzene (GW-SL= 1.6 ug/l).** Benzene concentrations exceeded SLs in one or more samples from 13 locations as summarized in attached Table A5.11. Concentrations are plotted on Figures 5-11a to 5-11c. At locations DOF-MW6 and MW-Eu, the SL was exceeded in only the first sample but was not confirmed in two to three later sampling rounds. The highest concentrations were detected at P12 (48 ug/l) and DOF-MW8 (60 to 70 ug/l). Based on the concentration patterns, the release area appears to be located beneath the eastern portion of drum cleaning/reconditioning buildings.

  COPC Status and Basis. Benzene is identified as a proposed GW-COPC. The SL was exceeded at multiple locations, beneath and generally downgradient of the eastern portion of the drum reconditioning buildings. The SL exceedances appear to be in a defined area, generally upgradient of the embayment, with potential migration towards the embayment and adjacent Boyer property.

- **VOCs Associated with LNAPL in SA-MW1**. Confirmed exceedances of toluene (SL=130 ug/l), 1,3-dichlorobenzene (SL=2 ug/l), and 1,4-dichlorobenzene (SL=8.9 ug/l) occurred in samples from SA-MW1 at maximum EFs of 2.6 to 4.5. The apparent 1,4-

dichlorobenzene exceedance in a sample from DOF-MW6 (November 2012) was not confirmed by three later sample analyses.

COPC Status and Basis. While the maximum EFs are relatively low (<5), toluene, 1,3-dichlorobenzene and 1,4- dichlorobenzene are identified as proposed GW-COPCs because they were detected in samples from SA-MW1 located adjacent to the embayment shoreline. These constituents appear to be associated with LNAPL detected in this well.

- **Ethylbenzene (SL=31 ug/l).** Concentrations exceeded the SL at two locations including P15 (87 ug/l) and SA-MW1 (240 to 420 ug/l) and appears associated with the exceedance of gasoline-range organics in these samples. The maximum EF was approximately 14.

  COPC Status and Basis. Ethylbenzene is identified as a COPC because it was detected in samples from SA-MW1 located adjacent to the embayment shoreline at an EF of 14.

- **1,1-Dichloroethane (SL=11 ug/l).** 1,1-dichloroethane concentrations exceeded the SL at only one location (P15 at 69 ug/l). The SL is based on protection of indoor air which is not a complete pathway at this property.

  COPC Status and Basis. 1,1-dichloroethane is not identified as a proposed COPC because it was detected in only one push-probe location at a maximum EF of 6.3. Furthermore, the SL in based on an incomplete exposure pathway.

- **Chlorinated Organic Solvents.** Tetrachloroethene (PCE – SL=2.9 ug/l), trichloroethene (TCE – SL=0.7 ug/l), and vinyl chloride (VC – SL=0.18 ug/l) are chlorinated organic solvent compounds that exceeded SLs in a number of groundwater samples. These compounds are considered together because the parent solvents (PCE and TCE) breakdown to cis-1,2-dichloroethene (cis-1,2-DCE) and VC by reductive dechlorination under certain conditions (EPA 1998) and these latter compounds were detected in the groundwater samples. The presence of VC provides strong evidence that reductive dechlorination is occurring.

  Concentrations of organic solvent constituents are illustrated on the following figures:

  - PCE – Figures 5-12a to 5-12c
  - TCE – Figures 5-13a to 5-13c
  - cis-1,2-DCE – Figures 5-14a to 5-14c
  - VC –Figures 5-15a to 5-15c

  PCE (two locations) and TCE (four locations) intermittently exceeded SLs in one or more samples at locations (MW-Dp, MW-Ju, P15, SA-MW1, and DOF-MW7) as illustrated in Table A5.11 and the figures. A surface water SL for cis-1,2-DCE is not available. To provide perspective, the MTCA Method B cleanup level (16 ug/l), protective of drinking water uses, was compared to the available groundwater data. The Method B level was only exceeded at two locations P14 (23 ug/l) and DOF-MW7 (25 ug/l) within the interpreted release area for benzene. Concentrations in most other samples ranged between not detected (<0.2 ug/l) and 0.5 ug/l, except for SA-MW1 where concentrations between 1.5 and 9.6 ug/l were detected.

As noted above, available data indicate that PCE, TCE and cis-1,2-DCE are degrading to **vinyl chloride (SL=0.18 ug/l).** VC exceeded its SL in one or more samples from 13 locations as presented in Table A5.11 and Figures 5-15a,b,c. The highest concentrations were detected at P15 (8.8 ug/l), P14 (2.1 ug/l), DOF-MW7 (0.43 to 2.1 ug/l) and SA-MW1 (2.5 to 19 ug/l). Most of the exceedances occurred within the estimated VOC release area shown on the figures.

COPC Status and Basis. VC is identified as a proposed GW-COPC. SL exceedances occurred at multiple locations including along the embayment shoreline. The SL exceedances appear to be in a generally defined area, generally upgradient of the embayment, with potential migration towards the embayment and the adjacent Boyer property. PCE, TCE and cis-1,2-DCE are also identified as proposed COPCs because degradation of these compounds appears to be creating VC to levels that exceed SLs.

5.4.3.6 Semivolatile Organic Compounds (SVOCs)

Six SVOCs were identified as first-cut groundwater COPCs as listed in attached Tables A5.10a and discussed below. Detected concentrations are summarized in attached Table A5.12.

- **2-Methylnaphthalene (GW-SL=32 ug/l).** 2-methylnaphthalene is a low molecular weight PAH that was detected in approximately 14% of samples analyzed. SLs were exceeded at two locations (attached Table A5.12). The apparent exceedance (59 ug/l) was not confirmed at DOF-MW7 as two later samples were below the SL. The SL was exceeded in the three samples collected from SA-MW1 (46 to 80 ug/l) and appear to be associated with LNAPL.

  COPC Status and Basis. 2-methylnaphthalene is identified as a proposed GW-COPC because it was detected in samples from SA-MW1 located adjacent to the embayment shoreline.

- **Naphthalene (GW-SL=1.4 ug/l).** Naphthalene is a low molecular weight PAH that was detected in approximately 41% of samples analyzed. Concentrations are illustrated on Figures 5-16a to 5-16c. SLs were exceeded three locations (attached Table A5.12). The exceedance (1.6 ug/l) was not confirmed at MW-Eu as two later samples were below the SL. Three of four sample concentrations (up to 2.8 ug/l) were just above the SL at location DOF-MW7. The highest concentrations (23 to 25 ug/l) were in samples from SA-MW1 and appear associated with LNAPL.

  COPC Status and Basis. Naphthalene is identified as a proposed COPC because it was detected in samples from SA-MW1 located adjacent to the embayment shoreline at an EF of 18.

- **2-Methylphenol (GW-SL-27 ug/l)**. This compound was detected in 7.2% of the samples and only exceeded the SL in a sample from P15 at a concentration of 36 ug/l, just above the SL (attached Table A5.12).

COPC Status and Basis. 2-methylphenol is not identified as a proposed COPC because it was only detected at one push-probe location at a low EF of 1.3. It was not detected in downgradient wells.

2,4-Dimethylphenol (GW-SL=6.3 ug/l). 2,4-Dimethylphenol was detected in 9% of the samples analyzed and at only two locations. One of the two exceedances occurred in the first sample from DOF-MW7 (attached Table A5.12). The exceedance was not confirmed in three later samples. The second exceedance was in a sample from push-probe P15 at 65 ug/l (EF=10). This compound did not exceed the SL in samples from downgradient well SA-MW1.

COPC Status and Basis. 2,4-dimethylphenol is not identified as a proposed COPC because the SL was exceeded at only one push-probe location (P15) at an EF=10. The SL was not exceeded in samples from SA-MW1 or other locations.

- **Pentachlorophenol (GW-SL=0.025 ug/l).** Pentachlorophenol (PCP) was detected in 18% of the samples analyzed at a maximum EF of 300 (P32A at 7.5 ug/l). At probe P32B a PCP concentration of 2 ug/l (EF=80) was detected. Concentrations are plotted on Figures 5-17a to 5-17c. The SL was intermittently exceeded, in one or more samples, at seventeen locations (attached Table A5.12). The highest concentration (240 ug/l) was in a 2012 sample from DOF-MW7 which was not confirmed in three later sampling rounds. PCP was not detected in the most recent sample from DOF-MW7 at a reporting limit of 0.025 ug/l. Exceedances were not confirmed during multiple monitoring rounds from wells DOF-MW5, DOF-MW6, DOF-MW8, SA-MW2, MW-Eu, MW-Fu, and MW-Ku.

  COPC Status and Basis. PCP is identified as a proposed GW-COPC based on high EFs in samples from push-probes P32a and P32b.

- **bis(2-Ethylhexyl)phthalate – BEHP (GW-SL=0.2 ug/l).** BEHP was detected in 23% of the samples. Concentrations are plotted on Figures 5-18a to 5-18c. SLs were exceeded at eleven locations with a maximum EF of 50 (10 ug/l at P14). BEHP concentrations in wells samples ranged between 0.1 and 5.1 ug/l as illustrated in Table A5.12. BEHP is a common laboratory contaminant. Sixteen of the detections (or 60%) occurred during the March 2016 sampling round where all the concentrations (0.1 to 1.2 ug/l) were below the rinsate sample concentration of 1.6 ug/l and were generally not confirmed in the following September 2016 data set. Seven of the remaining detections (0.2 to 5.1 ug/l) occurred during the September 2016 sampling round. BEHP was not previously detected in four of the seven September 2016 locations.

  COPC Status and Basis. BEHP is identified as a proposed GW-COPC based a maximum EF of 50 and exceedances occurred in one or more samples from ten locations.

5.4.3.7 Pesticides

- **4,4'-DDD (SL=0.0013 ug/l) and 4,4'-DDE (SL=0.0013 ug/l)**. 4,4'-DDD and/or 4,4'-DDE were detected in 54% of the samples with apparent exceedances at 9 to 10 locations as summarized in attached Table A5.12. Maximum EFs were 25 (4,4'-DDD) and 31

(4,4'-DDE). Concentrations are plotted on Figures 5-19a to 5-19c and 5-20a to 5-20c, respectively. Laboratory analysis of these compounds often result in false positive detections in the presence of PCBs (DMD Inc. personal communication). The analytical method is unable to separate PCB interferences at the concentration levels reported in the project samples. PCBs were detected in all but one of the samples where 4,4'-DDD and 4,4'-DDE were reportedly detected and that one sample (MW-Ju) had an elevated PCB reporting limit (attached Table A5.12).

COPC Status and Basis. 4,4'-DDD and 4,4'-DDE are identified as proposed GW-COPCs based on their detection frequency and maximum EFs.

- **trans-Chlordane (SL=3.6E-04 ug/l; PQL=0.00063 ug/l) and cis-Chlordane (SL=3.6E-04 ug/l; PQL=0.00063 ug/l).** These compounds are typically detected together if present in groundwater samples. Trans- and cis-Chlordane were detected in approximately 6.5 to 8.5% of the samples and in one or more samples from seven to eight locations as summarized in attached Table A5.12. Concentrations are plotted on Figures 5-21a to 5-21c and Figures 5-22a to 5-22c, respectively. Exceedance of the GW-SL was only confirmed at DOF-MW6. At locations MW-Du, MW-HL and MW-IL, these constituents were detected in the first sample, but their presence was not confirmed in two later sampling rounds.

  COPC Status and Basis. Trans- and cis-Chlordane are identified as proposed GW-COPCs based on the maximum EFs of between 27 and 48, respectively.

5.4.3.8 Metals

- **Arsenic (GW-SL=8 ug/l)**. Dissolved arsenic was detected in 94% of the samples and exceeded the SL in 7.5% of the samples collected from six locations as summarized in attached Tables A5.13a,b. In just the monitoring well samples, the FOE was 3.7% and the SL exceedance was confirmed in only one sample location (DOF-MW8). Dissolved arsenic concentrations are plotted on Figures 5-23a to 5-23c. The SL was exceeded in four water table push-probe samples (P11, P12, P13 and P15) where concentrations ranged from 11 to 28.6 ug/l. Concentrations also exceeded the SL in two upper zone sample locations (P26 and DOF-MW8) at concentrations between 8.8 and 15 ug/l. None of the lower zone samples exceeded the SL. Arsenic does not appear to be migrating to surface water.

  The source of arsenic appears to be naturally occurring in soil. Arsenic leaching occurs under reducing conditions which appear present in the water table zone[12] above the aquitard and at several other very localized locations. Arsenic appears to drop out of solution with migration towards the embayment and in an eastward direction where less reducing/oxidizing conditions appear to be present. These would be caused by groundwater mixing with more oxygenated marine water.

[12] The average soil arsenic concentration in the upper ten feet of soil at push-probe locations P11, P12, P13 and P15 is calculated to be 3.2 mg/kg which is below the background concentration (7 mg/kg) in Puget Sound soil (Ecology 1994).

COPC Status and Basis. Arsenic is not identified as a proposed GW-COPC. The frequency of exceedance (7.4%) is less than 10% and the maximum EF in monitoring well samples is low (3.6). The EF for most of the locations where exceedances occurred was less than 2. Arsenic was detected above the SL in localized interior portions of the ICS property and appears to be dropping out of solution with migration.

- **Cadmium (GW-SL=1.2 ug/l).** Dissolved cadmium was detected in 25% of the samples analyzed. The highest total cadmium concentration was 1.2 ug/l detected in a sample from push-probe location P27B (Table A5.13a). Total or dissolved cadmium concentrations in other push-probe and monitoring well samples were below the SL.

  COPC Status and Basis. Cadmium is not identified as a proposed GW-COPC because none of the total or dissolved concentrations exceeded the SL.

- **Total Chromium (GW-SL=27 ug/l)**. Dissolved total chromium was detected in 88% of the samples and exceeded SLs in 12% of the samples collected from four locations as summarized in attached tables A5.13a,b. Dissolved total chromium concentrations are plotted on Figures 5-24a to 5-24c. The SL was exceeded in samples from three upper zone well locations located within the interior of the site (DOF-MW2 to DOF-MW4) where concentrations ranged between 28.3 and 75 ug/l and in one push probe sample (P30 – 36 ug/l). The SL was not exceeded at any other sample locations including those along the embayment shoreline and downgradient (east) property line. The cause of the total chromium exceedances within the southwestern portion of the property is not readily apparent and appears associated with relatively high copper concentrations in the same wells (discussed below). The exceedance locations within the southwest portion of the ICS/NWC property pose no risk to surface water.

  COPC Status and Basis. Total chromium is identified as a proposed GW-COPC because its frequency of exceedance was greater than 10.

- **Copper (GW-SL=3.1 ug/l)**. Dissolved copper was detected in 76% of the samples and exceeded SLs in 18% of the samples collected from seven to eight locations as summarized in attached tables A5.13a,b. Dissolved copper concentrations are plotted on Figures 5-25a to 5-25c. Dissolved copper concentrations exceeded the SL in samples from three upper zone well locations located within the interior of the site (DOF-MW2 to DOF-MW4) where concentrations ranged between 1.7 and 19 ug/l, in one upper zone shoreline well location (SA-MW3 – 4 to 9.2 ug/l) and one deeper push-probe screening sample location (P30 – 27 ug/l). The September 2016 samples from DOF-MW5 (4.1 ug/l) and MW-Du (4.1 ug/l) also exceeded the SL, although the two to three previous sample analyses were below the SL. The SL was not exceeded at any other sample locations including most of those along the embayment shoreline and downgradient of the east property line. The dissolved copper exceedances within the southwestern portion of the property appear associated with most of the dissolved total chromium exceedances discussed above and do not appear to pose a risk to surface water.

COPC Status and Basis. Dissolved copper is identified as a proposed GW-COPC as the frequency of exceedance (18%) was greater than 10%.

- **Lead (GW-SL=8.1 ug/l)**. Dissolved lead was detected in 66% of the samples. No samples exceeded the SL as summarized in attached table A5.13a,b. The highest dissolved lead concentration was 5 ug/l detected in push-probe P30.

  COPC Status and Basis. Lead is not identified as a proposed GW-COPC because none of the dissolved lead concentrations exceeded the SL.

- **Mercury (GW-SL=25 ng/l)**. Dissolved mercury was detected in 30% of the samples and exceeded the SL in less than 1% of the samples summarized in attached tables A5.13a,b. Dissolved mercury concentrations are plotted on Figures 5-28a to 5-28c. The sample concentration above the SL (26 ng/l at P30) only marginally exceeded the SL of 25 ng/l. Dissolved mercury was not detected above SLs is samples from other push-probe or monitoring well samples.

  COPC Status and Basis. Mercury is identified as a proposed GW-COPC for post-remedy monitoring purposes. Unlike the other metals whose SL are based on dissolved concentrations, WAC 173-201A-240 indicates the surface water criterion is a total-recoverable fraction of the metal. While available data indicate particles are biasing high the total mercury concentrations in the groundwater samples (see Appendix K), mercury will be included in the post-remedy groundwater monitoring program.

- **Nickel (GW-SL=8.2 ug/l)**. Dissolved nickel was detected in 97% of the samples and exceeded the SL in 5.7% of the samples from seven locations as summarized in attached tables A5.13a,b. SL exceedances from the two well locations (SA-MW1 and SA-MW3) were not confirmed by three later samples. The remaining exceedances were from push probes. Dissolved nickel concentrations are plotted on Figures 5-29a to 5-29c.

  COPC Status and Basis. Dissolved nickel is not identified as a proposed GW-COPC. The frequency of exceedance (5.7%) and maximum EF (2.2) were less than 10. Two of the monitoring well exceedances were not confirmed by later sampling. Five of the seven exceedances occurred in lower zone push-probe probe screening samples. The elevated push-probe nickel concentrations were likely the result of estuarine (saline) water interferences (DOF 2015). Later testing used an improved analytical technique (ICP-MS equipped with a collision cell) to assist in limiting saline water interferences. Nickel was not above the SL in later samples from wells SA-MW1 and SA-MW3 where the improved method was applied.

- **Zinc (GW-SL=81 ug/l).** Dissolved zinc was detected in 69% of the samples and exceeded the SL in 0.9% of the samples collected from one location as summarized in attached tables A5.13a,b. Dissolved zinc concentrations are plotted on Figures 5-30a to 5-30c. Dissolved zinc concentrations appeared to exceed the SL in one upper-zone well sample (DOF-MW6 – 228 ug/l). Two earlier samples and one later sample from this well were below the SL. This concentration was traced to a laboratory contamination issue that was resolved. A sample from Seep 2 collected in July 2012 had a concentration above the SL of 210 ug/l. The sample result appears anomalous as no other validated samples on the ICS/NWC property approach this concentration.

COPC Status and Basis. Dissolved zinc is not identified as a proposed GW-COPC based on the frequency of exceedance (0.9%) and EF (2.6%) being less than 10.

5.4.3.9 Other Constituents

As noted above, a final check screening was completed using the second step factors discussed above for constituents with frequency of exceedances <5% of the samples and/or whose EFs were greater than 1. Eleven constituents fell into this category.

The screening results for the remaining eleven constituents are summarized in attached Table A5.10b. Frequency of exceedances ranged between less than 1% and 3.7%. All but one of the EFs were 10 or less. Dieldrin was detected in samples from two non-contiguous push-probe locations (P16 and P27B). The sample results appear anomalous. The higher concentration (0.14 ug/l) was detected in the sample from P16. Dieldrin was not detected in samples from monitoring well SA-MW3 which lies downgradient from P16 and is screened within a similar interval (see Section D-D' – Figure 4-5). However, dieldrin was detected in soil at these two locations. While particles entrained in the samples may be the cause of the exceedances, this compound is identified as a proposed GW-COPC.

5.4.4 GROUNDWATER COPCS – DOUGLAS PROPERTY

Available data suggest that releases from the ICS/NWC property occurred to the LDW turning basin formerly located north of the ICS/NWC property prior to filling that created the Douglas property. While the former bottom elevations of the turning basin are not known, sediment core and boring data indicate that the elevations were lower than 0 feet MLLW where moderate to heavy sheens were reported during drilling for soil sampling and well installations (see section C'-C", Figure 4-4b). Wells DMC-MWA to DMC-MWC were installed by DOF in the lower groundwater zone below 0 feet MLLW as summarized below in Table 5.10 to monitor deeper groundwater conditions on the north side of the embayment.

Table 5.10 – Douglas Lower Zone Well Screen Elevations

Well	Top Screen	Bottom Screen
DMC-MWA	(+)0.4	(-)10
DMC-MWB	(-)2.4	(-)12
DMC-MWC	(+)1.1	(-)8.9

Note: Elevations relative to MLLW

Attached Table A5.14 presents a summary of constituent detections along with a comparison to surface water SLs for the lower zone Douglas wells listed above. In general, the most frequent detections and exceedances of SLs occurred in samples from DMC-MWA. Fewer detections and SL exceedances were observed in an easterly direction in wells DMC-MWB and DMC-MWC as illustrated on Figures 5-8c to 5-30c. The data are discussed below.

- **Metals**. Most of the metal concentrations were below SLs. Dissolved lead (14.4 to 19.2 ug/l) exceeded SLs in samples collected during the initial sampling (November 2015). However, sampling did not confirm the SL exceedances during the next two rounds (March and September 2016). Therefore, lead is not identified as a proposed GW-COPC in Douglas property, lower zone groundwater.

- **Petroleum Hydrocarbons**. GRO, DRO and RRO were not detected above SLs in samples from wells DMC-MWB and DMC-MWC, and GRO concentrations in well DMC-MWA were below SLs. DRO/RRO consistently exceeded SLs in samples from DMC-MWA. DRO/RRO are identified as proposed GW-COPCs in Douglas property, lower zone groundwater.

- **Volatile Organic Compounds (VOCs)**. A number of VOCs were detected in the Douglas lower zone groundwater samples. VOC detections were below SLs in samples from DMC-MWB and DMC-MWC. Benzene consistently exceeded its SL in samples from well MWA where concentrations ranged from 29 to 36 ug/l. Benzene is identified as a Douglas property, lower zone proposed GW-COPC.

- **Semivolatile Organic Compounds (SVOCs)**. Naphthalene, acenaphthene, N-nitrosodiphenylamine, benzo(a)anthracene, bis(2-ethylhexyl)phthalate (BEHP), chrysene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene exceeded SLs in one or more samples.

    - Naphthalene exceeded SLs in samples from DMC-MWA and DMC-MWB. The most recent sample from well DMC-MWB was below the SL. Based on the consistent exceedances in samples from DMC-MWA, naphthalene is identified as a Douglas property, lower zone proposed GW-COPC.

    - Acenaphthene and n-nitrosodiphenylamine only exceeded SLs in one of the nine samples collected from wells DMC-MWA to DMC-MWC. These constituents are not identified as Douglas property, lower zone proposed GW-COPCs.

    - Benzo(a)anthracene, chrysene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene exceeded SLs, with one exception, in samples from DMC-MWA. Benzo(a)anthracene was detected above the SL in one of three samples from DMC-MWB but at a concentration below the PQL. Based on the consistent detections above the SL in well DMC-MWA, these compounds are identified as Douglas property, lower zone proposed GW-COPCs.

    - BEHP exceeded the SL in samples from all the wells. The highest concentrations were detected in samples from DMC-MWA, but concentrations declined from 4 ug/l to 0.2 ug/l during the three sampling events. Occasional detections occurred in samples from wells DMC-MWB and –MWC at or just above the PQL of 0.2 ug/l. Based on the most recent detections being at or below the PQL, BEHP is not identified as a Douglas property, lower zone proposed GW-COPC .

- **Chlorinated Pesticides/PCBs.** 4,4'-DDE and 4,4'-DDD, hexachlorobenzene and PCBs were detected in one or more samples.
    - Hexachlorobenzene was only detected in one of nine samples near its PQL and is not identified as a GW-COPC.
    - PCBs were most frequently detected in samples from all wells. Total Aroclor PCB is identified as a Douglas property, lower zone proposed GW-COPC.
    - 4,4'-DDE and 4,4'-DDD were detected in all samples from DMC-MWA and in one of the three samples collected from DMC-MWB. As noted earlier, the detection of these chlorinated pesticides is likely related to analytical interferences caused by the presence of PCBs. Therefore, these two compounds are not identified as Douglas property, lower zone proposed GW-COPCs.

A review of the PCB and chlorinated pesticide data indicate declining concentration trends. For example, PCB concentrations in samples from DMC-MWA consistently declined from 0.61 ug/l to 0.049 ug/l between November 2015 and September 2016. This represents a decline of over 90% in less than a one-year period and suggests that drilling disturbances likely have affected the analytical results. This issue is further discussed in Section 6.2.3 below.

5.4.5 SUMMARY OF PROPOSED GROUNDWATER COPCS

Table 5.11 below presents a summary of GW-COPCs.

Table 5.11 – Proposed GW-COPC Summary

Constituent	ICS/NWC Property	Douglas Property (Lower Zone)
LNAPL	X	-----
Dissolved chromium and copper	X	-----
Dissolved mercury	X(a)	-----
GRO	X	-----
DRO/RRO	X(a)	X
Benzene	X	X
Toluene and Ethylbenzene	X	-----
1,3- and 1,4- Dichlorobenzene	X	-----
Vinyl Chloride (+PCE, TCE, cis-1,2-DCE)	X	-----
Naphthalene, 2-Methylnaphthalene	X	X (naphthalene)

Table 5.11 – Proposed GW-COPC Summary (continued)

Constituent	ICS/NWC Property	Douglas Property (Lower Zone)
Bis(2-ethylhexyl)phthalate and Pentachlorophenol	X	-----
Benzo(a)anthracene, chrysene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene	-----	X
4,4’-DDE, 4,4’-DDD, trans- and cis-Chlordane	X	-----
Dieldrin	X	-----
Total PCBs	X	X

Note: ---- - Not identified as a proposed GW-COPC; (a) Identified for future monitoring purposes.

5.4.6 OFF-SITE PROBE DATA

Three push probes were drilled off-site, southeast of the Upland Area property corner (Figure 3-4b). Screening level groundwater samples were obtained from depths between 10’-14’ and 20’-24’ below ground surface. The data are summarized in Appendix G (Table G.3). Several dissolved metals (arsenic, total chromium, copper, lead and zinc) were detected but, with one exception, were below SLs; a dissolved copper of 10 ug/l was detected in the P35 sample from 20’-24’. Dissolved copper was not detected in any of the other samples.

Several organic constituents were detected as summarized below in Table 5.12. The organic constituents were only intermittently detected and, with the exception of PCP and PCBs, were below SLs. It is likely the detections of PCP and PCBs in the P34 groundwater sample were likely caused by particles being entrained in the samples sent to the laboratory. The P34 sample collected from 10’ to 14’ had a turbidity of 78 NTUs and PCBs were detected (117 ug/kg) in a soil sample collected from a depth of three to five feet.

Table 5.12 - Organic Constituents Detected in Off-Site Push-Probe Samples (ug/l)

Constituent	Screening Level	P34 (10’-14’)	P34 (20’-24’)	P35 (10’–14’)	P35 (20’–24’)	P36 (10’-24’)	P36 (20’–24’)
1,1-Dichloroethane	11	<0.2	0.27	<0.2	1.2	<0.2	<0.2
Benzoic Acid	590	<20	<20	<20	<20	4.8	5.5
Naphthalene	1.4	0.05	0.06	<0.1	<0.1	<0.1	0.06
Diethylphthalate	93	<1.0	<1.0	<1.0	<1.0	2.2	4.4
Pentachlorophenol	0.025	0.34	<0.25	<0.25	<0.25	<0.25	<0.25
4-4’-DDE	(b)	0.013	<0.005	<0.005	<0.005	<0.005	<0.005
4-4’-DDD	(b)	0.010	<0.005	<0.005	<0.005	<0.005	<0.005
Total PCBs	0.01 (7E-06) (a)	0.025	0.41	<0.01	<0.01	<0.01	<0.01

Notes: (a) PQL(screening level) (b) Detection likely associated with PCB interference; < - Less than.

5.5 SOIL DATA AND PROPOSED COPCS

Data Used in Characterization Analysis. The primary data used to characterize soil conditions beneath the ICS/NWC property were collected between October 2012 and October 2015 and are summarized in Appendix H (Tables H.4a, H.4b and H.5). These data were supplemented with the results of fifteen split sample analyses (metals) by EPA in 1986 (designated EPA-xxx in Appendix H, Table H.1), six sample analyses by SAIC (for Ecology) in 2007, and thirty push-probe samples collected (by DOF) in 2008 summarized in Appendix H, (Tables H.3a and H.3b). Note the two Hart-Crowser boring samples listed in Table H.1 were not used as these samples had long sample intervals covered by the EPA split samples.

The composite soil sample results by Hart Crower (samples 1 to 6 in Appendix H, Table H.1) and Parametrix (SC-1 in Appendix H, Table H.2) were qualitatively incorporated into the RI soil characterization. Selected sample results were included on figures of proposed soil COPC concentrations to allow comparison with the discrete sample concentration results discussed in the preceding paragraph. The composite sample results were generally consistent with the results of soil samples collected in the period 2012 to 2015.

Site characterization of soil conditions on the Douglas property included analysis of three deeper soil samples collected by DOF from the screened intervals of wells DMC-MWA to DMC-MWC for PCBs and samples collected by consultants for the Douglas property owners and documented in a draft RI report (Geoengineers 2016). These data are summarized in Appendix H (Table H.6).

5.5.1 SAMPLE LOCATIONS AND ANALYTICAL PROGRAM

During implementation of the RI field sampling, push-probe and monitoring well soil samples were collected and analyzed for a wide range of constituents. Sample locations are shown on Figure 3-4a. Soil analytical results are summarized in Appendix H as described above. Between April 2007 and December 2015, approximately 189 soil samples were analyzed by SAIC (for Ecology) and DOF. Soil samples were also collected in 1986 and 1991. Samples were analyzed for the constituents listed below in Table 5.13.

Table 5.13 - Soil Laboratory Analyses

Analysis Class	Soil Sample Analyses	Methods
pH	X (N=4)	SW846-M9045
Total Organic Halides (TOX)	X (NAPL-LP4)	SW846-M9076
Metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn)	X	SW846-M6020A; M7471A (Hg)
Petroleum Hydrocarbons	X	NWTPH-G & -Dx; -HCID (NAPL-LP4)
Volatile Organics	X	SW846-M8260C
Semivolatile Organics	X	SW846-8270D; M8270D-SIM
Chlorinated Pesticides	X	SW846-M8081

Analysis Class	Soil Sample Analysis	Methods
PCBs (Aroclors)	X	SW846-M8082
PCDD/PCDF	X (N=2)	EPA-M1613B

N = Number of samples

5.5.2 SOIL CONTACT SCREENING LEVELS (SLS)

Soil SLs and COPCs were evaluated for the soil contact exposure pathway for the ICS/NWC property. Data collected in 2007/08 and more recently in the period 2012 to 2015 were used to complete the preliminary screening for soil contact (SC) COPCs. Historic data collected in 1986 and 1991 supplemented the more recent data as part of evaluating the proposed SC-COPCs. This exposure pathway was not addressed for the Douglas property because possible impacts caused by releases from the ICS/NWC property were to sediments/soils that were buried by fill and now are deeper than the soil contact point of compliance (fifteen feet below existing grades). Sources of the SLs are listed below.

- **Direct (Soil) Contact SLs**. Soil contact SLs (SC-SLs) protective of human contact were obtained from Ecology's LDW Workbook (2018) and CLARC (primarily for SLs based on an industrial site use). SLs assuming both unrestricted[13] and industrial site uses were compiled. SLs based on unrestricted site uses were used to identify SC-COPCs. Application of SC-SLs to identify SC-COPCs assumed the site to be unpaved with a point of compliance fifteen feet below ground surface.

- **Ecologic Soil Contact SLs.** The site qualifies for use of the "*Simplified Terrestrial Ecological Evaluation Procedures*" (WAC 173-340-7492) based on an analysis by Ecology (see Appendix M). Ecologic SLs were obtained from Table 749 (in WAC 173-340-900) titled "*Priority Contaminants of Ecological Concern*" assuming an industrial land use. Application of ecologic criteria to identify SC-COPCs assumed the site to be unpaved with a point of compliance fifteen feet below ground surface.

SLs are summarized in attached Table A5.15a, along with the number of sample analyses, detection frequency, highest detected concentration, whether a constituent was identified as a proposed GW-COPC, and whether the constituent was carried forward for additional evaluation. The lower of the human/ecologic direct contact values were used for screening purposes. Preliminary SC-COPCs were identified as discussed below.

[13] While the site is zoned and in industrial use, unrestricted site use soil (human) contact SLs were used, as directed by Ecology, to identify SC-COPCs to provide a more conservative screening analysis in this RI. SLs based on industrial site uses were assumed to be protective of subsurface utility workers. Cleanup levels appropriate to current and future land uses will be further evaluated in the FS.

5.5.3 SOIL CONTACT COPCS – ICS/NWC PROPERTY

First-cut SC-COPCs were identified using a similar approach as was used to identify GW-COPCs:

- Non-detects were eliminated from further evaluation.
- Constituents with no SL were eliminated from further evaluation.
- Maximum Concentration – Constituents whose maximum concentration was less than the lowest SC-SL listed in Table A5.15a were eliminated from further evaluation.

First-cut SC-COPCs carried forward for additional evaluation are summarized in Tables A5.15a and A5.15b. Constituents carried forward were further evaluated using the criteria listed in WAC 173-340-740(7)(d). Constituents were identified as proposed SC-COPCs if the constituent concentration exceeded the SL (based on an unrestricted site use) of one or more of the following criteria:

- One or more samples exceeded two times the SL,
- More than 10% of the samples exceeded the SL, and
- The Upper 95% Confidence Level on the Mean (UCL95%) concentration was above the SL.

To provide additional perspective, the criteria listed above were used to compare site soil concentrations to SLs based on an industrial site use, as the site meets the definition of an industrial site under MTCA (WAC 173-340-200). The industrial based SLs would primarily protect subsurface utility workers as most of the site is paved.

The assumed point of compliance was 15 feet below ground surface. Pro-CUL (v. 4.0) was used to estimate the UCL95% concentration. This software includes both parametric (for normal and lognormal distributed data) and non-parametric (for data sets where the distribution is not known) techniques.

As a final step, the composite soil sample results summarized in Tables H-1 (1986) and H-2 (1991) were qualitatively reviewed and the composite areas and results were plotted on figures showing the concentrations of discrete samples for proposed SC-COPCs. The constituents carried forward for additional evaluation are discussed below.

5.5.3.1 Total Aroclor PCBs

The SC-SLs of 1.0 mg/kg to identify proposed SC-COPCs and 65.6 mg/kg to protect subsurface utility workers were used. Figure 5-31 presents a histogram that illustrates the range of PCB soil concentrations detected on the ICS/NWC property which ranged from <0.004 and 119 mg/kg. The data appear log-normally distributed with a site wide UCL95% concentration of 11 mg/kg. Thirty-four samples from twenty-seven locations exceeded 2X the SL (2.0 mg/kg). Two of the six composite samples of shallow soil (top two feet) collected in 1986 before the site was paved had concentrations of Aroclor 1260 of 0.4 mg/kg. PCBs were not detected in the other four composite samples. PCBs were not detected in the 1991 surface composite soil sample at a reporting limit of 0.2 mg/kg. Total PCB concentrations (UCL95%) exceeded the SL used to identify proposed SC-COPCs.

COPC Status and Basis. Total PCBs in soil less than fifteen deep exceeded SLs and are identified as proposed SC-COPCs.

5.5.3.2 GRO

The GRO SC-SL is 30 mg/kg for both unrestricted and industrial land use sites. This criterion is based on protecting groundwater quality. GRO soil concentrations detected on the ICS/NWC property ranged from 4.2 mg/kg and 3,000 mg/kg. Most samples (82%) were below the SL.

COPC Status and Basis. GRO is identified as proposed SC-COPCs because the SL was exceeded in greater than 10% of the samples and ten sample concentrations were greater than 2x the SL (60 mg/kg).

5.5.3.3 DRO+RRO and DRO

The DRO+RRO and DRO SC-SL is 2000 mg/kg for both unrestricted and industrial land use sites. This criterion is based on preventing the accumulation of mobile LNAPL on the water table. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from <11 mg/kg and 65,000 mg/kg. Most samples (85%) were below the SL. DRO+RRO exceeded 2x the SL (4,000 mg/kg in fourteen samples from eleven locations). DRO exceeded 2x the SL in ten samples from eight locations.

COPC Status and Basis. DRO+RRO and DRO are identified as proposed SC-COPCs because the SL was exceeded.

5.5.3.4 Arsenic

Arsenic is a naturally occurring metaloid that is present in most Puget Sound soils above typical reporting limits. For this reason, the Method B SC-SL for unrestricted site use (0.67 mg/kg) was adjusted upward to Puget Sound background (7 mg/kg – Ecology 1994). The Method B based industrial land use SL is 87.5 mg/kg. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from 0.8 to 25.7 mg/kg. A UCL95% of 4.6 mg/kg was calculated assuming a log-normal distribution of data. The six composite samples of shallow soil (top two feet) collected in 1986 before the site was paved, had arsenic concentrations that ranged from 4.5 to 7.8 mg/kg. Arsenic was not detected in the surface 1991 composite soil sample collected in the area adjacent to the manholes at a reporting limit of 11 mg/kg.

The site meets the unrestricted land use SL except for three samples that exceeded two times the adjusted SL (14 mg/kg). These samples include P26 (25.7 mg/kg at 3'-5') and LP1 (14.5 mg/kg at 3'-5'; 21.4 mg/kg at 6.5'-8'). Arsenic concentrations were below the industrial land use SL to protect subsurface utility workers.

COPC Status and Basis. Arsenic is identified as a proposed SC-COPC because several samples exceed 2x the unrestricted site use SL.

5.5.3.5 Lead

Lead is a naturally occurring metal with a background concentration in the Puget Sound region of 24 mg/kg. The SC-SLs of 220 mg/kg (based on ecologic receptors) to identify proposed SC-COPCs and 1,000 mg/kg to protect subsurface utility workers were used. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from 0.5 to 4,590 mg/kg. The data are not normally or log-normally distributed. A non-parametric Chebyshev 95%UCL concentration of 361 mg/kg was estimated using ProUCL 4.0. The six composite samples of shallow soil (top two feet) collected in 1986 before the site was paved, had lead concentrations that ranged from 48 to 1,400 mg/kg (see Figure 6-16). Lead was detected in the surface 1991 composite soil sample collected in the area where the existing manholes exist at a concentration of 49 mg/kg.

Lead concentrations in soil less than fifteen feet deep exceeded the UCL95% concentration (361 mg/kg) and nine samples exceeded 2x the SL (440 mg/kg). Three of the six 1986 composite sample locations also exceeded 2x the SL. Three samples exceeded 2x the industrial land use based SL.

COPC Status and Basis. Lead is identified as a proposed SC-COPC because soil concentrations exceeded SLs.

5.5.3.6 Total Chromium

Chromium is a naturally occurring metal with a background concentration in the Puget Sound region of 48 mg/kg. The SC-SLs of 135 mg/kg to identify COPCs (based on ecologic receptors) and 5,250,000 mg/kg to protect subsurface utility workers were used. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from 7.6 to 910 mg/kg. The data are not normally or log-normally distributed. A non-parametric Chebyshev 95%UCL concentration of 81 mg/kg was estimated using ProUCL 4.0. The six composite samples of shallow soil (top two feet) collected in 1986 before the site was paved had total chromium concentrations that ranged from 20 to 200 mg/kg (Appendix H, Table H.1). Chromium was detected in the surface 1991 composite soil sample collected in the area adjacent to the manholes at a concentration of 15.9 mg/kg.

Two samples exceeded 2x the SL of 135 mg/kg. These two samples contain very high levels of DRO/RRO (17,200 mg/kg and 65,000 mg/kg, respectively), which precludes the presence of any oxidized species such as Cr+6. Total chromium in these samples can only exist in the metal or Cr+3 ion phase.

COPC Status and Basis. Total chromium is identified as a proposed SC-COPC because soil concentrations exceeded the ecologic based SL.

5.5.3.7 Zinc

Zinc is a naturally occurring metal with a background concentration in the Puget Sound region of 85 mg/kg. The SC-SLs of 570 mg/kg to identify COPCs (based on ecologic receptors) and 1,050,000 mg/kg to protect subsurface utility workers were used. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from 18 to 2,120 mg/kg. The data are not normally or log-normally distributed. A non-parametric Chebyshev UCL95% concentration of 270 mg/kg was estimated using ProUCL 4.0. The six composite samples of shallow soil (top two feet) collected in 1986 before the site was paved had zinc concentrations that ranged from 70 to 640 mg/kg (Appendix H, Table H.1). Zinc was detected in the surface 1991 composite soil sample collected in the area adjacent to the manholes at a concentration of 58 mg/kg. Three samples exceeded 2x the SL (1,140 mg/kg).

COPC Status and Basis. Zinc is identified as a proposed SC-COPC because soil concentrations exceed the ecologic based SL.

5.5.3.8 Pentachlorophenol-PCP

SC-SLs of 2.5 mg/kg to identify COPCs and 328 mg/kg to protect subsurface utility workers were used. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from 0.004 to 160 mg/kg. The data are not normally or log-normally distributed. A non-parametric Chebyshev UCL95% concentration of 36 mg/kg was estimated using ProUCL 4.0. The six composite samples of shallow soil (top two feet) collected in 1986 before the site was paved, had PCP concentrations that ranged from not detected to 0.81 mg/kg (PCP was not detected in three of the six composite samples – Appendix, Table H.1). PCP was not analyzed in the 1991 composite sample collected near the manholes.

PCP concentrations in soil less than fifteen feet deep meet the industrial land use-based SLs. However, the unrestricted land use-based SL was exceeded; the UCL95% was greater than 2.5 mg/kg and samples from two locations exceeded two times the SL (5 mg/kg). These locations included DOF-MW7 (160 mg/kg at 3' to 4') and LP3 (5.3 mg/kg at 6' to 8').

COPC Status and Basis. PCP is identified as a proposed SC-COPC because soil concentrations exceed the SC-SL.

5.5.3.9 BaPEq

BaPEq represents the combined potential toxicity of carcinogenic PAHs (cPAHs) including benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. Toxicity factors used to calculate the BaPEq concentrations are listed in Table 5.4 above. SC-SLs of 0.19 mg/kg to identify COPCs and 131 mg/kg to protect subsurface utility workers were used. Figure 5-31 presents a histogram that illustrates the range of soil concentrations detected on the ICS/NWC property which ranged from <0.0001 and 16 mg/kg. No cPAHs were detected in the six composite samples collected in 1986, although reporting limits are not available. cPAHs were not detected in the surface 1991 composite soil sample collected in the area where the existing manholes exist at a reporting limit of 0.38 mg/kg. A UCL95% of 0.36 mg/kg was estimated assuming a log-normal distribution of data. Six samples from five locations exceeded 2x the SL (0.38 mg/kg). None of the samples exceeded the industrial land use-based SL to protect subsurface utility workers.

COPC Status and Basis. BaPEq is identified as a SC-COPC because soil concentrations exceeded the SC-SL used to identify proposed COPCs.

5.5.3.10 PCDD/PCDFs

SC-SLs of 12.8 ng/kg to identify COPCs and 1,680 ng/kg to protect subsurface utility workers were used. Two soil samples were collected from locations P21 (12'-14') and P18 (14'-16') and analyzed for PCDDs/PCDFs. These samples were chosen because they had relatively high PCB concentrations of 4.3 and 11.7 mg/kg, respectively. PCDD/PCDFs are associated with and are derived from PCB mixtures.

The results are summarized in Appendix H, Table H.5. Calculated values of TCDD 2,3,7,8-TEQ were 184 ng/kg-TEQ (P21) and 319 ng/kg-TEQ (P18). The values exceeded the unrestricted land use SL but are well below the industrial site use SL.

COPC Status and Basis. PCDD/PCDF compounds are not identified as SC-COPCs because of the limited number of samples, the industrial SL was not exceeded, and any risk posed by these compounds will be mitigated by addressing PCBs.

5.5.3.11 Dieldrin

SC-SLs of 0.06 mg/kg to identify COPCs and 8.2 mg/kg to protect subsurface utility workers were used. Dieldrin was only detected in three samples from two locations (P16, P27). Detected sample concentrations ranged between 0.0016 and 0.250 mg/kg. Two of the samples exceeded two times the SL (0.12 mg/kg) used to identify proposed COPCs. None of the sample concentrations exceed the industrial land use based SL.

COPC Status and Basis. Dieldrin is identified as a proposed SC-COPC because soil concentrations exceed 2x the SC-SL.

5.5.3.12 Sum of 4,4'-DDE, -DDD, -DDT

The SL to identify proposed COPCs is 1 mg/kg to protect ecologic receptors. Sample concentrations ranged between 0.017 and 5.9 mg/kg. Three samples (3%) exceeded the SL at locations at LP-1 (6.5'-8'), LP3 (6'-8'), and LP-4 (8'-10'). One sample exceeded 2x the SL (2 mg/kg).

COPC Status and Basis. The sum of the 4,4'-DDE, -DDD, -DDT is identified as a proposed SC-COPC because soil concentrations exceed 2x the SC-SL at one location.

5.5.4 SOIL LEACHING COPCS

Soil constituents of concern based on leaching into groundwater were initially (first cut) identified based on the list of proposed GW-COPCs (attached Table A5.16). Constituents in this list were further evaluated based on soil concentrations, association with LNAPL and their geochemical properties. Soil leaching (S-Leach) proposed COPCs were identified as follows:

- **ICS-NWC Property/Associated with LNAPL** – Toluene, 1,3-dichlorobenzene, 1,4-dichlorobenzene and 2-methylnaphthalene.

- **ICS-NWC Property/Associated with Soil –** Total PCBs, GRO, DRO+RRO, benzene, ethylbenzene, tetrachloroethene (PCE), trichloroethene (TCE), naphthalene, BEHP, PCP and dieldrin.

- **Douglas Property (Lower Zone)/Associated with Soil –** Total PCB, DRO+RRO, benzene, naphthalene, several cPAHs.

The following proposed GW-COPCs were not identified as proposed S-Leach COPCs based on the following:

- The source of **cis-1,2-Dichloroethene** and **vinyl chloride** in groundwater appears to be the degradation of PCE and TCE rather than leaching from soil.

- **Dissolved chromium** and **copper** exceed GW-SLs primarily in upper zone groundwater (below the aquitard) within the southwestern portion of the ICS-NWC property (Figures 5-24a-c; 5-25a-c). There does not appear to be a widespread source of these metals in soil.

    - Figure 5-31 illustrates the general distribution of chromium in soil. All but two of the soil concentrations are below or near Puget Sound background (48 mg/kg). Relatively high chromium concentrations were detected in only soil samples from LP-3 (910 mg/kg at 6'-8') and P-29 (755 mg/kg at 3'-4'). However, the GW-SL is not exceeded at locations proximal to these two locations (filled drainage ditch and SA-MW1 areas). Based on these data, it does not appear that chromium is leaching from soil to a significant degree.

    - Figure 5-26 presents histograms that illustrate the distribution of copper in soil beneath the ICS-NWC site. Most concentrations are below the background concentration of 36 mg/kg for Puget Sound soil (Ecology 1994). Figures 5-27a,b,c present copper concentrations in soil with increasing depth. Samples with concentrations greater than background (up to 450 mg/kg) were found primarily along the former drainage ditch alignment, in the sample from SA-MW1 (205 mg/kg), and in a sample from MW-Ju (161 mg/kg). The highest concentration is associated with the former lagoon area. However, the GW-SL is not exceeded at locations proximal to these locations. Based on these data, it does not appear that copper is leaching from soil to a significant degree.

- **4,4'-DDE and 4,4'-DDD**. While these constituents are identified as GW-COPCs, available data indicate that their presence is likely caused by analytical interference caused by the presence of PCBs, rather than leaching from soil.

- **Trans- and cis-Chlordane**. These constituents appear to be present in groundwater samples from DOF-MW6. They have only been detected in shallow soil at locations P27 and MW-Ju. They have not been detected in soil samples in the vicinity of DOF-MW6. The source of trans- and cis-chlordane in groundwater is not clear but does not appear be caused from soil leaching.

5.5.4 SUMMARY OF PROPOSED SOIL COPCS

Table 5.14 below presents a summary of soil COPCs identified as part of this RI.

Table 5.14 – Summary of Proposed Soil COPCs

Constituent	Soil Contact ICS/NWC	Soil Leaching ICS/NWC	LNAPL Leaching ICS/NWC	Douglas Property (Lower Zone – Soil Leaching)
Arsenic	X	-----	-----	-----
Total chromium	X	-----	-----	-----
Lead	X	-----	-----	-----
Zinc	X	-----	-----	-----
GRO & ethylbenzene		X	-----	-----
DRO/RRO	X	X	X	X
Toluene, 1,3- & 1,4-dichlorobenzene, 2-methylnaphthalene	-----	-----	X	-----
Benzene	-----	X	-----	X
PCE, TCE	-----	X	-----	-----
Naphthalene	-----	X	-----	X
BEHP	-----	X	-----	-----
Pentachlorophenol (PCP)	X	X	-----	-----
BaPEq (TEQ)	X	-----	-----	-----
Benzo(a)anthracene, chrysene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene	-----	-----	-----	X
Dieldrin	X	X	-----	-----
4,4-DDE, +-DDD, +-DDT	X	-----	-----	-----
Total PCBs	X	X	X	X

Note: ----- - Not identified as a proposed Soil-COPC.

5.6 STORM WATER SYSTEM

The 2nd Avenue Outfall drains a mixed land use area south of the ICS/NWC property (Figure 2-7). No ICS/NWC property storm water drains to the system; site storm water is collected, treated (as necessary) and discharged to the Metro sanitary sewer system in accordance with a Metro discharge permit. On the ICS/NWC property, the 2nd Ave. conveyance system consists of two concrete manhole structures (MH-1 and MH-2), concrete sewer pipe (30" CMP and 24" RCP[14]) and an outfall that discharges to the central part of the embayment (Figures 2-4b and 2-8).

Data Used in Characterization Analysis. Data available to characterize storm water discharges include analyzes of both solids and liquid samples and are summarized in Appendix I (Tables I.1, I.2 and I.3). Samples collected in 1991 and 2007 were included for completeness. The sediment sample collected from the end of the 2nd Ave. Outfall in 2007 (Sed. 5 in Table I.1) was not used because the sample may not reflect storm water particle discharges, as the sample was collected only a foot inside the end of the discharge pipe. The purpose of the conveyance system water sampling was to assess whether groundwater infiltration into the storm water pipe was affecting the quality of water discharging to the embayment. The 2007 water sample (Appendix I, Table I.2) was not used because only a pipe end sample was collected and analyzed. Samples collected in 2012 and 2015 were used in this site characterization analysis.

5.6.1 SAMPLES AND ANALYTICAL PROGRAM

During implementation of the RI field sampling program, sediment (solids) and storm water (liquid) samples were collected in August 2012, March 2015 and September 2015 and analyzed for the constituents listed below in Table 5.15. Upstream samples were collected from manhole MH-1. Water samples were collected at low tide contemporaneously from MH-1 and the mouth of the outfall.

Table 5.15 – Storm Water Sample Laboratory Analyses

Analysis Class	Soil Sample Analyses	Storm Water Analyses	Methods
Conventional/Field Analyses	none	X	EPA 300 (Cl & SO4)/See Appendix C
Total Organic Carbon	X	none	SW846-M9090
Grain Size	X	none	PSEP
Metals (Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Ag, Zn)	X	X	SW846-6010C & EPA 200.8; SW846-M7470/7471A (Hg)
Petroleum Hydrocarbons	X	X	NWTPH-G & - Dx
Volatile Organics	X	X	SW846-8260C
Semivolatile Organics	X	X	SW846-8270/8270-SIM; M8041 (chlorinated phenols)
Chlorinated Pesticides	X	X	SW846-M8081
PCBs (Aroclors)	X	X	SW846-M8082
PCDD/PCDF	X	none	EPA 1613B

[14] CMP – Corrugated Metal Pipe; RCP – Reinforced Concrete Pipe

5.6.2 DETECTED CONSTITUTENTS AND COMPARISON TO SLS

5.6.2.1 Storm Water Solids

In 2012, samples were obtained of sediment that had accumulated in the bottom of man-hole MH-1 located near the upstream corner of the ICS/NWC property. Analysis of these storm water sediments provides an indication of the storm water solids (particles) being transported to the embayment via storm water. The analytical constituents are summarized in Appendix I (Table I.3) along with SLs and SL exceedances. SLs were based on guidance for storm water source control evaluations at upland sites (Ecology 2015). Those constituents that exceeded SLs are summarized below in Table 5.16.

Table 5.16 - Storm Water Solids SL Exceedances

Constituent	Concentration (ug/kg-dw)	Lower SL (ug/kg-dw)	Upper SL (ug/kg-dw)
Zinc	464	410 (EF=1.1)	960 (EF<1)
Phenol	500	420 (EF=1.2)	1200 (EF<1)
1,4-Dichlorobenzene	2900	110 (EF=26)	120 (EF=24)
Benzyl Alcohol	160	57 (EF=2.8)	73 (EF=2.2)
1,2-Dichlorobenzene	3,400	35(EF=97)	50 (EF=68)
Benzoic Acid	770	650 (EF=1.2)	650 (EF=1.2)
1,2,4-Trichlorobenzene	5,300	31 (EF=171)	51 (EF=104)
Naphthalene	4100	2100 (EF=2.0)	2400 (EF=1.7)
Phenanthrene	1700	1500 (EF=1.1)	5400 (EF<1)
Butylbenzylphthalate	82	63 (EF=1.3)	900 (EF<1)
bis(2-Ethylhexyl)-phthalate	3,400	1300 (EF=2.6)	1900 (EF=1.8)
LPAH	6,780	5200 (EF=1.3)	13,000 (EF<1)
Hexachlorobenzene	230	22 (EF=10)	70 (EF=3.3)

Notes: SLs are from source control guidance (Ecology 2015). EF = Exceedance factor

The highest EFs (greater than approximately 25) were calculated for 1,4-dichlorobenzene, 1,2-dichlorobenzene, and 1,2,4-trichlorobenzene. It should be noted that PCBs did not exceed the 2015 storm water guidance SLs of 130 to 1,000 ug/kg-dw. However, these SLs are substantially above the LDW-ROD CUL of 2 ug/kg. Additional evaluation of the possible impact of storm water solids discharge from the 2nd Ave. Outfall is warranted but is beyond the scope of this RI, as these solids are derived from properties upstream of the ICS/NWC property.

5.6.2.2 Storm Water

In August 2012, March 2015 and September 2015, water samples were obtained from the storm water system for analysis. The sampling included the contemporaneous sampling of upstream location MH-1 and the outfall to provide data to evaluate whether groundwater infiltration into the pipe was occurring at the joints where partial separations were observed during the video survey. The storm water conveyance is tidally influenced. Samples were obtained at lower tides when a larger portion of storm water would be present in the samples. The dissolved solids (sum of Cl, Na, SO4, Ca and Mg) concentrations of the collected samples are summarized below in Table 5.17.

Table 5.17 - Dissolved Solid Concentrations in Storm Water Samples

Date	MH-1 (Upstream)	Outfall (Downstream)
August 3, 2012	12275 mg/l	13558 mg/l
March 23, 2015	702 mg/l	1264 mg/l
September 22, 2015	7960 mg/l	13131 mg/l

Dissolved solids ranged between approximately 700 and 13,558 mg/l. Embayment water samples ranged between 6,733 and 16,085 mg/l (attached Table A4.5), depending on sample depth with an average of approximately 11,400 mg/l. Using these data, the samples collected in August 2012 and September 2015 contained mostly estuarine water while the samples collected in March 2015 (wet season) contained mostly (fresh) storm water.

Storm water system liquid sample results are summarized in Appendix I (Table I.3) along with SLs based primarily on Ecology (2015) guidance. Storm water constituents that exceeded the SLs (that occurred in samples collected in March 2015), their concentrations, and exceedance factors are summarized below in Table 5.18.

Table 5.18 – Storm Water Liquid Constituent Exceedances

Constituent	Screening Level	MH-1 (March 2015)		Outfall (March 2015)		Range of Concentrations in Well DOF-MW1
		Concentration	EF	Concentration	EF	
Dissolved Copper	3.1 ug/l	7.1 ug/l	2.3	7.6 ug/l	2.5	0.5 to <5 ug/l
Diesel Range Hydrocarbons	0.5 mg/l	0.75 mg/l	1.5	0.89 mg/l	1.8	<0.1 mg/l
Heavy-Oil Range Hydrocarbons	0.5 mg/l	2.3 mg/l	4.6	1.7 mg/l	3.4	<0.2 mg/l
Chrysene	0.018 ug/l	0.07 ug/l	4.4	0.06 ug/l	3.7	<0.1 to <0.01 ug/l
Total PCBs	6.4E-05 ug/l (PQL=0.01)	0.079 ug/l	7.9	0.055 ug/l	5.5	0.16 to 1.5 ug/l

EF – Exceedance factor

5.6.3 POTENTIAL FOR INFILTRATION INTO THE STORM WATER SYSTEM

The video survey of the storm water conveyance in September 2013 (see Appendix A) indicated the piping was in generally good condition. However, a partial slip joint separation was observed north of MH-2 as illustrated on Figure 2.8, raising the possibility of groundwater infiltrating into the pipe with discharge to the embayment. Groundwater elevations higher than water levels within the pipe would indicate the potential for groundwater infiltration into the storm water system.

High tide groundwater elevations in well DOF-MW1, located 15 to 20 feet upgradient of the joint separation were measured near the top of the pipe while low tide water levels were measured at elevations below to approximately 1.5 feet above the estimated elevation of the pipe bottom. Low tide groundwater elevations at the pipe would be approximately 0.3 to 0.5 feet lower than those at DOF-MW1 based on the hydraulic gradient between DOF-MW1 and MW-Gu. While high tide groundwater levels are near the top of the pipe, groundwater infiltration would not occur because water levels in the pipe would be higher as the pipe is connected to the embayment and pipe water levels fluctuate with the tides. As indicated on Figure 2.8, high tide elevations are higher than the groundwater elevations at DOF-MW1.

Low tide water elevations appear to be generally below the bottom of the pipe so groundwater infiltration into the pipe would not occur. However, during some periods, low tide groundwater levels appear be above the bottom of the pipe so there is some potential for minor groundwater infiltration into the pipe for limited periods, however this has not been documented by low tide flow observations within the pipe (i.e. low tide flows have been similar up and down stream of the partial separation) and analysis of storm water pipe samples.

As summarized in Appendix I (Table I.3), most constituents were either not detected or were detected below SLs. For those constituents that exceeded SLs (see Table 5.18 above), upstream/discharge concentrations were either similar to or lower than discharge concentrations (concentrations of PCBs were lower). These data include samples obtained near the end of the wetter season in March 2015 when the low tide water table would be expected to be relatively high and above the bottom of the pipe, as it was in February 2018.

Another line of evidence is a comparison of the storm water concentrations with those in samples from well DOF-MW1. If groundwater infiltration were occurring, it would likely be from the vicinity of DOF-MW1. As summarized in Table 5.18 above, only PCBs were higher in the well sample, and PCB concentrations were lower in the discharge concentrations as compared to the upstream concentrations. Based on the evaluations discussed above, there does not appear to be significant groundwater infiltration into the storm water system that is affecting the quality of storm water discharges.

5.6.4 MIGRATION ALONG PIPE BEDDING

Groundwater can migrate along more permeable pipe bedding, with the potential of discharging to the embayment. This does not appear to be occurring based on the following lines of evidence:

- During low tides, there was no visual evidence of seeps emanating from soil at/surrounding the 2nd Ave. Outfall.

- During higher tides, groundwater gradients are inward to the ICS/NWC property so flow to the embayment along pipe bedding is not indicated (see Figure 4-16a).

- During lower tides, groundwater elevations immediately adjacent to the embayment are higher than those further upstream along the conveyance (see Figures 4-16b and 4-18b). Flow along the pipe bedding would have to flow upgradient to reach the embayment.

6.0 NATURE AND EXTENT OF COPC CONSTITUENTS

Section 6 discusses the nature and extent of the site proposed COPCs that were discussed in Section 5. The lateral and vertical distribution of soil constituents that exceeded SC-COPCs and soil/sediment constituents that may be causing exceedance of GW-COPCs by leaching were further evaluated and are discussed below. A summary of proposed COPCs by site media is presented below in Table 6.1.

6.1 EMBAYMENT SEDIMENT

Site media exhibiting the greatest number of COPCs was embayment sediment as summarized in Table 6.1. The surface and subsurface distribution of four constituents (PCBs, lead, mercury and DRO/RRO) whose concentrations significantly exceeded SLs are shown on Figures 5-5 to 5-6.

Distribution in Sediment. The highest concentrations of SED-COPCs were encountered within the upper reaches of the embayment on the south shore beneath the former head of a wharf that existed up until at least 1960 (Figures 2-1 and 2-2). It appears that most of the SED-COPCs releases to the embayment were in the vicinity of the former wharf. Additional releases to the embayment likely occurred by seepage of mobile LNAPL from the area surrounding well SA-MW1 and, to a much lesser extent, from groundwater migration into the embayment.

Transport by Erosion. Transport of sediment from the intertidal embayment could occur from bank and sediment erosion to the LDW, as the embayment is tidally influenced. The potential for such transport is enhanced by the presence of the 2nd Ave. and Seattle reservoir outfall discharges during periods of lower tides when the embayment bottom is exposed.

As noted in Section 4, groundwater flow reversals and mixing are tidally controlled and enhanced during especially high tides. Tidal estuarine water flows in near shore areas could "*smear*" contaminants across sediments and adjacent soils. During these periods, it is possible that sediment constituents could flow into and partition to soils in the groundwater zones along the immediate shoreline. For example, well HC-B1 is screened immediately adjacent to and below the embayment bottom. High/low tide measurements indicate that water levels in this well fluctuate approximately 5 feet over a tidal cycle and during higher tides groundwater gradients are inward to the ICS/NWC property.

6.2 UPLAND SOILS AND GROUNDWATER – ICS/NWC PROPERTY

6.2.1 TOTAL PCBS.

Distribution in Soil. PCBs are identified as proposed groundwater and soil COPCs. The range of PCB concentrations in soil is presented on the histograms as Figure 6-1. The highest concentrations were generally found in samples collected above a depth of ten feet. Average concentrations declined with depth from 7,647 ug/kg (0'-5') to 548 ug/kg (15'-20') as summarized on the histograms. As noted earlier in this report, the PCBs appear associated with dielectric fluids.

Table 6.1 – Summary of COPCs by Media

Constituent	SED-COPC	GW-COPC		Soil - COPC	
		ICS/NWC	Douglas	ICS/NWC	Douglas
Arsenic	X			SC	
Copper		X(dissolved)			
Total Chromium	X	X(dissolved)		SC	
Lead	X			SC	
Mercury	X	X(a)			
Zinc	X			SC	
Mobile LNAPL		X		SC, L	
DRO/RRO	X	X(a)	X	SC, L	L
Benzene		X	X	L	L
GRO, ethylbenzene		X		L	
Toluene		X		L	
Chlorinated Organic Solvents		X		L	
Naphthalene		X	X	L	L
2-Methylnaphthalene	X	X		L	
cPAHs, B(a)PEq. (TEQ)	X		X	SC	L
1,2- & 1,4-Dichlorobenzene	X				
1,3- & 1,4-Dichlorobenzene		X		L	
Benzyl alcohol	X				
2,4-Dimethylphenol	X				
1,2,4-Trichlorobenzene	X				
Anthracene, Acenaphthene Fluorene	X				
N-Nitrosodiphenylamine	X				
Pentachlorophenol	X	X		SC, L	
Bis(2-ethylhexyl)phthalate		X		L	
Butylbenzylphthalate	X				
4,4-DDE, -DDD & trans-, cis-chlordane		X		SC (4,4'-xxx)	
Dieldrin		X		SC, L	
Total PCBs	X	X	X	SC, L	L
PCCD/PCDFs	X				

X – COPC; SC– COPC by soil contact (ICS property); L – COPC by soil leaching; (a) – proposed as a GW-COPC for future monitoring purposes.

Soil PCBs exhibit chromatographic profiles resembling Aroclors, which are commercial mixtures used in dielectric and other applications. Figures 6-2a to 6-2d show the lateral extent of PCBs beneath the ICS/NWC property. With just a few exceptions, the higher concentrations of PCBs are located along the former drainage ditch alignment where the settling lagoon was located and along the embayment shoreline were waste materials in the drums to be reconditioned were handled. Total PCB concentrations along the eastern and northern portion of the plant ranged up to 119,000 ug/kg. Elsewhere on the property, PCBs were generally less than 100 ug/kg. The area where PCBs are higher than 100 ug/kg are highlighted on the figures.

The subsurface soil concentration patterns are illustrated on Figures 6-3a to 6-3g. Section trends are shown on Figure 6-2a and are the same sections used to illustrate the subsurface geologic conditions beneath the property. Sections A-A’, B-B’, D-D’ and F-F’ show concentrations across and along the filled-in drainage ditch. Concentrations near the bottom of the former lagoon, approximately six to eight feet below grade, ranged from 9,200 to 113,000 ug/kg (Figure 6-3f). At location P8, a near surface sample had a concentration of 119,000 ug/kg.

Sections C-C’, D-D’, E-E’ and G-G’ show concentrations along the embayment shoreline. The highest concentrations were found in the SA-MW1 area where PCB concentrations up to 90,000 ug/kg were detected. The higher concentrations extend to a depth of eight to ten feet in this area. At location MW-Ju, a concentration of 39,800 ug/kg was detected in shallower soil (Figure 6-3g). The higher PCB concentrations are associated with mobile LNAPL and relatively high DRO/RRO soil concentrations (see Figure 6-8a,b). Figure 6-4 shows a binary plot of TPH vs. PCBs in soil (TPH=DRO+RRO). While there is a significant amount of variability in the data (as would be expected given the original source materials and likely co-releases of other petroleum products/fluids not containing PCBs), the general trend is that as DRO/RRO concentrations increase, PCB concentrations increase indicating these compounds are generally associated with one another.

Distribution and Transport in Groundwater. PCBs are relatively insoluble in water and have high organic-carbon soil/water partition coefficients (i.e. they are highly hydrophobic and partition strongly to soil containing organic carbon). PCBs are persistent and do not significantly degrade in the environment.

Available groundwater analytical data indicate that PCBs and DRO/RRO are not migrating in groundwater above SLs from the filled-in drainage ditch (east property line) even though soil in the ditch contains high concentrations of both these constituents and they are in contact with groundwater. The nature and transport characteristics of PCBs were the subject of a technical memorandum prepared by DMD Inc. which is presented in Appendix N. The major findings of this review were as follows:

- PCB’s in site soils and estuarine sediments are associated with non-aqueous phase petroleum hydrocarbon oils (NAPLs) and appear to be a result of the release of hydrocarbon-containing dielectric fluids.

- PCB’s in groundwater are generally detected in the immediate vicinity of PCB-contaminated soils.

- PCB-contaminated soils and sediments are sources to ground and surface water contamination.

- PCBs are not migrating in groundwater to a significant extent. Groundwater samples from wells installed in soil containing PCBs have detectable concentrations as shown on Figures 5-8a to 5-8c. However, with migration, PCBs appear to be attenuating to an extent that PCBs have not been detected (RL = 0.01 ug/l) in samples from wells downgradient (east) of the former lagoon.

- PCB-contaminated groundwater migration is either relatively slow and/or site conditions provide relatively high attenuation for the migration of PCB's in groundwater.

- PCB's [apparent] attenuation in site groundwater is affected by several mechanisms, specifically –
  - low or restricted groundwater flow from source areas,
  - groundwater advection/dispersion in downgradient mixing zones, and
  - soil adsorption/sequestration from the dissolved phase (partitioning to organic carbon in soil).

- PCB's in site media reflect the composition of commercial (Aroclor) mixtures. *In situ* degradation/reduction of PCB's in source media is not apparent.

- The site exhibits characteristics that have minimized the wide-spread contamination of environmental media with PCB's from groundwater flow.

- PCB migration to the embayment appears to be primarily related to the presence of mobile LNAPL and the presence of high concentrations of DRO/RRO. PCBs are dissolved in LNAPL and any LNAPL that leaks into the embayment will contain PCBs. Furthermore, as DRO/RRO dissolves in groundwater, PCBs will also dissolve (co-solvency) and migrate with groundwater.

Declining PCB Concentrations in a Number of Wells. Review of the PCB groundwater data indicate that drilling disturbance has affected the analytical results in a number of lower zone monitoring well samples. As shown on Figure 5-8c, PCBs were detected in the initial samples from wells MW-HL and MW-IL. These wells were installed on October 7, 2015 and the initial samples were collected on November 18 and 20, 2015. The initial samples detected PCBs at 0.02 and 0.006 ug/l, respectively. PCBs were not detected in two later samples collected from both wells near the end of March and September 2016 at an RL of 0.01 ug/l.

More significant concentration declines were observed in samples from the lower zone Douglas wells DMC-MW-A to DMC-MW-C. These wells were installed on February 12 and 13, 2015 and were sampled on November 24, 2015 and March 30/September 29, 2016. Figure 6-5 shows the concentration declines. The most significant decline occurred in samples from DMC-MWA where concentrations decreased from 0.61 ug/l to 0.071, a decline of approximately 88%. The declines in samples from DMC-MWB and DMC-MWC were approximately 60 to 70%, and PCBS were not detected in the last sample from DMC-MWC and were just above the reporting limit in the last sample from DMC-MWB. Field turbidity data indicate that entrainment of particles in the samples also declined in the later samples. Samples from DMC-MWA, for example, declined in turbidity from 133 NTUs in November 2015 to 18.7 NTUs in September 2016, a decline of 86%. Turbidity also declined in wells DMC-MWB and DMC-MWC. This issue is further discussed for the Douglas property samples in Section 6.3 later is this report.

Aroclor and Congener PCB Analysis of Groundwater Samples. In 2017 (Ecology 2017a), the consulting firm Leidos completed sampling and analysis for PCBs within the Green-Duwamish River Watershed under contract to Ecology. One of the purposes of the work was to compare the PCB Aroclor (EPA Method 8082) and Congener (EPA Method 1668) analytical methods, especially with regard to reporting limits. Three samples were obtained from the ICS/NWC property including from DOF-MW3, DOF-MW1 and SA-MW2 on March 29, 2017. Ecology completed both Aroclor and congener analysis of the samples. DOF collected split groundwater samples for PCB congener analysis and AXYS Analytical Services of Vancouver, BC completed the congener analyses. DOF did not complete Aroclor analysis of the samples because Ecology had contracted ARI to complete the analyses; ARI is also the ICS/NWC project laboratory. The results of the DOF split sample congener analysis are included in Appendix O and were validated by DMD, Inc. The PCB Aroclor and congener analytical results are summarized on Figure 6-6.

The Ecology and split sample congener analyses arrived at similar concentrations of 0.07 to 0.2 ug/l in samples from DOF-MW1 and SA-MW2, respectively. The Aroclor analysis results were similar to the congener results but were somewhat higher (0.09 to 0.27 ug/l). The comparative analyses of Aroclor and congener PCBs in groundwater at the ICS/NWC site indicate the PCB profiles resemble common commercial mixtures, namely Aroclors. This is also supported by a review and assessment of soil and chromatographic profiles generated in support of the project RI characterization using EPA Method 8082. Overall, the data indicate that the Aroclor method provides sufficiently representative groundwater PCB data to complete the FS.

DOF-MW3 is located beneath the aquitard within the upgradient portion of the site. Aroclor PCBs were not detected in the sample at an RL of 0.014 ug/l. Congener PCBs were detected at concentrations from 0.0002 ug/l (Ecology sample) to 0.0004 ug/l (DOF split sample). These levels are not significantly different from the range reported for laboratory method blanks (0.0001 to 0.0002 ug/l), and thus represent levels of environmental and laboratory background.

6.2.2 MOBILE LNAPL AND DRO/RRO.

Distribution in Soil. **MOBILE LNAPL** is identified as a groundwater and soil COPC. Constituents contained in the LNAPL appear to be leaching to groundwater. Mobile LNAPL has been encountered only in well SA-MW1 and appears to be present in the area local to this well. Chromatographic profile analyses indicate the LNAPL resembles mineral oil typically used in dielectric applications such as transformers, switches and capacitors. The fluid is reported to contain high concentrations of DRO and RRO petroleum hydrocarbons and PCBs. Groundwater exceedances of toluene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene only occurred in samples from well SA-MW1 where LNAPL is present. Other refined petroleum products such as gasoline appear to have mixed with the dielectric fluid. The LNAPL was encountered adjacent to the wharf that formerly extended into the LDW and where most of the materials delivered to the ICS/NWC property appear to have historically been handled.

Petroleum hydrocarbons consisting of DRO and RRO are proposed as groundwater and soil COPCs. Figure 6-7 is a histogram that illustrates the range of DRO/RRO concentrations and number of detections in site soils with increasing depth. Most of the higher concentration samples were located in the upper ten feet of soil where average concentrations ranged from 5,384 mg/kg (0'-5') to 3,012 mg/kg (5'-10'). Below ten feet the average concentration declines to less than 550 mg/kg.

Figures 6-8a to 6-8d show the lateral extent of DRO/RRO in the upper twenty feet of soil in five-foot intervals beneath the site. The highest soil concentrations, up to 65,000 mg/kg, were found in the SA-MW1 area where mobile LNAPL is present. Higher concentrations were detected above the aquitard to a depth of approximately ten feet. Much lower concentrations were found elsewhere and in deeper soil beneath the ICS/NWC property as illustrated on Sections F'-F" and G-G' (Figures 6-9a and 6-9b).

Distribution and Transport in Groundwater. Mobile LNAPL has the potential to leak from the SA-MW1 area into the embayment. While relatively high soil concentrations have been detected at other locations (e.g. 46,000 mg/kg at location MW-Ju), no mobile LNAPL has been encountered elsewhere on the ICS/NWC property. DRO and RRO have relatively low solubility in water, however some transport can occur in groundwater. Figures 5-10a to 5-10c show the concentration patterns in groundwater. DRO/RRO has only been consistently detected above SLs in groundwater samples from SA-MW1 where mobile LNAPL is present.

6.2.3 BENZENE

Distribution in Soil. Benzene is a proposed groundwater and soil COPC. The range of benzene concentrations in soil is presented in the histograms as Figure 6-10. Benzene was either not detected or was detected at a concentration less than 10 ug/kg. The highest concentration was encountered at LP-4 in the former settling basin area with a concentration of 1,600 ug/kg (6'-8'). In the SA-MW1 area benzene may be derived from refined petroleum fuels such as gasoline mixed with mobile LNAPL. Elsewhere the source of benzene appears to be paint thinners and other solvents used on the property as this compound does not have a strong association with gasoline range hydrocarbons (see attached Table A5.11).

Figures 6-11a to 6-11d show the lateral extent of benzene in soil beneath the ICS/NWC property. Elevated concentrations are present in soil at depths between 5 and 15 feet below ground surface, generally east of the drum reconditioning plant (VOC release area). Samples in this area ranged from 11 to 29 ug/kg. Higher concentrations (50 to 1,600 ug/kg) are associated with samples collected from the former lagoon area. Concentrations of 15 to 21 ug/kg were found in several samples along the embayment shoreline. Benzene Section B-B' (Figure 6-12) illustrates the subsurface extent of benzene in the area between the plant and former lagoon. The trend of the section is shown on Figure 6-11a. The higher benzene soil concentrations appear to be associated with the higher benzene concentrations detected in groundwater samples (Figure 5-

11a to 5-11b). The highest groundwater benzene concentrations (60-70 ug/l) were found in samples from DOF-MW8 located on the east side of the reconditioning plant.

Distribution and Transport in Groundwater. Benzene is moderately soluble in water and has a low organic carbon soil/water partition coefficient (i.e. does not strongly partition to soil). While it will dissolve in and migrate with groundwater, benzene, for the most part, also naturally declines with such migration. As shown on Figure 5-11b, the benzene concentrations found in upper zone samples from well DOF-MW8 appear to be declining as groundwater migrates in an easterly direction. Benzene has not been detected in any of the downgradient well samples located east of the site. The declines are likely caused by advection/dispersion and degradation.

6.2.4 CHLORINATED ORGANIC SOLVENT CONSTITUENTS.

Distribution in Soil. Vinyl chloride (VC) is proposed as a groundwater COPC. PCE and TCE are proposed as soil-COPCs as these compounds appear to be the sources of VC by reductive dechlorination. The range of PCE+TCE concentrations in soil is presented in histograms as Figure 6-13. Most of the samples were either not detected or were less than 30 ug/kg. A concentration of 900 ug/kg was reported for shallow soil in the 1986 composite Area 6 (in vicinity of SA-MW1). The highest concentration was encountered at LP-3 in the former lagoon area with a concentration of 2,000 ug/kg (6’-8’) and appears associated with elevated PCB concentrations in the former lagoon. Four other samples ranged from 120 to 420 ug/kg. Most of the detections occurred in the northern portion of the VOC release area shown on Figures 5-15a to 5-15c and in the areas where relatively high soil concentrations of PCBs are present (Figures 6-2a to 6-2c).

PCE and TCE in their pure form are dense non-aqueous phase liquids (DNAPLs) because they are of higher density and do not readily mix with water. They have been historically used as dry cleaning and degreasing solvents and are often associated with waste oils. There is no evidence to indicate that these materials were released as separate phase liquids based on soil and groundwater concentration data. PCE (150,000 ug/l) and TCE (1,100,000 ug/l) are moderately soluble in groundwater (Howard 1990[15]). Pankow and Cherry (1996) indicate that if dissolved concentrations exceed 1% of the effective solubility, then serious consideration should be given to the presence in the subsurface of these materials in the DNAPL phase. None of the detected PCE or TCE concentrations are close to the indicated solubilities. The sources of these compounds were likely low concentration residues mixed with other materials such as oils.

Transport in Groundwater. VC is relatively soluble in groundwater, however its concentration beneath the site will depend on the rate of degradation of its parent compounds. It has a very low organic carbon partition coefficient and will migrate in groundwater. VC degrades to carbon dioxide/water or to ethene and ethane depending on conditions (EPA 1998). Degradation is not promoted when conditions are conducive for reductive dechlorination. Degradation would likely be promoted within the more aerobic subsurface zone where groundwater mixes with estuarine water along the shoreline.

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[15] Values are the maximum solubility of these compounds in water. In most cases, the effective solubility would be lower.

VC appears to be migrating mostly within the upper groundwater zone (Figure 5-15b) from the VOC release area. It has not been detected to the east of the ICS/NWC property at a reporting limit of 0.2 ug/l. VC is also associated with mobile LNAPL in the SA-MW1 area along the embayment.

6.2.5 SOIL CONTACT COPCS

As discussed above, PCBs and DRO/RRO are proposed as soil contact COPCs. In addition to these constituents, lead, arsenic, total chromium, zinc, BaPEq, PCP, dieldrin, and the sum of 4,4'-DDD, -DDE and –DDT exceed soil contact SLs in one or more samples.

6.2.5.1 Lead

Distribution in Soil. Lead is a proposed soil contact COPC. Figure 6-15 presents histograms that show the concentration range of lead in soil. The lateral extent of soil lead concentrations is shown on Figures 6-16a to 6-16c. Most concentrations are below the ecologic SL of 220 mg/kg. All samples above 220 mg/kg were collected from along the former drainage ditch alignment or in the SA-MW1 area. Six samples ranged in concentration from 388 to 836 mg/kg while three samples were above the industrial land use SC-SL of 1,000 mg/kg. The higher concentrations are associated with the SA-MW1 (3,570 to 4,590 mg/kg) and former lagoon (3,600 mg/kg) areas. These concentrations are associated with elevated DRO/RRO and PCB concentrations.

6.2.5.2 Other Soil Contact COPCs

Distribution in Soil. In addition to PCBs, DRO/RRO and lead discussed above, soil concentrations of arsenic, total chromium, zinc, BaPEq, PCP, dieldrin, and the sum of 4,4'-DDD, -DDE and –DDT exceed soil contact SLs in one or more samples. Figure 6-17a highlights the locations and depth intervals where the exceedances occur, along with the detected concentrations. The exceedances occur within the area where elevated PCB concentrations occur, that is along the embayment shoreline and filled drainage ditch.

6.2.6 LEACHING COPCS

Distribution in Soil. GRO, toluene, ethylbenzene, naphthalene, 2-methylnaphthalene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene are proposed as soil COPCs because of their detection in groundwater samples. This suite of constituents appears associated with LNAPL and DRO/RRO in soil generally within and somewhat upgradient of the SA-MW1 area. PCP, BEHP and dieldrin were detected in site soils as described below.

- **Pentachlorophenol** (PCP) was intermittently detected and exceeded its SL (0.025 ug/l) in groundwater samples from seventeen push-probe and well locations (Figures 5-17a,c). It was detected in soil samples from thirteen locations as illustrated on Figure 6-17b at concentrations between 0.05 and 160 mg/kg. The highest concentrations were detected in soil samples from DOF-MW-7 (160 mg/kg at 3'-4') and LP-3 (5.3 mg/kg at 6'-8'). To the extent that PCP is leaching from soil, it appears to be generally occurring within what appears to be the VOC release area and where PCBs were detected at concentrations greater than 100 ug/kg.

- **bis(2-Ethylhexyl)phthalate** (BEHP) was intermittently detected in groundwater samples and exceeded its SL (0.2 ug/l based on the PQL) in groundwater samples from ten locations (Figures 5-18a,c). BEHP is a common laboratory contaminant and most of the detections were near the reporting limit of 0.2 ug/l. The highest concentration was detected in a sample from push-probe P14 (10 ug/l). The highest well sample concentrations were detected in samples from wells MW-Ju (5.1 ug/l) and SA-MW3 (3.1 ug/l). As illustrated on Figure 6-17b, the highest BEHP concentrations were detected in soil samples from LP3 (55 mg/kg at 6'-8'), MW-Ju (44 mg/kg at 3'-4') and P29 (7.6 mg/kg at 3'-4'). BEHP is generally co-located in soil with PCP.

- **Dieldrin** was detected in two push-probe groundwater samples from two locations (P16 and P27B). Dieldrin was also detected in only three (of 144 soil samples). The samples were from P16 (0.25 mg/kg at 3'-4') and P27 (0.087 mg/kg at 1'-3'; 0.002 mg/kg at 9'-11'). It does not appear that dieldrin is migrating in groundwater as this compound was not detected in downgradient wells SA-MW3, MW-IL or MW-Ju, or in any other wells. It is highly likely the source of dieldrin was drilling carry down coupled with particles in the samples, as samples from both push-probes had high turbidity (372 to 575 NTUs).

6.3 UPLAND SOILS AND GROUNDWATER – DOUGLAS PROPERTY

As discussed earlier in this report, there is evidence that releases occurred to the former turning basin from the north shoreline of the ICS/NWC property before filling that created the Douglas property. Any releases from ICS/NWC property would have been buried by fill.

6.3.1 DOUGLAS SOIL POTENTIALLY IMPACTED BY SHORELINE RELEASES

Douglas soil observations and analytical data were evaluated to estimate the depth (elevation) interval potentially affected by releases from the ICS/NWC property. Field data documented on the geologic logs and analytical data were compiled for wells drilled deep enough (significantly below zero feet MLLW) to provide pertinent information. The well depths and elevations are summarized in attached Table A6.1. Thirteen wells were drilled and sampled to adequate depths for use in this analysis; their locations are shown on Figure 6-18.

Data for the deeper well sample locations are summarized in attached Table A6.2. As highlighted on the table, sheens, elevated organic vapor (PID) measurements, and relatively elevated concentrations of DRO, RRO, PCB, lead and mercury were found in samples collected between approximately (-)4 to (-)11 feet MLLW. These samples appear to likely have been near the bottom of the turning basin and the observations/analytical data are consistent with materials present along the north ICS/NWC shoreline and in embayment sediment. The vertical extent of the subsurface layer where these observations/data were collected is shown on Section C'-C" (Figure 6-19). The trend of the section is shown on Figure 6-18.

Figure 6-20 shows the lateral extent of PCB concentrations in the estimated turning basin bottom layer prior to filling. Concentrations ranged from 28 ug/kg to 47,800 ug/kg. The large variability in lateral concentrations is not surprising, as this layer was likely highly disturbed by prop scour during log-rafting operations and by filling. PCB concentrations within the layer along Section C-C" (Figure 6-19) ranged from 590 ug/kg to 47,800 ug/kg. Concentrations above and below the layer were significantly lower and ranged from <3.9 to 240 ug/kg.

6.3.2 IMPACTS ON GROUNDWATER CONSTITUENT CONCENTRATIONS

Deeper GW-COPCs were identified herein based on sampling and analysis of wells DMC-MWA, DMC-MWB and DMC-MWC located along the north embayment shoreline on the Douglas property discussed in Section 5. These GW-COPCs, along with those groundwater "*Indicator Hazardous Substances*" or IHSs identified in the draft Douglas RI (Geoengineers 2016), are summarized below in Table 6.2. GW-COPCs and IHSs are considered equivalent for this discussion.

Table 6.2 – Douglas Property COPCs/IHs

DOF GW-COPCs	Douglas IHs
DRO/RRO (sum)	GRO and DRO
Benzene	Benzene
Naphthalene	Naphthalene
cPAHs	Benzo(a)anthracene/Total cPAH TEQ
Total PCBs	Total PCBs
	4,4'-DDD and 4,4'-DDE

A similar range of constituents was identified to be of concern by both RI studies. It should be noted that the majority of data relied upon in the Douglas property RI was collected from wells whose screens were installed above the former turning basin bottom layer discussed above (see Figure 6-19). Most of the petroleum hydrocarbon exceedances (GRO, DRO, benzene, PAHs) were associated with the release of petroleum fuels within the central portion of the property (see Figure 34 of the draft Geoengineers RI) and are unrelated to any releases from the ICS/NWC property. DOF used data from deeper wells DMC-MWA to DMC-MWC to identify GW-COPCs. There are also differences in the criteria used to identify GW-COPCs which will affect where exceedances are interpreted to be present. For example, the benzene SL used by Geoengineers (58 ug/l) is different from that in the LDW screening level workbook (1.6 ug/l).

The pesticides 4,4'-DDD and 4,4'-DDE are identified as IHs for the Douglas property. A review of the Douglas data indicates that PCBs were also detected in the samples. As discussed in Section 5 above, the analytical method used to analyze the pesticides is unable to separate PCB interferences at the concentration levels reported in the project samples. It is likely that the pesticides are not present in groundwater beneath the Douglas property.

Total PCBs are identified to be of concern in groundwater beneath both properties. As discussed earlier, sample turbidity is likely biasing the PCB analytical results for both properties; the higher the turbidity the higher the PCB concentration. Most of the Douglas property wells are screened in soils where PCBs are known to be present. Even small levels of turbidity in a sample can have a dramatic effect on the reported concentration. This is illustrated on Figure 6-

21 for samples from wells located along the Douglas LDW and embayment shorelines where total PCB is plotted against turbidity. The data trends clearly show how turbidity affects PCB concentrations reported by the laboratory. Future monitoring on both properties needs to consider how turbidity affects groundwater PCB results and use sampling methods to minimize turbidity (and total suspended solids) of samples sent to the laboratory. Additional care, over and above what is normally exercised, will be necessary.

7.0 CONCEPTUAL MODEL

A conceptual model of the site conditions was developed based on the information described above. The major components of the model by topic are summarized below.

7.1 HYDROGEOLOGY

The project area lies within the Duwamish River valley. Uplands are present on the eastern and western sides of the valley. Regionally groundwater recharge occurs on the uplands with groundwater discharge to the valley and LDW.

The geology and groundwater zones have been characterized and consist of the following.

Table 7.1 – Geologic Units and Groundwater Zones

Upland Area		**Embayment**		**Douglas**	
Geologic Unit	GW Zone	Geologic Unit	GW Zone	Geologic Unit	GW Zone
Upper Sand	Water Table/Upper	Upper Sand	-----	Dredge Sand	Water Table/Upper
Fine Grained Unit	Aquitard	Fine Grained Unit	Aquitard	Fine Grained Unit	Aquitard
Lower Sand	Lower	Lower Sand	Lower	Lower Sand	Lower

In general, the geologic materials beneath the site consist of interbedded finer grained sands and silts. The embayment was created by placing dredge fill to the north of the ICS/NWC property; now the Douglas Property. A fine-grained aquitard (silt/clay) deposit underlies the western portion of the ICS/NWC property, the embayment and southern portion of the Douglas property. Where present, the aquitard restricts the vertical migration of groundwater.

Water levels in the groundwater zones are affected by tides, except within the water table zone that lies above the aquitard. During higher tides groundwater flows into both properties while during lower tides flow reverses towards the embayment and LDW.

Vertical hydraulic gradients are present, the direction of which changes with tidal levels. Generally upward gradients are present during high tides and downward gradients are present during low tides. The pattern of groundwater level fluctuations indicate that a hydraulic barrier is present along the central embayment shoreline.

An analysis of conventional ions (Cl, Na, SO4, Ca and Mg) for the ICS/NWC property indicates that mixing of fresh groundwater with saline estuarine water occurs beneath the site. Shallow groundwater is fresh and becomes more saline with increasing depth and proximity to surface water. Deeper groundwater (45 to 50 feet) has dissolved solids concentrations approaching or higher than 10,000 mg/l (Figure 4-27). Groundwater beneath the site is classified as non-potable using the MTCA criteria.

7.2 EXPOSURE PATHWAYS AND RECEPTORS

Potential receptors, exposure pathways and the status of the pathways (complete, not complete) are summarized below in Table 7.2.

Table 7.2 - Potential Receptors and Exposure Pathways

Receptor	Media	Pathway	Status
Humans	Upland Soil and Sediment	Ingestion and dermal contact – Visitors and on-site buried-utility workers	**Complete**
		Inhalation of soil/sediment particles	Not complete – main site is paved, and sediments are wet when exposed
		Ingestion and dermal contact - Embayment sediments (recreational exposure – during shellfish harvesting, beach play)	**Complete** – while potential exposure is remote, the ROD indicates the pathway should be considered complete.
	Groundwater	Ingestion of fish and shellfish (note Duwamish Waterway is not classified as a potable water supply)	**Complete** – Groundwater to surface water pathway
		Indoor air vapor inhalation	Not complete
Terrestrial Organisms	Upland Soil	Exposure to upland soils	**Complete** – Site lies within industrial area and is mostly paved or is covered with quarry spalls that prevent exposure. A small portion of property remains uncovered but will likely be covered in the future.
Aquatic Organisms	Surface water and sediment	Exposure to estuarine water and Embayment sediments	**Complete**
	Groundwater	Groundwater discharge to surface water	**Complete**
	Storm Water	Municipal discharge from 2nd Ave. outfall	**Complete**

7.3 CONSTITUENTS OF POTENTIAL CONCERN (COPCS)

COPCs were identified for each media and complete exposure pathway. A summary of COPCs by media is presented in Table 6.1 above.

- **Embayment Sediments** – Eighteen sediment constituents were identified as COPCs including metals, SVOCs, PCBs and PCDD/PCDFs. PCBs exceeded SLs most frequently and by the greatest amount in sediment samples.

- **Groundwater** – ICS/NWC GW-COPCs include fifteen constituents including metals (dissolved copper and total chromium), VOCs, SVOCs, several pesticides and PCBs. DRO/RRO and mercury are proposed GW-COPCs for future monitoring purposes. PCBs exceeded GW-SLs most frequently and by the greatest amount and are associated with leaching from oils contained in soil. Lower zone Douglas Property GW-COPCs include DRO/RRO, benzene, naphthalene, several cPAHs and PCBs

- **Upland Area Soil –** Proposed SC-COPCs on the ICS/NWC property include metals (arsenic, total chromium, lead, zinc), LNAPL, GRO, DRO/RRO, several cPAHs (based on BaPEq-TEQ concentrations), PCP, sum of 4,4'-DDD, - DDE, - DDT, dieldrin and PCBs. These SC-COPCs were proposed assuming an unpaved site and 1) unrestricted land use for human contact, and 2) industrial land use for ecologic receptors. Proposed soil leaching COPCs on the ICS/NWC property include LNAPL, DRO/RRO, GRO, benzene, ethylbenzene, toluene, chlorinated solvents (PCE and TCE), naphthalene, 2-methylnaphthalene, 1,3- and 1-4-dichlorobenzene, PCP, BEHP, dieldrin and PCBs. Proposed soil leaching COPCs from deeper Douglas property soil include DRO/RRO, benzene, naphthalene, several cPAHs and PCBs.

- **Storm Water –** The results of analyses of storm water solids (collected from an upstream manhole and water samples (upstream and downstream) were compared to SLs based on Ecology guidance for source control evaluations for upland sites adjacent to the LDW (Ecology 2015).

    - Thirteen solids constituents exceeded SLs as summarized in Table 5.16 above. 1,4-dichlorobenzene, 1,2-dichlorobenzene and 1,2,4-trichlorobenzene exceeded SLs by the greatest margins. PCBs were not identified to be of concern based on the Ecology guidance, however the detected concentration of 105 ug/kg-dw is well above the cleanup level (2 ug/kg) set in the LDW-ROD. The exceedances are not related to the ICS/NWC site. The discharge of storm water sediments to the embayment are a concern from a recontamination perspective after a sediment remedy is implemented.

    - Five storm water (liquid) constituents exceeded SLs including DRO/RRO, dissolved copper, chrysene and total PCBs (see Table 5.18 above). Available data indicate that the quality of storm water discharges to the embayment are not being affected by groundwater infiltration from the ICS/NWC property into the storm water conveyance system.

Remedial Driver. Available data indicate that PCBs will be the primary focus of the FS and will likely drive the remedy. This is based on the following observations and findings:

- PCBs were the most consistently detected constituents above SLs in embayment surface sediment (100%-dw concentrations), subsurface sediment (61%-dw concentrations), and groundwater (52%). These percentages were higher than the exceedance percentages of other proposed COPCs for these media.

- While DRO/RRO SL exceedances in soil were greater than PCB soil contact exceedances, PCB soil contact and groundwater exceedances were more widespread than DRO/RRO exceedances as illustrated on Figures 5-8a,b,c (PCBs) and 5-10a,b,c (DRO/RRO) for groundwater and Figures 6-2a,b,c,d (PCBs) and Figures 6-8a,b,c,d (DRO/RRO) for soil.

- In general, PCBs exceeded SLs in most samples where other COPCs exceeded SLs. This is graphically shown by shading on the pertinent media tables.

7.4 AREAS OF CONCERN AND CONSTITUENT MIGRATION

- **Upland Area**. The primary Upland Area locations of concern are where waste materials were handled, i.e. primarily the filled-in drainage ditch along the east property line and the central shoreline adjacent to the embayment (Figure 7-1).

- **Embayment**. Sediment in the embayment exceeds SLs to depths of five to six feet below the existing mudline.

- **Douglas Property**. Groundwater from the lower zone flowing into the head of the embayment exceeds SLs for a number of constituents.

Groundwater analytical data indicate that constituent migration is not occurring from the main site in an eastward direction towards the LDW. Migration appears to be occurring to the embayment along portions of the southern and northern shorelines.

Two outfalls discharge to the embayment. The embayment is intertidal and flows from these outfalls during lower tides have the potential to erode and transport sediment in an easterly direction to the LDW.

8.0 DATA GAPS

- PCB concentrations in lower zone wells, especially DMC-MWA, need to be confirmed as they substantially declined over the three available monitoring rounds. Sampling was completed in February 2019 to further assess this issue, the results of which will be incorporated into the conceptual model to complete the FS.

- Groundwater data and a fate and transport evaluation of the migration of PCBs (Appendix N) indicate little migration is occurring in groundwater based on the Aroclor analyses and the physical/chemical properties of PCBs. A comparison of the results of Aroclor and congener analyses (see Section 6.2.3) of split samples indicate that the Aroclor method provides similar data (at much lower cost) when PCBs are present above the Aroclor PQL (0.01 ug/l or 10 parts per trillion). However, the congener analysis method has a lower PQL (0.0001 to 0.0002 ug/l). Available site-specific data indicates that environmental and laboratory background may be on the order of 0.0003 to 0.0004 ug/l. Sampling and analysis using the congener method of downgradient wells where PCBs have not been detected is a data gap. Sampling was completed in February 2019 to further assess this issue, the results of which will be incorporated into the conceptual model to complete the FS.

- The DRO/RRO soil contact SL is based on a non-health standard. For soils with DRO/RRO concentrations above the SL that also contain other COPCs above SLs this is not a significant issue. However, for some location's analysis using the Ecology EPH method would provide data to set a site-specific SC-DRO/RRO SL.

- High metals concentrations are present in upland soils that exceed SLs. TCLP testing of selected samples is necessary to determine how such soil should be handled/disposed if removed from the site. Such data, while not absolutely necessary to complete the FS, would assist in making the cost estimates more reliable.

- Testing of lower zone groundwater along the northern periphery of the Douglas property, and confirmation of same elsewhere along the periphery, will likely be necessary to assess/confirm possible migration to the embayment and LDW via groundwater.

- As part of planning for a proposed embayment interim action additional investigation have been completed or are underway which will provide additional information that will facilitate completion of the FS. These include the following:

    - An **ALTA survey** of the ICS/NWC area along the embayment shoreline and filled in ditch was completed, as well as a topographic survey of the embayment using Lidar. This latter survey provided topographic mapping of the embayment, including beneath vegetation that is consistent with information for the upland.

    - **Geotechnical analyses** of the embayment bank to assess bank stability to implement the selected embayment remedy.

- **Groundwater modelling** to assess changes to the groundwater flow regime with installation of a barrier wall along portions of the embayment shoreline. Installation of such a wall appears necessary for bank stability during contaminated sediment removal. This analysis is being coordinated with the geotechnical analyses.

- **Vegetation Survey and Biological Assessment** of the embayment to facilitate design and permitting of the embayment remedy.

- **Cultural Resource Evaluation** completed to facilitate permitting.

9.0 REMEDIAL ACTION OBJECTIVES

Based on the accumulated RI data and information, the FS will be completed to address the following Remedial Action Objectives (RAOs):

Table 9.1 - Remedial Action Objectives

Sediment • Reduce risk to humans and animals (e.g. sea otters) via ingestion of fish and shellfish • Prevent human recreational contact with sediment above cleanup levels • Reduce risk to aquatic organisms via contact with sediment	**Point of Compliance (per ROD)** • 0 to 10 cm outside of clamming and beach areas • 0 to 45 cm in clamming and beach areas
Soil • Reduce risk to site buried-utility workers via soil contact	**Point of Compliance (per MTCA)** • 0 to 15 feet below ground surface
Surface Water/Sediment (via groundwater discharge to Embayment) • Reduce risk to aquatic life (water column and sediment) • Reduce risk to humans via ingestion of fish and shellfish	**Point of Compliance (per MTCA and ROD)** • Closest point of groundwater discharge to surface water (shoreline) and sediment (0 to 45 cm)

10.0 CLOSING AND SIGNATURE

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

Signature and Stamp

11.0 REFERENCES

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TABLE A2.1 - Summary of Site Activities and Changes in Site Practices

ICS/NW Cooperage Site
Seattle, Washington

Activity	On-Site Location	Possible Releases	Types of Releases	Change in Site Practices
Handling and Storage of Drums	Primarily along embayment shoreline including at the head of a wharf into the LDW and within the southern and eastern portions of the ICS-NWC property.	1) Spillage of drum content residues directly to sediment from the former wharf; 2) Spillage of drum residues to soil in drum storage areas.	Materials contained in drums included oils, food products, agricultural residues and solvents. Residues in the drums likely contained volatile and semivolatile organic compounds, metals, pesticides, and PCB containing wastes based on site testing.	1) Drum shipments to the site by barge were discontinued sometime after World War II and drums arrived by truck; 2) Past practices included accepting drums containing liquid residues. This practice has been discontined and drums containing residues are retured to the sender; 3) The site was paved with concrete in the late 1980s, including the outside drum storage areas preventing releases to soil. 4) The Closed Top Drum Line that produced most of the process wastewater was discontinued in January 2015 and was subsequently dismantled. This activity substantially reduced the volume of process water produced at the site; 5) Any oils recovered at the site are now recycled off-site.
Cleaning of Closed Top Drums	Inside Wash Plant	Spillage to concrete floor with infiltration through joints and cracks into ground.		
Cleaning of Open Top Drums	Upstairs Reconditioning Plant	Release of particulate matter from the drum furnace to unpaved areas.		
Treatment of Process Waste Materials	1) Prior to 1968, treatment occurred in a lagoon along the eastern property line (former ditch); 2) After 1968 process wastewater was pre-treated along a portion of the embayment shoreline.	1) Direct discharge into a settling lagoon with overflow water being discharged to the LDW; 2) Spillage of process wastes/treated wastewater along the embayment shoreline.		1) In 1968 process wastewater and stormwater began to be pre-treated and discharged to the Metro sanitary sewer and the former settling lagoon was filled. 2) In 1973 a berm was constructed to prevent stormwater discharge to the embayment. The berm would have also prevented the migration of spillage to the embayment from the pre-treatment system; 3) In the late 1980s, the property was paved and any site spillage would have been collected and treated along with stormwater.
Manufacture of New Drums	New Drum Plant	Spillage to concrete floor with infiltration through joints and cracks into ground.	Alkaline and acidic wastewater	
Painting of New/Reconditioned Drums	Upstairs Reconditioning Plant	Spillage to concrete floor with infiltration through joints and cracks into ground.	Paints and solvents containing volatile organic compounds	Improved storage and handling of painting materials
Stormwater Discharges	Most of property. Infiltration into site soils or discharge to the embayment and drainage ditch.	Spillage and particulate fall-out to ground that was subsequently entrained in storm water.	Residues contained in drums or particulate from drum furnace	1) The ditch was filled in the mid- to late-1960s and after 1968 stormwater was allowed to infiltrate into site soils or was collected, treated and discharged to the Metro sewer; 2) A berm was constructed in 1973 to prevent stormwater discharges to the embayment; 3) The site was paved in the late 1980s and stormwater was collected/treated and discharged to the sanitary sewer. There are no stormwater connections to the 2nd Ave. Outfall storm sewer.

TABLE A2.2 - Results of Baghouse Dust and Furnace Ash Analyses - August 2012

Constituents	Units	ICS-ASH	ICS-DUST
		ash	dust
		8/13/12	8/13/12
		furnace	*baghouse*
		VF62	VF62
% solids	%	71	100
Antimony	mg/kg	**33.7**	**0.5**
Arsenic	mg/kg	**4.7**	**8.3**
Beryllium	mg/kg	0.2 U	0.2 U
Cadmium	mg/kg	**3.9**	**0.3**
Chromium	mg/kg	**2110**	**1150**
Copper	mg/kg	**1830**	**653**
Lead	mg/kg	**226**	**1200**
Mercury	mg/kg	**0.05**	0.02 U
Nickel	mg/kg	**171**	**107**
Silver	mg/kg	**13.7** J_R	**1.6**
Zinc	mg/kg	**3680**	**2380**
Phenol	µg/kg	**45,000**	**350**
2-Chlorophenol	µg/kg	190 U	18 U
1,3-Dichlorobenzene	µg/kg	48 U	4.5 U
1,4-Dichlorobenzene	µg/kg	48 U	**6.3**
Benzyl alcohol	µg/kg	**3300**	**60**
1,2-Dichlorbenzene	µg/kg	48 U	**7.0**
2-Methylphenol	µg/kg	**1900**	**33**
4-Methylphenol	µg/kg	**1000**	**47**
N-Nitrosodi-n-propylamine	µg/kg	190 U	18 U
Hexachloroethane	µg/kg	190 U	18 U
Nitrobenzene	µg/kg	190 U	18 U
Isophorone	µg/kg	**220,000**	**210**
2,4-Dimethylphenol	µg/kg	**790**	18 U
Benzoic acid	µg/kg	3900 U	**730**
2,4-Dichlorophenol	µg/kg	1900 U	180 U
1,2,4-Trichlorobenzene	µg/kg	48 U	4.5 U
Naphthalene	µg/kg	**91,000**	**160**
4-Chloro-3-methylphenol	µg/kg	970 U	90 U
2-Methylnaphthalene	µg/kg	**22,000**	**39**
2,4,6-Trichlorophenol	µg/kg	970 U	90 U
2,4,5-Trichlorophenol	µg/kg	970 U	90 U
2-Chloronaphthalene	µg/kg	190 U	18 U
Dimethylphthalate	µg/kg	**81,000**	18 U
Acenaphthylene	µg/kg	190 U	18 U
Acenaphthene	µg/kg	**360**	18 U
Dibenzofuran	µg/kg	190 U	18 U
2,6-Dinitrotoluene	µg/kg	970 U	90 U

TABLE A2.2 - Results of Baghouse Dust and Furnace Ash Analyses - August 2012

Constituents	Units	ICS-ASH	ICS-DUST
		ash	dust
		8/13/12	8/13/12
		furnace	*baghouse*
		VF62	VF62
2,4-Dinitrotoluene	µg/kg	970 U	90 U
Diethylphthalate	µg/kg	480 U	45 U
4-Chlorophenyl-phenylether	µg/kg	190 U	18 U
Fluorene	µg/kg	**640**	18 U
N-Nitrosodiphenylamine	µg/kg	**2800**	18 U
Pentachlorophenol	µg/kg	480 U	45 U
Phenanthrene	µg/kg	**760**	18 U
Carbazole	µg/kg	190 U	18 U
Anthracene	µg/kg	190 U	18 U
Di-n-butylphthalate	µg/kg	**9300**	**640**
Fluoranthene	µg/kg	**340**	18 U
Pyrene	µg/kg	**350**	18 U
Butylbenzylphthalate	µg/kg	**5600**	**120**
Benzo(a)anthracene	µg/kg	190 U	18 U
bis (2-Ethylhexyl)phthalate	µg/kg	**26,000**	**2000**
Chry-sene	µg/kg	**350**	18 U
Di-n-octylphthalate	µg/kg	190 U	**49**
total Benzofluoranthenes	µg/kg	390 U	36 U
Benzo(a)-pyrene	µg/kg	190 U	18 U
Indeno(1,2,3-cd)pyrene	µg/kg	190 U	18 U
Dibenz(a,h)anthracene	µg/kg	190 U	18 U
Benzo(g,h,i)perylene	µg/kg	190 U	18 U
LPAH	µg/kg	92,760	160
HPAH	µg/kg	1040	36 U
Hexachlorobenzene	µg/kg	190 U	**18**
Hexachlorobutadiene	µg/kg	190 U	18 U

Notes:

J_R = estimate; due to low matrix spike recovery. Value likely biased low.

U = nondetected at the associated lower reporting limit.

J_Q = estimate; due to noncompliant CCV check.

J = estimate associated with value less than the verifiable lower quantitation limit.

TABLE A3.1 - Index to Appendix Data Summaries

Investigator	Year	Area	Surface Soil	Subsurface Soil	Surface Sediment	Subsurface Sediment	Ground-water	Seep	Storm Water Sediment	Storm water
Hart-Crowser	1986-87	ICS-Upland	Tbl. H-1	Tbl. H-1	-----	-----	Tbl. G1	-----	-----	-----
Parametrix/SAIC	1991	ICS-Upland	Tbl. H-2	-----	Tbl. F-1	-----	-----	-----	Tbl. I-1	-----
Hart-Crowser	1991	ICS-Upland	-----	-----	-----	-----	Tbl. G1	-----	-----	-----
Windward (SI/RI)	1998-2006	Embayment	-----	-----	Tbl. F-1	Tbl. F-5	-----	-----	-----	-----
SAIC	2007	ICS-Upland/Em-bayment	-----	Tbl. H-3	Tbl. F-1	-----	Tbl. G2	Tbl. G2	Tbl. I-1	Tbl. I-2
DOF	2008	ICS-Upland	-----	Tbl. H-3	-----	-----	-----	-----	-----	-----
DOF (initial RI phase)	2012	ICS-Upland/Em-bayment	-----	Tbl. H-4(a)	Tbl. F-2	Tbl. F-4	Tbl. G2	Tbl. G2	Tbl. I-3	Tbl. I-3
DOF (RI Phase 2a)	2014	ICS-Upland/Em-bayment/ Douglas	-----	Tbl. H-4	Tbl. F-2(b)	-----	Tbl. G2	-----	-----	Tbl. I-3
DOF (RI Phase 2b)	2015/16	Upland/ Douglas/Off-Site	-----	Tbl. H-4	-----	-----	Tbls. G2/G3 & G4	-----	-----	Tbl. I-3
Geoengineers RI	1990/2015	Embayment/ Douglas	Tbl. H-6	Tbl. H-6	-----	-----	Tbl. G5	Tbl. G-5	-----	-----

Notes: (a) Includes the results for archived samples collected in 2012 and analyzed in 2013
(b) The results of TCLP testing are presented in the report text.

TABLE A4.1 - Summary of Well Construction Data

Well	Installation Date	Installed By	Drilled Depth (ft)	Elevation GS (ft. NAVD88)	Screen Depth (ft-GS)		Screen Elevation (ft-NAVD88)		Comment
					Top	Bottom	Top	Bottom	
ICS-NWC Property									
HC-B1	May-86	Hart Crowser	25	12.9	16	21	-3.1	-8.1	Active
HC-B2	May-86		25	13.5	14	19	-0.5	-5.5	Abandoned
HC-B2R	Oct-15	DOF	10	12.8	4.5	9.5	8.3	3.3	Active
HC-B3	May-86	Hart Crowser	25	-----	17.5	22.5	-----	-----	Destroyed
HC-B4	Sep-86		25	-----	19	24	-----	-----	Abandoned
HC-B5	Sep-86		24	-----	17	22	-----	-----	Abanonded
SA-MW1	Apr-07	SAIC	25.5	13.0	4	24	9.0	-11.0	Active
SA-MW2	Apr-07		26.5	12.3	4	24	8.3	-11.7	Active
SA-MW3	Apr-07		26	13.0	4	24	9.0	-11.0	Active
DOF-MW1	Oct-12	DOF	25	14.1	12	17	2.1	-3.0	Active
DOF-MW2	Oct-12		20	17.1	14.8	19.8	2.3	-2.7	Active
DOF-MW3	Oct-12		25	17.2	17	22	0.1	-4.9	Active
DOF-MW4	Oct-12		25	15.9	17	22	-1.1	-6.1	Active
DOF-MW5	Oct-12		25	15.5	17	22	-1.5	-6.5	Active
DOF-MW6	Oct-12		20	11.9	13	18	-1.1	-6.1	Active
DOF-MW7	Oct-12		20	13.0	12.7	17.7	0.3	-4.7	Active
DOF-MW8	Oct-12		20	13.8	12.9	17.9	0.9	-4.1	Active
MW-Ap	Oct-15		10	13.5	4.5	9.5	9.0	4.0	Active
MW-Bp	Oct-15		10	15.9	5.5	10.5	10.4	5.4	Active
MW-Cp	Oct-15		10	14.0	3.5	8.5	10.5	5.5	Active
MW-Dp	Oct-15		12	13.8	5	10	8.8	3.8	Active
MW-Du	Oct-15		12	13.8	11	21	2.8	-7.2	Active
MW-Eu	Oct-15		15	12.2	4.5	14.5	7.7	-2.4	Active
MW-Fu	Oct-15		15	13.1	4.5	14.5	8.6	-1.4	Active
MW-FL	Oct-15		30	13.1	19.5	29.5	-6.4	-16.4	Active
MW-Gu	Oct-15		15	13.5	4.5	14.5	9.0	-1.0	Active
MW-GL	Oct-15		30	13.7	19.6	29.6	-6.0	-16.0	Active
MW-HL	Oct-15		30	11.9	19.6	29.6	-7.7	-17.7	Active
MW-IL	Oct-15		35	12.9	24.5	34.5	-11.6	-21.6	Active
MW-Ju	Oct-15		15	12.5	5	15	7.5	-2.6	Active
MW-Ku	Oct-15		15	12.0	4.5	14.5	7.5	-2.6	Active
MW-KL	Oct-15		30	11.9	19.7	29.7	-7.8	-17.8	Active
MW-Lu	Oct-15		15	12.0	4.5	14.5	7.5	-2.5	Active
MW-LL	Oct-15		30	12.1	19.5	29.5	-7.4	-17.4	Active
LNAP-1	Oct-15		10	12.6	5	10	7.6	2.6	Active
LNAP-2	Oct-15		10	12.2	4.4	9.7	7.8	2.5	Active
Douglas Property									
DMC-MW1	Oct-90	Dames & Moore	20	18.0	10	20	8.0	-2.0	Active
DMC-MW2	Oct-90		20	-----	10	20	-----	-----	Active
DMC-MW3	Oct-90		20	18.1	10	20	8.1	-1.9	Active
DMC-MW4	Oct-90		20	17.7	10	20	7.7	-2.3	Active

TABLE A4.1 - Summary of Well Construction Data

Well	Installation Date	Installed By	Drilled Depth (ft)	Elevation GS (ft. NAVD88)	Screen Depth (ft-GS)		Screen Elevation (ft-NAVD88)		Comment
					Top	Bottom	Top	Bottom	
DMC-MW5	Jan-91	Dames & Moore	20	15.9	10	20	5.9	-4.1	Active
DMC-MW6	Jan-91		20	-----	10	20	-----	-----	Destroyed
DMC-MW7	Jan-91		20	-----	10	20	-----	-----	Destroyed
DMC-MW8	Jun-08	SAIC	36.5	17.3	10(a)	20	7.5	-2.7	Active
DMC-MW9	Jun-08		21.5	16.7	10(a)	20	6.9	-3.3	Active
DMC-MW10	Jun-08		21.5	17.0	10(a)	20	7.2	-3.0	Active
DMC-MW11	Jun-08		21.5	17.9	10	20	7.9	-2.1	Active
DMC-MW12	Jun-08		36.5	18.3	10(a)	20	8.4	-1.7	Active
DMC-MW2R	Jul-13	Geo-Engineers	41	17.2	7	22	10.2	-4.8	Active
DMC-MW13	Jul-13		38.5	18.0	7	22	11.0	-4.0	Active
DMC-MW14	Jul-13		36	16.6	7	22	9.6	-5.4	Active
DMC-MW15	Jul-13		36	15.9	7	22	8.9	-6.1	Active
DMC-MW16	Jul-13		36	18.2	7	22	11.2	-3.8	Active
DMC-MW17	Jul-13		38.5	17.0	7	22	10.0	-5.0	Active
DMC-MW18	Jul-13		38.5	17.9	7	22	10.9	-4.1	Active
DMC-MW19	Jul-13		36	17.5	7	22	10.5	-4.5	Active
DMC-MWA	Feb-15	DOF	30.5	17.7	20	30	-2.3	-12.3	Active
DMC-MWB	Feb-15		32	18.4	23	33	-4.6	-14.6	Active
DMC-MWC	Feb-15		32	17.8	19	29	-1.3	-11.3	Active

Notes: (a) - The screen is not shown on the SAIC logs. A top of screen depth of 10 feet was assumed based on the log of DMC-MW11 where a screen depth was noted.

TABLE A4.2 - Groundwater Level Elevations - April 2016

Groundwater Elevations Near High Tide - April 11, 2016 (high tide 10.80' MLLW @0810)

Well	Northing	Easting	TOC elev. (ft)*	Ground Surface Elev. (ft)	Screen Depth (feet)	Screen Elevation (feet)	Zone	Depth to Water (ft. below TOC)	Time	Water Level Elevation (ft)	Notes
MWAp	200173	1269797	13.08	13.5	4.5-9.5	+9.0/+4.0	Perched/WT	4.21	0859	8.87	
MWBp	200095	1269852	15.60	15.9	5.5-10.5	+10.4/+5.4	Perched/WT	6.38	0905	9.22	
MWCp	199995	1269943	13.69	14.0	3.5-8.5	+10.5/+5.5	Perched/WT	4.31	0849	9.38	
MWDp	200271	1269723	13.53	13.8	5-10	+8.8/+3.8	Perched/WT	5.47	0812	8.06	
LNAP-1	200212	1270040	12.24	12.6	5-10	+7.6/+2.6	Perched/WT	5.95	0909	6.29	
LNAP-2	200254	1269921	11.96	12.2	4.4-9.7	+7.8/+2.5	Perched/WT	6.39	0910	5.57	
HC-B2R	200186	1270108	12.50	12.8	4.5-9.5	+8.3/+3.3	Water Tbl.	7.01	0838	5.49	
MWEu	200297	1270058	11.83	12.2	4.5-14.5	+7.7/-2.3	Water Tbl.	5.70	0827	6.13	
MWFu	200170	1270230	12.68	13.1	4.5-14.5	+8.6/-1.4	Water Tbl.	5.44	0835	7.24	
MWGu	200055	1270222	13.13	13.5	4.5-14.5	+9.0/-1.0	Water Tbl.	6.21	0837	6.92	
MWJu	200282	1270134	12.18	12.5	5-15	+7.5/-2.5	Water Tbl.	4.96	0830	7.22	
MWKu	199927	1270348	11.59	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	4.10	0845	7.49	
MWLu	199901	1270258	11.69	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	4.10	0847	7.59	
DOF-MW1	199988	1270151	13.74	14.1	12-17	+2.1/-2.9	Upper	7.09	0844	6.65	
DOF-MW2	199928	1269979	16.80	17.1	14.8-19.8	+2.3/-2.7	Upper	10.97	0850	5.83	
DOF-MW3	199878	1269775	16.79	17.2	17-22	+0.2/-4.8	Upper	11.25	0851	5.54	
DOF-MW4	199985	1269797	15.54	15.9	17-22	-1.0/-6.0	Upper	9.79	0852	5.75	
DOF-MW5	200064	1269721	15.14	15.5	17-22	-1.4/-6.4	Upper	9.28	0853	5.86	
DOF-MW6	200248	1269827	11.53	11.9	13-18	-1.1/-6.1	Upper	5.29	0840	6.24	
DOF-MW7	200184	1269970	12.67	13.0	12.7-17.7	+0.3/-4.7	Upper	6.55	0833	6.12	
DOF-MW8	200098	1270037	13.51	13.8	12.9-17.9	+0.9/-4.1	Upper	7.31	0843	6.20	
SA-MW1	200268	1269944	12.57	13.0	4-24	+9.0/-11.0	Upper	6.85	0915	5.72	0.37' NAPL
SA-MW2	200311	1270090	11.97	12.3	4-24	+8.3/-11.7	Upper	4.75	0829	7.22	
SA-MW3	200249	1270174	12.57	13.0	4-24	+9.0/-11.0	Upper	4.65	0832	7.92	
MWDu	200273	1269723	13.57	13.8	11-21	+2.8/-7.2	Upper	7.40	0752	6.17	
HC-B1	200304	1270043	13.74	12.9	16-21	-3.1/-8.1	Lower	6.60	0828	7.14	
MWFL	200168	1270230	12.80	13.1	19.5-29.5	-6.4/-16.4	Lower	4.82	0836	7.98	
MWGL	200055	1270221	13.32	13.7	19.6-29.6	-5.9/-15.9	Lower	5.51	0838	7.81	
MWHL	200269	1269831	11.73	11.9	19.6-29.6	-7.7/-17.7	Lower	5.54	0901	6.19	
MWIL	200248	1270172	12.59	12.9	24.5-34.5	-11.6/-21.6	Lower	4.65	0831	7.94	
MWKL	199925	1270348	11.57	11.9	19.7-29.7	-7.8/-17.8	Lower	3.91	0846	7.66	
MWLL	199899	1270260	11.65	12.1	19.5-29.5	-7.4/-17.4	Lower	4.22	0848	7.43	
MW-A	200383	1269955	17.10	17.7	20.1-30.1	-2.4/-12.4	Lower	8.80	0815	8.30	Douglas
MW-B	200402	1270066	18.00	18.4	23.2-33.2	-4.8/-14.8	Lower	10.47	0817	7.53	Douglas
MW-C	200398	1270179	17.48	17.8	19.1-29.1	-1.3/-11.3	Lower	9.20	0819	8.28	Douglas

TABLE A4.2 - Groundwater Level Elevations - April 2016

Groundwater Elevations Near Low Tide - April 11, 2016 (Low Tide -1.3' MLLW @ 1456)

Well	Northing	Easting	TOC elev. (ft)*	Ground Surface Elev. (ft)	Screen Depth (feet)	Screen Elevation (feet)	Zone	Depth to Water (ft. below TOC)	Time	Water Level Elevation (ft)	Notes
MWAp	200173	1269797	13.08	13.5	4.5-9.5	+9.0/+4.0	Perched/WT	4.20	1535	8.88	
MWBp	200095	1269852	15.60	15.9	5.5-10.5	+10.4/+5.4	Perched/WT	6.40	1448	9.20	
MWCp	199995	1269943	13.69	14.0	3.5-8.5	+10.5/+5.5	Perched/WT	4.32	1529	9.37	
MWDp	200271	1269723	13.53	13.8	5-10	+8.8/+3.8	Perched/WT	5.47	1445	8.06	
LNAP-1	200212	1270040	12.24	12.6	5-10	+7.6/+2.6	Perched/WT	5.90	1545	6.34	
LNAP-2	200254	1269921	11.96	12.2	4.4-9.7	+7.8/+2.5	Perched/WT	6.35	1546	5.61	
HC-B2R	200186	1270108	12.50	12.8	4.5-9.5	+8.3/+3.3	Water Tbl.	7.89	1506	4.61	
MWEu	200297	1270058	11.83	12.2	4.5-14.5	+7.7/-2.3	Water Tbl.	6.21	1454	5.62	
MWFu	200170	1270230	12.68	13.1	4.5-14.5	+8.6/-1.4	Water Tbl.	10.92	1508	1.76	
MWGu	200055	1270222	13.13	13.5	4.5-14.5	+9.0/-1.0	Water Tbl.	11.46	1512	1.67	
MWJu	200282	1270134	12.18	12.5	5-15	+7.5/-2.5	Water Tbl.	5.52	1457	6.66	
MWKu	199927	1270348	11.59	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	9.70	1525	1.89	
MWLu	199901	1270258	11.69	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	nm	-----	-----	
DOF-MW1	199988	1270151	13.74	14.1	12-17	+2.1/-2.9	Upper	9.23	1524	4.51	
DOF-MW2	199928	1269979	16.80	17.1	14.8-19.8	+2.3/-2.7	Upper	11.84	1530	4.96	
DOF-MW3	199878	1269775	16.79	17.2	17-22	+0.2/-4.8	Upper	11.89	1531	4.90	
DOF-MW4	199985	1269797	15.54	15.9	17-22	-1.0/-6.0	Upper	10.78	1533	4.76	
DOF-MW5	200064	1269721	15.14	15.5	17-22	-1.4/-6.4	Upper	10.55	1554	4.59	
DOF-MW6	200248	1269827	11.53	11.9	13-18	-1.1/-6.1	Upper	7.35	1540	4.18	
DOF-MW7	200184	1269970	12.67	13.0	12.7-17.7	+0.3/-4.7	Upper	8.29	1505	4.38	
DOF-MW8	200098	1270037	13.51	13.8	12.9-17.9	+0.9/-4.1	Upper	8.64	1522	4.87	
SA-MW1	200268	1269944	12.57	13.0	4-24	+9.0/-11.0	Upper	7.10	1552	5.47	0.49' LNAPL
SA-MW2	200311	1270090	11.97	12.3	4-24	+8.3/-11.7	Upper	4.90	1456	7.07	
SA-MW3	200249	1270174	12.57	13.0	4-24	+9.0/-11.0	Upper	12.45	1459	0.12	
MWDu	200273	1269723	13.57	13.8	11-21	+2.8/-7.2	Upper	9.40	1542	4.17	
HC-B1	200304	1270043	13.74	12.9	16-21	-3.1/-8.1	Lower	11.75	1455	1.99	
MWFL	200168	1270230	12.80	13.1	19.5-29.5	-6.4/-16.4	Lower	12.32	1509	0.48	
MWGL	200055	1270221	13.32	13.7	19.6-29.6	-5.9/-15.9	Lower	12.16	1513	1.16	
MWHL	200269	1269831	11.73	11.9	19.6-29.6	-7.7/-17.7	Lower	7.70	1541	4.03	
MWIL	200248	1270172	12.59	12.9	24.5-34.5	-11.6/-21.6	Lower	12.75	1458	-0.16	
MWKL	199925	1270348	11.57	11.9	19.7-29.7	-7.8/-17.8	Lower	9.79	1520	1.78	
MWLL	199899	1270260	11.65	12.1	19.5-29.5	-7.4/-17.4	Lower	nm	-----	-----	
MW-A	200383	1269955	17.10	17.7	20.1-30.1	-2.4/-12.4	Lower	13.98	1436	3.12	Douglas
MW-B	200402	1270066	18.00	18.4	23.2-33.2	-4.8/-14.8	Lower	12.45	1439	5.55	Douglas
MW-C	200398	1270179	17.48	17.8	19.1-29.1	-1.3/-11.3	Lower	11.60	1441	5.88	Douglas

Horizontal coordinates - US State Plane NAD 1983 (conus) CORS96
* TOC elevation referenced to NAVD88

TOC - Top of Casing
MLLW = NAVD88 plus 2.435 feet.

WT - Water Table Well

TABLE A4.3 - Groundwater Level Elevations - February 2018

ICS/NWC Site
Seattle, Washington

Groundwater Elevations Near High Tide - February 6, 2018 (high tide 11.8' MLLW @0923)

Well	Northing	Easting	TOC elev. (ft)*	Ground Surface Elev. (ft)	Screen Depth (feet)	Screen Elevation (feet)	Zone	Depth to Water (ft. below TOC)	Time	Water Level Elevation (ft)	Notes
MWAp	200173	1269797	13.08	13.5	4.5-9.5	+9.0/+4.0	Perched/WT	4.35	0935	8.73	
MWBp	200095	1269852	15.60	15.9	5.5-10.5	+10.4/+5.4	Perched/WT	6.79	0932	8.81	
MWCp	199995	1269943	13.69	14.0	3.5-8.5	+10.5/+5.5	Perched/WT	4.60	0926	9.09	
MWDp	200271	1269723	13.53	13.8	5-10	+8.8/+3.8	Perched/WT	4.90	0853	8.63	
LNAP-1	200212	1270040	12.24	12.6	5-10	+7.6/+2.6	Perched/WT	6.11	0915	6.13	
LNAP-2	200254	1269921	11.96	12.2	4.4-9.7	+7.8/+2.5	Perched/WT	5.70	0856	6.26	
HC-B2R	200186	1270108	12.50	12.8	4.5-9.5	+8.3/+3.3	Water Tbl.	6.75	0907	5.75	
MWEu	200297	1270058	11.83	12.2	4.5-14.5	+7.7/-2.3	Water Tbl.	5.60	0902	6.23	
MWFu	200170	1270230	12.68	13.1	4.5-14.5	+8.6/-1.4	Water Tbl.	5.24	0909	7.44	
MWGu	200055	1270222	13.13	13.5	4.5-14.5	+9.0/-1.0	Water Tbl.	6.70	0912	6.43	
MWJu	200282	1270134	12.18	12.5	5-15	+7.5/-2.5	Water Tbl.	4.85	0903	7.33	
MWKu	199927	1270348	11.59	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	4.01	0921	7.58	
MWLu	199901	1270258	11.69	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	3.24	0923	8.45	
DOF-MW1	199988	1270151	13.74	14.1	12-17	+2.1/-2.9	Upper	6.76	0919	6.98	
DOF-MW2	199928	1269979	16.80	17.1	14.8-19.8	+2.3/-2.7	Upper	10.95	0930	5.85	
DOF-MW3	199878	1269775	16.79	17.2	17-22	+0.2/-4.8	Upper	11.20	0931	5.59	
DOF-MW4	199985	1269797	15.54	16.0	17-22	-1.0/-6.0	Upper	9.75	0934	5.79	
DOF-MW5	200064	1269721	15.14	15.6	17-22	-1.4/-6.4	Upper	9.22	0928	5.92	
DOF-MW6	200248	1269827	11.53	11.9	13-18	-1.1/-6.1	Upper	5.3	0854	6.23	
DOF-MW7	200184	1269970	12.67	13.0	12.7-17.7	+0.3/-4.7	Upper	6.52	0916	6.15	
DOF-MW8	200098	1270037	13.51	13.8	12.9-17.9	+0.9/-4.1	Upper	7.40	0917	6.11	
SA-MW1	200268	1269944	12.57	13.0	4-24	+9.0/-11.0	Upper	6.20	0940	6.37	2.1' NAPL
SA-MW2	200311	1270090	11.97	12.3	4-24	+8.3/-11.7	Upper	4.65	0901	7.32	
SA-MW3	200249	1270174	12.57	13.0	4-24	+9.0/-11.0	Upper	4.55	0905	8.02	
MWDu	200273	1269723	13.57	13.8	11-21	+2.8/-7.2	Upper	7.35	0852	6.22	
HC-B1	200304	1270043	13.74	12.9	16-21	-3.1/-8.1	Lower	7.15	0900	6.59	
MWFL	200168	1270230	12.80	13.1	19.5-29.5	-6.4/-16.4	Lower	4.65	0910	8.15	
MWGL	200055	1270221	13.32	13.7	19.6-29.6	-5.9/-15.9	Lower	5.40	0913	7.92	
MWHL	200269	1269831	11.73	11.9	19.6-29.6	-7.7/-17.7	Lower	5.58	0855	6.15	
MWIL	200248	1270172	12.59	12.9	24.5-34.5	-11.6/-21.6	Lower	4.45	0904	8.14	
MWKL	199925	1270348	11.57	11.9	19.7-29.7	-7.8/-17.8	Lower	3.82	0922	7.75	
MWLL	199899	1270260	11.65	12.1	19.5-29.5	-7.4/-17.4	Lower	4.11	0924	7.54	

TABLE A4.3 - Groundwater Level Elevations - February 2018

Well	Northing	Easting	TOC elev. (ft)*	Ground Surface Elev. (ft)	Screen Depth (feet)	Screen Elevation (feet)	Zone	Depth to Water (ft. below TOC)	Time	Water Level Elevation (ft)	Notes
DMC-MW-1	200452	1269870	17.39	18.1	10-20	+8.1/-1.9	Upper	9.88	0907	7.51	Douglas
DMC-MW-2R	200473	1269973	17.37	17.2	7-22	+10.8/-4.2	Upper	9.95	0915	7.42	Douglas
DMC-MW-3	200482	1269932	17.29	18.1	10-20	+8.3/-1.7	Upper	10.55	0909	6.74	Douglas
DMC-MW-4	200540	1269936	16.51	17.7	10-20	+7.9/-2.1	Upper	8.7	0917	7.81	Douglas
DMC-MW-5	200609	1269978	15.02	15.9	10-20	+6.6/-3.4	Upper	8.69	9.25	6.33	Douglas
DMC-MW-8	200400	1270060	16.93	17.3	10-20	+7.5/-2.5	Upper	9.41	0853	7.52	Douglas
DMC-MW-9	200384	1269980	16.32	16.7	10-20	+6.9/-3.1	Upper	7.45	0857	8.87	Douglas
DMC-MW-10	200387	1269915	16.73	17.0	10-20	+7.2/-2.8	Upper	9.42	0902	7.31	Douglas
DMC-MW-11	200408	1269834	17.59	17.9	10-20	+8.1/-1.9	Upper	10.07	0905	7.52	Douglas
DMC-MW-12	200465	1269908	17.88	18.3	10-20	+8.4/-1.6	Upper	10.73	0911	7.15	Douglas
DMC-MW-13	200441	1270168	17.60	18.0	7-22	+11/-4.0	Upper	10.04	0847	7.56	Douglas
DMC-MW-14	200571	1270057	16.16	16.6	7-22	+9.6/-5.4	Upper	8.59	0844	7.57	Douglas
DMC-MW-15	200653	1269985	15.49	15.9	7-22	+8.9/-6.1	Upper	7.2	0840	8.29	Douglas
DMC-MW-16	200515	1269912	17.59	18.2	7-22	+11.2/-3.8	Upper	9.66	0910	7.93	Douglas
DMC-MW-17	200611	1269897	16.51	17.0	7-22	+10.0/-5.0	Upper	8.35	0920	8.16	Douglas
DMC-MW-18	200467	1270048	17.60	17.9	7-22	+10.9/-4.1	Upper	10.61	0855	6.99	Douglas
DMC-MW-19	200514	1269976	16.99	17.5	7-22	+10.5/-4.5	Upper	9.71	0912	7.28	Douglas
MW-A	200383	1269955	17.10	17.7	20.1-30.1	-2.4/-12.4	Lower	8.77	0900	8.33	Douglas
MW-B	200402	1270066	18.00	18.4	23.2-33.2	-4.8/-14.8	Lower	12.49	0852	5.51	Douglas
MW-C	200398	1270179	17.48	17.8	19.1-29.1	-1.3/-11.3	Lower	9.50	0850	7.98	Douglas

Horizontal coordinates - US State Plane NAD 1983 (conus) CORS96
* TOC elevation referenced to NAVD88

TOC - Top of Casing
MLLW = NAVD88 plus 2.435 feet.

WT - Water Table Well

TABLE A4.3 - Groundwater Level Elevations - February 2018

Groundwater Elevations Near Low Tide - February 6, 2018 (Low Tide +2.5' MLLW @ 1609)

Well	Northing	Easting	TOC elev. (ft)*	Ground Surface Elev. (ft)	Screen Depth (feet)	Screen Elevation (feet)	Zone	Depth to Water (ft. below TOC)	Time	Water Level Elevation (ft)	Notes
MWAp	200173	1269797	13.08	13.5	4.5-9.5	+9.0/+4.0	Perched/WT	4.35	1628	8.73	
MWBp	200095	1269852	15.60	15.9	5.5-10.5	+10.4/+5.4	Perched/WT	6.82	1625	8.78	
MWCp	199995	1269943	13.69	14.0	3.5-8.5	+10.5/+5.5	Perched/WT	4.60	1620	9.09	
MWDp	200271	1269723	13.53	13.8	5-10	+8.8/+3.8	Perched/WT	4.91	1541	8.62	
LNAP-1	200212	1270040	12.24	12.6	5-10	+7.6/+2.6	Perched/WT	6.10	1608	6.14	
LNAP-2	200254	1269921	11.96	12.2	4.4-9.7	+7.8/+2.5	Perched/WT	5.71	1551	6.25	
HC-B2R	200186	1270108	12.50	12.8	4.5-9.5	+8.3/+3.3	Water Tbl.	6.92	1600	5.58	
MWEu	200297	1270058	11.83	12.2	4.5-14.5	+7.7/-2.3	Water Tbl.	5.45	1555	6.38	
MWFu	200170	1270230	12.68	13.1	4.5-14.5	+8.6/-1.4	Water Tbl.	10.10	1603	2.58	
MWGu	200055	1270222	13.13	13.5	4.5-14.5	+9.0/-1.0	Water Tbl.	9.01	1605	4.12	
MWJu	200282	1270134	12.18	12.5	5-15	+7.5/-2.5	Water Tbl.	6.62	1552	5.56	
MWKu	199927	1270348	11.59	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	8.40	1617	3.19	
MWLu	199901	1270258	11.69	12.0	4.5-14.5	+7.5/-2.5	Water Tbl.	4.42	1616	7.27	
DOF-MW1	199988	1270151	13.74	14.1	12-17	+2.1/-2.9	Upper	7.90	1612	5.84	
DOF-MW2	199928	1269979	16.80	17.1	14.8-19.8	+2.3/-2.7	Upper	11.35	1621	5.45	
DOF-MW3	199878	1269775	16.79	17.2	17-22	+0.2/-4.8	Upper	11.49	1623	5.30	
DOF-MW4	199985	1269797	15.54	16.0	17-22	-1.0/-6.0	Upper	10.28	1624	5.26	
DOF-MW5	200064	1269721	15.14	15.6	17-22	-1.4/-6.4	Upper	10.01	1626	5.13	
DOF-MW6	200248	1269827	11.53	11.9	13-18	-1.1/-6.1	Upper	6.45	1547	5.08	
DOF-MW7	200184	1269970	12.67	13.0	12.7-17.7	+0.3/-4.7	Upper	7.60	1609	5.07	
DOF-MW8	200098	1270037	13.51	13.8	12.9-17.9	+0.9/-4.1	Upper	7.94	1611	5.57	
SA-MW1	200268	1269944	12.57	13.0	4-24	+9.0/-11.0	Upper	6.20	1632	6.37	2.1' NAPL
SA-MW2	200311	1270090	11.97	12.3	4-24	+8.3/-11.7	Upper	4.70	1556	7.27	
SA-MW3	200249	1270174	12.57	13.0	4-24	+9.0/-11.0	Upper	9.76	1559	2.81	
MWDu	200273	1269723	13.57	13.8	11-21	+2.8/-7.2	Upper	8.55	1545	5.02	
HC-B1	200304	1270043	13.74	12.9	16-21	-3.1/-8.1	Lower	7.72	1553	6.02	
MWFL	200168	1270230	12.80	13.1	19.5-29.5	-6.4/-16.4	Lower	10.54	1604	2.26	
MWGL	200055	1270221	13.32	13.7	19.6-29.6	-5.9/-15.9	Lower	10.62	1606	2.70	
MWHL	200269	1269831	11.73	11.9	19.6-29.6	-7.7/-17.7	Lower	6.76	1550	4.97	
MWIL	200248	1270172	12.59	12.9	24.5-34.5	-11.6/-21.6	Lower	10.47	1558	2.12	
MWKL	199925	1270348	11.57	11.9	19.7-29.7	-7.8/-17.8	Lower	8.50	1615	3.07	
MWLL	199899	1270260	11.65	12.1	19.5-29.5	-7.4/-17.4	Lower	8.25	1617	3.40	

TABLE A4.3 - Groundwater Level Elevations - February 2018

Well	Northing	Easting	TOC elev. (ft)*	Ground Surface Elev. (ft)	Screen Depth (feet)	Screen Elevation (feet)	Zone	Depth to Water (ft. below TOC)	Time	Water Level Elevation (ft)	Notes
DMC-MW-1	200452	1269870	17.39	18.1	10-20	+8.1/-1.9	Upper	9.89	1609	7.50	Douglas
DMC-MW-2R	200473	1269973	17.37	17.2	7-22	+10.8/-4.2	Upper	10.95	1611	6.42	Douglas
DMC-MW-3	200482	1269932	17.29	18.1	10-20	+8.3/-1.7	Upper	9.52	1610	7.77	Douglas
DMC-MW-4	200540	1269936	16.51	17.7	10-20	+7.9/-2.1	Upper	8.66	1613	7.85	Douglas
DMC-MW-5	200609	1269978	15.02	15.9	10-20	+6.6/-3.4	Upper	8.71	1616	6.31	Douglas
DMC-MW-8	200400	1270060	16.93	17.3	10-20	+7.5/-2.5	Upper	10.4	1600	6.53	Douglas
DMC-MW-9	200384	1269980	16.32	16.7	10-20	+6.9/-3.1	Upper	10.08	1604	6.24	Douglas
DMC-MW-10	200387	1269915	16.73	17.0	10-20	+7.2/-2.8	Upper	10.53	1607	6.20	Douglas
DMC-MW-11	200408	1269834	17.59	17.9	10-20	+8.1/-1.9	Upper	10.16	1608	7.43	Douglas
DMC-MW-12	200465	1269908	17.88	18.3	10-20	+8.4/-1.6	Upper	10.89	1610	6.99	Douglas
DMC-MW-13	200441	1270168	17.60	18.0	7-22	+11/-4.0	Upper	10.65	1552	6.95	Douglas
DMC-MW-14	200571	1270057	16.16	16.6	7-22	+9.6/-5.4	Upper	9.19	1548	6.97	Douglas
DMC-MW-15	200653	1269985	15.49	15.9	7-22	+8.9/-6.1	Upper	7.92	1545	7.57	Douglas
DMC-MW-16	200515	1269912	17.59	18.2	7-22	+11.2/-3.8	Upper	9.67	1612	7.92	Douglas
DMC-MW-17	200611	1269897	16.51	17.0	7-22	+10.0/-5.0	Upper	8.4	1614	8.11	Douglas
DMC-MW-18	200467	1270048	17.60	17.9	7-22	+10.9/-4.1	Upper	10.59	1602	7.01	Douglas
DMC-MW-19	200514	1269976	16.99	17.5	7-22	+10.5/-4.5	Upper	9.69	1612	7.30	Douglas
MW-A	200383	1269955	17.10	17.7	20.1-30.1	-2.4/-12.4	Lower	12.45	1605	4.65	Douglas
MW-B	200402	1270066	18.00	18.4	23.2-33.2	-4.8/-14.8	Lower	12.05	1558	5.95	Douglas
MW-C	200398	1270179	17.48	17.8	19.1-29.1	-1.3/-11.3	Lower	10.99	1556	6.49	Douglas

Horizontal coordinates - US State Plane NAD 1983 (conus) CORS96
TOC - Top of Casing
WT - Water Table Well
* TOC elevation referenced to NAVD88
MLLW = NAVD88 plus 2.435 feet.

TABLE A4.4 - Estuarine Water Mixing

Location	MP Screen Depth	Elec. Conduc-tivity	Dissolved Solids	Sodium	Chloride	Sulfate	Calcium	Magnes-ium	Hard-ness	Estuarine Water Content				
	(ft)	(uS)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(%)	(%)	(%)	(%)	(%)
		EC	DS	Na	Cl	SO4	Ca	Mg	H	Basis Cl	Basis Na	Basis DS	Average	Range
P11	8	**741**	**121**	**70.2**	**12.1**	**2.9**	**15.4**	**20**	**120**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P12	7	**1510**	**435**	**314**	**73.9**	**<1**	**27.8**	**18.8**	**150**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P13	12.5	**1138**	**275**	**186**	**58.3**	**0.7**	**16**	**13.6**	**96**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P14	12.5	**1575**	**705**	**124**	**514**	**1.2**	**48**	**18.1**	**190**	5.4%	<5.0%	<5.0%	<5.0%	<5.0%
P15	5.5	**1847**	**709**	**431**	**251**	**11.4**	**13.3**	**2.5**	**43**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P16	11.5	**1943**	**1223**	**419**	**643**	**2.5**	**56.4**	**102**	**560**	7.5%	<5.0%	5.4%	6.0%	<5% - 6%
P18A	27.5	**2690**	**1715**	**730**	**840**	**0.5**	**71.5**	**73**	**480**	10.7%	9.8%	10.0%	10.2%	10%-11%
P18B	47.5	**8610**	**13646**	**4080**	**8220**	**4.2**	**587**	**755**	**4600**	100%	100%	100%	100%	100%
P20	12.5	**1142**	**442**	**34.8**	**16**	**143**	**201**	**46.8**	**690**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P21A	27.5	**1163**	**342**	**195**	**71.5**	**0.6**	**30.4**	**44.7**	**260**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P21B	47.5	**10960**	**10608**	**2730**	**6490**	**184**	**643**	**561**	**3900**	100%	71.0%	92.6%	87.8%	71%-100%
P23	12.5	**728**	**216**	**22.2**	**34.6**	**47.2**	**67.4**	**44.9**	**350**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P26	12.5	**13910**	**10008**	**3200**	**5620**	**589**	**184**	**415**	**2200**	88.5%	85.3%	87.0%	86.9%	85%-89%
P27A	17.5	**10060**	**6979**	**2460**	**3790**	**486**	**69.6**	**173**	**890**	58.7%	62.7%	58.9%	60.1%	58%-63%
P27B	47.5	**12050**	**8366**	**2000**	**5170**	**3.5**	**553**	**639**	**4000**	81.1%	48.6%	71.7%	67.2%	49%-81%
P28	27.5	**5250**	**5081**	**1700**	**2850**	**205**	**135**	**191**	**1100**	43.4%	39.5%	41.3%	41.4%	40%-43%
P29	31.5	**3070**	**2590**	**750**	**1470**	**136**	**123**	**111**	**760**	21.0%	10.4%	18.1%	16.5%	10%-21%
P30	27.5	**6030**	**5275**	**1840**	**2930**	**201**	**111**	**193**	**1100**	44.7%	43.7%	43.1%	43.8%	43%-45%
P31	27.5	**4010**	**2606**	**983**	**1460**	**0.5**	**62.8**	**99.2**	**570**	20.8%	17.5%	18.3%	18.9%	17%-21%
P32A	27.5	**2560**	**2742**	**510**	**1950**	**83.8**	**66.7**	**131**	**710**	28.8%	<5.0%	19.5%	17.8%	<5%-29%
P32B	37.5	**4590**	**2415**	**1360**	**891**	**0.7**	**65.5**	**97.4**	**560**	11.5%	29.1%	16.5%	19.0%	12%-29%
P33A	28	**710**	**153**	**54**	**25**	**0.6**	**29.6**	**43.7**	**250**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
P33B	38	**2150**	**939**	**561**	**280**	**2.4**	**53.9**	**41.4**	**310**	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%
MW-1		6551	-----	-----	2210	323	130	170	1000	33.0%	-----	-----		
MW-1	14.5	10393	6553	2030	3670	434	135	284	1500	56.7%	49.6%	54.9%	49.3%	33%-57%
MW-1		9530	-----	2120	-----	-----	135	266	1433	-----	52.3%	-----		
MW-2		1940	-----	-----	179	1	15.3	22.1	130	<5.0%	-----	-----		
MW-2	17.5	2077	717	484	198	0.5	14.1	20.3	120	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-2		2000	-----	454	-----	-----	12.7	18.1	106	-----	<5.0%	-----		

TABLE A4.4 - Estuarine Water Mixing

Location	MP Screen Depth (ft)	Elec. Conduc-tivity (uS)	Dissolved Solids (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Calcium (mg/l)	Magnes-ium (mg/l)	Hard-ness (mg/l)	Estuarine Water Content (%)	(%)	(%)	(%)	(%)
		EC	DS	Na	Cl	SO4	Ca	Mg	H	Basis Cl	Basis Na	Basis DS	Average	Range
MW-3		1623	-----	-----	217	0.8	16.7	40.5	210	<5.0%	-----	-----		
MW-3	19.5	2225	775	425	270	0.4	23.6	56.3	290	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-3		2230	-----	399	-----	-----	21.4	51	264	-----	<5.0%	-----		
MW-4		1455	-----	-----	103	1.1	16	24.8	140	<5.0%	-----	-----		
MW-4	19.5	1531	522	369	118	0.4	13.9	20.4	120	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-4		1699	-----	323	-----	-----	12.5	18.3	107	-----	-----	-----		
MW-5		828	-----	-----	61.9	1	7.1	10.9	63	<5.0%	-----	-----		
MW-5	19.5	1156	471	235	207	0.3	10.8	17.8	100	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-5		1198	-----	231	-----	-----	12.1	19.5	111	-----	<5.0%	-----		
MW-6		1255	-----	-----	356	<0.1	31.4	37.8	230	<5.0%	-----	-----		
MW-6	15.5	1296	562	241	270	5.5	21.5	23.6	150	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-6		1312	-----	252	-----	-----	22.1	27	166	-----	-----	-----		
MW-7		2095	-----	-----	470	2.5	36.5	28.2	210	<5.0%	-----	-----		
MW-7	15.5	1806	767	369	378	0.1	15.9	4.1	57	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-7		1896	-----	385	-----	-----	18.2	4.3	63	-----	<5.0%	-----		
MW-8		1090	-----	-----	46	1.5	32.4	35.1	230	<5.0%	-----	-----		
MW-8	15.5	1095	220	121	39.7	0.5	28.3	30.3	200	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-8		1061	-----	129	-----	-----	30.3	33	212	-----	<5.0%	-----		
HC-B1		10097	-----	-----	3730	4.8	126	205	1200	57.7%	-----	-----		
HC-B1	18.5	7553	6219	2080	3770	4.8	134	230	1300	58.4%	51.1%	51.8%	57.6%	51%-68%
HC-B1		10594	-----	2660	-----	-----	217	366	2050	-----	68.8%	-----		
HC-B2(R)	7	414	-----	6.9	-----	-----	63.7	7.9	190	-----	<5.0%	-----	<5%	<5%
HC-B2(R)		157	-----	3.5	-----	-----	35.7	3.1	102	-----	<5.0%	-----		
SA-MW1	14	3394	1393	751	554	19.3	37.4	31.7	220	6.1%	10.5%	7.0%	9.1%	6%-13%
SA-MW1		2929	-----	828	-----	-----	19.3	17.4	120	-----	12.8%	-----		
SA-MW2		7021	-----	-----	2280	36.1	85.7	156	860	34.1%	-----	-----		
SA-MW2	13	4486	5148	1600	3110	132	117	189	1100	47.6%	36.4%	41.9%	40.0%	34%-48%
SA-MW2		1174	407	329	-----	-----	46.6	31.1	245	-----	-----	-----		

TABLE A4.4 - Estuarine Water Mixing

Location	MP Screen Depth (ft)	Elec. Conduc-tivity (uS)	Dissolved Solids (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Calcium (mg/l)	Magnes-ium (mg/l)	Hard-ness (mg/l)	Estuarine Water Content (%)	(%)	(%)	(%)	(%)
		EC	DS	Na	Cl	SO4	Ca	Mg	H	Basis Cl	Basis Na	Basis DS	Average	Range
SA-MW3	13	10760			4050	576	142	312	1600	62.9%	-----	-----	33.8%	<5%-63%
SA-MW3		6471	4244	1540	2220	334	46.7	103	540	33.2%	34.6%	33.5%		
SA-MW3		2248	-----	520	-----	-----	9.2	20.9	109	-----	<5.0%	-----		
MW-Du	16	876	305	156	116	4.7	15.5	13	92	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-Du		854	-----	153	-----	-----	16.1	12.6	92	-----	<5.0%	-----		
MW-Eu	9.5	18219	8755	2730	4850	564	241	370	2100	75.9%	71.0%	75.4%	78.1%	71%-90.2%
MW-Eu		18745	-----	3360	-----	-----	269	531	2860	-----	90.2%	-----		
MW-Fu	9.5	962	353	55.2	78.4	59.7	136	24.1	440	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-Fu		755	-----	20.7	-----	-----	85.6	14.3	273	-----	<5.0%	-----		
MW-FL	24.5	4880	2729	1060	1490	21.6	54.7	103	560	21.3%	19.9%	19.4%	20.4%	19%-21%
MW-FL		5081	-----	1100	-----	-----	60.6	122	654	-----	21.1%	-----		
MW-Gu	9.5	1345	429	61.3	192	15.6	61.9	98.4	560	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-Gu		1902	-----	123	-----	-----	124	126	829	-----	<5.0%	-----		
MW-GL	24.6	9193	6211	1910	3690	273	107	231	1200	57.1%	45.9%	51.7%	51.0%	46%-57%
MW-GL		9091	-----	2020	-----	-----	110	252	1313	-----	49.3%	-----		
MW-HL	24.6	5966	3943	1200	2310	230	72.8	130	720	34.6%	24.2%	30.7%	27.0%	19%-35%
MW-HL		5788	-----	1020	-----	-----	63.2	119	648	-----	18.7%	-----		
MW-IL	29.5	8888	5060	1720	2950	31.2	139	220	1300	45.0%	40.1%	41.1%	36.9%	21%-45%
MW-IL		5961	-----	1110	-----	-----	82.4	122	711	-----	21.4%	-----		
MW-Ju	10	2915	1294	460	666	80.5	45	42.1	290	<5.0%	<5.0%	6.1%	<5%	<5%-6%
MW-Ju		1193	-----	268	-----	-----	24.6	22.9	156	-----	<5.0%	-----		
MW-Ku	9.5	272	96	25.3	17.4	11.1	33.2	9.3	120	<5.0%	<5.0%	<5.0%	<5%	<5%
MW-Ku		364	-----	37	-----	-----	36.8	6.9	120	-----	<5.0%	-----		
MW-KL	24.7	3618	2481	1060	1180	85.2	43.6	112	570	16.2%	19.9%	17.1%	19.2%	16%-24%
MW-KL		6039	-----	1180	-----	-----	43.6	115	583	-----	23.6%	-----		

TABLE A4.4 - Estuarine Water Mixing

Location	MP Screen Depth (ft)	Elec. Conduc-tivity (uS)	Dissolved Solids (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Calcium (mg/l)	Magnes-ium (mg/l)	Hard-ness (mg/l)	Estuarine Water Content (%)	(%)	(%)	(%)	(%)
		EC	DS	Na	Cl	SO4	Ca	Mg	H	Basis Cl	Basis Na	Basis DS	Average	Range
Seep 1	0	6609	-----	-----	2430	321	74.1	173	900	36.6%	-----	-----	34.9%	33%-37%
Seep 2	0	6202	-----	-----	2220	303	76.2	179	930	33.2%	-----	-----		
DMC-MWA	25	2793	1222	475	635	8.3	40.2	63.9	360	7.4%	<5.0%	<5.0%	<5%	<5% -7.4%
DMC-MWA		2961	-----	473	-----	-----	36.6	66.7	374	-----	<5%	-----		
DMC-MWB	28	6102	3721	1170	2250	14.5	132	154	960	33.6%	23.3%	28.6%	25.6%	17%-34%
DMC-MWB		6381	-----	955	-----	-----	130	148	935	-----	16.7%	-----		
DMC-MWC	24	11240	7016	2120	3900	413	250	333	2000	60.5%	52.3%	59.2%	57.4%	52%-61%
DMC-MWC		11240	-----	2290	-----	-----	240	319	1914	-----	57.5%	-----		
Embay Upper	-----	21410	6733	2250	3640	509	86.4	248	1200	Embayment Water Samples				
Embay Lower	-----	44500	16085	5110	9020	1220	181	554	2700					
Embay Mean		32955	11409	3680	6330	865	134	401	1950	Estuarine Water End Point				
Mean Wells 2, 3, 4		1864	637	409	181	1	16	30	165	Fresh Groundwater End Point				

Notes:

[light orange box] Full conventional data set

[yellow box] Estuarine Water Samples

Cl - Chloride
Na - Sodium
DS - Dissolved Solids

----- Not analyzed
MP - Mid-Point

TABLE A4.5 - Results of Embayment Water Sample Analyses

Sample Designation (b)	Date	Time	ARI Delivery Group	Conduc-tivity (uS)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Hardness (mg-CaCo3/l)(a)
ICS-UPPER-DR-101415	10/14/15	1530 (c)	AOO8	21410	86.4	248	2250	3640	509	1200
ICS-LOWER-DR-101415	10/14/15	1600 (c)	AOO8	44500	181	554	5110	9020	1220	2700

Notes: (a) - Calculated

(b) - Samples obtained from 2-feet below water surface (UPPER) and 2-feet above mud-line (LOWER). Lower sample obtained from approximately six feet below the water surface.

(c) - Samples obtained predicted tidal level of 8 feet MLLW.

TABLE A5.1 - Sediment Screening Levels (SLs)

Detected Constituent	Units	Screening Level	ROD Table 19			ROD Table 20	SMS		Comment
			Human Seafood Consumption	Human Direct Contact	Ecological Food Source	Ecological Benthic Contact	SCO Marine Sediment	AETs Marine Sediment (dw)	
Antimony	-----	na	na	na	na	na	na	na	
Arsenic	mg/kg-dw	7	na	7	na	57	57	57	SL based on soil background concentrations
Beryllium	-----	na	na	na	na	na	na	na	
Cadmium	mg/kg-dw	5.1	na	na	na	5.1	5.1	5.1	
Chromium (Total)	mg/kg-dw	260	na	na	na	260	260	260	
Copper	mg/kg-dw	390	na	na	na	390	390	390	
Lead	mg/kg-dw	450	na	na	na	450	450	450	
Mercury	mg/kg-dw	0.41	na	na	na	0.41	0.41	0.41	
Nickel	-----	na	na	na	na	na	na	nd	
Silver	mg/kg-dw	6.1	na	na	na	6.1	6.1	6.1	
Zinc	mg/kg-dw	410	na	na	na	410	410	410	
Total Petroleum Hydrocarbons	mg/kg-dw	2000	na	na	na	2000	na	na	MTCA Method A Soil CUL - Sum of diesel and lube-oil range hydrocarbons
Phenol	ug/kg-dw	420	na	na	na	420	420	420	
2-Chlorophenol	-----	na	na	na	na	na	na	na	
1,3-Dichlorobenzene	-----	na	na	na	na	na	na	na	
1,4-Dichlorobenzene	ug/kg-OCN	3100	na	na	na	3100	3100	110	Use AET dw if TOC between 0.5 and 3.5%
Benzyl alcohol	ug/kg-dw	57	na	na	na	57	57	57	
1,2-Dichlorobenzene	ug/kg-OCN	2300	na	na	na	2300	2300	35	Use AET dw if TOC between 0.5 and 3.5%
2-Methylphenol	ug/kg-dw	63	na	na	na	na	63	63	
4-Methylphenol	ug/kg-dw	670	na	na	na	670	670	670	
N-Nitrosodi-n-propylamine	-----	na	na	na	na	na	na	na	
Hexachloroethane	-----	na	na	na	na	na	na	na	
Nitrobenzene	-----	na	na	na	na	na	na	na	
Isophorone	-----	na	na	na	na	na	na	na	
2,4-Dimethylphenol	ug/kg-dw	29	na	na	na	29	29	29	
Benzoic acid	ug/kg-dw	650	na	na	na	650	650	650	
2,4-Dichlorophenol	-----	na	na	na	na	na	na	na	

TABLE A5.1 - Sediment Screening Levels (SLs)

Detected Constituent	Units	Screening Level	ROD Table 19			ROD Table 20	SMS		Comment
			Human Seafood Consumption	Human Direct Contact	Ecological Food Source	Ecological Benthic Contact	SCO Marine Sediment	AETs Marine Sediment (dw)	
1,2,4-Trichlorobenzene	ug/kg-OCN	810	na	na	na	810	810	31	Use AET dw if TOC between 0.5 and 3.5%
Naphthalene	ug/kg-OCN	99000	na	na	na	99000	99000	2100	Use AET dw if TOC between 0.5 and 3.5%
4-Chloro-3-methylphenol	-----	na	na	na	na	na	na	na	
2-Methylnaphthalene	ug/kg-OCN	38000	na	na	na	38000	38000	670	Use AET dw if TOC between 0.5 and 3.5%
2,4,6-Trichlorophenol	-----	na	na	na	na	na	na	na	
2,4,5-Trichlorophenol	-----	na	na	na	na	na	na	na	
2-Chloronaphthalene	-----	na	na	na	na	na	na	na	
Dimethylphthalate	ug/kg-OCN	53000	na	na	na	53000	53000	71	Use AET dw if TOC between 0.5 and 3.5%
Acenaphthylene	ug/kg-OCN	na	na	na	na	na	66000	1300	Use AET dw if TOC between 0.5 and 3.5%
Acenaphthene	ug/kg-OCN	16000	na	na	na	16000	16000	500	Use AET dw if TOC between 0.5 and 3.5%
Dibenzofuran	ug/kg-OCN	15000	na	na	na	15000	15000	540	Use AET dw if TOC between 0.5 and 3.5%
2,6-Dinitrotoluene	-----	na	na	na	na	na	na	na	
2,4-Dinitrotoluene	-----	na	na	na	na	na	na	na	
Diethylphthalate	ug/kg-OCN	na	na	na	na	na	61000	200	Use AET dw if TOC between 0.5 and 3.5%
4-Chlorophenyl-phenylethe	-----	na	na	na	na	na	na	na	
Fluorene	ug/kg-OCN	23000	na	na	na	23000	23000	540	Use AET dw if TOC between 0.5 and 3.5%
N-Nitrosodiphenylamine	ug/kg-OCN	11000	na	na	na	11000	11000	28	Use AET dw if TOC between 0.5 and 3.5%
Pentachlorophenol	ug/kg-dw	360	na	na	na	360	360	360	
Phenanthrene	ug/kg-OCN	100000	na	na	na	100000	100000	1500	Use AET dw if TOC between 0.5 and 3.5%
Carbazole	-----	na	na	na	na	na	na	na	
Anthracene	ug/kg-OCN	220000	na	na	na	220000	220000	960	Use AET dw if TOC between 0.5 and 3.5%
Di-n-butylphthalate	ug/kg-OCN	na	na	na	na	na	220000	1400	Use AET dw if TOC between 0.5 and 3.5%
Fluoranthene	ug/kg-OCN	160000	na	na	na	160000	160000	1700	Use AET dw if TOC between 0.5 and 3.5%
Pyrene	ug/kg-OCN	1000000	na	na	na	1000000	1000000	2600	Use AET dw if TOC between 0.5 and 3.5%
Butylbenzylphthalate	ug/kg-OCN	4900	na	na	na	4900	4900	63	Use AET dw if TOC between 0.5 and 3.5%
bis(2-Ethylhexyl)phthalate	ug/kg-OCN	47000	na	na	na	47000	47000	1300	Use AET dw if TOC between 0.5 and 3.5%
Di-n-octylphthalate	ug/kg-OCN	na	na	na	na	na	58000	6200	Use AET dw if TOC between 0.5 and 3.5%
Benzo(a)anthracene	ug/kg-OCN	110000	na	na	na	110000	110000	1300	cPAH - SL based on beach play as a benzo(a)pyrene equivalent concentration

TABLE A5.1 - Sediment Screening Levels (SLs)

Detected Constituent	Units	Screening Level	ROD Table 19			ROD Table 20	SMS		Comment
			Human Seafood Consumption	Human Direct Contact	Ecological Food Source	Ecological Benthic Contact	SCO Marine Sediment	AETs Marine Sediment (dw)	
Chrysene	ug/kg-OCN	110000	na	na	na	110000	110000	1400	cPAH - SL based on beach play as a benzo(a)pyrene equivalent concentration
total Benzofluoranthenes	ug/kg-OCN	230000	na	na	na	230000	230000	3200	cPAH - SL based on beach play as a benzo(a)pyrene equivalent concentration
Benzo(a)pyrene	ug/kg-OCN	99000	na	na	na	99000	99000	1600	cPAH - SL based on beach play as a benzo(a)pyrene equivalent concentration
Indeno(1,2,3-cd)pyrene	ug/kg-OCN	34000	na	na	na	34000	34000	600	cPAH - SL based on beach play as a benzo(a)pyrene equivalent concentration
Dibenz(a,h)anthracene	ug/kg-OCN	12000	na	na	na	12000	12000	230	cPAH - SL based on beach play as a benzo(a)pyrene equivalent concentration
Benzo(g,h,i)perylene	ug/kg-OCN	31000	na	na	na	31000	31000	670	
cPAH	ug TEQ/kg-dw	90	na	90	na	na	na	na	380 ugTEQ/kg LDW wide; 150 ugTEQ/kg Clamming areas; 90 ugTEQ/kg Indv.
LPAH	ug/kg-OCN	370000	na	na	na	370000	370000	5200	Use AET dw if TOC between 0.5 and 3.5%
HPAH	ug/kg-OCN	960000	na	na	na	960000	960000	12000	Use AET dw if TOC between 0.5 and 3.5%
Tributyltin ion	-----	na	na	na	na	na	na	na	
alpha-BHC	-----	na	na	na	na	na	na	na	
beta-BHC	-----	na	na	na	na	na	na	na	
delta-BHC	-----	na	na	na	na	na	na	na	
gamma-BHC (Lindane)	-----	na	na	na	na	na	na	na	
Heptachlor	-----	na	na	na	na	na	na	na	
Aldrin	-----	na	na	na	na	na	na	na	
Heptachlor epoxide	-----	na	na	na	na	na	na	na	
Endosulfan I	-----	na	na	na	na	na	na	na	
Dieldrin	-----	na	na	na	na	na	na	na	
4,4'-DDE	-----	na	na	na	na	na	na	na	
Endrin	-----	na	na	na	na	na	na	na	
Endosulfan II	-----	na	na	na	na	na	na	na	
4,4'-DDD	-----	na	na	na	na	na	na	na	
Endosulfan sulfate	-----	na	na	na	na	na	na	na	

TABLE A5.1 - Sediment Screening Levels (SLs)

Detected Constituent	Units	Screening Level	ROD Table 19			ROD Table 20	SMS		Comment
			Human Seafood Consumption	Human Direct Contact	Ecological Food Source	Ecological Benthic Contact	SCO Marine Sediment	AETs Marine Sediment (dw)	
4,4'-DDT	-----	na	na	na	na	na	na	na	
Methoxychlor	-----	na	na	na	na	na	na	na	
Endrin ketone	-----	na	na	na	na	na	na	na	
Endrin aldehyde	-----	na	na	na	na	na	na	na	
trans-Chlordane	-----	na	na	na	na	na	na	na	
cis-Chlordane	-----	na	na	na	na	na	na	na	
Toxaphene	-----	na	na	na	na	na	na	na	
Hexachlorobenzene	ug/kg-OCN	380	na	na	na	380	380	22	Use AET dw if TOC between 0.5 and 3.5%
Hexachlorobutadiene	ug/kg-OCN	na	na	na	na	na	3900	11	Use AET dw if TOC between 0.5 and 3.5%
Aroclor 1016	-----	na	na	na	na	na	na	na	
Aroclor 1242	-----	na	na	na	na	na	na	na	
Aroclor 1248	-----	na	na	na	na	na	na	na	
Aroclor 1254	-----	na	na	na	na	na	na	na	
Aroclor 1260	-----	na	na	na	na	na	na	na	
Aroclor 1221	-----	na	na	na	na	na	na	na	
Aroclor 1232	-----	na	na	na	na	na	na	na	
Total PCBs	ug/kg dw	2	2	500	128	na	na	na	Clamming Areas; 1,700 ug/kg Indv. Beaches
Total PCBs	ug/kg OCN	12000	na	na	na	12000	12000	130	Use AET dw if TOC between 0.5 and 3.5%
,3,7,8-TCDD (Dioxin/Furans	ng TEQ/kg-dw	2	2	13	na	na	na	na	37 ng TEQ/kg LDW wide; 13 ngTEQ/kg clamming areas; 28 ngTEQ/kg Indv. beaches

Notes: SL - Screening Level
na - not available
OCN - Organic carbon normalized concentration
SMS - Sediment Management Standards
dw - Dry weight concentration
AET - Apparent Effects Threshold
SCO - Sediment Cleanup Objective

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	Collection Date	ARI Delivery Group	Arsenic mg/kg, dry	Arsenic EF	Cadmium mg/kg, dry	Cadmium EF	Chromium mg/kg, dry	Chromium EF	Lead mg/kg, dry	Lead EF	Mercury mg/kg, dry
Screening Levels			7	1	5.1	1	260	1	450	1	0.41
ICS-DSS-01-SE	41253	VW14	**61.1**	**8.7**	**0.3**	**0.1**	**35.2**	**0.1**	**69.8**	**0.2**	**0.17**
ICS-DSS-02-SE	41093	VB16	**10.0**	**1.4**	**0.2**	**0.0**	**26.4**	**0.1**	**35.5**	**0.1**	**0.12**
ICS-DSS-03-SE	41093	VB16	**17.2**	**2.5**	**0.6**	**0.1**	**37**	**0.1**	**92.3**	**0.2**	**0.45**
ICS-DSS-04-SE	41093	VB16	**13.2**	**1.9**	**5.3**	**1.0**	**167**	**0.6**	**1250**	**2.8**	**2.42**
ICS-DSS-05-SE	41093	VB16	**28.8**	**4.1**	**0.7**	**0.1**	**84.6**	**0.3**	**150**	**0.3**	**0.28**
ICS-DSS-06-SE	41093	VB16	**7.1**	**1.0**	**2.6**	**0.5**	**612**	**2.4**	**633**	**1.4**	**7.7**
ICS-DSS-07-SE	41093	VB16	**10.6**	**1.5**	**0.2**	**0.0**	**24.0**	**0.1**	**75.6**	**0.2**	**0.25**
ICS-DSS-08-SE	41093	VB16	**13.9**	**2.0**	**0.9**	**0.2**	**70.5**	**0.3**	**201**	**0.4**	**3.8**
ICS-DSS-09-SE	41093	VB16	**13.0**	**1.9**	**8.2**	**1.6**	**288**	**1.1**	**5920**	**13.2**	**14.3**
ICS-DSS-10-SE	41093	VB16	**4.2**	**0.6**	**0.3**	**0.1**	**28.4**	**0.1**	**59.0**	**0.1**	**0.21**
ICS-DSS-11-SE	41093	VB16	**8.1**	**1.2**	**1.0**	**0.2**	**90.6**	**0.3**	**626**	**1.4**	**0.71**
ICS-DSS-12-SE	41093	VB16	**8.3**	**1.2**	**4.3**	**0.8**	**1110**	**4.3**	**3930**	**8.7**	**0.16**
ICS-DSS-13-SE	41093	VB16	**3.4**	**0.5**	**0.2**	**0.0**	**25.0**	**0.1**	**42.1**	**0.1**	**0.12**
ICS-DSS-14-SE	41092	VB00	**23.2**	**3.3**	**0.5**	**0.1**	**36.1**	**0.1**	**201**	**0.4**	**0.17**
ICS-DSS-15-SE	41093	VB16	**19.1**	**2.7**	**0.4**	**0.1**	**23.2**	**0.1**	**55.5**	**0.1**	**0.21**
ICS-DSS-16-SE	41092	VB00	**14.9**	**2.1**	**0.1**	**0.0**	**15.3**	**0.1**	**18.0**	**0.0**	**0.03**
ICS-DSS-17-SE	41092	VB00	**8.3**	**1.2**	0.1 U	**0.0**	**32**	**0.1**	**44.4**	**0.1**	**0.15**
ICS-DSS-18-SE	41092	VB00	**21.0**	**3.0**	**0.3**	**0.1**	**21.2**	**0.1**	**55.5**	**0.1**	**0.20**
ICS-DSS-19-SE	41092	VB00	**16.4**	**2.3**	**1.3**	**0.3**	**65**	**0.3**	**343**	**0.8**	**1.73**
ICS-DSS-20-SE	41092	VB00	**12.1**	**1.7**	**0.2**	**0.0**	**26**	**0.1**	**42.3**	**0.1**	**0.18**
ICS-DSS-21-SE	41092	VB00	**10.4**	**1.5**	**0.4**	**0.1**	**29**	**0.1**	**55.9**	**0.1**	**0.54**
ICS-DSS-22-SE	41092	VB00	**7.0**	**1.0**	**0.3**	**0.1**	**21**	**0.1**	**22.3**	**0.0**	**0.17**
ICS-DSS-23-SE	41092	VB00	**3.1**	**0.4**	**0.2**	**0.0**	**24.3**	**0.1**	**29.5**	**0.1**	**0.08**
ICS-DSS-24-SE	41093	VB16	**11.1**	**1.6**	0.2 U	**0.0**	**27**	**0.1**	**59.7**	**0.1**	**0.22**
ICS-DSS-25-SE	41093	VB16	**9.7**	**1.4**	**0.4**	**0.1**	**28**	**0.1**	**50.4**	**0.1**	**0.34**
ICS-DSS-26-SE	41092	VB00	**12.6**	**1.8**	**1.6**	**0.3**	**268**	**1.0**	**1690**	**3.8**	**0.83**
ICS-DSS-27-SE	41092	VB00	**17.1**	**2.4**	**0.6**	**0.1**	**39.6**	**0.2**	**683**	**1.5**	**0.92**
ICS-DSS-28-SE	41092	VB00	**14.5**	**2.1**	**0.6**	**0.1**	**33**	**0.1**	**47.5**	**0.1**	**0.34**
ICS-DSS-29-SE	41092	VB00	**8.9**	**1.3**	**0.3**	**0.1**	**15.7**	**0.1**	**74.1**	**0.2**	**0.05**
ICS-DSS-30-SE	41092	VB00	**5.4**	**0.8**	0.1 U	**0.0**	**13.2**	**0.1**	**16.3**	**0.0**	**0.06**
ICS-DUP-13-SE	41093	VB16	**3.3**	**0.5**	**0.1**	**0.0**	**20.1**	**0.1**	**48.3**	**0.1**	**0.11**
ICS-DUP-04-SE	41093	VB16	**17.6**	**2.5**	**7.4**	**1.5**	**298**	**1.1**	**2190**	**4.9**	**2.20**

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	Collection Date	ARI Delivery Group	Arsenic mg/kg, dry	Arsenic EF	Cadmium mg/kg, dry	Cadmium EF	Chromium mg/kg, dry	Chromium EF	Lead mg/kg, dry	Lead EF	Mercury mg/kg, dry
Number of Samples(a)			**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.			**25**	**25**	**2**	**2**	**4**	**4**	**7**	**7**	**10**
% Exceed			**83.3%**	**83.3%**	**6.7%**	**6.7%**	**13.3%**	**13.3%**	**23.3%**	**23.3%**	**33.3%**
Maximum			**61.1**	**8.7**	**8.2**	**1.6**	**1110**	**4.3**	**5920**	**13.2**	**14.3**
Minimum			**3.1**	**0.4**	**0.1**	**0.0**	**13.2**	**0.1**	**16.3**	**0.0**	**0.0**

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*
U = nondetected at the associated lower reporting limit.
2,3,7,8-TCDD - TEQ (TCDD toxicity equivalence) based on WHO 2005 relative toxicity factors.
cPAH TEQ based on Ecology guidance
EF - Exceedance Factor
TEQ - Toxicity Equivalency Quotient
BaPEq. - Benzo(a)pyrene equivalent concentration
[yellow box] *Concentration exceeds screening level*
(a) - Not include duplicates

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	Mercury EF	Zinc mg/kg, dry	Zinc EF	DRO/RRO mg/kg,dry	DRO+RRO EF	Phenol µg/kg, dry	Phenol EF	Benzyl alcohol µg/kg, dry	Benzyl alcohol EF	2-Methyl-phenol µg/kg, dry	2-Methyl-phenol EF
Screening Levels	1	410	1	2000	1	420	1	57	1	63	1
ICS-DSS-01-SE	**0.4**	**125**	**0.3**	**634**	**0.3**	**35 J**	**0.1**	58 U	1.0	14 U	0.2
ICS-DSS-02-SE	**0.3**	**98**	**0.2**	**332**	**0.2**	55 U	**0.1**	55 U	1.0	14 U	0.2
ICS-DSS-03-SE	**1.1**	**289**	**0.7**	**560**	**0.3**	**28**	**0.1**	**62**	**1.1**	**5 J**	0.1
ICS-DSS-04-SE	**5.9**	**1270**	**3.1**	**4400**	**2.2**	83 U	**0.2**	83 U	1.5	21.0 U	0.3
ICS-DSS-05-SE	**0.7**	**190**	**0.5**	**316**	**0.2**	**18 J**	**0.0**	**29**	0.5	5.0 U	0.1
ICS-DSS-06-SE	**18.8**	**400**	**1.0**	**2170**	**1.1**	**88**	**0.2**	**25**	0.4	**16**	0.3
ICS-DSS-07-SE	**0.6**	**141**	**0.3**	**100**	**0.1**	19 U	**0.0**	**9 J**	0.2	4.7 U	0.1
ICS-DSS-08-SE	**9.3**	**195**	**0.5**	**820**	**0.4**	**55**	**0.1**	**12 J**	0.2	**4.9**	0.1
ICS-DSS-09-SE	**34.9**	**1220**	**3.0**	**21700**	**10.9**	**650 J**	**1.5**	**640 J**	**11.2**	**620**	**9.8**
ICS-DSS-10-SE	**0.5**	**74**	**0.2**	**70**	**0.0**	18 U	**0.0**	**7 J**	0.1	4.6 U	0.1
ICS-DSS-11-SE	**1.7**	**281**	**0.7**	**276**	**0.1**	**66**	**0.2**	**18 J**	0.3	**12**	0.2
ICS-DSS-12-SE	**0.4**	**3820**	**9.3**	**54000**	**27.0**	**5700**	**13.6**	**20,000**	**351**	440 U	7.0
ICS-DSS-13-SE	**0.3**	**52**	**0.1**	**133**	**0.1**	**14 J**	**0.0**	**7 J**	0.1	4.7 U	0.1
ICS-DSS-14-SE	**0.4**	**188**	**0.5**	**154**	**0.1**	**31 J**	**0.1**	**40**	0.7	**2.8 J**	0.0
ICS-DSS-15-SE	**0.5**	**168**	**0.4**	**348**	**0.2**	**28**	**0.1**	**30**	0.5	**3.8 J**	0.1
ICS-DSS-16-SE	**0.1**	**66**	**0.2**	**43.5**	**0.0**	19 U	**0.0**	**9 J**	0.1	4.8 U	0.1
ICS-DSS-17-SE	**0.4**	**75**	**0.2**	**124**	**0.1**	**16 J**	**0.0**	**7 J**	0.1	**21**	0.3
ICS-DSS-18-SE	**0.5**	**150**	**0.4**	**101**	**0.1**	**12 J**	**0.0**	**21**	0.4	4.7 U	0.1
ICS-DSS-19-SE	**4.2**	**318**	**0.8**	**950**	**0.5**	**140 J**	**0.3**	**110**	**1.9**	**22**	0.3
ICS-DSS-20-SE	**0.4**	**109**	**0.3**	**116**	**0.1**	**44 J**	**0.1**	**52**	0.9	4.7 U	0.1
ICS-DSS-21-SE	**1.3**	**146**	**0.4**	**199**	**0.1**	**67 J**	**0.2**	**200**	**3.5**	**18**	0.3
ICS-DSS-22-SE	**0.4**	**81**	**0.2**	**228**	**0.1**	**11 J**	**0.0**	**10 J**	0.2	4.8 U	0.1
ICS-DSS-23-SE	**0.2**	**58**	**0.1**	**129**	**0.1**	20 U	**0.0**	**8 J**	0.1	4.9 U	0.1
ICS-DSS-24-SE	**0.5**	**117**	**0.3**	**232**	**0.1**	19 U	**0.0**	**84**	1.5	**3.5 J**	0.1
ICS-DSS-25-SE	**0.8**	**130**	**0.3**	**307**	**0.2**	**32**	**0.1**	**170**	**3.0**	4.9 U	0.1
ICS-DSS-26-SE	**2.0**	**1340**	**3.3**	**234**	**0.1**	**190 J**	**0.5**	**33**	0.6	**43**	0.7
ICS-DSS-27-SE	**2.2**	**242**	**0.6**	**670**	**0.3**	**35 J**	**0.1**	**19**	0.3	**6.6**	0.1
ICS-DSS-28-SE	**0.8**	**121**	**0.3**	**740**	**0.4**	**28 J**	**0.1**	**51**	0.9	4.7 U	0.1
ICS-DSS-29-SE	**0.1**	**100**	**0.2**	**131**	**0.1**	18 U	**0.0**	**7 J**	0.1	4.6 U	0.1
ICS-DSS-30-SE	**0.1**	**62**	**0.2**	**14**	**0.0**	19 U	**0.0**	**10 J**	0.2	4.8 U	0.1
ICS-DUP-13-SE	**0.3**	**55**	**0.1**	**107**	**0.1**	**14 J**	**0.0**	**9 J**	0.2	4.8 U	0.1
ICS-DUP-04-SE	**5.4**	**1590**	**3.9**	**4000**	**2.0**	**50 J**	**0.1**	**34 J**	0.6	**12 J**	0.2

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	Mercury EF	Zinc mg/kg, dry	Zinc EF	DRO/RRO mg/kg,dry	DRO+RRO EF	Phenol µg/kg, dry	Phenol EF	Benzyl alcohol µg/kg, dry	Benzyl alcohol EF	2-Methyl-phenol µg/kg, dry	2-Methyl-phenol EF
Number of Samples(a)	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	**10**	**4**	**4**	**4**	**4**	**2**	**2**	**6**	**6**	**1**	**1**
% Exceed	**33.3%**	**13.3%**	**13.3%**	**13.3%**	**13.3%**	**6.7%**	**6.7%**	**20.0%**	**20.0%**	**3.3%**	**3.3%**
Maximum	**34.9**	**3820**	**9.3**	**54000**	**27.0**	**5700**	**13.6**	**20000**	**351**	**620**	**9.8**
Minimum	**0.1**	**52.0**	**0.1**	**14.0**	**0.0**	**11.0**	**0.0**	**7.1**	**0.1**	**2.8**	**0.0**

Notes:

J = estimate associated with value less than the verifiable lower quantitation limit
U = nondetected at the associated lower reporting limit.
2,3,7,8-TCDD - TEQ (TCDD toxicity equivalence) based on WHO 2005 relative toxicity factors.
cPAH TEQ based on Ecology guidance
EF - Exceedance Factor
TEQ - Toxicity Equivalency Quotient
BaPEq. - Benzo(a)pyrene equivalent concentration
DRO+RRO - Diesel- + Motor Oil-Range Organics
[yellow box] *Concentration exceeds screening level*
(a) - Not include duplicates

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	4-Methyl-phenol µg/kg, dry	4-Methyl-phenol EF	2,4-Dimethyl-phenol µg/kg, dry	2,4-Dimethyl-phenol EF	Benzoic acid µg/kg, dry	Benzoic acid EF	Pentachloro-phenol µg/kg, dry	Pentachloro-phenol EF	Benzo(a)-anthracene µg/kg, dry	Chrysene µg/kg, dry
Screening Levels	670	1	29	1	650	1	360	1	BaPEq	BaPEq
ICS-DSS-01-SE	**70 J**	0.1	**29 J**	1.0	1200 U	1.8	**150 J**	**0.4**	**3500**	**3800**
ICS-DSS-02-SE	110 U	0.2	55 U	1.9	1100 U	1.7	140 U	**0.4**	**470**	**680**
ICS-DSS-03-SE	**13 J**	0.0	**5 J**	0.2	**160 J**	0.2	**56**	**0.2**	**340**	**770**
ICS-DSS-04-SE	**79 J**	0.1	**50 J**	**1.7**	1700 U	2.6	**360**	**1.0**	**190**	**410**
ICS-DSS-05-SE	**14 J**	0.0	20 U	0.7	400 U	0.6	**22 J**	**0.1**	**110**	**310**
ICS-DSS-06-SE	**32 J**	0.0	**11 J**	0.4	**250 J**	0.4	**820**	**2.3**	**35**	**110**
ICS-DSS-07-SE	37 U	0.1	19 U	0.7	370 U	0.6	**25 J**	**0.1**	**20**	**36**
ICS-DSS-08-SE	**14 J**	0.0	**5 J**	0.2	**210 J**	0.3	**920**	**2.6**	**72**	**130**
ICS-DSS-09-SE	**1900**	**2.8**	**830**	**28.6**	14000 U	21.5	**6500 J**	**18.1**	**2700**	**5200**
ICS-DSS-10-SE	37 U	0.1	18 U	0.6	370 U	0.6	**48 J**	**0.1**	**12**	**19**
ICS-DSS-11-SE	**42**	0.1	**14 J**	0.5	**330 J**	0.5	**290**	**0.8**	**80**	**130**
ICS-DSS-12-SE	3500 U	5.2	**4400**	**152**	35000 U	53.8	**1000 J**	**2.8**	**130000**	**180000**
ICS-DSS-13-SE	38 U	0.1	19 U	0.7	380 U	0.6	**45 J**	**0.1**	**76**	**87**
ICS-DSS-14-SE	39 U	0.1	20 U	0.7	**230 J**	0.4	**21 J**	**0.1**	**47**	**100**
ICS-DSS-15-SE	**27 J**	0.0	**3 J**	0.1	**120 J**	0.2	**51**	**0.1**	**53**	**98**
ICS-DSS-16-SE	39 U	0.1	19 U	0.7	390 U	0.6	48 U	**0.1**	19	19
ICS-DSS-17-SE	**12 J**	0.0	**3 J**	0.1	370 U	0.6	**24 J**	**0.1**	**42**	**66**
ICS-DSS-18-SE	38 U	0.1	19 U	0.7	380 U	0.6	**15 J**	**0.0**	**34**	**67**
ICS-DSS-19-SE	**90**	0.1	**20 J**	0.7	**380 J**	0.6	**400**	**1.1**	**260**	**460**
ICS-DSS-20-SE	**11 J**	0.0	**3 J**	0.1	**1200**	**1.8**	47 U	**0.1**	**160**	**370**
ICS-DSS-21-SE	**29 J**	0.0	**9 J**	0.3	**360 J**	0.6	**65 J**	**0.2**	**200**	**340**
ICS-DSS-22-SE	38 U	0.1	**3 J**	0.1	380 U	0.6	48 U	**0.1**	**63**	**81**
ICS-DSS-23-SE	39 U	0.1	20 U	0.7	390 U	0.6	49 U	**0.1**	**71**	**92**
ICS-DSS-24-SE	**14 J**	0.0	**3 J**	0.1	**190 J**	0.3	**18 J**	**0.1**	**96**	**190**
ICS-DSS-25-SE	**18 J**	0.0	**3 J**	0.1	**250 J**	0.4	**28 J**	**0.1**	**100**	**160**
ICS-DSS-26-SE	**71**	0.1	**13 J**	0.4	**610**	0.9	**400**	**1.1**	**170**	**240**
ICS-DSS-27-SE	**17 J**	0.0	**6 J**	0.2	**220 J**	0.3	**140 J**	**0.4**	**250**	**360**
ICS-DSS-28-SE	**17 J**	0.0	**4 J**	0.1	**120 J**	0.2	47 U	**0.1**	**43**	**50**
ICS-DSS-29-SE	37 U	0.1	18 U	0.6	370 U	0.6	46 U	**0.1**	**18**	**45**
ICS-DSS-30-SE	38 U	0.1	19 U	0.7	380 U	0.6	48 U	**0.1**	19	**15**
ICS-DUP-13-SE	38 U	0.1	19 U	0.7	380 U	0.6	**27 J**	**0.1**	**60**	**77**
ICS-DUP-04-SE	**46 J**	0.1	**34 J**	**1.2**	**940 J**	**1.4**	**400**	**1.1**	**120**	**180**

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	4-Methyl-phenol µg/kg, dry	4-Methyl-phenol EF	2,4-Dimethyl-phenol µg/kg, dry	2,4-Dimethyl-phenol EF	Benzoic acid µg/kg, dry	Benzoic acid EF	Pentachloro-phenol µg/kg, dry	Pentachloro-phenol EF	Benzo(a)-anthracene µg/kg, dry	Chrysene µg/kg, dry
Number of Samples(a)	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	**1**	**1**	**3**	**3**	**2**	**2**	**7**	**7**	**TEQ**	**TEQ**
% Exceed	**3.3%**	**3.3%**	**10.0%**	**10.0%**	**6.7%**	**6.7%**	**23.3%**	**23.3%**	**TEQ**	**TEQ**
Maximum	**3500**	**2.8**	**4400**	**152**	**35000**	**1.8**	**6500**	**18.1**	**130000**	**180000**
Minimum	**11.0**	**0.0**	**3.0**	**0.1**	**120.0**	**0.2**	**15.0**	**0.0**	**12**	**15**

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*
U = nondetected at the associated lower reporting limit.
2,3,7,8-TCDD - TEQ (TCDD toxicity equivalence) based on WHO 2005 relative toxicity factors.
cPAH TEQ based on Ecology guidance
EF - Exceedance Factor
TEQ - Toxicity Equivalency Quotient
BaPEq. - Benzo(a)pyrene equivalent concentration
[yellow box] *Concentration exceeds screening level*
(a) - Not include duplicates

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	total Benzo-fluoranthenes µg/kg, dry	Benzo(a)-pyrene µg/kg, dry	Indeno(1,2,3-cd)pyrene µg/kg, dry	Dibenz(a,h)-anthracene µg/kg, dry	BaPEq. (TEQ) µg/kg, dry	BaPEq. (TEQ) EF	Total Detected PCBs µg/kg, dry	Total Detected PCBs EF	2,3,7,8-TCDD - TEQ ND=0 ng/kg, dry	2,3,7,8-TCDD - TEQ ND/2 ng/kg, dry
Screening Levels	BaPEq	BaPEq	BaPEq	BaPEq	90	1	2	1	2	2
ICS-DSS-01-SE	**5000**	**3000**	**1200**	**510**	**4518**	**50.2**	**1190**	**595**	-----	-----
ICS-DSS-02-SE	**940**	**440**	**270**	**140**	**755**	**8.4**	**570**	**285**	**28.8**	**28.8**
ICS-DSS-03-SE	**850**	**260**	**140**	**70**	**471**	**5.2**	**1540**	**770**	-----	-----
ICS-DSS-04-SE	**470**	**220**	**140**	**71**	**375**	**4.2**	**27,800**	**13900**	-----	-----
ICS-DSS-05-SE	**360**	**95**	**51**	**27**	**177**	**2.0**	**6400**	**3200**	-----	-----
ICS-DSS-06-SE	**180**	**150**	**61**	**17**	**196**	**2.2**	**15,300**	**7650**	-----	-----
ICS-DSS-07-SE	**52**	**24**	**19**	**10**	**43**	**0.5**	**591**	**295.5**	-----	-----
ICS-DSS-08-SE	**190**	**78**	**110**	**37**	**154**	**1.7**	**3400**	**1700**	**304**	**304**
ICS-DSS-09-SE	**3300**	**1800**	**900**	**580**	**3122**	**34.7**	**194,000**	**97000**	-----	-----
ICS-DSS-10-SE	**30**	**13**	**9.2**	18	**18**	**0.2**	**1920**	**960**	-----	-----
ICS-DSS-11-SE	**190**	**96**	**65**	**21**	**152**	**1.7**	**5300**	**2650**	-----	-----
ICS-DSS-12-SE	**120000**	**71000**	**21000**	**13000**	**112900**	**1254**	**22,500**	**11250**	-----	-----
ICS-DSS-13-SE	**130**	**76**	**43**	**13**	**115**	**1.3**	**710**	**355**	-----	-----
ICS-DSS-14-SE	**140**	**46**	**38**	**14**	**84**	**0.9**	**582**	**291**	-----	-----
ICS-DSS-15-SE	**140**	**52**	**38**	**20**	**96**	**1.1**	**2100**	**1050**	-----	-----
ICS-DSS-16-SE	**14**	19	19	19	**1.4**	**0.02**	**42**	**21**	-----	-----
ICS-DSS-17-SE	**98**	**41**	18	18	**56**	**0.6**	**740**	**370**	-----	-----
ICS-DSS-18-SE	**140**	**44**	**34**	19	**65**	**0.7**	**500**	**250**	-----	-----
ICS-DSS-19-SE	**730**	**350**	**190**	**99**	**572**	**6.4**	**12,500**	**6250**	**396**	**396**
ICS-DSS-20-SE	**300**	**82**	**51**	**21**	**158**	**1.8**	**790**	**395**	-----	-----
ICS-DSS-21-SE	**410**	**180**	**110**	**53**	**308**	**3.4**	**1520**	**760**	-----	-----
ICS-DSS-22-SE	**110**	**56**	**34**	**11**	**89**	**1.0**	**1700**	**850**	-----	-----
ICS-DSS-23-SE	**110**	**41**	**27**	20	**63**	**0.7**	**560**	**280**	-----	-----
ICS-DSS-24-SE	**230**	**94**	**50**	**26**	**160**	**1.8**	**1710**	**855**	-----	-----
ICS-DSS-25-SE	**240**	**100**	**58**	**20**	**161**	**1.8**	**1450**	**725**	-----	-----
ICS-DSS-26-SE	**420**	**200**	**160**	**47**	**324**	**3.6**	**4170**	**2085**	-----	-----
ICS-DSS-27-SE	**580**	**280**	**170**	**77**	**461**	**5.1**	**5800**	**2900**	-----	-----
ICS-DSS-28-SE	**77**	**28**	**18**	19	**42**	**0.5**	**2880**	**1440**	-----	-----
ICS-DSS-29-SE	**54**	**19**	**17**	18	**28**	**0.3**	**59**	**29.5**	-----	-----
ICS-DSS-30-SE	**26**	19	**10**	19	**4**	**0.04**	**174**	**87**	-----	-----
ICS-DUP-13-SE	**100**	**54**	**36**	**12**	**86**	**1.0**	**730**	**365**	-----	-----
ICS-DUP-04-SE	**290**	**180**	**120**	**71**	**306**	**3.4**	**32,000**	**16000**	-----	-----

TABLE A5.2 - Exceedance Factors - Constituents w/ Dry Weight Screening Levels
Embayment Surface Sediments

Sample Location	total Benzo-fluoranthenes µg/kg, dry	Benzo(a)-pyrene µg/kg, dry	Indeno(1,2,3-cd)pyrene µg/kg, dry	Dibenz(a,h)-anthracene µg/kg, dry	BaPEq. (TEQ) µg/kg, dry	BaPEq. (TEQ) EF	Total Detected PCBs µg/kg, dry	Total Detected PCBs EF	2,3,7,8-TCDD - TEQ ND=0 ng/kg, dry	2,3,7,8-TCDD - TEQ ND/2 ng/kg, dry
Number of Samples(a)	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**3**	**3**
No. Exceed.	**TEQ**	**TEQ**	**TEQ**	**TEQ**	**19**	**19**	**30**	**30**	**3**	**3**
% Exceed	**TEQ**	**TEQ**	**TEQ**	**TEQ**	**63.3%**	**63.3%**	**100%**	**100%**	**100%**	**100%**
Maximum	**120000**	**71000**	**21000**	**13000**	**112900**	**1254**	**194000**	**97000**	**396**	**396**
Minimum	**14**	**13**	**9.2**	**10**	**1.4**	**0.02**	**42.0**	**21.0**	**28.8**	**28.8**

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

2,3,7,8-TCDD - TEQ (TCDD toxicity equivalence) based on WHO 2005 relative toxicity factors.

cPAH TEQ based on Ecology guidance

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

BaPEq. - Benzo(a)pyrene equivalent concentration

(yellow box) Concentration exceeds screening level

(a) - Not include duplicates

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Collection Date	ARI Delivery Group	TOC	1,4-Dichlorobenzene			1,2-Dichlorobenzene			1,2,4-Trichlorobenzene		
			Percent	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels				(a) 110(c)	3100	1	(a) 35(c)	2300	1	(a) 31(c)	810	1
ICS-DSS-01-SE	12/10/12	VW14	2.65	14 U	528	0.17	14 U	528	0.23	14 U	528	0.65
ICS-DSS-02-SE	7/3/12	VB16	3.24	14 U	432	0.14	14 U	432	0.19	14 U	432	0.53
ICS-DSS-03-SE	7/3/12	VB16	3.45	**4.1 J**	**119**	**0.04**	5 U	139	0.06	19 U	551	0.68
ICS-DSS-04-SE	7/3/12	VB16	2.83	21 U	742	0.24	21 U	742	0.32	**15 J**	**530**	**0.65**
ICS-DSS-05-SE	7/3/12	VB16	2.62	**4.4 J**	**168**	**0.05**	5 U	191	0.08	5 U	191	0.24
ICS-DSS-06-SE	7/3/12	VB16	5.55	**3.4 J**	**61**	**0.02**	**6.3**	**114**	**0.05**	**6.8**	**123**	**0.15**
ICS-DSS-07-SE	7/3/12	VB16	3.34	5 U	141	0.05	**3.4 J**	**102**	**0.04**	5 U	141	0.17
ICS-DSS-08-SE	7/3/12	VB16	2.92	**12**	**411**	**0.13**	**13**	**445**	**0.19**	**3.6 J**	**123**	**0.15**
ICS-DSS-09-SE (c)	7/3/12	VB16	18.1	**7600**	AET = 110	**69**	**12,000**	AET=35	**343**	**1400**	AET=31	**45**
ICS-DSS-10-SE	7/3/12	VB16	0.553	5 U	832	0.27	5 U	832	0.36	5 U	832	1.03
ICS-DSS-11-SE	7/3/12	VB16	2.73	**4.8**	**176**	**0.06**	**9.4**	**344**	**0.15**	**15**	**549**	**0.68**
ICS-DSS-12-SE(c)	7/3/12	VB16	30.9	440 U	AET = 110	nd	**1000**	AET=35	**29**	440 U	AET=31	nd
ICS-DSS-13-SE	7/3/12	VB16	1.85	**3.9 J**	**211**	**0.07**	**4.1 J**	**222**	**0.10**	**12**	**649**	**0.80**
ICS-DSS-14-SE	7/2/12	VB00	4.96	5 U	99	0.03	5 U	99	0.04	5 U	99	0.12
ICS-DSS-15-SE	7/3/12	VB16	4.25	**4.3 J**	**101**	**0.03**	**4.3 J**	**101**	**0.04**	5 U	118	0.15
ICS-DSS-16-SE	7/2/12	VB00	1.05	5 U	457	0.15	5 U	457	0.20	5 U	457	0.56
ICS-DSS-17-SE	7/2/12	VB00	2.32	5 U	198	0.06	5 U	198	0.09	5 U	198	0.24
ICS-DSS-18-SE	7/2/12	VB00	2.66	5 U	177	0.06	5 U	177	0.08	5 U	177	0.22
ICS-DSS-19-SE	7/2/12	VB00	2.93	**30**	**1024**	**0.33**	**17**	**580**	**0.25**	**22**	**751**	**0.93**
ICS-DSS-20-SE	7/2/12	VB00	1.54	5 U	305	0.10	5 U	305	0.13	5 U	305	0.38
ICS-DSS-21-SE	7/2/12	VB00	1.92	**8.1**	**422**	**0.14**	**3.0 J**	**156**	**0.07**	**2.9 J**	**151**	**0.19**
ICS-DSS-22-SE	7/2/12	VB00	1.22	**4.6 J**	**377**	**0.12**	5 U	393	0.17	4.8 U	393	0.49
ICS-DSS-23-SE	7/2/12	VB00	1.42	5 U	345	0.11	5 U	345	0.15	**4.6 J**	**324**	**0.40**
ICS-DSS-24-SE	7/3/12	VB16	2.64	**3.5 J**	**133**	**0.04**	5 U	182	0.08	4.8 U	182	0.22
ICS-DSS-25-SE	7/3/12	VB16	3.48	**5 U**	**155**	**0.05**	**3.8 J**	**109**	**0.05**	**3.0 J**	**86**	**0.11**
ICS-DSS-26-SE	7/2/12	VB00	2.63	**9 U**	**323**	**0.10**	**16**	**608**	**0.26**	**36**	**1369**	**1.69**
ICS-DSS-27-SE	7/2/12	VB00	2.92	**4.4 J**	**151**	**0.05**	**3.6 J**	**123**	**0.05**	**7.0**	**240**	**0.30**
ICS-DSS-28-SE	7/2/12	VB00	2.24	**5.8**	**259**	**0.08**	**2.4 J**	**107**	**0.05**	**3.6 J**	**161**	**0.20**
ICS-DSS-29-SE	7/2/12	VB00	1.93	5 U	238	0.08	5 U	238	0.10	4.6 U	238	0.29
ICS-DSS-30-SE	7/2/12	VB00	0.442	4.8 U	1086	0.35	4.8 U	1086	0.47	4.8 U	1086	1.3

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Collection Date	ARI Delivery Group	TOC Percent	1,4-Dichlorobenzene			1,2-Dichlorobenzene			1,2,4-Trichlorobenzene		
				µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels				(a) 110(c)	3100	1	(a) 35(c)	2300	1	(a) 31(c)	810	1
ICS-DUP-13-SE	7/3/12	VB16	1.55	**2.5 J**	161	0.05	5 U	310	0.13	**8.4**	**542**	**0.67**
ICS-DUP-04-SE	7/3/12	VB16	7.86	21 U	AET = 110	0.19	21 U	AET=35	0.60	**20 J**	AET=31	**0.65**
No. Spls.				**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.				-----	1	1	-----	2	2	-----	1	1
% Exceed				-----	-----	3.3%	-----	-----	6.7%	-----	-----	3.3%
Maximum				7600	1086	69.00	12000	1086	343	1400	1369	45
Minimum				15.00	1077.84	0.01	2.40	98.79	0.04	2.90	86.21	0.11

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level (yellow box)

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

ICS/NW Cooperage Site
Seattle, WA

Sample Location	Naphthalene			2-Methylnaphthalene			Dimethylphthalate			Acenaphthylene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 2100(c)	99000	1	(a) 670(c)	38000	1	(a) 71(c)	53000	1	(a) 1300(c)	66000	1
ICS-DSS-01-SE	**52 J**	**1962**	**0.02**	**38 J**	**1434**	**0.04**	58 U	22	0.00	58 U	2189	0.03
ICS-DSS-02-SE	55 U	1698	0.02	55 U	1698	0.04	55 U	17	0.00	55 U	1698	0.03
ICS-DSS-03-SE	**18 J**	**522**	**0.01**	**16 J**	**464**	**0.01**	19 U	6	0.00	**31**	**899**	**0.01**
ICS-DSS-04-SE	**79 J**	**2792**	**0.03**	**75 J**	**2650**	**0.07**	**180**	**64**	**0.00**	**58 J**	**2049**	**0.03**
ICS-DSS-05-SE	20 U	763	0.01	20 U	763	0.02	**11 J**	**4**	**0.00**	**23**	**878**	**0.01**
ICS-DSS-06-SE	**43**	**775**	**0.01**	**80**	**1441**	**0.04**	**54**	**10**	**0.00**	**11 J**	**342**	**0.01**
ICS-DSS-07-SE	19 U	569	0.01	19 U	569	0.01	19 U	6	0.00	19 U	359	0.01
ICS-DSS-08-SE	**47**	**1610**	**0.02**	**52**	**1781**	**0.05**	**500**	**17123**	**0.32**	**12 J**	**22260**	**0.34**
ICS-DSS-09-SE (c)	**12,000**	AET=2100	**5.7**	**13,000**	AET=670	**19**	720 U	AET=71	nd	**650 J**	AET=1300	**0.50**
ICS-DSS-10-SE	**62**	**11212**	**0.11**	**12 J**	**2170**	**0.06**	18 U	3255	0.06	18 U	3436	0.05
ICS-DSS-11-SE	**130**	**4762**	**0.05**	**100**	**3663**	**0.10**	**60**	**2198**	**0.04**	19 U	318681	nd
ICS-DSS-12-SE(c)	**120,000**	AET=2100	**57**	**50,000**	AET=670	**75**	1700 U	AET=71	nd	**8700**	AET=1300	**6.7**
ICS-DSS-13-SE	**110**	**5946**	**0.06**	**62**	**3351**	**0.09**	19 U	1027	0.02	**17 J**	**595**	**0.01**
ICS-DSS-14-SE	**20**	**403**	**0.00**	**18 J**	**363**	**0.01**	**10 J**	**196**	**0.00**	**11 J**	**403**	**0.01**
ICS-DSS-15-SE	**15 J**	**353**	**0.00**	**15 J**	**353**	**0.01**	20 U	471	0.01	20 U	471	0.01
ICS-DSS-16-SE	19 U	1810	0.02	19 U	1810	0.05	19 U	1810	0.03	19 U	1810	0.03
ICS-DSS-17-SE	**130**	**5603**	**0.06**	**35**	**1509**	**0.04**	**12 J**	**517**	**0.01**	**11 J**	**474**	**0.01**
ICS-DSS-18-SE	19 U	714	0.01	19 U	714	0.02	19 U	714	0.01	19 U	714	0.01
ICS-DSS-19-SE	**92**	**3140**	**0.03**	**120**	**4096**	**0.11**	**68**	**2321**	**0.04**	**25**	**853**	**0.01**
ICS-DSS-20-SE	**18 J**	**1169**	**0.01**	**17 J**	**1104**	**0.03**	**2900**	**188312**	**3.6**	**10 J**	**649**	**0.01**
ICS-DSS-21-SE	**41**	**2135**	**0.02**	**35**	**1823**	**0.05**	**20**	**1042**	**0.02**	**15 J**	**781**	**0.01**
ICS-DSS-22-SE	**64**	**5246**	**0.05**	**21**	**1721**	**0.05**	19 U	1557	0.03	**12 J**	**984**	**0.01**
ICS-DSS-23-SE	**110**	**7746**	**0.08**	**36**	**2535**	**0.07**	**9.8 J**	**690**	**0.01**	20 U	1408	0.02
ICS-DSS-24-SE	**20**	**758**	**0.01**	**14 J**	**530**	**0.01**	19 U	720	0.01	**13**	**492**	**0.01**
ICS-DSS-25-SE	**20**	**575**	**0.01**	**15 J**	**431**	**0.01**	20 U	575	0.01	20 U	575	0.01
ICS-DSS-26-SE	**180**	**6844**	**0.07**	**150**	**5703**	**0.15**	**82**	**3118**	**0.06**	**12**	**456**	**0.01**
ICS-DSS-27-SE	**78**	**2671**	**0.03**	**68**	**2329**	**0.06**	**100**	**3425**	**0.06**	**54**	**1849**	**0.03**
ICS-DSS-28-SE	**21**	**938**	**0.01**	**21**	**938**	**0.02**	19 U	848	0.02	19 U	848	0.01
ICS-DSS-29-SE	18 U	933	0.01	18 U	933	0.02	18 U	933	0.02	18 U	933	0.01
ICS-DSS-30-SE	19 U	4299	0.04	19 U	4299	0.1131	19 U	4299	0.0811	19 U	4299	0.07

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Naphthalene			2-Methylnaphthalene			Dimethylphthalate			Acenaphthylene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 2100(c)	99000	1	(a) 670(c)	38000	1	(a) 71(c)	53000	1	(a) 1300(c)	66000	1
ICS-DUP-13-SE	**82**	**5290**	**0.05**	**45**	**2903**	**0.08**	19 U	1226	0.02	**11 J**	**710**	**0.01**
ICS-DUP-04-SE	**96**	AET=2100	**0.04**	**100**	AET=670	**0.15**	**67 J**	AET=71	**0.94**	**50 J**	AET=1300	**0.04**
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	2	-----	-----	2	-----	-----	1	-----	-----	1
% Exceed	-----	-----	6.7%	-----	-----	6.7%	-----	-----	3.3%	-----	-----	3.3%
Maximum	120000	11212	57.0	50000	5703	75.0	2900	188312	3.6	8700	318681	6.7
Minimum	15.00	353	0.00	12.00	353	0.01	9.70	4	0.00	10.00	342	0.01

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Acenaphthene			Dibenzofuran			Diethylphthalate		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 500(c)	16000	1	(a) 540(c)	15000	1	(a) 200(c)	61000	1
ICS-DSS-01-SE	**260**	**9811**	**0.61**	**67**	**2528**	**0.17**	140 U	5283	0.09
ICS-DSS-02-SE	**100**	**3086**	**0.19**	**30 J**	**926**	**0.06**	140 U	4321	0.07
ICS-DSS-03-SE	**22**	**638**	**0.04**	**18 J**	**522**	**0.03**	48 U	1391	0.02
ICS-DSS-04-SE	83 U	2933	0.18	83 U	2933	0.20	210 U	7420	0.12
ICS-DSS-05-SE	20 U	763	0.05	20 U	763	0.05	50 U	1908	0.03
ICS-DSS-06-SE	20 U	360	0.02	20 U	360	0.02	50 U	901	0.01
ICS-DSS-07-SE	19 U	569	0.04	19 U	569	0.04	47 U	1407	0.02
ICS-DSS-08-SE	19 U	651	0.04	**12 J**	**411**	**0.03**	48 U	1644	0.03
ICS-DSS-09-SE (c)	**4600**	AET=500	**9.2**	**3800**	AET=540	**7.0**	1800 U	AET=200	nd
ICS-DSS-10-SE	18 U	3255	0.20	18 U	3255	0.22	46 U	8318	0.14
ICS-DSS-11-SE	19 U	696	0.04	**60**	**2198**	**0.15**	48 U	1758	0.03
ICS-DSS-12-SE(c)	**39,000**	AET=500	**78**	**26,000**	AET=540	**48**	4400 U	AET=200	nd
ICS-DSS-13-SE	**13 J**	**703**	**0.04**	**30**	**1622**	**0.11**	47 U	2541	0.04
ICS-DSS-14-SE	20 U	403	0.03	20 U	403	0.03	49 U	988	0.02
ICS-DSS-15-SE	20 U	471	0.03	20 U	471	0.03	50 U	1176	0.02
ICS-DSS-16-SE	19 U	1810	0.11	19 U	1810	0.12	48 U	4571	0.07
ICS-DSS-17-SE	18 U	776	0.05	**34**	**1466**	**0.10**	46 U	1983	0.03
ICS-DSS-18-SE	19 U	714	0.04	19 U	714	0.05	**39 J**	**1466**	**0.02**
ICS-DSS-19-SE	**49**	**1672**	**0.10**	**33**	**1126**	**0.08**	**36 J**	**1229**	**0.02**
ICS-DSS-20-SE	19 U	1234	0.08	**15 J**	**974**	**0.06**	47 U	3052	0.05
ICS-DSS-21-SE	**44**	**2292**	**0.14**	**24**	**1250**	**0.08**	47 U	2448	0.04
ICS-DSS-22-SE	**31**	**2541**	**0.16**	**20**	**1639**	**0.11**	48 U	3934	0.06
ICS-DSS-23-SE	**190**	**13380**	**0.84**	**220**	**15493**	**1.03**	49 U	3451	0.06
ICS-DSS-24-SE	**9.7 J**	**367**	**0.02**	**14 J**	**530**	**0.04**	48 U	1818	0.03
ICS-DSS-25-SE	20 U	575	0.04	**11 J**	**316**	**0.02**	49 U	1408	0.02
ICS-DSS-26-SE	**36**	**1369**	**0.09**	**52**	**1977**	**0.13**	46 U	1749	0.03
ICS-DSS-27-SE	**10 J**	**342**	**0.02**	**27**	**925**	**0.06**	46 U	1575	0.03
ICS-DSS-28-SE	19 U	848	0.05	**14 J**	**625**	**0.04**	47 U	2098	0.03
ICS-DSS-29-SE	18 U	933	0.06	18 U	933	0.06	46 U	2383	0.04
ICS-DSS-30-SE	19 U	4299	0.27	19 U	4299	0.29	48 U	10860	0.18

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Acenaphthene			Dibenzofuran			Diethylphthalate		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 500(c)	16000	1	(a) 540(c)	15000	1	(a) 200(c)	61000	1
ICS-DUP-13-SE	19 U	1226	0.08	**21**	**1355**	**0.09**	48 U	3097	0.05
ICS-DUP-04-SE	84 U	AET=500	0.17	84 U	AET=540	0.16	210 U	AET=200	nd
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	2	-----	-----	2	-----	-----	0
% Exceed	-----	-----	6.7%	-----	-----	6.7%	-----	-----	0.0%
Maximum	39000	13380	78.0	26000	15493	48.0	4400	10860	0.2
Minimum	9.70	342	0.02	11.00	316	0.02	36.00	901	0.01

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level (yellow box)

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Fluorene			N-Nitrosodiphenylamine			Phenanthrene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 540(c)	23000	1	(a) 28(c)	11000	1	(a) 1500(c)	100000	1
ICS-DSS-01-SE	**220**	**8302**	**0.36**	58 U	2189	0.20	**3700**	**139623**	**1.40**
ICS-DSS-02-SE	**66**	**2037**	**0.09**	55 U	1698	0.15	**710**	**21914**	**0.22**
ICS-DSS-03-SE	**23**	**667**	**0.03**	19 U	551	0.05	**270**	**7826**	**0.08**
ICS-DSS-04-SE	83 U	2933	0.13	**32 J**	**1131**	**0.10**	**460**	**16254**	**0.16**
ICS-DSS-05-SE	**12 J**	**458**	**0.02**	**4 J**	**134**	**0.01**	**390**	**14885**	**0.15**
ICS-DSS-06-SE	20 U	360	0.02	**14 J**	**252**	**0.02**	**74**	**1333**	**0.01**
ICS-DSS-07-SE	19 U	569	0.02	19 U	569	0.05	**29**	**868**	**0.01**
ICS-DSS-08-SE	**10 J**	**342**	**0.01**	**9.1 J**	**312**	**0.03**	**110**	**3767**	**0.04**
ICS-DSS-09-SE (c)	**6200**	AET=540	**12**	**4000**	AET=28	**143**	**14,000**	AET=1500	**9.3**
ICS-DSS-10-SE	18 U	3255	0.14	18 U	3255	0.30	**28**	**5063**	**0.05**
ICS-DSS-11-SE	**14 J**	**513**	**0.02**	**14 J**	**513**	**0.05**	**200**	**7326**	**0.07**
ICS-DSS-12-SE(c)	**58,000**	AET=540	**107**	**4800**	AET=28	**171**	**380,000**	AET=1500	**253**
ICS-DSS-13-SE	**25**	**1351**	**0.06**	**11 J**	**595**	**0.05**	**180**	**9730**	**0.10**
ICS-DSS-14-SE	20 U	403	0.02	**3.5 J**	**71**	**0.01**	**60**	**1210**	**0.01**
ICS-DSS-15-SE	20 U	471	0.02	**3.3 J**	**78**	**0.01**	**61**	**1435**	**0.01**
ICS-DSS-16-SE	19 U	1810	0.08	19 U	1810	0.16	**19 U**	**1810**	**0.02**
ICS-DSS-17-SE	18 U	776	0.03	**2.9 J**	**125**	**0.01**	**110**	**4741**	**0.05**
ICS-DSS-18-SE	19 U	714	0.03	**3.4 J**	**128**	**0.01**	**24**	**902**	**0.01**
ICS-DSS-19-SE	**51**	**1741**	**0.08**	20 U	683	0.06	**330**	**11263**	**0.11**
ICS-DSS-20-SE	**16 J**	**1039**	**0.05**	**3.1 J**	**201**	**0.02**	**100**	**6494**	**0.06**
ICS-DSS-21-SE	**41**	**2135**	**0.09**	19 U	990	0.09	**430**	**22396**	**0.22**
ICS-DSS-22-SE	**18 J**	**1475**	**0.06**	19 U	1557	0.14	**110**	**9016**	**0.09**
ICS-DSS-23-SE	**400**	**28169**	**1.2**	20 U	1408	0.13	**150**	**10563**	**0.11**
ICS-DSS-24-SE	**16 J**	**606**	**0.03**	19 U	720	0.07	**230**	**8712**	**0.09**
ICS-DSS-25-SE	**12 J**	**345**	**0.01**	**2.7 J**	**78**	**0.01**	**90**	**2586**	**0.03**
ICS-DSS-26-SE	**40**	**1521**	**0.07**	**42**	**1597**	**0.15**	**380**	**14449**	**0.14**
ICS-DSS-27-SE	**12 J**	**411**	**0.02**	**7.8 J**	**267**	**0.02**	**170**	**5822**	**0.06**
ICS-DSS-28-SE	**18 J**	**804**	**0.03**	**19**	**848**	**0.08**	**55**	**2455**	**0.02**
ICS-DSS-29-SE	18 U	933	0.04	18 U	933	0.08	**18 J**	**933**	**0.01**
ICS-DSS-30-SE	19 U	4299	0.19	19 U	4299	0.39	**18**	**4072**	**0.04**

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Fluorene			N-Nitrosodiphenylamine			Phenanthrene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 540(c)	23000	1	(a) 28(c)	11000	1	(a) 1500(c)	100000	1
ICS-DUP-13-SE	**18 J**	**1161**	**0.05**	**8 J**	**542**	**0.05**	**130**	**8387**	**0.08**
ICS-DUP-04-SE	84 U	AET=540	0.16	**38**	AET=28	**1.4**	**160**	AET=1500	**0.11**
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	3	-----	-----	2	-----	-----	3
% Exceed	-----	-----	10.0%	-----	-----	6.7%	-----	-----	10.0%
Maximum	58000	28169	107.0	4800	4299	171.0	380000	139623	253.0
Minimum	10.00	342	0.01	2.70	70.56	0.01	18.00	868	0.01

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

[yellow box] *Exceeds OCN or AET screening level*

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Anthracene			Di-n-butylphthalate			Fluoranthene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 960(c)	220000	1	(a) 1400(c)	220000	1	(a) 1700(c)	160000	1
ICS-DSS-01-SE	**720**	**27170**	**0.12**	58 U	2189	0.01	**5100**	**192453**	**1.2**
ICS-DSS-02-SE	**180**	**5556**	**0.03**	55 U	1698	0.01	**1100**	**33951**	**0.21**
ICS-DSS-03-SE	**85**	**2464**	**0.01**	19 U	551	0.00	**1100**	**31884**	**0.20**
ICS-DSS-04-SE	**71 J**	**2509**	**0.01**	**130**	**4594**	**0.02**	**1100**	**38869**	**0.24**
ICS-DSS-05-SE	**29**	**1107**	**0.01**	20 U	763	0.00	**1100**	**41985**	**0.26**
ICS-DSS-06-SE	**25**	**450**	**0.00**	**85**	**1532**	**0.01**	**78**	**1405**	**0.01**
ICS-DSS-07-SE	19 U	569	0.00	19 U	569	0.00	**49**	**1467**	**0.01**
ICS-DSS-08-SE	**33**	**1130**	**0.01**	**72**	2466	0.01	**150**	**5137**	**0.03**
ICS-DSS-09-SE (c)	**16,000**	AET=960	**17**	**3400**	AET=1400	**2.4**	**7000**	AET=1700	**4.1**
ICS-DSS-10-SE	18 U	3255	0.01	**18 J**	**3255**	**0.01**	**29**	**5244**	**0.03**
ICS-DSS-11-SE	**36**	**1319**	**0.01**	**43**	**1575**	**0.01**	**160**	**5861**	**0.04**
ICS-DSS-12-SE(c)	**78,000**	AET=960	**81**	**44,000**	AET=1400	**31**	**390,000**	AET=1700	**229**
ICS-DSS-13-SE	**40**	**2162**	**0.01**	19 U	1027	0.00	**180**	**9730**	**0.06**
ICS-DSS-14-SE	**18 J**	**363**	**0.00**	20 U	403	0.00	**120**	**2419**	**0.02**
ICS-DSS-15-SE	**15 J**	**353**	**0.00**	20 U	471	0.00	**130**	**3059**	**0.02**
ICS-DSS-16-SE	19 U	1810	0.01	19 U	1810	0.01	**11 J**	**1048**	**0.01**
ICS-DSS-17-SE	**23**	**991**	**0.00**	18 U	776	0.00	**98**	**4224**	**0.03**
ICS-DSS-18-SE	**11 J**	**414**	**0.00**	**22**	**827**	**0.00**	**63**	**2368**	**0.01**
ICS-DSS-19-SE	**100**	**3413**	**0.02**	**130**	**4437**	**0.02**	**500**	**17065**	**0.11**
ICS-DSS-20-SE	**33**	**2143**	**0.01**	**320**	**20779**	**0.09**	**290**	**18831**	**0.12**
ICS-DSS-21-SE	**90**	**4688**	**0.02**	**38**	**1979**	**0.01**	**540**	**28125**	**0.18**
ICS-DSS-22-SE	**28**	**2295**	**0.01**	19 U	1557	0.01	**190**	**15574**	**0.10**
ICS-DSS-23-SE	**70**	**4930**	**0.02**	20 U	1408	0.01	**510**	**35915**	**0.22**
ICS-DSS-24-SE	**35**	**1326**	**0.01**	19 U	720	0.00	**370**	**14015**	**0.09**
ICS-DSS-25-SE	**28**	**805**	**0.00**	**13 J**	**374**	**0.00**	**200**	**5747**	**0.04**
ICS-DSS-26-SE	**68**	**2586**	**0.01**	**220**	**8365**	**0.04**	**410**	**15589**	**0.10**
ICS-DSS-27-SE	**62**	**2123**	**0.01**	**31**	**1062**	**0.00**	**410**	**14041**	**0.09**
ICS-DSS-28-SE	**26**	**1161**	**0.01**	**14 J**	**625**	**0.00**	**160**	**7143**	**0.04**
ICS-DSS-29-SE	18 U	933	0.00	**10 J**	**518**	**0.00**	**41**	**2124**	**0.01**
ICS-DSS-30-SE	19 U	4299	0.02	19 U	4299	0.02	**24**	**5430**	**0.03**

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Anthracene			Di-n-butylphthalate			Fluoranthene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 960(c)	220000	1	(a) 1400(c)	220000	1	(a) 1700(c)	160000	1
ICS-DUP-13-SE	**29**	**1871**	**0.01**	19 U	1226	0.01	**130**	**8387**	**0.05**
ICS-DUP-04-SE	**50 J**	AET=960	**0.05**	**120**	AET=1400	0.00	**200**	AET=1700	**0.12**
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	2	-----	-----	2	-----	-----	3
% Exceed	-----	-----	6.7%	-----	-----	6.7%	-----	-----	10.0%
Maximum	78000	27170	81.0	44000	20779	31.0	390000	192453	229.0
Minimum	11.00	353	0.00	10.00	374	0.00	11.00	1048	0.01

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Pyrene			Butylbenzylphthalate			Benzo(a)anthracene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 2600(c)	1000000	1	(a) 63(c)	4900	1	(a) 1300(c)	110000	1
ICS-DSS-01-SE	**5400**	**203774**	**0.20**	**13 J**	**491**	**0.10**	**3500**	**132075**	**1.2**
ICS-DSS-02-SE	**1000**	**30864**	**0.03**	55 U	1698	0.35	**470**	**14506**	**0.13**
ICS-DSS-03-SE	**920**	**26667**	**0.03**	**43 J**	**1246**	**0.25**	**340**	**9855**	**0.09**
ICS-DSS-04-SE	**710**	**25088**	**0.03**	**230 J**	8127	**1.7**	**190**	**6714**	**0.06**
ICS-DSS-05-SE	**770**	**29389**	**0.03**	20 U	763	0.16	**110**	**4198**	**0.04**
ICS-DSS-06-SE	**78**	**1405**	**0.00**	20 U	360	0.07	**35**	**631**	**0.01**
ICS-DSS-07-SE	**41**	**1228**	**0.00**	19 U	569	0.12	**20**	**599**	**0.01**
ICS-DSS-08-SE	**160**	**5479**	**0.01**	19 U	651	0.13	**72**	**2466**	**0.02**
ICS-DSS-09-SE (c)	**6800**	AET=2600	**2.6**	**1100**	AET=63	**17**	**2700**	AET=1300	**2.1**
ICS-DSS-10-SE	**28**	**5063**	**0.01**	18 U	3255	0.66	**12 J**	**2170**	**0.02**
ICS-DSS-11-SE	**150**	**5495**	**0.01**	**58 J**	**2125**	**0.43**	**80**	**2930**	**0.03**
ICS-DSS-12-SE(c)	**290,000**	AET=2600	**112**	**44000 J**	AET=63	**698**	**130000**	AET=1300	**100**
ICS-DSS-13-SE	**170**	**9189**	**0.01**	19 U	1027	0.21	**76**	**4108**	**0.04**
ICS-DSS-14-SE	**110**	**2218**	**0.00**	**25 J**	**504**	**0.10**	**47**	**948**	**0.01**
ICS-DSS-15-SE	**130**	**3059**	**0.00**	**31 J**	**729**	**0.15**	**53**	**1247**	**0.01**
ICS-DSS-16-SE	**9.7 J**	**924**	**0.00**	19 U	1810	0.37	19 U	1810	0.02
ICS-DSS-17-SE	**89**	**3836**	**0.00**	**14 J**	**603**	**0.12**	**42**	**1810**	**0.02**
ICS-DSS-18-SE	**66**	**2481**	**0.00**	**16 J**	**602**	**0.12**	**34**	**1278**	**0.01**
ICS-DSS-19-SE	**730**	**24915**	**0.02**	**110 J**	**3754**	**0.77**	**260**	**8874**	**0.08**
ICS-DSS-20-SE	**280**	**18182**	**0.02**	19 U	1234	0.25	**160**	**10390**	**0.09**
ICS-DSS-21-SE	**540**	**28125**	**0.03**	**150 J**	7813	**1.6**	**200**	**10417**	**0.09**
ICS-DSS-22-SE	**230**	**18852**	**0.02**	**12 J**	984	0.20	**63**	**5164**	**0.05**
ICS-DSS-23-SE	**350**	**24648**	**0.02**	20 U	1408	0.29	**71**	**5000**	**0.05**
ICS-DSS-24-SE	**280**	**10606**	**0.01**	**28 J**	1061	0.22	**96**	**3636**	**0.03**
ICS-DSS-25-SE	**180**	**5172**	**0.01**	**27 J**	776	0.16	**100**	**2874**	**0.03**
ICS-DSS-26-SE	**360**	**13688**	**0.01**	**260 J**	9886	**2.0**	**170**	**6464**	**0.06**
ICS-DSS-27-SE	**400**	**13699**	**0.01**	18 U	616	0.13	**250**	**8562**	**0.08**
ICS-DSS-28-SE	**160**	**7143**	**0.01**	19 U	848	0.17	**43**	**1920**	**0.02**
ICS-DSS-29-SE	**41**	**2124**	**0.00**	18 U	933	0.19	**18 J**	**933**	**0.01**
ICS-DSS-30-SE	**25**	**5656**	**0.01**	19 U	4299	0.88	19 U	4299	0.04

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Pyrene			Butylbenzylphthalate			Benzo(a)anthracene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 2600(c)	1000000	1	(a) 63(c)	4900	1	(a) 1300(c)	110000	1
ICS-DUP-13-SE	**120**	**7742**	**0.01**	19 U	1226	0.25	**60**	**3871**	**0.04**
ICS-DUP-04-SE	**250**	AET=2600	**0.10**	84 U	AET=63	nd	**120**	AET=1300	**0.09**
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	2	-----	-----	5	-----	-----	3
% Exceed	-----	-----	6.7%	-----	-----	16.7%	-----	-----	10.0%
Maximum	290000	203774	112.0	44000	9886	698.0	130000	132075	100.0
Minimum	9.70	924	0.00	12.00	360	0.07	12.00	599	0.01

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	*bis* (2-Ethylhexyl)phthalate			Chrysene			Di-n-octylphthalate		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 1300(c)	47000	1	(a) 1400(c)	110000	1	(a) 6200(c)	58000	1
ICS-DSS-01-SE	**520**	**19623**	**0.42**	**3800**	**143396**	**1.3**	58 U	2189	0.03
ICS-DSS-02-SE	**260**	**8025**	**0.17**	**680**	**20988**	**0.19**	55 U	1698	0.03
ICS-DSS-03-SE	**620**	**17971**	**0.38**	**770**	**22319**	**0.20**	19 U	551	0.03
ICS-DSS-04-SE	**1300**	**45936**	**0.98**	**410**	**14488**	**0.13**	83 U	2933	0.03
ICS-DSS-05-SE	**320**	**12214**	**0.26**	**310**	**11832**	**0.11**	20 U	763	0.03
ICS-DSS-06-SE	**260**	**4685**	**0.10**	**110**	**1982**	**0.02**	20 U	360	0.06
ICS-DSS-07-SE	**36**	**1078**	**0.02**	**36**	**1078**	**0.01**	19 U	569	0.03
ICS-DSS-08-SE	**150**	**5137**	**0.11**	**130**	**4452**	**0.04**	19 U	651	0.03
ICS-DSS-09-SE (c)	**9600**	AET=1300	**7.4**	**5200**	AET=1400	**3.7**	720 U	AET=6200	nd
ICS-DSS-10-SE	**57**	**10307**	**0.22**	**19**	**3436**	**0.03**	18 U	3255	0.01
ICS-DSS-11-SE	**330**	**12088**	**0.26**	**130**	**4762**	**0.04**	19 U	696	0.03
ICS-DSS-12-SE(c)	**180000**	AET=1300	**138**	**180000**	AET=1400	**129**	1700 U	AET=6200	nd
ICS-DSS-13-SE	**79**	**4270**	**0.09**	**87**	**4703**	**0.04**	19 U	1027	0.02
ICS-DSS-14-SE	**83**	**1673**	**0.04**	**100**	**2016**	**0.02**	20 U	403	0.05
ICS-DSS-15-SE	**300**	**7059**	**0.15**	**98**	**2306**	**0.02**	**40**	941	0.04
ICS-DSS-16-SE	**16 J**	**1524**	**0.03**	19 U	1810	0.02	19 U	1810	0.01
ICS-DSS-17-SE	**49**	**2112**	**0.04**	**66**	**2845**	**0.03**	18 U	776	0.02
ICS-DSS-18-SE	**79**	**2970**	**0.06**	**67**	**2519**	**0.02**	19 U	714	0.03
ICS-DSS-19-SE	**1400**	**47782**	**1.02**	**460**	**15700**	**0.14**	20 U	683	0.03
ICS-DSS-20-SE	**98**	**6364**	**0.14**	**370**	**24026**	**0.22**	19 U	1234	0.02
ICS-DSS-21-SE	**320**	**16667**	**0.35**	**340**	**17708**	**0.16**	19 U	990	0.02
ICS-DSS-22-SE	**60**	**4918**	**0.10**	**81**	**6639**	**0.06**	19 U	1557	0.01
ICS-DSS-23-SE	**84**	**5915**	**0.13**	**92**	**6479**	**0.06**	20 U	1408	0.01
ICS-DSS-24-SE	**300**	**11364**	**0.24**	**190**	**7197**	**0.07**	19 U	720	0.03
ICS-DSS-25-SE	**270**	**7759**	**0.17**	**160**	**4598**	**0.04**	**27**	776	0.03
ICS-DSS-26-SE	**550**	**20913**	**0.44**	**240**	**9125**	**0.08**	18 U	684	0.03
ICS-DSS-27-SE	**180**	**6164**	**0.13**	**360**	**12329**	**0.11**	18 U	616	0.03
ICS-DSS-28-SE	**190**	**8482**	**0.18**	**50**	**2232**	**0.02**	19 U	848	0.02
ICS-DSS-29-SE	**26**	**1347**	**0.03**	**45**	**2332**	**0.02**	18 U	933	0.02
ICS-DSS-30-SE	**24**	**5430**	**0.12**	**15**	**3394**	**0.03**	19 U	4299	0.00

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	*bis* (2-Ethylhexyl)phthalate			Chrysene			Di-n-octylphthalate		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 1300(c)	47000	1	(a) 1400(c)	110000	1	(a) 6200(c)	58000	1
ICS-DUP-13-SE	**63**	**4065**	**0.09**	**77**	**4968**	**0.05**	19 U	1226	0.02
ICS-DUP-04-SE	**1200**	AET=1300	**0.92**	**180**	AET=1400	**0.13**	84 U	AET=6200	
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	3	-----	-----	3	-----	-----	0
% Exceed	-----	-----	10.0%	-----	-----	10.0%	-----	-----	0.0%
Maximum	180000	47782	138.0	180000	143396	129.0	1700	4299	0.06
Minimum	16.00	1078	0.02	15.00	1078	0.01	15.00	1077.84	0.01

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	total Benzofluoranthenes			Benzo(a)pyrene			Indeno(1,2,3-cd)pyrene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 3200(c)	230000	1	(a) 1600(c)	99000	1	(a) 600(c)	34000	1
ICS-DSS-01-SE	**5000**	188679	0.82	**3000**	**113208**	**1.1**	**1200**	**45283**	**1.3**
ICS-DSS-02-SE	**940**	29012	0.13	**440**	**13580**	**0.14**	**270**	**8333**	**0.25**
ICS-DSS-03-SE	**850**	24638	0.11	**260**	**7536**	**0.08**	**140**	**4058**	**0.12**
ICS-DSS-04-SE	**470**	16608	0.07	**220**	**7774**	**0.08**	**140**	**4947**	**0.15**
ICS-DSS-05-SE	**360**	13740	0.06	**95**	**3626**	**0.04**	**51**	**1947**	**0.06**
ICS-DSS-06-SE	**180**	3243	0.01	**150**	**2703**	**0.03**	**61**	**1099**	**0.03**
ICS-DSS-07-SE	**52**	1557	0.01	**24**	**719**	**0.01**	**19**	**569**	**0.02**
ICS-DSS-08-SE	**190**	6507	0.03	**78**	**2671**	**0.03**	**110**	**3767**	**0.11**
ICS-DSS-09-SE (c)	**3300**	AET=3200	**1.03**	**1800**	AET=1600	**1.1**	**900**	AET=600	**1.5**
ICS-DSS-10-SE	**30 J**	5425	0.02	**13 J**	**2351**	**0.02**	**9.2 J**	**1664**	**0.05**
ICS-DSS-11-SE	**190**	6960	0.03	**96**	**3516**	**0.04**	**65**	**2381**	**0.07**
ICS-DSS-12-SE(c)	**120000**	AET=3200	**38**	**71000**	AET=1600	**44**	**21000**	AET=600	**35**
ICS-DSS-13-SE	**130**	**7027**	**0.03**	**76**	**4108**	**0.04**	**43**	**2324**	**0.07**
ICS-DSS-14-SE	**140**	**2823**	**0.01**	**46**	**927**	**0.01**	**38**	**766**	**0.02**
ICS-DSS-15-SE	**140**	**3294**	**0.01**	**52**	**1224**	**0.01**	**38**	**894**	**0.03**
ICS-DSS-16-SE	**14 J**	**1333**	**0.01**	19 U	1810	0.02	19 U	1810	0.05
ICS-DSS-17-SE	**98**	**4224**	**0.02**	**41**	**1767**	**0.02**	18 U	776	0.02
ICS-DSS-18-SE	**140**	**5263**	**0.02**	**44**	**1654**	**0.02**	**34**	**1278**	**0.04**
ICS-DSS-19-SE	**730**	**24915**	**0.11**	**350**	**11945**	**0.12**	**190**	**6485**	**0.19**
ICS-DSS-20-SE	**300**	**19481**	**0.08**	**82**	**5325**	**0.05**	**51**	**3312**	**0.10**
ICS-DSS-21-SE	**410**	**21354**	**0.09**	**180**	**9375**	**0.09**	**110**	**5729**	**0.17**
ICS-DSS-22-SE	**110**	**9016**	**0.04**	**56**	**4590**	**0.05**	**34**	**2787**	**0.08**
ICS-DSS-23-SE	**110**	**7746**	**0.03**	**41**	**2887**	**0.03**	**27**	**1901**	**0.06**
ICS-DSS-24-SE	**230**	**8712**	**0.04**	**94**	**3561**	**0.04**	**50**	**1894**	**0.06**
ICS-DSS-25-SE	**240**	**6897**	**0.03**	**100**	**2874**	**0.03**	**58**	**1667**	**0.05**
ICS-DSS-26-SE	**420**	**15970**	**0.07**	**200**	**7605**	**0.08**	**160**	**6084**	**0.18**
ICS-DSS-27-SE	**580**	**19863**	**0.09**	**280**	**9589**	**0.10**	**170**	**5822**	**0.17**
ICS-DSS-28-SE	**77**	**3438**	**0.01**	**28**	**1250**	**0.01**	**18 J**	**804**	**0.02**
ICS-DSS-29-SE	**54**	**2798**	**0.01**	**19**	**984**	**0.01**	**17 J**	**881**	**0.03**
ICS-DSS-30-SE	**26**	**5882**	**0.03**	19 U	4299	0.04	**10**	**2262**	**0.07**

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	total Benzofluoranthenes			Benzo(a)pyrene			Indeno(1,2,3-cd)pyrene		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 3200(c)	230000	1	(a) 1600(c)	99000	1	(a) 600(c)	34000	1
ICS-DUP-13-SE	**100**	**6452**	**0.03**	**54**	**3484**	**0.04**	**36**	**2323**	**0.07**
ICS-DUP-04-SE	**290**	AET=3200	**0.09**	**180**	AET=1600	**0.11**	**120**	AET=600	**0.20**
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	2	-----	-----	3	-----	-----	3
% Exceed	-----	-----	6.7%	-----	-----	10.0%	-----	-----	10.0%
Maximum	120000	188679	38.0	71000	113208	44.0	21000	45283	35.0
Minimum	14.00	1333	0.01	13.00	719	0.01	9.20	569	0.02

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ also is available

(c) TOC >3.5%- SLs based on AET dw value - xxx(c)

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

Exceeds OCN or AET screening level

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

ICS/NW Cooperage Site
Seattle, WA

Sample Location	Dibenz(a,h)anthracene			Benzo(g,h,i)perylene			LPAH			HPAH		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 230(c)	12000	1	(a) 670(c)	31000	1	(a) 5200(c)	370000	1	(a) 12000(c)	960000	1
ICS-DSS-01-SE	**510**	**19245**	**1.6**	**1200**	**45283**	**1.5**	**4952**	186868	**0.51**	**28,710**	**1083396**	**1.1**
ICS-DSS-02-SE	**140**	**4321**	**0.36**	**300**	**9259**	**0.30**	**1056**	**32593**	**0.09**	**5340**	**164815**	**0.17**
ICS-DSS-03-SE	**70**	**2029**	**0.17**	**140**	**4058**	**0.13**	**449**	**13014**	**0.04**	**4590**	**133043**	**0.14**
ICS-DSS-04-SE	**71 J**	**2509**	**0.21**	**210**	**7420**	**0.24**	**668**	**23604**	**0.06**	**3521**	**124417**	**0.13**
ICS-DSS-05-SE	**27**	**1031**	**0.09**	**58**	**2214**	**0.07**	**454**	**17328**	**0.05**	**2881**	**109962**	**0.11**
ICS-DSS-06-SE	**17 J**	**306**	**0.03**	**83**	**1495**	**0.05**	**153**	**2757**	**0.01**	**792**	**14270**	**0.01**
ICS-DSS-07-SE	**10 J**	**299**	**0.02**	**24**	**719**	**0.02**	**29**	**868**	**0.00**	**275**	**8234**	**0.01**
ICS-DSS-08-SE	**37**	**1267**	**0.11**	**160**	**5479**	**0.18**	**212**	**7260**	**0.02**	**1087**	**37226**	**0.04**
ICS-DSS-09-SE (c)	**580 J**	AET=230	**2.5**	**1100**	AET=670	**1.6**	**53,450**	AET=5200	**10**	**29,380**	AET=12000	2.4
ICS-DSS-10-SE	18 U	3255	0.27	**13 J**	**2351**	**0.08**	**90**	**16275**	**0.04**	**153**	**27703**	**0.03**
ICS-DSS-11-SE	**21**	**769**	**0.06**	**73**	**2674**	**0.09**	**380**	**13919**	**0.04**	**965**	**35348**	**0.04**
ICS-DSS-12-SE(c)	**13000**	AET=230	**57**	**19000**	AET=670	**28**	**683700**	AET=5200	**131**	**1234000**	AET=12000	**103**
ICS-DSS-13-SE	**13 J**	**703**	**0.06**	**49**	**2649**	**0.09**	**385**	**20811**	**0.06**	**824**	**44541**	**0.05**
ICS-DSS-14-SE	**14 J**	**282**	**0.02**	**47**	**948**	**0.03**	**109**	**2198**	**0.01**	**662**	**13347**	**0.01**
ICS-DSS-15-SE	**20**	**471**	**0.04**	**57**	**1341**	**0.04**	**91**	**2141**	**0.01**	**718**	**16894**	**0.02**
ICS-DSS-16-SE	19 U	1810	0.15	19 U	1810	0.06	**19**	**1810**	**0.00**	**35**	**3305**	**0.00**
ICS-DSS-17-SE	18 U	776	0.06	**45**	**1940**	**0.06**	**274**	**11810**	**0.03**	**479**	**20647**	**0.02**
ICS-DSS-18-SE	19 U	714	0.06	**38**	**1429**	**0.05**	**35**	**1316**	**0.00**	**486**	**18271**	**0.02**
ICS-DSS-19-SE	**99**	**3379**	**0.28**	**220**	**7509**	**0.24**	**647**	**22082**	**0.06**	**3539**	**120785**	**0.13**
ICS-DSS-20-SE	**21**	**1364**	**0.11**	**53**	**3442**	**0.11**	**177**	**11494**	**0.03**	**1607**	**104351**	**0.11**
ICS-DSS-21-SE	**53**	**2760**	**0.23**	**140**	**7292**	**0.24**	**661**	**34427**	**0.09**	**2513**	**130885**	**0.14**
ICS-DSS-22-SE	**11 J**	**902**	**0.08**	**46**	**3770**	**0.12**	**263**	**21557**	**0.06**	**821**	**67295**	**0.07**
ICS-DSS-23-SE	**20 U**	**1408**	**0.12**	**32**	**2254**	**0.07**	**920**	**64789**	**0.18**	**1233**	**86831**	**0.09**
ICS-DSS-24-SE	**26**	**985**	**0.08**	**50**	**1894**	**0.06**	**324**	**12261**	**0.03**	**1386**	**52500**	**0.05**
ICS-DSS-25-SE	**20**	**575**	**0.05**	**70**	**2011**	**0.06**	**150**	**4310**	**0.01**	**1128**	**32414**	**0.03**
ICS-DSS-26-SE	**47**	**1787**	**0.15**	**200**	**7605**	**0.25**	**716**	**27224**	**0.07**	**2207**	**83916**	**0.09**
ICS-DSS-27-SE	**77**	**2637**	**0.22**	**180**	**6164**	**0.20**	**386**	**13219**	**0.04**	**2707**	**92705**	**0.10**
ICS-DSS-28-SE	19 U	848	0.07	**23**	**1027**	**0.03**	**120**	**5357**	**0.01**	**559**	**24955**	**0.03**
ICS-DSS-29-SE	18 U	933	0.08	**25**	**1295**	**0.04**	**18**	**933**	**0.00**	**260**	**13472**	**0.01**
ICS-DSS-30-SE	19 U	4299	0.36	**10**	**2262**	**0.07**	**18**	**4072**	**0.01**	**110**	**24887**	**0.03**

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Dibenz(a,h)anthracene			Benzo(g,h,i)perylene			LPAH			HPAH		
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 230(c)	12000	1	(a) 670(c)	31000	1	(a) 5200(c)	370000	1	(a) 12000(c)	960000	1
ICS-DUP-13-SE	**12 J**	**774**	**0.06**	**38**	**2452**	**0.08**	**270**	**17419**	**0.05**	**627**	**40452**	**0.04**
ICS-DUP-04-SE	**71 J**	AET=230	**0.31**	**190**	670	**0.28**	**356**	AET=5200	**0.07**	**1601**	AET=12000	0.13
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	3	-----	-----	3	-----	-----	2	-----	-----	3
% Exceed	-----	-----	10.0%	-----	-----	10.0%	-----	-----	6.7%	-----	-----	10.0%
Maximum	13000	19245	57.0	19000	45283	28.0	683700	186868	131.0	1234000	1083396	103.0
Minimum	10.00	282	0.02	10.00	670	0.02	18.00	868	0.00	34.70	3305	0.00

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

nd - Not detected

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ

(c) TOC >3.5%- SLs based on AET dw value - xxx(c) also is available

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

[yellow box] *Exceeds OCN or AET screening level*

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Hexachlorobenzene			Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1221	Aroclor 1232
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry
Screening Levels	(a) 22(c)	380	1	-----	-----	-----	-----	-----	-----	-----
ICS-DSS-01-SE	10 U	374	0.98	20 U	20 U	**420**	**420**	**350**	20 U	20 U
ICS-DSS-02-SE	3 U	90	0.24	38 U	38 U	**190**	**210**	**170**	38 U	38 U
ICS-DSS-03-SE	4 U	122	0.32	97 U	97 U	**450**	**530**	**560**	97 U	97 U
ICS-DSS-04-SE	17 U	601	1.58	310 U	310 U	**3800 J**	**10,000**	**14,000**	310 U	310 U
ICS-DSS-05-SE	0.5 U	18	0.05	97 U	**3500**	97 U	**1700**	**1200**	97 U	97 U
ICS-DSS-06-SE	6 U	103	0.27	250 U	250 U	**2500 J**	**5800**	**7000**	250 U	250 U
ICS-DSS-07-SE	0.5 U	14	0.04	38 U	38 U	**71**	190 U	**520**	38 U	38 U
ICS-DSS-08-SE	2 U	68	0.18	63 U	63 U	950 U	**2000**	**1400**	63 U	63 U
ICS-DSS-09-SE (c)	1300 U	AET=22	nd	5400 U	**120,000**	5400 U	**44,000**	**30,000**	5400 U	5400 U
ICS-DSS-10-SE	1 U	154	0.40	39 U	39 U	**690**	**630**	**600**	39 U	39 U
ICS-DSS-11-SE	4 U	132	0.35	120 U	120 U	**1500**	**1800**	**2000**	120 U	120 U
ICS-DSS-12-SE(c)	**300**	AET=22	**14**	240 U	**11,000**	240 U	**8900**	**2600**	240 U	240 U
ICS-DSS-13-SE	0.5 U	26	0.07	39 U	39 U	**280**	**230**	**200**	39 U	39 U
ICS-DSS-14-SE	0.5 U	9	0.02	39 U	39 U	**72**	**180**	**330**	39 U	39 U
ICS-DSS-15-SE	0.5 U	11	0.03	96 U	96 U	**680**	**740**	**680**	96 U	96 U
ICS-DSS-16-SE	0.5 U	47	0.12	4 U	4 U	**8.0**	**12**	**22**	4 U	4 U
ICS-DSS-17-SE	1 U	26	0.07	39 U	39 U	**190**	**270**	**280**	39 U	39 U
ICS-DSS-18-SE	0.5 U	18	0.05	40 U	40 U	**110**	**190**	**200**	40 U	40 U
ICS-DSS-19-SE	10 U	334	0.88	410 U	410 U	**4400**	**4700**	**3400**	410 U	410 U
ICS-DSS-20-SE	0.5 U	32	0.08	39 U	39 U	**240**	**320**	**230**	39 U	39 U
ICS-DSS-21-SE	2 U	104	0.27	40 U	40 U	**450**	**580**	**490**	40 U	40 U
ICS-DSS-22-SE	0.5 U	38	0.10	38 U	38 U	**540**	**760**	**400**	38 U	38 U
ICS-DSS-23-SE	0.5 U	34	0.09	20 U	20 U	**180**	**200**	**180**	20 U	20 U
ICS-DSS-24-SE	2 U	61	0.16	98 U	98 U	**590**	**560**	**560**	98 U	98 U
ICS-DSS-25-SE	4 U	124	0.33	96 U	96 U	**500**	**530**	**420**	96 U	96 U
ICS-DSS-26-SE	3 U	125	0.33	39 U	39 U	**1600**	**1800**	**770**	39 U	39 U
ICS-DSS-27-SE	5 U	168	0.44	280 U	280 U	980 U	**3100**	**2700**	280 U	280 U
ICS-DSS-28-SE	0.5 U	21	0.06	38 U	38 U	**1100**	**1200**	**580**	38 U	38 U
ICS-DSS-29-SE	0.5 U	24	0.06	4 U	4 U	11 U	**30**	**29**	4 U	4 U
ICS-DSS-30-SE	0.49	111	0.29	3.9 U	3.9 U	39.0 U	**130**	**44**	3.9 U	3.9 U

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Hexachlorobenzene			Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1221	Aroclor 1232
	µg/kg, dry	ug/kg OCN	EF	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry	µg/kg, dry
Screening Levels	(a) 22(c)	380	1	-----	-----	-----	-----	-----	-----	-----
ICS-DUP-13-SE	1 U	65	0.17	39 U	39 U	**260**	**260**	**210**	39 U	39 U
ICS-DUP-04-SE	15 U	AET=22	0.68	770 U	770 U	5800 U	**14,000**	**18,000**	770 U	770 U
No. Spls.	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
No. Exceed.	-----	-----	2	-----	-----	-----	-----	-----	-----	-----
% Exceed	-----	-----	6.7%	-----	-----	-----	-----	-----	-----	-----
Maximum	1300	601	14.0	nd	120000	5800	44000	30000	nd	nd
Minimum	0.46	9.48	0.02	nd	3.80	8.00	12.00	22.00	nd	nd

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

nd - Not detected

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ

(c) TOC >3.5%- SLs based on AET dw value - xxx(c) also is available

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

[yellow box] Exceeds OCN or AET screening level

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Total Detected PCBs		
	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 130(c)	12000	1
ICS-DSS-01-SE	**1190**	**44906**	**3.7**
ICS-DSS-02-SE	**570**	**17593**	**1.5**
ICS-DSS-03-SE	**1540**	**44638**	**3.7**
ICS-DSS-04-SE	**27,800**	**982332**	**82**
ICS-DSS-05-SE	**6400**	**244275**	**20**
ICS-DSS-06-SE	**15,300**	**275676**	**23**
ICS-DSS-07-SE	**591**	**17695**	**1.5**
ICS-DSS-08-SE	**3400**	**116438**	**9.7**
ICS-DSS-09-SE (c)	**194,000**	AET=130	**1492**
ICS-DSS-10-SE	**1920**	**347197**	**29**
ICS-DSS-11-SE	**5300**	**194139**	**16**
ICS-DSS-12-SE(c)	**22,500**	AET=130	**173**
ICS-DSS-13-SE	**710**	**38378**	**3.2**
ICS-DSS-14-SE	**582**	**11734**	**1.0**
ICS-DSS-15-SE	**2100**	**49412**	**4.1**
ICS-DSS-16-SE	**42**	**4000**	**0.3**
ICS-DSS-17-SE	**740**	**31897**	**2.7**
ICS-DSS-18-SE	**500**	**18797**	**1.6**
ICS-DSS-19-SE	**12,500**	**426621**	**36**
ICS-DSS-20-SE	**790**	**51299**	**4.3**
ICS-DSS-21-SE	**1520**	**79167**	**6.6**
ICS-DSS-22-SE	**1700**	**139344**	**12**
ICS-DSS-23-SE	**560**	**39437**	**3.3**
ICS-DSS-24-SE	**1710**	**64773**	**5.4**
ICS-DSS-25-SE	**1450**	**41667**	**3.5**
ICS-DSS-26-SE	**4170**	**158555**	**13**
ICS-DSS-27-SE	**5800**	**198630**	**17**
ICS-DSS-28-SE	**2880**	**128571**	**11**
ICS-DSS-29-SE	**59**	**3057**	**0.3**
ICS-DSS-30-SE	**174**	**39367**	**3.3**

TABLE A5.3 - Exceedance Factors - Constituents w/ OCN Screening Levels
Embayment Surface Sediments

Sample Location	Total Detected PCBs		
	µg/kg, dry	ug/kg OCN	EF
Screening Levels	(a) 130(c)	12000	1
ICS-DUP-13-SE	**730**	**47097**	**3.9**
ICS-DUP-04-SE	**32,000**	**AET=130**	**246**
No. Spls.	**30**	**30**	**30**
No. Exceed.	-----	-----	27
% Exceed	-----	-----	90.0%
Maximum	194000	982332	1492
Minimum	42	3057	0.25

Notes: *J = estimate associated with value less than the verifiable lower quantitation limit*

U = nondetected at the associated lower reporting limit.

nd - Not detected

(a) - Screening level based on carbon normalized values, if TOC between 0.5 and 3.5%

(b) - Screening level based on benzo(a)pyrene beach-play TEQ

(c) TOC >3.5%- SLs based on AET dw value - xxx(c) also is available

na - Screenihng level not available

EF - Exceedance Factor

TEQ - Toxicity Equivalency Quotient

OCN - Organic carbon normalized

[yellow box] *Exceeds OCN or AET screening level*

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	ARI Delivery Group	Arsenic mg/kg, dry	Arsenic EF	Cadmium mg/kg, dry	Cadmium EF	Chromium mg/kg, dry	Chromium EF	Copper mg/kg, dry	Copper EF	Lead mg/kg, dry	Lead EF
Screening Levels		-----	7	1	5.1	1	260	1	390	1	450	1
ICS-A-SE-1	0.4	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	VV01	11.5	1.6	0.3	0.1	19.5	0.0	427	1.1	86.7	0.2
ICS-A-SE-3	2.7	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	VV01	9.7	1.4	0.2	0.0	21.5	0.0	42.8	0.1	10.3	0.0
ICS-A-SE-5	5.1	VV01	6.5	0.9	0.1 U	0.0	22	0.0	33.7	0.1	10.6	0.0
ICS-A-SE-6	6.3	XD56	9.5	1.4	0.2	0.0	25.7	0.0	49.3	0.1	12.4	0.0
ICS-A-SE-7	7.2	XD56	9.2	1.3	0.2	0.0	23.3	0.0	43.5	0.1	10.4	0.0
ICS-B-SE-1	1.1	VV01	19.8	2.8	0.2 U	0.0	22.7	0.0	34.8	0.1	14.9	0.0
ICS-B-SE-2	2.2	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	VV01	31.1	4.4	5.4	1.1	153	0.0	169	0.4	796	1.8
ICS-B-SE-4	4.4	XD56	9.4	1.3	1.1	0.2	45.8	0.0	133	0.3	218	0.5
ICS-B-SE-5	5.5	VV01	7.7	1.1	0.2	0.0	24	0.0	43.1	0.1	12.4	0.0
ICS-B-SE-6	6.6	XD56	10.1	1.4	0.3	0.1	25.4	0.0	50.6	0.1	13.3	0.0
ICS-C-SE-1	0.5	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	VV01	5.6	0.8	0.1 U	0.0	11.0	0.0	36.0	0.1	13.1	0.0
ICS-C-SE-3	3.3	VV01	7.3	1.0	0.1	0.0	18.9	0.0	34.0	0.1	7.9	0.0
ICS-C-SE-4	4.4	VV01	4.1	0.6	0.1 U	0.0	10.8	0.0	11.0	0.0	8.0	0.0
ICS-D-SE-1	0.7	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	VV01	15.1	2.2	8.8	1.6	431	1.7	254	0.7	4430	9.8
ICS-D-SE-3	3.8	VV01	8.7	1.2	0.2	0.0	25	0.0	41.3	0.1	28.3	0.1
ICS-D-SE-4	5.3	VV01	8.8	1.3	0.2	0.0	27	0.0	47.7	0.1	10.6	0.0
ICS-D-SE-5	6.7	XD56	9.4	1.3	0.2	0.0	25.1	0.0	46.6	0.1	11.6	0.0
ICS-F-SE-1	0.5	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	XD56	12.7	1.8	3.4	0.7	114	0.0	56.6	0.1	4380	9.7
ICS-F-SE-3	3.1	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-3	3.1	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	XD56	8.7	1.2	0.2	0.0	24.7	0.0	46.1	0.1	11.5	0.0
ICS-F-SE-5	5.8	VV01	11.2	1.6	0.2	0.0	24.4	0.0	50.9	0.1	17.4	0.0
ICS-F-SE-6	7	VV01	-----		-----		-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	VV01	5.8	0.8	0.1 U	0.0	18.4	0.0	33.7	0.1	11.5	0.0
ICS-F-SE-8	9.7	VV01	2.0	0.3	0.1 U	0.0	12.2	0.0	14.2	0.0	2.1	0.0
ICS-F-SE-9	10.9	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	ARI Delivery Group	Arsenic mg/kg, dry	Arsenic EF	Cadmium mg/kg, dry	Cadmium EF	Chromium mg/kg, dry	Chromium EF	Copper mg/kg, dry	Copper EF	Lead mg/kg, dry	Lead EF
Screening Levels		-----	7	1	5.1	1	260	1	390	1	450	1
ICS-G-SE-1	0.6	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-3	3	VV01	11.9	1.7	0.5	0.1	23.7	0.0	41.7	0.1	22.5	0.1
ICS-G-SE-4	4.1	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	VV01	24.9	3.6	2.6	0.5	112	0.0	141	0.4	1340	3.0
ICS-G-SE-6	6.8	VV01	11.6	1.7	0.3	0.1	23.0	0.0	65.3	0.2	33.9	0.1
ICS-H-SE-1	0.4	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	VV01	4.7	0.7	0.5	0.1	59.7	0.0	46.9	0.1	168	0.4
ICS-H-SE-3	3.3	VV01	7.2	1.0	1.3	0.3	96.4	0.0	61.3	0.2	936	2.1
ICS-H-SE-4	4.7	VV10	2.7	0.4	0.1 U	0.0	14.0	0.0	18.1	0.0	6.5	0.0
ICS-I-SE-1	0.9	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	VV10	10.1	1.4	0.4	0.1	24.9	0.0	37.3	0.1	123	0.3
ICS-I-SE-3	4.2	VV10	6.6	0.9	0.2	0.0	18.4	0.0	41.4	0.1	25.4	0.1
ICS-I-SE-4	5.9	XD56	11.1	1.6	0.2	0.0	26.3	0.0	58.5	0.2	38.5	0.1
ICS-I-SE-5	7.8	VV10	5.1	0.7	0.1 U	0.0	14.4	0.0	34.7	0.1	18.8	0.0
ICS-I-SE-6	9.5	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	VV10	26.0	3.7	2.2	0.4	64.4	0.0	61.1	0.2	224	0.5
ICS-J-SE-4	6.8	XD56	6.1	0.9	0.1 U	0.0	16.0	0.0	22.3	0.1	11.4	0.0
ICS-J-SE-5	8.5	VV10	5.6	0.8	0.1 U	0.0	15.3	0.0	25.3	0.1	13.7	0.0
ICS-J-SE-6	10.4	VV10	7.2	1.0	0.1 U	0.0	17.8	0.0	43.6	0.1	22.4	0.0
ICS-K-SE-1	0.7	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	VV10	11.3	1.6	2.5	0.5	52.4	0.0	129	0.3	310	0.7
ICS-K-SE-3	3.8	XD56	4.1	0.6	0.2	0.0	26.4	0.0	25.1	0.1	79.3	0.2
ICS-K-SE-4	5.5	VV10	21.0	3.0	1.6	0.3	45.2	0.0	46.3	0.1	241	0.5
ICS-K-SE-5	7	VV10	6.9	1.0	0.1 U	0.0	14.9	0.0	25.1	0.1	17.7	0.0
ICS-L-SE-1	0.7	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	VV10	6.3	0.9	0.4	0.1	23.6	0.0	21.9	0.1	87.2	0.2
ICS-L-SE-3	3.5	VV10	7.1	1.0	0.3	0.1	17.9	0.0	44.3	0.1	62.0	0.1
ICS-L-SE-4	5	VV10	6.2	0.9	0.1 U	0.0	18.4	0.0	29.5	0.1	11.9	0.0

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	ARI Delivery Group	Arsenic mg/kg, dry	Arsenic EF	Cadmium mg/kg, dry	Cadmium EF	Chromium mg/kg, dry	Chromium EF	Copper mg/kg, dry	Copper EF	Lead mg/kg, dry	Lead EF
Screening Levels		-----	**7**	**1**	**5.1**	**1**	**260**	**1**	**390**	**1**	**450**	**1**
ICS-L-SE-5	6.7	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-1	0.6	VV10	**7.7**	**1.1**	**0.4**	**0.1**	**21.7**	**0.0**	**52.9**	**0.1**	**57.9**	**0.1**
ICS-M-SE-2	1.6	VV10	**2.9**	**0.4**	0.1 U	**0.0**	**13.0**	**0.0**	**16.8**	**0.0**	**23.7**	**0.1**
ICS-M-SE-3	2.7	VV10	**1.1**	**0.2**	0.1 U	**0.0**	**8.9**	**0.0**	**8.0**	**0.0**	**1.9**	**0.0**
ICS-DUP	G-SE3	VV01	**10.1**	**1.4**	**0.5**	**0.1**	**22.5**	**0.0**	**39.3**	**0.1**	**20.4**	**0.0**
ICS-DUP	K-SE2	VV10	**12.6**	**1.8**	**1.5**	**0.3**	**59.3**	**0.0**	**115**	**0.3**	**364**	**0.8**
No. Spls.			**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**
No. Exceedances			**25**	**25**	**2**	**2**	**1**	**1**	**1**	**1**	**5**	**5**
% Exceed			**54.3%**	**54.3%**	**4.3%**	**4.3%**	**2.2%**	**2.2%**	**2.2%**	**2.2%**	**10.9%**	**10.9%**
Maximum			**31**	**4.4**	**8.8**	**1.6**	**431**	**1.7**	**427**	**1.1**	**4430**	**9.8**
Minimum			**1.1**	**0.2**	**0.1**	**0.0**	**8.9**	**0.0**	**8.0**	**0.0**	**1.9**	**0.0**

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
[yellow box] *- Value exceeds screening level based on dry wt. basis*

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Mercury mg/kg, dry	Mercury EF	Zinc mg/kg, dry	Zinc EF	DRO+RRO mg/kg,dry	DRO+RRO EF	Benzyl alcohol µg/kg, dry	Benzyl alcohol EF	2,4-Dimethyl-phenol µg/kg, dry	2,4-Dimethyl-phenol EF
Screening Levels		**0.41**	**1**	**410**	**1**	**2000**	**1**	**57**	**1**	**29**	**1**
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	**0.24**	**0.6**	**111**	**0.3**	**630**	**0.3**	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**0.17**	**0.4**	**61**	**0.1**	**84**	**0.0**	**130**	**2.3**	**15 J**	**0.5**
ICS-A-SE-5	5.1	**0.12**	**0.3**	**52**	**0.1**	**72**	**0.0**	**130**	**2.3**	**4.6 J**	**0.2**
ICS-A-SE-6	6.3	**0.15**	**0.4**	**72**	**0.2**	**87**	**0.0**	**190**	**3.3**	25 U	0.9 U
ICS-A-SE-7	7.2	**0.14**	**0.34**	**63**	**0.2**	**121**	**0.1**	**140**	**2.5**	24 U	0.8 U
ICS-B-SE-1	1.1	**0.04**	**0.1**	**80**	**0.2**	**85**	**0.0**	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**13.1 J**	**32.0**	**670**	**1.6**	**14300**	**7.2**	57 U	1 U	**58**	**2.0**
ICS-B-SE-4	4.4	**1.8 J**	**4.5**	**286**	**0.7**	**14200**	**7.1**	52 U	1 U	**120**	**4.1**
ICS-B-SE-5	5.5	**0.13**	**0.3**	**65**	**0.2**	**114**	**0.1**	**150**	**2.6**	**5.4 J**	**0.2**
ICS-B-SE-6	6.6	**0.19 J**	**0.5**	**74**	**0.2**	**147**	**0.1**	**160**	**2.8**	25 U	0.9 U
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	**0.04**	**0.1**	**31**	**0.1**	**91**	**0.0**	-----	-----	-----	-----
ICS-C-SE-3	3.3	**0.12**	**0.3**	**53**	**0.1**	**66**	**0.0**	**54**	**0.9**	**92**	**3.2**
ICS-C-SE-4	4.4	**0.03**	**0.07**	**26**	**0.1**	**61**	**0.0**	20 U	0.4 U	**22**	**0.8**
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	**38.8**	**94.6**	**3240**	**7.9**	**21900**	**11.0**	-----	-----	-----	-----
ICS-D-SE-3	3.8	**2.05**	**5.0**	**79**	**0.2**	**103**	**0.1**	**41**	**0.7**	**82**	**2.8**
ICS-D-SE-4	5.3	**0.14**	**0.3**	**68**	**0.2**	**71**	**0.0**	**100**	**1.8**	**4.3 J**	**0.1**
ICS-D-SE-5	6.7	**0.15 J**	**0.4**	**67**	**0.2**	**119**	**0.1**	**170**	**3.0**	24 U	0.8 U
ICS-F-SE-1	0.5	-----		-----		-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**0.29 J**	**0.7**	**1420**	**3.5**	**14100**	**7.1**	59 U	1 U	**890**	**31**
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**0.16 J**	**0.4**	**70**	**0.2**	**115**	**0.1**	**120**	**2.1**	24 U	0.8 U
ICS-F-SE-5	5.8	**0.17**	**0.4**	**66**	**0.2**	**89**	**0.0**	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**0.09**	**0.2**	**54**	**0.1**	**43**	**0.0**	**42**	**0.7**	20 U	0.7 U
ICS-F-SE-8	9.7	**0.02**	**0.0**	**28**	**0.1**	13 U	**0.0**	18 U	0.3 U	18 U	0.6 U
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Mercury mg/kg, dry	Mercury EF	Zinc mg/kg, dry	Zinc EF	DRO+RRO mg/kg,dry	DRO+RRO EF	Benzyl alcohol µg/kg, dry	Benzyl alcohol EF	2,4-Dimethyl-phenol µg/kg, dry	2,4-Dimethyl-phenol EF
Screening Levels		**0.41**	**1**	**410**	**1**	**2000**	**1**	**57**	**1**	**29**	**1**
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-3	3	**0.20**	**0.5**	**91**	**0.2**	**225**	**0.1**	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**0.49**	**1.2**	**840**	**2.0**	**16300**	**8.2**	110 U	2 U	**58 J**	**2.0**
ICS-G-SE-6	6.8	**0.20**	**0.20**	**81**	**0.2**	**193**	**0.1**	**61**	**1.1**	**4.9 J**	**0.2**
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	**0.39**	**1.0**	**149**	**0.4**	**880**	**0.4**	-----	-----	-----	-----
ICS-H-SE-3	3.3	**4.85**	**11.8**	**377**	**0.9**	**3400**	**1.7**	26 U	0.5 U	**15 J**	**0.5**
ICS-H-SE-4	4.7	**0.04**	**0.10**	**37**	**0.1**	**78**	**0.0**	19 U	0.3 U	**6.4 J**	**0.2**
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	**1.77**	**4.3**	**109**	**0.3**	**850**	**0.4**	-----	-----	-----	-----
ICS-I-SE-3	4.2	**0.30**	**0.7**	**60**	**0.1**	**206**	**0.1**	**36 J**	**0.6**	57 U	2.0 U
ICS-I-SE-4	5.9	**0.24 J**	**0.6**	**91**	**0.2**	**181**	**0.1**	**72**	**1.3**	24 U	0.8 U
ICS-I-SE-5	7.8	**0.14**	**0.3**	**40**	**0.1**	**710**	**0.4**	18 U	0.3 U	18 U	0.6 U
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	**0.29**	**0.7**	**201**	**0.5**	**3000**	**1.5**	-----	-----	-----	-----
ICS-J-SE-4	6.8	**0.08 J**	**0.2**	**51**	**0.1**	**112**	**0.1**	**37**	**0.6**	24 U	0.8 U
ICS-J-SE-5	8.5	**0.11**	**0.3**	**44**	**0.1**	**95**	**0.0**	**27**	**0.5**	**3 J**	**0.1**
ICS-J-SE-6	10.4	**0.11**	**0.27**	**56**	**0.1**	**99**	**0.0**	**44**	**0.8**	19 U	0.7 U
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	**1.95**	**4.8**	**213**	**0.5**	**1760**	**0.9**	-----	-----	-----	-----
ICS-K-SE-3	3.8	**0.38**	**0.9**	**70**	**0.2**	**250**	**0.1**	19 U	0.3 U	24 U	0.8 U
ICS-K-SE-4	5.5	**0.21**	**0.5**	**143**	**0.3**	**1060**	**0.5**	**57**	**1**	**11 J**	**0.4**
ICS-K-SE-5	7	**0.12**	**0.3**	**46**	**0.1**	**83**	**0.0**	20 U	0.4 U	20 U	0.7 U
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	**0.34**	**0.8**	**82**	**0.2**	**2600**	**1.3**	-----	-----	-----	-----
ICS-L-SE-3	3.5	**0.63**	**1.5**	**89**	**0.2**	**197**	**0.1**	**25**	**0.4**	**6.4 J**	**0.2**
ICS-L-SE-4	5	**0.31**	**0.8**	**52**	**0.1**	**66**	**0.0**	**27**	**0.5**	**3.5 J**	**0.1**

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Mercury mg/kg, dry	Mercury EF	Zinc mg/kg, dry	Zinc EF	DRO+RRO mg/kg,dry	DRO+RRO EF	Benzyl alcohol µg/kg, dry	Benzyl alcohol EF	2,4-Dimethyl-phenol µg/kg, dry	2,4-Dimethyl-phenol EF
Screening Levels		**0.41**	**1**	**410**	**1**	**2000**	**1**	**57**	**1**	**29**	**1**
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-1	0.6	**0.21**	**0.5**	**116**	**0.3**	**215**	**0.1**	-----	-----	-----	-----
ICS-M-SE-2	1.6	**0.04**	**0.1**	**48**	**0.1**	**45**	**0.0**	20 U	0.4 U	20 U	0.7 U
ICS-M-SE-3	2.7	0.3 U	**0.73**	**21**	**0.1**	2 U	**0.0**	19 U	0.3 U	19 U	0.7 U
ICS-DUP	G-SE3	**0.21**	**0.5**	**84**	**0.2**	**212**	**0.1**	-----	-----	-----	-----
ICS-DUP	K-SE2	**2.32**	**5.7**	**261**	**0.6**	**1730**	**0.9**	-----	-----	-----	-----
No. Spls.		**46**	**46**	**46**	**46**	**46**	**46**	**34**	**34**	**34**	**34**
No. Exceedances		**9**	**9**	**4**	**4**	**8**	**8**	**11**	**11**	**6**	**6**
% Exceed		**19.6%**	**19.6%**	**8.7%**	**8.7%**	**17.4%**	**17.4%**	**32.4%**	**32.4%**	**17.6%**	**17.6%**
Maximum		**39**	**94.6**	**3240**	**7.9**	**21900**	**11.0**	**190**	**3.3**	**890**	**31**
Minimum		**0.0**	**0.0**	**21.0**	**0.1**	**2.0**	**0.0**	**18.0**	**0.3**	**3.0**	**0.1**

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
DRO+RRO - Diesel- + Motor oil-Range Organics
[yellow box] *- Value exceeds screening level based on dry wt. basis*

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Pentachloro-phenol µg/kg, dry	Pentachloro-phenol EF	Benzo(a)-anthracene µg/kg, dry	Chrysene µg/kg, dry	total Benzo-fluoranthenes µg/kg, dry	Benzo(a)-pyrene µg/kg, dry	Indeno(1,2,3-cd)pyrene µg/kg, dry	Dibenz(a,h)-anthracene µg/kg, dry
Screening Levels		**360**	**1**	TEQ	TEQ	TEQ	TEQ	TEQ	TEQ
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**18 J**	**0.1**	**53**	**65**	**78**	**53**	**23**	20 U
ICS-A-SE-5	5.1	48 U	0.1 U	**26**	**38**	**43**	19 U	**12 J**	19 U
ICS-A-SE-6	6.3	20 U	0.1 U	**30**	**47**	**56**	20 U	**20**	20 U
ICS-A-SE-7	7.2	19 U	0.1 U	**35**	**47**	**59**	19 U	**18 J**	19 U
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**800**	**2.2**	**640**	**1100**	**930**	**480**	**120**	**57**
ICS-B-SE-4	4.4	52 U	0.1 U	**280**	**480**	**460**	**200**	**83**	52 U
ICS-B-SE-5	5.5	49 U	0.1 U	**29**	**43**	**48**	20 U	20 U	20 U
ICS-B-SE-6	6.6	20 U	0.1 U	**33**	**45**	**56**	20 U	**17 J**	20 U
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	46 U	0.1 U	**19**	**22**	**30 J**	18 U	18 U	18 U
ICS-C-SE-4	4.4	49 U	0.1 U	**35**	**36**	**48**	**31**	**14 J**	20 U
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	48 U	0.1 U	**59**	**75**	**100**	**48**	**27**	**10 J**
ICS-D-SE-4	5.3	50 U	0.1 U	**34**	**44**	**48**	20 U	**13 J**	20 U
ICS-D-SE-5	6.7	19 U	0.1 U	**39**	**50**	**66**	19 U	**18 J**	19 U
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	59 U	0.2 U	**280 J**	**410**	**410 J**	**220 J**	300 U	300 U
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	20 U	0.1 U	**29**	**37**	**51**	20 U	**15 J**	20 U
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	49 U	0.1 U	**18 J**	**26**	**16 J**	20 U	**14 J**	20 U
ICS-F-SE-8	9.7	46 U	0.1 U	18 U	18 U	37 U	18 U	18 U	18 U
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Pentachloro-phenol µg/kg, dry	Pentachloro-phenol EF	Benzo(a)-anthracene µg/kg, dry	Chrysene µg/kg, dry	total Benzo-fluoranthenes µg/kg, dry	Benzo(a)-pyrene µg/kg, dry	Indeno(1,2,3-cd)pyrene µg/kg, dry	Dibenz(a,h)-anthracene µg/kg, dry
Screening Levels		**360**	**1**	TEQ	TEQ	TEQ	TEQ	TEQ	TEQ
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**880 J**	**2.4**	**740**	**1800**	**890**	110 U	**140**	110 U
ICS-G-SE-6	6.8	48 U	0.1 U	**110**	**130**	**180**	**110**	**45**	**16 J**
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	**190 J**	**0.5**	**350**	**490**	**490**	**260**	**68**	**26**
ICS-H-SE-4	4.7	49 U	0.1 U	**14 J**	**15 J**	**20 J**	19 U	19 U	19 U
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	140 U	0.4 U	**300**	**540**	**780**	**360**	**180**	**63**
ICS-I-SE-4	5.9	19 U	0.1 U	**42**	**45**	**80**	19 U	**18 J**	19 U
ICS-I-SE-5	7.8	46 U	0.1 U	**310**	**350**	**470**	**360**	**170**	**73**
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	19 U	0.1 U	**19**	**23**	**34 J**	19 U	19 U	19 U
ICS-J-SE-5	8.5	47 U	0.1 U	**94**	**160**	**140**	**72**	**36**	**11 J**
ICS-J-SE-6	10.4	48 U	0.1 U	**80**	**78**	**120**	**64**	**34**	**16 J**
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	19 U	0.1 U	**31**	**67**	**56**	**22**	19 U	19 U
ICS-K-SE-4	5.5	**59 J**	**0.2**	**54**	**79**	**90**	**38**	**28**	20 U
ICS-K-SE-5	7	49 U	0.1 U	**120**	**170**	**210**	**110**	**49**	**17 J**
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	49 U	0.1 U	**91**	**120**	**160**	**93**	**50**	**21**
ICS-L-SE-4	5	48 U	0.1 U	**40**	**50**	**67**	19 U	**21**	19 U

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Pentachloro-phenol µg/kg, dry	Pentachloro-phenol EF	Benzo(a)-anthracene µg/kg, dry	Chrysene µg/kg, dry	total Benzo-fluoranthenes µg/kg, dry	Benzo(a)-pyrene µg/kg, dry	Indeno(1,2,3-cd)pyrene µg/kg, dry	Dibenz(a,h)-anthracene µg/kg, dry
Screening Levels		**360**	**1**	TEQ	TEQ	TEQ	TEQ	TEQ	TEQ
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	49 U	0.1 U	20 U	**14 J**	**25 J**	**9.8 J**	20 U	20 U
ICS-M-SE-3	2.7	47 U	0.1 U	19 U	19 U	38 U	19 U	19 U	19 U
ICS-DUP	G-SE3	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP	K-SE2	-----	-----	-----	-----	-----	-----	-----	-----
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceedances		**2**	**2**	-----	-----	-----	-----	-----	-----
% Exceed		**5.9%**	**5.9%**	-----	-----	-----	-----	-----	-----
Maximum		**880**	**2.4**	**740**	**1800**	**930**	**480**	**300**	**300**
Minimum		**18.0**	**0.1**	**14.0**	**14.0**	**16.0**	**9.8**	**12.0**	**10.0**

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
- Value exceeds screening level based on dry wt. basis

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	BaPEq. (TEQ) µg/kg, dry	BaPEq. (TEQ) EF	Aroclor 1016 µg/kg, dry	Aroclor 1242 µg/kg, dry	Aroclor 1248 µg/kg, dry	Aroclor 1254 µg/kg, dry	Aroclor 1260 µg/kg, dry	Aroclor 1221 µg/kg, dry	Aroclor 1232 µg/kg, dry	Detected total PCBs µg/kg, dry	Detected total PCBs EF
Screening Levels		**90**		-----	-----	-----	-----	-----	-----	-----	2	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	75 U	75 U	**810**	**870**	**690**	75 U	75 U	**2370**	**1185**
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
ICS-A-SE-4	3.9	**89.1**	**1.0**	3.8 U	3.8 U	**42**	**31**	**26**	3.8 U	3.8 U	**99**	**49.5**
ICS-A-SE-5	5.1	**46.5**	**0.5**	3.8 U	3.8 U	**12**	**7.8**	**7.3**	3.8 U	3.8 U	**27.1**	**13.55**
ICS-A-SE-6	6.3	**51.1**	**0.6**	3.8 U	3.8 U	4.8 U	3.8 U	3.8 U	3.8 U	3.8 U	4.8 U	2.4 U
ICS-A-SE-7	7.2	**49.7**	**0.6**	3.8 U	3.8 U	6.3 U	3.8 U	3.8 U	3.8 U	3.8 U	6.3 U	3.2 U
ICS-B-SE-1	1.1	-----	-----	37 U	37 U	**170**	**140**	**120**	37 U	37 U	**430**	**215**
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**717**	**8.0**	400 U	400 U	**9600**	**11,000**	**8600**	400 U	400 U	**29,200**	**14600**
ICS-B-SE-4	4.4	**339**	**3.8**	1500 U	1500 U	**23,000**	**12,000**	**9100**	1500 U	1500 U	**44,100**	**22050**
ICS-B-SE-5	5.5	**50.1**	**0.6**	3.9 U	**50**	3.9 U	**24**	**23**	3.9 U	3.9 U	**97**	**48.5**
ICS-B-SE-6	6.6	**51.1**	**0.6**	4.0 U	4.0 U	5.6 U	4.0 U	4.0 U	4.0 U	4.0 U	5.6 U	2.8 U
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	3.6 U	3.6 U	**18**	**21**	**16**	3.6 U	3.6 U	**55**	**27.5**
ICS-C-SE-3	3.3	**42.9**	**0.5**	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	1.9 U
ICS-C-SE-4	4.4	**61.1**	**0.7**	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	1.8 U
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	200 U	200 U	**6200**	**7700**	**3100**	200 U	200 U	**17,000**	**8500**
ICS-D-SE-3	3.8	**77.4**	**0.9**	3.9 U	3.9 U	**27**	**30**	**10**	3.9 U	3.9 U	**67**	**33.5**
ICS-D-SE-4	5.3	**49.9**	**0.6**	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	0.0 U
ICS-D-SE-5	6.7	**50.8**	**0.6**	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	2.0 U
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**623.1**	**6.9**	3.8 U	3.8 U	130 U	**160**	**170**	3.8 U	3.8 U	**330**	**165**
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**49.9**	**0.6**	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	2.0 U
ICS-F-SE-5	5.8	-----	-----	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	2.0 U
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**45.1**	**0.5**	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	2.0 U
ICS-F-SE-8	9.7	**43.5**	**0.5**	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	1.9 U
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	BaPEq. (TEQ) µg/kg, dry	BaPEq. (TEQ) EF	Aroclor 1016 µg/kg, dry	Aroclor 1242 µg/kg, dry	Aroclor 1248 µg/kg, dry	Aroclor 1254 µg/kg, dry	Aroclor 1260 µg/kg, dry	Aroclor 1221 µg/kg, dry	Aroclor 1232 µg/kg, dry	Detected total PCBs µg/kg, dry	Detected total PCBs EF
Screening Levels		**90**		-----	-----	-----	-----	-----	-----	-----	2	1
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-3	3	-----	-----	39 U	39 U	**610**	**670**	**270**	39 U	39 U	**1550**	**775**
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**415**	**4.6**	78 U	78 U	**3600**	**3600**	**2800**	78 U	78 U	**10,000**	**5000**
ICS-G-SE-6	6.8	**161**	**1.8**	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	2.0 U
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	170 U	170 U	**7400**	**4900**	**5800**	170 U	170 U	**18,100**	**9050**
ICS-H-SE-3	3.3	**382**	**4.2**	580 U	580 U	**13,000**	**16,000**	**9100**	580 U	580 U	**38,100**	**19050**
ICS-H-SE-4	4.7	**43.5**	**0.5**	18 U	**260**	18 U	93 U	18 U	18 U	18 U	**260**	**130**
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	140 U	140 U	**5100**	**6000**	**1900**	140 U	140 U	**13,000**	**6500**
ICS-I-SE-3	4.2	**554**	**6.2**	3.9 U	3.9 U	**170**	**160**	**65**	3.9 U	3.9 U	**395**	**197.5**
ICS-I-SE-4	5.9	**52.5**	**0.6**	3.9 U	3.9 U	**70**	**46**	**27**	3.9 U	3.9 U	**143**	**71.5**
ICS-I-SE-5	7.8	**532**	**5.9**	3.8 U	**36**	3.8 U	19 U	**5.6**	3.8 U	3.8 U	**42**	**20.8**
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	3.8 U	3.8 U	**47**	**110**	**180**	3.8 U	3.8 U	**337**	**168.5**
ICS-J-SE-4	6.8	**45.4**	**0.5**	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4 U	2.0 U
ICS-J-SE-5	8.5	**112**	**1.2**	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	4 U	1.9 U
ICS-J-SE-6	10.4	**104**	**1.2**	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	4 U	2.0 U
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
ICS-K-SE-2	2.2	-----	-----	170 U	170 U	**5000**	**5100**	**2900**	170 U	170 U	**13,000**	**6500**
ICS-K-SE-3	3.8	**52.3**	**0.6**	38 U	38 U	**760**	**590**	**260**	38 U	38 U	**1610**	**805**
ICS-K-SE-4	5.5	**76.0**	**0.8**	3.8 U	3.8 U	**22**	76 U	**81**	3.8 U	3.8 U	**103**	**51.5**
ICS-K-SE-5	7	**167**	**1.9**	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	1.9 U
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	38 U	38 U	**910**	**880**	**520**	38 U	38 U	**2310**	**1155**
ICS-L-SE-3	3.5	**145**	**1.6**	4.0 U	4.0 U	**8.0**	**9.2**	**6.0**	4.0 U	4.0 U	**23**	**11.6**
ICS-L-SE-4	5	**51.3**	**0.6**	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	2.0 U

TABLE A5.4 - Exceedance Factors - Constituents with Dry Weight Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	BaPEq. (TEQ) µg/kg, dry	BaPEq. (TEQ) EF	Aroclor 1016 µg/kg, dry	Aroclor 1242 µg/kg, dry	Aroclor 1248 µg/kg, dry	Aroclor 1254 µg/kg, dry	Aroclor 1260 µg/kg, dry	Aroclor 1221 µg/kg, dry	Aroclor 1232 µg/kg, dry	Detected total PCBs µg/kg, dry	Detected total PCBs EF
Screening Levels		**90**		-----	-----	-----	-----	-----	-----	-----	2	1
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-1	0.6	-----	-----	37 U	37 U	**370**	**360**	**380**	37 U	37 U	**1110**	**555**
ICS-M-SE-2	1.6	**36.4**	**0.4**	3.8 U	3.8 U	**98**	**120**	**94**	3.8 U	3.8 U	**312**	**156**
ICS-M-SE-3	2.7	**45.8**	**0.5**	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	1.9 U
ICS-DUP	G-SE3	-----	-----	38 U	38 U	**390**	**440**	**210**	38 U	38 U	**1040**	**520**
ICS-DUP	K-SE2	-----	-----	220 U	220 U	**6700**	**6500**	**3400**	220 U	220 U	**16,600**	**8300**
No. Spls.		**34**	**34**	**0**	**3**	**24**	**25**	**27**	**0**	**0**	**46**	**46**
No. Exceedances		**11**	**11**	-----	-----	-----	-----	-----	-----	-----	**28**	**28**
% Exceed		**32.4%**	**32.4%**	-----	-----	-----	-----	-----	-----	-----	**60.9%**	**60.9%**
Maximum		**717**	**8**	**0**	**260**	**23000**	**16000**	**9100**	**0**	**0**	**44100**	**22050**
Minimum		**36.4**	**0.4**	**0.0**	**36.0**	**8.0**	**7.8**	**5.6**	**0.0**	**0.0**	**3.6**	**0.0**

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
[yellow box] *- Value exceeds screening level based on dry wt. basis*

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Collection Date	ARI Delivery Group	TOC	1,4-Dichlorobenzene			1,2-Dichlorobenzene			1,2,4-Trichlorobenzene		
				%	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF
Screening Levels					(a)	3100	1	(a)	2300	1	(a)	810	1
ICS-A-SE-1	0.4	11/26/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	11/26/12	VV01	1.37	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	11/26/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	11/26/12	VV01	2.77	**3**	**108**	**0.0**	**6.5**	**235**	**0.1**	**6.9**	**249**	**0.3**
ICS-A-SE-5	5.1	11/26/12	VV01	1.61	**2.9**	**180**	**0.1**	**10**	**621**	**0.3**	<4.8	298	0.4
ICS-A-SE-6	6.3	11/26/12	XD56	3.22	<5.0	155	0.1	<5.0	155	0.1	<5.0	155	0.2
ICS-A-SE-7	7.2	11/26/12	XD56	4.22	<4.8	114	0.0	<4.8	114	0.0	<4.8	114	0.1
ICS-B-SE-1	1.1	11/27/12	VV01	0.78	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	11/27/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	11/27/12	VV01	3.96	**300**	**7576**	**2.4**	**97**	**2449**	**1.1**	**66**	**1667**	**2.1**
ICS-B-SE-4	4.4	11/27/12	XD56	3.37	**370**	**10979**	**3.5**	**150**	**4451**	**1.9**	**52**	**1543**	**1.9**
ICS-B-SE-5	5.5	11/27/12	VV01	3.64	**22**	**604**	**0.2**	**22**	**604**	**0.3**	<4.9	135	0.2
ICS-B-SE-6	6.6	11/27/12	XD56	2.66	<4.9	184	0.1	<4.9	184	0.1	<4.9	184	0.2
ICS-C-SE-1	0.5	11/27/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	11/27/12	VV01	0.89	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	11/27/12	VV01	2.29	<4.6	201	0.1	<4.6	201	0.1	<4.6	201	0.2
ICS-C-SE-4	4.4	11/27/12	VV01	1.57	**33**	**2102**	**0.7**	**2.8**	**178**	**0.1**	<4.9	312	0.4
ICS-D-SE-1	0.7	11/27/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	11/27/12	VV01	6.91	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	11/27/12	VV01	2.07	**15**	**725**	**0.2**	**76**	**3671**	**1.6**	<4.8	232	0.3
ICS-D-SE-4	5.3	11/27/12	VV01	2.70	<5.0	185	0.1	<5.0	185	0.1	<5.0	185	0.2
ICS-D-SE-5	6.7	11/27/12	XD56	2.26	<4.8	212	0.1	<4.8	212	0.1	<4.8	212	0.3
ICS-F-SE-1	0.5	11/27/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	11/27/12	XD56	3.15	**11**	**349**	**0.1**	**9.5**	**302**	**0.1**	<15.0	476	0.6
ICS-F-SE-3	3.1	12/10/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	11/27/12	XD56	2.22	<4.9	221	0.1	<4.9	221	0.1	<4.9	221	0.3
ICS-F-SE-5	5.8	11/27/12	VV01	2.67	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	11/27/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	11/27/12	VV01	1.26	<4.9	389	0.1	<4.9	389	0.2	<4.9	389	0.5
ICS-F-SE-8	9.7	11/27/12	VV01	0.436	<4.6	1055	0.3	<4.6	1055	0.5	<4.6	1055	1.3
ICS-F-SE-9	10.9	11/27/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	11/28/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	11/28/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Collection Date	ARI Delivery Group	TOC %	1,4-Dichlorobenzene µg/kg, dry	1,4-Dichlorobenzene µg/kg, OCN	1,4-Dichlorobenzene EF	1,2-Dichlorobenzene µg/kg, dry	1,2-Dichlorobenzene µg/kg, OCN	1,2-Dichlorobenzene EF	1,2,4-Trichlorobenzene µg/kg, dry	1,2,4-Trichlorobenzene µg/kg, OCN	1,2,4-Trichlorobenzene EF
Screening Levels					(a)	3100	1	(a)	2300	1	(a)	810	1
ICS-G-SE-3	3	11/28/12	VV01	1.78	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP1-SE	SE-3	11/28/12	VV01	1.32	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	11/28/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	11/28/12	VV01	1.85	**140**	**7568**	**2.4**	<29.0	1568	0.7	<29.0	1568	1.9
ICS-G-SE-6	6.8	11/28/12	VV01	1.60	<4.8	**300**	0.1	**3.2**	**200**	**0.1**	<4.8	300	0.4
ICS-H-SE-1	0.4	11/28/12	VV01	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	11/28/12	VV01	2.00	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	11/28/12	VV01	3.41	**1000**	**29326**	**9.5**	**100**	**2933**	**1.3**	**36**	**1056**	**1.3**
ICS-H-SE-4	4.7	11/28/12	VV10	0.856	**24**	**2804**	**0.9**	**7.4**	**864**	**0.4**	**6.1**	**713**	**0.9**
ICS-I-SE-1	0.9	11/28/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	11/28/12	VV10	3.13	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	11/28/12	VV10	2.28	<14.0	614	0.2	<14.0	614	0.3	<14.0	614	0.8
ICS-I-SE-4	5.9	11/28/12	XD56	2.84	<4.8	169	0.1	**3.0**	**106**	**0.0**	<4.8	169	0.2
ICS-I-SE-5	7.8	11/28/12	VV10	1.02	<4.6	451	0.1	<4.6	451	0.2	<4.6	451	0.6
ICS-I-SE-6	9.5	11/28/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	11/28/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	11/28/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	11/28/12	VV10	2.31	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	11/28/12	XD56	0.96	<4.7	489	0.2	<4.7	489	0.2	<4.7	489	0.6
ICS-J-SE-5	8.5	11/28/12	VV10	1.33	<4.7	353	0.1	<4.7	353	0.2	<4.7	353	0.4
ICS-J-SE-6	10.4	11/28/12	VV10	1.55	<4.8	310	0.1	<4.8	310	0.1	<4.8	310	0.4
ICS-K-SE-1	0.7	11/30/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	11/30/12	VV10	2.37	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP2-SE	SE-2	11/30/12	VV10	2.03	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	11/30/12	XD56	0.88	**5.0**	**569**	**0.2**	**3.1**	**353**	**0.2**	**3.8**	**432**	**0.5**
ICS-K-SE-4	5.5	11/30/12	VV10	2.31	**2.7**	**117**	**0.0**	<5.0	216	0.1	<5.0	216	0.3
ICS-K-SE-5	7	11/30/12	VV10	1.83	<4.9	268	0.1	<4.9	268	0.1	<4.9	268	0.3
ICS-L-SE-1	0.7	11/30/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	11/30/12	VV10	1.66	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	11/30/12	VV10	1.55	<4.9	316	0.1	<4.9	316	0.1	<4.9	316	0.4
ICS-L-SE-4	5	11/30/12	VV10	1.44	<4.8	333	0.1	<4.8	333	0.1	<4.8	333	0.4
ICS-L-SE-5	6.7	11/30/12	VV10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Collection Date	ARI Delivery Group	TOC %	1,4-Dichlorobenzene µg/kg, dry	1,4-Dichlorobenzene µg/kg, OCN	1,4-Dichlorobenzene EF	1,2-Dichlorobenzene µg/kg, dry	1,2-Dichlorobenzene µg/kg, OCN	1,2-Dichlorobenzene EF	1,2,4-Trichlorobenzene µg/kg, dry	1,2,4-Trichlorobenzene µg/kg, OCN	1,2,4-Trichlorobenzene EF
Screening Levels					(a)	3100	1	(a)	2300	1	(a)	810	1
ICS-M-SE-1	0.6	11/30/12	VV10	2.55	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	11/30/12	VV10	2.95	<4.9	166	0.1	<4.9	166	0.1	<4.9	166	0.2
ICS-M-SE-3	2.7	11/30/12	VV10	0.283	<4.7	1661	0.5	<4.7	1661	0.7	<4.7	1661	2.1
No. Spls.					**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceed.					-----	4	4	-----	4	4	-----	3	3
% Exceed					-----	11.8%	11.8%	-----	11.8%	11.8%	-----	8.8%	8.8%
Maximum					1000	29326	9.5	150	4451	1.9	66	1667	2.1
Minimum					3	108	0.0	3	106	0.0	4	114	0.1

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] *- Value exceeds screening level (based on carbon normalized value)*

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Naphthalene			2-Methylnaphthalene			Dimethylphthalate			Acenaphthene		
		µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF
Screening Levels		(a)	99000	1	(a)	38000	1	(a)	53000	1	(a)	16000	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**66**	**2383**	**0.0**	**41**	**1480**	**0.0**	<20	722	0.0	**46**	**1661**	**0.1**
ICS-A-SE-5	5.1	**50**	**3106**	**0.0**	**34**	**2112**	**0.1**	<19	1180	0.0	**21**	**1304**	**0.1**
ICS-A-SE-6	6.3	**71**	**2205**	**0.0**	**44**	**1366**	**0.0**	<20	621	0.0	**27**	**839**	**0.1**
ICS-A-SE-7	7.2	**52**	**1232**	**0.0**	**39**	**924**	**0.0**	<19	450	0.0	**25**	**592**	**0.0**
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**360**	9091	**0.1**	**260**	**6566**	**0.2**	<57	1439	0.0	**910**	**22980**	**1.4**
ICS-B-SE-4	4.4	**120**	**3561**	**0.0**	**180**	**5341**	**0.1**	<52	1543	0.0	**220**	**6528**	**0.4**
ICS-B-SE-5	5.5	**57**	1566	**0.0**	**44**	**1209**	**0.0**	<20	549	0.0	**29**	**797**	**0.0**
ICS-B-SE-6	6.6	**73**	**2744**	**0.0**	**48**	**1805**	**0.0**	<20	752	0.0	**32**	**1203**	**0.1**
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	**24**	**1048**	**0.0**	**13**	**568**	**0.0**	<18	786	0.0	**21**	**917**	**0.1**
ICS-C-SE-4	4.4	**18**	**1146**	**0.0**	<20.0	**1274**	0.0	<20	1274	0.0	**23**	**1465**	**0.1**
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	**620**	**29952**	**0.3**	**520**	**25121**	**0.7**	<19	918	0.0	**34**	**1643**	**0.1**
ICS-D-SE-4	5.3	**69**	**2556**	**0.0**	**45**	**1667**	**0.0**	<20	741	0.0	**31**	**1148**	**0.1**
ICS-D-SE-5	6.7	**77**	**3407**	**0.0**	**63**	**2788**	**0.1**	<19	841	0.0	**23**	**1018**	**0.1**
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**17000**	**539683**	**5.5**	**62000**	**1968254**	**51.8**	<300	9524	0.2	**980**	**31111**	**1.9**
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**72**	**3243**	**0.0**	**120**	**5405**	**0.1**	<20	901	0.0	**22**	**991**	**0.1**
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**22**	**1746**	**0.0**	**20**	**1587**	**0.0**	<20	1587	0.0	<20	1587	0.1
ICS-F-SE-8	9.7	18	**4128**	**0.0**	<18.0	**4128**	0.1	<18	4128	0.1	<18	4128	0.3
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Naphthalene			2-Methylnaphthalene			Dimethylphthalate			Acenaphthene		
		µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF
Screening Levels		(a)	99000	1	(a)	38000	1	(a)	53000	1	(a)	16000	1
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP1-SE	SE-3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**380**	**20541**	**0.2**	**220**	**11892**	**0.3**	<110	5946	0.1	**330**	**17838**	**1.1**
ICS-G-SE-6	6.8	**84**	**5250**	**0.1**	**40**	**2500**	**0.1**	<19	1188	0.0	**34**	**2125**	**0.1**
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	**190**	**5572**	**0.1**	**91**	**2669**	**0.1**	<26	762	0.0	**240**	**7038**	**0.4**
ICS-H-SE-4	4.7	**20**	**2336**	**0.0**	<19.0	**2220**	0.1	<19	2220	0.0	<19	2220	0.1
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	**86**	**3772**	**0.0**	**29**	**1272**	**0.0**	<57	2500	0.0	**77**	**3377**	**0.2**
ICS-I-SE-4	5.9	**56**	**1972**	**0.0**	**19**	**669**	**0.0**	<19	669	0.0	**290**	**10211**	**0.6**
ICS-I-SE-5	7.8	**23**	**2255**	**0.0**	**11**	**1078**	**0.0**	<18	1765	0.0	**520**	**50980**	**3.2**
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	**53**	**5515**	**0.1**	**43**	**4475**	**0.1**	<19	1977	0.0	**19**	**1977**	**0.1**
ICS-J-SE-5	8.5	**64**	**4812**	**0.0**	**17**	**1278**	**0.0**	<19	1429	0.0	**44**	**3308**	**0.2**
ICS-J-SE-6	10.4	**23**	**1484**	**0.0**	**36**	**2323**	**0.1**	<19	1226	0.0	**23**	**1484**	**0.1**
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP2-SE	SE-2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	<19	2162	0.0	**13**	**1479**	**0.0**	<19	2162	0.0	**18**	**2048**	**0.1**
ICS-K-SE-4	5.5	**100**	**4329**	**0.0**	**140**	**6061**	**0.2**	<20	866	0.0	**62**	2684	**0.2**
ICS-K-SE-5	7	**83**	**4536**	**0.0**	**21**	**1148**	**0.0**	<20	1093	0.0	**80**	**4372**	**0.3**
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	**160**	**10323**	**0.1**	**39**	**2516**	**0.1**	<20	1290	0.0	**66**	**4258**	**0.3**
ICS-L-SE-4	5	**71**	**4931**	**0.0**	**38**	**2639**	**0.1**	<19	1319	0.0	**23**	**1597**	**0.1**
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Naphthalene			2-Methylnaphthalene			Dimethylphthalate			Acenaphthene		
		µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF
Screening Levels		(a)	99000	1	(a)	38000	1	(a)	53000	1	(a)	16000	1
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	<20.0	**678**	0.0	<20.0	**678**	0.0	<20	678	0.0	<20	678	0.0
ICS-M-SE-3	2.7	<19.0	**6714**	0.1	<19.0	**6714**	0.2	<19	6714	0.1	<19	6714	0.4
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceed.		-----	1	1	-----	1	1	-----	0	0	-----	4	4
% Exceed		-----	2.9%	2.9%	-----	2.9%	2.9%	-----	0.0%	0.0%	-----	11.8%	11.8%
Maximum		17000	539683	5.5	62000	1968254	51.8	300	9524	0.2	980	50980	3.2
Minimum		18	678	0.0	11	568	0.0	18	450	0.0	18	592	0.0

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] *- Value exceeds screening level (based on carbon normalized value)*

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Dibenzofuran			Fluorene			N-Nitrosodiphenylamine			Phenanthrene		
		µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	15000	1	(a)	23000	1	(a)	11000	1	(a)	100000	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**43**	**1552**	**0.1**	**51**	**1841**	**0.1**	<20	722	0.1	**180**	**6498**	**0.1**
ICS-A-SE-5	5.1	**30**	**1863**	**0.1**	**33**	**2050**	**0.1**	**11**	**683**	**0.1**	**110**	**6832**	**0.1**
ICS-A-SE-6	6.3	**39**	**1211**	**0.1**	**44**	**1366**	**0.1**	<5.0	155	0.0	**150**	**4658**	**0.0**
ICS-A-SE-7	7.2	**37**	**877**	**0.1**	**39**	**924**	**0.0**	<4.8	114	0.0	**130**	**3081**	**0.0**
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	<57	1439	0.1	**450**	**11364**	**0.5**	<57	1439	0.1	**400**	**10101**	**0.1**
ICS-B-SE-4	4.4	**100**	**2967**	**0.2**	**260**	**7715**	**0.3**	<13	386	0.0	**630**	**18694**	**0.2**
ICS-B-SE-5	5.5	**39**	1071	**0.1**	**45**	**1236**	**0.1**	**6.6**	**181**	**0.0**	**140**	**3846**	**0.0**
ICS-B-SE-6	6.6	**45**	**1692**	**0.1**	**54**	**2030**	**0.1**	<4.9	184	0.0	**170**	**6391**	**0.1**
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	**20**	873	**0.1**	**22**	**961**	**0.0**	**2.4**	**105**	**0.0**	**53**	**2314**	**0.0**
ICS-C-SE-4	4.4	<20	1274	0.1	**13**	**828**	**0.0**	<20	1274	0.1	**49**	**3121**	**0.0**
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	**33**	1594	**0.1**	**51**	**2464**	**0.1**	**6.1**	**295**	**0.0**	**130**	**6280**	**0.1**
ICS-D-SE-4	5.3	**42**	1556	**0.1**	**51**	**1889**	**0.1**	**3.5**	**130**	**0.0**	**160**	**5926**	**0.1**
ICS-D-SE-5	6.7	**47**	**2080**	**0.1**	**40**	**1770**	**0.1**	<4.8	212	0.0	**140**	**6195**	**0.1**
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**1600**	**50794**	**3.4**	**5000**	**158730**	**6.9**	<15	476	0.0	**6800**	**215873**	**2.2**
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**38**	**1712**	**0.1**	**42**	**1892**	**0.1**	<4.9	221	0.0	**130**	**5856**	**0.1**
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**14**	**1111**	**0.1**	**20**	**1587**	**0.1**	<20	1587	0.1	**54**	**4286**	**0.0**
ICS-F-SE-8	9.7	<18	4128	0.3	<18	4128	0.2	<18	4128	0.4	**12**	**2752**	**0.0**
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Dibenzofuran			Fluorene			N-Nitrosodiphenylamine			Phenanthrene		
		µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	15000	1	(a)	23000	1	(a)	11000	1	(a)	100000	1
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP1-SE	SE-3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	91	4919	0.3	1200	64865	2.8	1800	97297	8.8	940	50811	0.5
ICS-G-SE-6	6.8	35	2188	0.1	52	3250	0.1	9.6	600	0.1	170	10625	0.1
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	86	2522	0.2	490	14370	0.6	260	7625	0.7	800	23460	0.2
ICS-H-SE-4	4.7	<19	2220	0.1	16	1869	0.1	3.3	386	0.0	35	4089	0.0
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	29	1272	0.1	52	2281	0.1	8.9	390	0.0	150	6579	0.1
ICS-I-SE-4	5.9	40	1408	0.1	59	2077	0.1	<4.8	169	0.0	67	2359	0.0
ICS-I-SE-5	7.8	23	2255	0.2	41	4020	0.2	2.8	275	0.0	500	49020	0.5
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	24	2497	0.2	21	2185	0.1	<4.7	489	0.0	90	9365	0.1
ICS-J-SE-5	8.5	25	1880	0.1	35	2632	0.1	<19	1429	0.1	120	9023	0.1
ICS-J-SE-6	10.4	15	968	0.1	21	1355	0.1	<19	1226	0.1	84	5419	0.1
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP2-SE	SE-2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	17	1934	0.1	12	1365	0.1	<4.7	535	0.0	34	3868	0.0
ICS-K-SE-4	5.5	34	1472	0.1	49	2121	0.1	<20	866	0.1	100	4329	0.0
ICS-K-SE-5	7	28	1530	0.1	39	2131	0.1	<20	1093	0.1	110	6011	0.1
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	48	3097	0.2	59	3806	0.2	4	258	0.0	200	12903	0.1
ICS-L-SE-4	5	32	2222	0.1	45	3125	0.1	2.6	181	0.0	130	9028	0.1
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Dibenzofuran			Fluorene			N-Nitrosodiphenylamine			Phenanthrene		
		µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg, OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	15000	1	(a)	23000	1	(a)	11000	1	(a)	100000	1
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	<20	678	0.0	<20	678	0.0	<20	678	0.1	<20	678	0.0
ICS-M-SE-3	2.7	<19	6714	0.4	<19	6714	0.3	<19	6714	0.6	<19	6714	0.1
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceed.		-----	1	1	-----	2	2	-----	1	1	-----	1	1
% Exceed		-----	2.9%	2.9%	-----	5.9%	5.9%	-----	2.9%	2.9%	-----	2.9%	2.9%
Maximum		1600	50794	3.4	5000	158730	6.9	1800	97297	8.8	6800	215873	2.2
Minimum		14	678	0.0	12	678	0.0	2	105	0.0	12	678	0.0

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] *- Value exceeds screening level (based on carbon normalized value)*

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Anthracene			Fluoranthene			Pyrene			Butylbenzylphthalate		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	220000	1	(a)	160000	1	(a)	1000000	1	(a)	4900	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**45**	**1625**	**0.0**	**200**	**7220**	**0.0**	**160**	**5776**	**0.0**	<4.9	177	0.0
ICS-A-SE-5	5.1	**22**	**1366**	**0.0**	**92**	**5714**	**0.0**	**78**	**4845**	**0.0**	<4.8	298	0.1
ICS-A-SE-6	6.3	**29**	**901**	**0.0**	**110**	**3416**	**0.0**	**100**	**3106**	**0.0**	**8.2**	**255**	**0.1**
ICS-A-SE-7	7.2	**33**	**782**	**0.0**	**130**	**3081**	**0.0**	**110**	**2607**	**0.0**	**6.6**	**156**	**0.0**
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**600**	**15152**	**0.1**	**2200**	**55556**	**0.3**	**2000**	**50505**	**0.1**	**47**	**1187**	**0.2**
ICS-B-SE-4	4.4	**160**	**4748**	**0.0**	**1700**	**50445**	**0.3**	**980**	**29080**	**0.0**	<13	386	0.1
ICS-B-SE-5	5.5	**26**	**714**	**0.0**	**120**	**3297**	**0.0**	**95**	**2610**	**0.0**	<4.9	135	0.0
ICS-B-SE-6	6.6	**28**	**1053**	**0.0**	**130**	**4887**	**0.0**	**110**	**4135**	**0.0**	**5.2**	**195**	**0.0**
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	**15**	**655**	**0.0**	**71**	**3100**	**0.0**	**58**	**2533**	**0.0**	**3.2**	**140**	**0.0**
ICS-C-SE-4	4.4	**14**	**892**	**0.0**	**83**	**5287**	**0.0**	**86**	**5478**	**0.0**	<4.9	312	0.1
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	**39**	**1884**	**0.0**	**240**	**11594**	**0.1**	**200**	**9662**	**0.0**	<4.8	232	0.0
ICS-D-SE-4	5.3	**30**	**1111**	**0.0**	**140**	**5185**	**0.0**	**100**	**3704**	**0.0**	<5.0	185	0.0
ICS-D-SE-5	6.7	**34**	**1504**	**0.0**	**140**	**6195**	**0.0**	**120**	**5310**	**0.0**	**5.0**	**221**	**0.0**
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**440**	**13968**	**0.1**	**860**	**27302**	**0.2**	**740**	**23492**	**0.0**	<15	476	0.1
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**24**	**1081**	**0.0**	**100**	**4505**	**0.0**	**93**	**4189**	**0.0**	<4.9	221	0.0
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**16**	**1270**	**0.0**	**74**	**5873**	**0.0**	**62**	**4921**	**0.0**	<4.9	389	0.1
ICS-F-SE-8	9.7	<18	4128	**0.0**	**12**	**2752**	**0.0**	**11**	**2523**	**0.0**	<4.6	1055	0.2
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Anthracene			Fluoranthene			Pyrene			Butylbenzylphthalate		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	220000	1	(a)	160000	1	(a)	1000000	1	(a)	4900	1
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP1-SE	SE-3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**730**	**39459**	**0.2**	**1600**	**86486**	**0.5**	**4200**	**227027**	**0.2**	**170**	**9189**	**1.9**
ICS-G-SE-6	6.8	**59**	**3688**	**0.0**	**250**	**15625**	**0.1**	**330**	**20625**	**0.0**	<4.8	300	0.1
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	**300**	**8798**	**0.0**	**910**	**26686**	**0.2**	**920**	**26979**	**0.0**	**51**	**1496**	**0.3**
ICS-H-SE-4	4.7	<19	2220	0.0	**41**	**4790**	**0.0**	**41**	**4790**	**0.0**	<4.9	572	0.1
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	**97**	**4254**	**0.0**	**460**	**20175**	**0.1**	**360**	**15789**	**0.0**	<14	614	0.1
ICS-I-SE-4	5.9	**25**	**880**	**0.0**	**130**	**4577**	**0.0**	**130**	**4577**	**0.0**	**9.5**	**335**	**0.1**
ICS-I-SE-5	7.8	**150**	**14706**	**0.1**	**770**	**75490**	**0.5**	**840**	**82353**	**0.1**	<4.6	451	0.1
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	**20**	**2081**	**0.0**	**87**	**9053**	**0.1**	**89**	**9261**	**0.0**	**48**	**4995**	**1.0**
ICS-J-SE-5	8.5	**57**	**4286**	**0.0**	**380**	**28571**	**0.2**	**270**	**20301**	**0.0**	<4.7	353	0.1
ICS-J-SE-6	10.4	**33**	**2129**	**0.0**	**260**	**16774**	**0.1**	**220**	**14194**	**0.0**	<4.8	310	0.1
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP2-SE	SE-2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	**15**	**1706**	**0.0**	**36**	**4096**	**0.0**	**76**	**8646**	**0.0**	**5.1**	**580**	**0.1**
ICS-K-SE-4	5.5	**44**	**1905**	**0.0**	**180**	**7792**	**0.0**	**200**	**8658**	**0.0**	<5.0	216	0.0
ICS-K-SE-5	7	**71**	**3880**	**0.0**	**280**	**15301**	**0.1**	**230**	**12568**	**0.0**	<4.9	268	0.1
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	**65**	**4194**	**0.0**	**400**	**25806**	**0.2**	**320**	**20645**	**0.0**	<4.9	316	0.1
ICS-L-SE-4	5	**37**	**2569**	**0.0**	**180**	**12500**	**0.1**	**150**	**10417**	**0.0**	<4.8	333	0.1
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Anthracene			Fluoranthene			Pyrene			Butylbenzylphthalate		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	220000	1	(a)	160000	1	(a)	1000000	1	(a)	4900	1
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	<20	678	0.0	**26**	**881**	**0.0**	**26**	**881**	**0.0**	<4.9	166	0.0
ICS-M-SE-3	2.7	<19	6714	0.0	<19	6714	0.0	<19	6714	0.0	<4.7	1661	0.3
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceed.		-----	0	0	-----	0	0	-----	0	0	-----	1	1
% Exceed		-----	0.0%	0.0%	-----	0.0%	0.0%	-----	0.0%	0.0%	-----	2.9%	2.9%
Maximum		730	39459	0.2	2200	86486	0.5	4200	227027	0.2	170	9189	1.9
Minimum		14	655	0.0	12	881	0.0	11	881	0.0	3	135	0.0

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] - Value exceeds screening level (based on carbon normalized value)

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Benzo(a)anthracene			*bis* (2-Ethylhexyl)phthalate			Chrysene			total Benzofluoranthenes		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	110000	1	(a)	47000	1	(a)	110000	1	(a)	230000	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**53**	**1913**	**0.0**	**40**	**1444**	0.0	**65**	**2347**	**0.0**	**78**	**2816**	**0.0**
ICS-A-SE-5	5.1	**26**	**1615**	**0.0**	**40**	**2484**	0.1	**38**	**2360**	**0.0**	**43**	**2671**	**0.0**
ICS-A-SE-6	6.3	**30**	**932**	**0.0**	<50	1553	0.0	**47**	**1460**	**0.0**	**56**	**1739**	**0.0**
ICS-A-SE-7	7.2	**35**	**829**	**0.0**	<48	1137	0.0	**47**	**1114**	**0.0**	**59**	**1398**	**0.0**
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**640**	**16162**	**0.1**	**5600**	**141414**	**3.0**	**1100**	**27778**	**0.3**	**930**	**23485**	**0.1**
ICS-B-SE-4	4.4	**280**	**8309**	**0.1**	**2900**	**86053**	**1.8**	**480**	**14243**	**0.1**	**460**	**13650**	**0.1**
ICS-B-SE-5	5.5	**29**	**797**	**0.0**	**66**	**1813**	**0.0**	**43**	**1181**	**0.0**	**48**	**1319**	**0.0**
ICS-B-SE-6	6.6	**33**	**1241**	**0.0**	**37**	**1391**	**0.0**	**45**	**1692**	**0.0**	**56**	**2105**	**0.0**
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	**19**	**830**	**0.0**	**92**	**4017**	**0.1**	**22**	**961**	**0.0**	**30**	**1310**	**0.0**
ICS-C-SE-4	4.4	**35**	**2229**	**0.0**	**28**	**1783**	**0.0**	**36**	**2293**	**0.0**	**48**	**3057**	**0.0**
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	**59**	**2850**	**0.0**	**37**	**1787**	**0.0**	**75**	**3623**	**0.0**	**100**	**4831**	**0.0**
ICS-D-SE-4	5.3	**34**	**1259**	**0.0**	**32**	**1185**	**0.0**	**44**	**1630**	**0.0**	**48**	**1778**	**0.0**
ICS-D-SE-5	6.7	**39**	**1726**	**0.0**	<48	2124	0.0	**50**	**2212**	**0.0**	**66**	**2920**	**0.0**
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**280**	**8889**	**0.1**	<740	23492	0.5	**410**	**13016**	**0.1**	**410**	**13016**	**0.1**
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**29**	**1306**	**0.0**	<49	2207	0.0	**37**	**1667**	**0.0**	**51**	**2297**	**0.0**
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**18**	**1429**	**0.0**	**32**	**2540**	**0.1**	**26**	**2063**	**0.0**	**16**	**1270**	**0.0**
ICS-F-SE-8	9.7	<18	4128	0.0	**29**	**6651**	**0.1**	<18	4128	0.0	<37	8486	0.0
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Benzo(a)anthracene			*bis* (2-Ethylhexyl)phthalate			Chrysene			total Benzofluoranthenes		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	110000	1	(a)	47000	1	(a)	110000	1	(a)	230000	1
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP1-SE	SE-3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**740**	**40000**	**0.4**	**2800**	**151351**	**3.2**	**1800**	**97297**	**0.9**	**890**	**48108**	**0.2**
ICS-G-SE-6	6.8	**110**	**6875**	**0.1**	**37**	**2313**	**0.0**	**130**	**8125**	**0.1**	**180**	**11250**	**0.0**
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	**350**	**10264**	**0.1**	**1400**	**41056**	**0.9**	**490**	**14370**	**0.1**	**490**	**14370**	**0.1**
ICS-H-SE-4	4.7	**14**	**1636**	**0.0**	**32**	**3738**	**0.1**	**15**	**1752**	**0.0**	**20**	**2336**	**0.0**
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	**300**	**13158**	**0.1**	<72	3158	0.1	**540**	**23684**	**0.2**	**780**	**34211**	**0.1**
ICS-I-SE-4	5.9	**42**	**1479**	**0.0**	<48	1690	0.0	**45**	**1585**	**0.0**	**80**	**2817**	**0.0**
ICS-I-SE-5	7.8	**310**	**30392**	**0.3**	**37**	**3627**	**0.1**	**350**	**34314**	**0.3**	**470**	**46078**	**0.2**
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	**19**	**1977**	**0.0**	<47	4891	0.1	**23**	**2393**	**0.0**	**34**	**3538**	**0.0**
ICS-J-SE-5	8.5	**94**	**7068**	**0.1**	**25**	**1880**	**0.0**	**160**	**12030**	**0.1**	**140**	**10526**	**0.0**
ICS-J-SE-6	10.4	**80**	**5161**	**0.0**	<24	1548	0.0	**78**	**5032**	**0.0**	**120**	**7742**	**0.0**
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP2-SE	SE-2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	**31**	**3527**	**0.0**	**120**	**13652**	**0.3**	**67**	**7622**	**0.1**	**56**	**6371**	**0.0**
ICS-K-SE-4	5.5	**54**	**2338**	**0.0**	**46**	**1991**	**0.0**	**79**	**3420**	**0.0**	**90**	**3896**	**0.0**
ICS-K-SE-5	7	**120**	**6557**	**0.1**	**24**	**1311**	**0.0**	**170**	**9290**	**0.1**	**210**	**11475**	**0.0**
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	**91**	**5871**	**0.1**	<25	1613	0.0	**120**	**7742**	**0.1**	**160**	**10323**	**0.0**
ICS-L-SE-4	5	**40**	**2778**	**0.0**	<24	1667	0.0	**50**	**3472**	**0.0**	**67**	**4653**	**0.0**
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Benzo(a)anthracene			*bis* (2-Ethylhexyl)phthalate			Chrysene			total Benzofluoranthenes		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	110000	1	(a)	47000	1	(a)	110000	1	(a)	230000	1
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	<20	678	0.0	**41**	**1390**	**0.0**	**14**	**475**	**0.0**	**25**	**847**	**0.0**
ICS-M-SE-3	2.7	<19	6714	0.1	**24**	**8481**	**0.2**	<19	6714	0.1	<38	13428	0.1
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceed.		-----	0	0	-----	3	3	-----	0	0	-----	0	0
% Exceed		-----	0.0%	0.0%	-----	8.8%	8.8%	-----	0.0%	0.0%	-----	0.0%	0.0%
Maximum		740	40000	0.4	5600	151351	3.2	1800	97297	0.9	930	48108	0.2
Minimum		14	678	0.0	24	1137	0.0	14	475	0.0	16	847	0.0

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] *- Value exceeds screening level (based on carbon normalized value)*

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Benzo(a)pyrene			Indeno(1,2,3-cd)pyrene			Dibenz(a,h)anthracene			Benzo(g,h,i)perylene		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	99000	1	(a)	34000	1	(a)	12000	1	(a)	31000	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**53**	**1913**	**0.0**	**23**	**830**	**0.0**	<20	722	0.1	**30**	**1083**	**0.0**
ICS-A-SE-5	5.1	<19	1180	0.0	**12**	**745**	**0.0**	<19	1180	0.1	**19**	**1180**	**0.0**
ICS-A-SE-6	6.3	<20	621	0.0	**20**	**621**	**0.0**	<20	621	0.1	**31**	**963**	**0.0**
ICS-A-SE-7	7.2	<19	450	0.0	**18**	**427**	**0.0**	<19	450	0.0	**24**	**569**	**0.0**
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**480**	**12121**	**0.1**	**120**	**3030**	**0.1**	**57**	**1439**	**0.1**	**140**	**3535**	**0.1**
ICS-B-SE-4	4.4	**200**	**5935**	**0.1**	**83**	**2463**	**0.1**	<52	1543	0.1	**83**	**2463**	**0.1**
ICS-B-SE-5	5.5	<20	549	0.0	<20	549	0.0	<20	549	0.0	**20**	**549**	**0.0**
ICS-B-SE-6	6.6	<20	752	0.0	**17**	**639**	**0.0**	<20	752	0.1	**25**	**940**	**0.0**
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-3	3.3	<18	786	0.0	<18	786	0.0	<18	786	0.1	**12**	**524**	**0.0**
ICS-C-SE-4	4.4	**31**	**1975**	**0.0**	**14**	**892**	**0.0**	<20	1274	0.1	**18**	**1146**	**0.0**
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-3	3.8	**48**	**2319**	**0.0**	**27**	**1304**	**0.0**	**10**	**483**	**0.0**	**34**	**1643**	**0.1**
ICS-D-SE-4	5.3	<20	741	0.0	**13**	**481**	**0.0**	<20	741	0.1	**18**	**667**	**0.0**
ICS-D-SE-5	6.7	<19	841	0.0	**18**	**796**	**0.0**	<19	841	0.1	**23**	**1018**	**0.0**
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**220**	**6984**	**0.1**	<300	9524	0.3	<300	9524	0.8	<300	9524	0.3
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	<20	901	0.0	**15**	**676**	**0.0**	<20	901	0.1	**20**	**901**	**0.0**
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	<20	1587	0.0	**14**	**1111**	**0.0**	<20	1587	0.1	**16**	**1270**	**0.0**
ICS-F-SE-8	9.7	<18	4128	0.0	<18	4128	0.1	<18	4128	0.3	<18	4128	0.1
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Benzo(a)pyrene			Indeno(1,2,3-cd)pyrene			Dibenz(a,h)anthracene			Benzo(g,h,i)perylene		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	99000	1	(a)	34000	1	(a)	12000	1	(a)	31000	1
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP1-SE	SE-3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	<110	5946	0.1	**140**	**7568**	**0.2**	<110	5946	0.5	**180**	**9730**	**0.3**
ICS-G-SE-6	6.8	**110**	**6875**	**0.1**	**45**	**2813**	**0.1**	**16**	**1000**	**0.1**	**56**	**3500**	**0.1**
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-3	3.3	**260**	**7625**	**0.1**	**68**	**1994**	**0.1**	**26**	**762**	**0.1**	**67**	**1965**	**0.1**
ICS-H-SE-4	4.7	<19	2220	0.0	<19	2220	0.1	<19	2220	0.2	<19	2220	0.1
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-3	4.2	**360**	**15789**	**0.2**	**180**	**7895**	**0.2**	**63**	**2763**	**0.2**	**210**	**9211**	**0.3**
ICS-I-SE-4	5.9	<19	669	0.0	**18**	**634**	**0.0**	<19	669	0.1	**22**	**775**	**0.0**
ICS-I-SE-5	7.8	**360**	**35294**	**0.4**	**170**	**16667**	**0.5**	**73**	**7157**	**0.6**	**220**	**21569**	**0.7**
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-4	6.8	<19	1977	0.0	<19	1977	0.1	<19	1977	0.2	**10**	**1041**	**0.0**
ICS-J-SE-5	8.5	**72**	**5414**	**0.1**	**36**	**2707**	**0.1**	**11**	**827**	**0.1**	**34**	**2556**	**0.1**
ICS-J-SE-6	10.4	**64**	**4129**	**0.0**	**34**	**2194**	**0.1**	**16**	**1032**	**0.1**	**42**	**2710**	**0.1**
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-DUP2-SE	SE-2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-3	3.8	**22**	**2503**	**0.0**	<19	2162	0.1	<19	2162	0.2	<19	2162	0.1
ICS-K-SE-4	5.5	**38**	**1645**	**0.0**	**28**	**1212**	**0.0**	<20	866	0.1	**32**	**1385**	**0.0**
ICS-K-SE-5	7	**110**	**6011**	**0.1**	**49**	**2678**	**0.1**	**17**	**929**	**0.1**	**65**	**3552**	**0.1**
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-3	3.5	**93**	**6000**	**0.1**	**50**	**3226**	**0.1**	**21**	**1355**	**0.1**	**56**	**3613**	**0.1**
ICS-L-SE-4	5	<19	1319	0.0	**21**	**1458**	**0.0**	<19	1319	0.1	**32**	**2222**	**0.1**
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	Benzo(a)pyrene			Indeno(1,2,3-cd)pyrene			Dibenz(a,h)anthracene			Benzo(g,h,i)perylene		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	99000	1	(a)	34000	1	(a)	12000	1	(a)	31000	1
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-M-SE-2	1.6	**9.8**	**332**	**0.0**	<20	678	0.0	<20	678	0.1	<20	678	0.0
ICS-M-SE-3	2.7	<19	6714	0.1	<19	6714	0.2	<19	6714	0.6	<19	6714	0.2
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**
No. Exceed.		-----	0	0	-----	0	0	-----	0	0	-----	0	0
% Exceed		-----	0.0%	0.0%	-----	0.0%	0.0%	-----	0.0%	0.0%	-----	0.0%	0.0%
Maximum		480	35294	0.4	300	16667	0.5	300	9524	0.8	300	21569	0.7
Minimum		10	332	0.0	12	427	0.0	10	450	0.0	10	524	0.0

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] *- Value exceeds screening level (based on carbon normalized value)*

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	LPAH			HPAH			Hexachlorobenzene			Detected PCBs		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	370000	1	(a)	960000	1	(a)	380	1	(a)	12000	1
ICS-A-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-2	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	**2370**	**172993**	**14.4**
ICS-A-SE-3	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-A-SE-4	3.9	**388**	**14007**	**0.0**	**662**	**23899**	**0.0**	<4.7	170	0.4	**99**	**3574**	**0.3**
ICS-A-SE-5	5.1	**236**	**14658**	**0.0**	**308**	**19130**	**0.0**	<0.96	60	0.2	**27.1**	**1683**	**0.1**
ICS-A-SE-6	6.3	**321**	**9969**	**0.0**	**394**	**12236**	**0.0**	<0.96	30	0.1	<4.8	149	0.0
ICS-A-SE-7	7.2	**279**	**6611**	**0.0**	**423**	**10024**	**0.0**	<0.96	23	0.1	<6.3	149	0.0
ICS-B-SE-1	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	**430**	**55484**	**4.6**
ICS-B-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-B-SE-3	3.3	**2720**	**68687**	**0.2**	**7667**	**193611**	**0.2**	<57	1439	3.8	**29,200**	**737374**	**61.4**
ICS-B-SE-4	4.4	**1390**	**41246**	**0.1**	**4266**	**126588**	**0.1**	<130	3858	10.2	**44100**	**1308605**	**109**
ICS-B-SE-5	5.5	**297**	**8159**	**0.0**	**355**	**9753**	**0.0**	<4.9	135	0.4	**97**	**2665**	**0.2**
ICS-B-SE-6	6.6	**357**	**13421**	**0.0**	**416**	**15639**	**0.0**	<1.0	38	0.1	<5.6	211	0.0
ICS-C-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-C-SE-2	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	**55**	**6152**	**0.5**
ICS-C-SE-3	3.3	**135**	**5895**	**0.0**	**212**	**9258**	**0.0**	<4.7	205	0.5	<3.8	166	0.0
ICS-C-SE-4	4.4	**117**	**7452**	**0.0**	**351**	**22357**	**0.0**	<0.94	60	0.2	<3.6	229	0.0
ICS-D-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-D-SE-2	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	**17,000**	**246020**	**20.5**
ICS-D-SE-3	3.8	**893**	**43140**	**0.1**	**793**	**38309**	**0.0**	<4.9	237	0.6	**67**	**3237**	**0.3**
ICS-D-SE-4	5.3	**322**	**11926**	**0.0**	**397**	**14704**	**0.0**	<4.8	178	0.5	<3.9	144	0.0
ICS-D-SE-5	6.7	**314**	**13894**	**0.0**	**456**	**20177**	**0.0**	<0.97	43	0.1	<3.9	173	0.0
ICS-F-SE-1	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-2	1.7	**30220**	**959365**	**2.6**	**2920**	**92698**	**0.1**	<4.8	152	0.4	**330**	**10476**	**0.9**
ICS-F-SE-3	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-4	4.5	**290**	**13063**	**0.0**	**345**	**15541**	**0.0**	<0.99	45	0.1	<4.0	180	0.0
ICS-F-SE-5	5.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	<4.0	150	0.0
ICS-F-SE-6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-F-SE-7	8.3	**112**	**8889**	**0.0**	**226**	**17937**	**0.0**	<4.7	373	1.0	<3.9	310	0.0
ICS-F-SE-8	9.7	<18	4128	0.0	**23**	**5275**	**0.0**	<0.92	211	0.6	<3.7	849	0.1
ICS-F-SE-9	10.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-2	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	LPAH			HPAH			Hexachlorobenzene			Detected PCBs		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	370000	1	(a)	960000	1	(a)	380	1	(a)	12000	1
ICS-G-SE-3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	**1550**	**87079**	**7.3**
ICS-DUP1-SE	SE-3	-----	-----	-----	-----	-----	-----	-----	-----	-----	**1040**	**78788**	**6.6**
ICS-G-SE-4	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-G-SE-5	5.1	**3580**	**193514**	**0.5**	**9550**	**516216**	**0.5**	<48	2595	6.8	**10,000**	**540541**	**45.0**
ICS-G-SE-6	6.8	**433**	**27063**	**0.1**	**1227**	**76688**	**0.1**	<4.9	306	0.8	<4.0	250	0.0
ICS-H-SE-1	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-H-SE-2	1.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	**18,100**	**905000**	**75.4**
ICS-H-SE-3	3.3	**2020**	**59238**	**0.2**	**3581**	**105015**	**0.1**	<71	2082	5.5	**38,100**	**1117302**	**93.1**
ICS-H-SE-4	4.7	**71**	**8294**	**0.0**	**131**	**15304**	**0.0**	<0.94	110	0.3	**260**	**30374**	**2.5**
ICS-I-SE-1	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-I-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	**13,000**	**415335**	**34.6**
ICS-I-SE-3	4.2	**499**	**21886**	**0.1**	**3253**	**142675**	**0.1**	<4.9	215	0.6	**395**	**17325**	**1.4**
ICS-I-SE-4	5.9	**497**	**17500**	**0.0**	**467**	**16444**	**0.0**	<4.9	173	0.5	**143**	**5035**	**0.4**
ICS-I-SE-5	7.8	**1234**	**120980**	**0.3**	**3563**	**349314**	**0.4**	<0.96	94	0.2	**42**	**4078**	**0.3**
ICS-I-SE-6	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-1	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-2	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-J-SE-3	4.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	**337**	**14589**	**1.2**
ICS-J-SE-4	6.8	**227**	**23621**	**0.1**	**262**	**27263**	**0.0**	<1.0	104	0.3	<4.0	416	0.0
ICS-J-SE-5	8.5	**342**	**25714**	**0.1**	**1197**	**90000**	**0.1**	<5.0	376	1.0	<3.8	286	0.0
ICS-J-SE-6	10.4	**184**	**11871**	**0.0**	**914**	**58968**	**0.1**	<4.9	316	0.8	<3.9	252	0.0
ICS-K-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-K-SE-2	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	**13,000**	**548523**	**45.7**
ICS-DUP2-SE	SE-2	-----	-----	-----	-----	-----	-----	-----	-----	-----	**16,600**	**817734**	**68.1**
ICS-K-SE-3	3.8	**79**	**8987**	**0.0**	**288**	**32765**	**0.0**	<4.7	535	1.4	**1610**	**183163**	**15.3**
ICS-K-SE-4	5.5	**355**	**15368**	**0.0**	**701**	**30346**	**0.0**	<4.8	208	0.5	**103**	**4459**	**0.4**
ICS-K-SE-5	7	**411**	**22459**	**0.1**	**1251**	**68361**	**0.1**	<4.7	257	0.7	<3.7	202	0.0
ICS-L-SE-1	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ICS-L-SE-2	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	**2310**	**139157**	**11.6**
ICS-L-SE-3	3.5	**601**	**38774**	**0.1**	**1311**	**84581**	**0.1**	<5.0	323	0.8	**23**	**1497**	**0.1**
ICS-L-SE-4	5	**328**	**22778**	**0.1**	**540**	**37500**	**0.0**	<4.8	333	0.9	<3.9	271	0.0
ICS-L-SE-5	6.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE A5.5 - Exceedance Factors - Constituents with OCN Screening Levels
Embayment Subsurface Sediments

Core Location	Mid-Point Depth (feet)	LPAH			HPAH			Hexachlorobenzene			Detected PCBs		
		µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF	µg/kg, dry	µg/kg,OCN	EF
Screening Levels		(a)	370000	1	(a)	960000	1	(a)	380	1	(a)	12000	1
ICS-M-SE-1	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	**1110**	**43529**	**3.6**
ICS-M-SE-2	1.6	<20	678	0.0	**101**	**3417**	**0.0**	<4.9	166	0.4	**312**	**10576**	**0.9**
ICS-M-SE-3	2.7	<19	6714	0.0	<19	6714	0.0	<0.95	336	0.9	<3.7	1307	0.1
No. Spls.		**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**48**	**48**	**48**
No. Exceed.		-----	1	1	-----	0	0	-----	0	0	-----	19	19
% Exceed		-----	2.9%	2.9%	-----	0.0%	0.0%	-----	0.0%	0.0%	-----	39.6%	39.6%
Maximum		30220	959365	2.6	9550	516216	0.5	<130.0	3858	10.2	44100	1308605	109.1
Minimum		<18	678	0.0	<19	3417	0.0	<0.9	23	0.1	<3.7	144	0.0

Notes: *U = nondetected at the associated lower reporting limit.*
J = estimate associated with value less than the verifiable lower quantitation limit.
< - Not detected at indicated reporting limit
----- - Not analyzed
(a) - Constituent with carbon-normalized cleanup criteria.
[yellow box] *- Value exceeds screening level (based on carbon normalized value)*

TABLE A5.6 - Surface Sediment Constituent Exceedances and Proposed COPCs

Constituent (a)	Units	Basis	Screening Level	Surface Sediment					COPC Basis		Sed. COPC	GW-COPC
				Highest Conc. (dw)	Number Spls.	Max. EF	Loc.	FOE (%)	EF>10	FOE> 6.7%(c)		
Arsenic	mg/kg	Dry-Wt.	7	61	30	8.7	DSS-01	83		X	Yes	No
Cadmium	mg/kg	Dry-Wt.	5.1	8.2	30	1.6	DSS-09	6.7			No	No
Chromium (Total)	mg/kg	Dry-Wt.	260	1110	30	4.3(2.4)	DSS-12	13 (10)		X	Yes	Yes
Lead	mg/kg	Dry-Wt.	450	5920	30	13	DSS-09	23	X	X	Yes	No
Mercury	mg/kg	Dry-Wt.	0.41	14.3	30	35	DSS-09	33	X	X	Yes	Yes(b)
Zinc	mg/kg	Dry-Wt.	410	3820	30	9.3(3.3)	DSS-12	13(10)		X	Yes	No
Total Petroleum Hydrocarbons	mg/kg	Dry-Wt.	2000	54000	30	27(11)	DSS-12	13(10)	X	X	Yes	Yes(b)
Phenol	ug/kg	Dry-Wt.	420	5700	30	14(1.5)	DSS-12	6.7(3.3)			No	No
1,4-Dichlorobenzene	ug/kg	OCN	3100	420	30	69	DSS-09	3.3	X		Yes	No
Benzyl alcohol	ug/kg	Dry-Wt.	57	20000	30	351(11.2)	DSS-12	20(17)	X	X	Yes	No
1,2-Dichlorobenzene	ug/kg	OCN	2300	663	30	343	DSS-09	6.7	X		Yes	No
2-Methylphenol	ug/kg	Dry-Wt.	63	620	30	9.8	DSS-09	3.3			No	No
4-Methylphenol	ug/kg	Dry-Wt.	670	3500	30	2.8	DSS-09	3.3			No	No
2,4-Dimethylphenol	ug/kg	Dry-Wt.	29	4400	30	152(29)	DSS-12	10(6.7)	X		Yes	No
Benzoic acid	ug/kg	Dry-Wt.	650	35000	30	1.8	DSS-20	6.7			No	No
1,2,4-Trichlorobenzene	ug/kg	OCN	810	77	30	45	DSS-09	3.3	X		Yes	No
Naphthalene	ug/kg	OCN	99000	120000	30	57 (5.7)	DSS-12	6.7(3.3)			No	Yes
2-Methylnaphthalene	ug/kg	OCN	38000	50000	30	75(19)	DSS-12	6.7(3.3)	X		Yes	Yes
Dimethylphthalate	ug/kg	OCN	53000	2900	30	3.6	DSS-20	3.3			No	No
Acenaphthylene	ug/kg	OCN	66000	8700	30	6.7(0.5)	DSS-12	3.3(0)			No	No
Acenaphthene	ug/kg	OCN	16000	39000	30	78(9.2)	DSS-12	6.7(3.3)			No	No
Dibenzofuran	ug/kg	OCN	15000	26000	30	48(7)	DSS-12	6.7(3.3)			No	No
Diethylphthalate	ug/kg	OCN	61000	39	30	0.2	DSS-18	0			No	No
Fluorene	ug/kg	OCN	23000	58000	30	107(12)	DSS-12	10(6.7)	X		Yes	No
N-Nitrosodiphenylamine	ug/kg	OCN	11000	4800	30	171(143)	DSS-12	6.7(3.3)	X		Yes	No
Pentachlorophenol	ug/kg	Dry-Wt.	360	6500	30	18	DSS-09	23	X	X	Yes	Yes
Phenanthrene	ug/kg	OCN	100000	380000	30	253(9.3)	DSS-12	6.7(3.3)			No	No
Anthracene	ug/kg	OCN	220000	78000	30	81(17)	DSS-12	6.7(3.3)	X		Yes	No
Di-n-butylphthalate	ug/kg	OCN	220000	44000	30	31(2.4)	DSS-12	6.7(3.3)			No	No
Fluoranthene	ug/kg	OCN	160000	390000	30	229(4.1)	DSS-12	10(6.7)			No	No
Pyrene	ug/kg	OCN	1000000	290000	30	112(2.6)	DSS-12	6.7(3.3)			No	No
Butylbenzylphthalate	ug/kg	OCN	4900	44000	30	698(17)	DSS-12	17(13)	X	X	Yes	No
bis(2-Ethylhexyl)phthalate	ug/kg	OCN	47000	180000	30	138(7.4)	DSS-12	10(6.7)			No	Yes
B(a)Peq. (TEQ)	ug/kg	Dry-Wt.	90	112900	30	1254(50)	DSS-12	63(60)	X	X	Yes	No
Benzo(a)anthracene (cPAH)	ug/kg	OCN	110000	130000	30	100(2.1)	DSS-12	10(6.7)			No	No
Chrysene (cPAH)	ug/kg	OCN	110000	180000	30	129(3.7)	DSS-12	10(6.7)			No	No

TABLE A5.6 - Surface Sediment Constituent Exceedances and Proposed COPCs

Constituent (a)	Units	Basis	Screening Level	Surface Sediment					COPC Basis		Sed. COPC	GW-COPC
				Highest Conc. (dw)	Number Spls.	Max. EF	Loc.	FOE (%)	EF>10	FOE> 6.7%(c)		
Di-n-octylphthalate	ug/kg	OCN	58000	40	30	0.06	DSS-15	0			No	No
total Benzofluoranthenes (cPAH)	ug/kg	OCN	230000	120000	30	38(1)	DSS-12	6.7(3.3)			No	No
Benzo(a)pyrene (cPAH)	ug/kg	OCN	99000	71000	30	44(1.1)	DSS-12	10(6.7)			No	No
Indeno(1,2,3-cd)pyrene (cPAH)	ug/kg	OCN	34000	21000	30	35(1.5)	DSS-12	10(6.7)			No	No
Dibenz(a,h)anthracene (cPAH)	ug/kg	OCN	12000	13000	30	57(2.5)	DSS-12	10(6.7)			No	No
Benzo(g,h,i)perylene	ug/kg	OCN	31000	19000	30	28(1.6)	DSS-12	10(6.7)			No	No
LPAH	ug/kg	OCN	370000	683700	30	131(10)	DSS-12	6.7(3.3)			No	No
HPAH	ug/kg	OCN	960000	1234000	30	103(2.4)	DSS-12	10(6.7)			No	No
Hexachlorobenzene	ug/kg	OCN	380	300	30	14(0.98)	DSS-12	6.7(3.3)			No	No
Total PCBs	ug/kg	OCN	12000		30	89	DSS-09	90	X	X	Yes	**Yes**
Total PCBs	ug/kg	Dry Wt.	2		30	97000	DSS-09	100	X	X	Yes	**Yes**
2,3,7,8-TCDD (TEQ)	ng/kg	Dry Wt.	2		3	396	DSS-19	100	X	X	Yes	-----

Notes:

OCN - Organic carbon normalized
EF - Exceedance Factor
FOE - Frequency of Exceedance
COPC - Constituent of Potential Concern
B(a)Peq. - Benzo(a)pyrene equivalent concentration
(a) - Constituent detected in one or more samples above screening level
(b) - For monitoring purposes (to confirm or not as a GW-COPC)
(c) - 6.7% = 2 of 30 samples
Max EF - 44(1.1) - Maximum EF in DSS-12 sample (next highest EF)
[yellow box] *- Constituent Identified as a COPC*
DSS-12 - Sample of an asphalt like solid (not representative of rest of embayment)
For these constituents the (3.7) values were used to identify a COPC

TABLE A5.7 - Subsurface Sediment Constituent Exceedances and Proposed COPCs

Constituent (a)	Units	Basis	Screening Level	Subsurface Sediment					COPC Basis		Sed. COPC	GW-COPC
				Highest Conc.	Number Spls.	Max. EF	Loc.	FOE (%)	EF>10	FOE> 6.7%(c)		
Arsenic	mg/kg	Dry-Wt.	7	31	46	4.4	B-SE-3	54		X	Yes	No
Cadmium	mg/kg	Dry-Wt.	5.1	8.8	46	1.7	D-SE-2	4.3			No	No
Chromium (Total)	mg/kg	Dry-Wt.	260	431	46	1.7	D-SE-2	2.2			No	Yes
Copper	mg/kg	Dry-Wt.	390	427	46	1.1	A-SE-2	2.2			No	Yes
Lead	mg/kg	Dry-Wt.	450	4430	46	9.8	D-SE-2	11		X	Yes	No
Mercury	mg/kg	Dry-Wt.	0.41	39	46	95	D-SE-2	20	X	X	Yes	Yes(b)
Zinc	mg/kg	Dry-Wt.	410	3240	46	7.9	D-SE-2	8.7			No	No
Total Petroleum Hydrocarbons	mg/kg	Dry-Wt.	2000	21900	46	11	D-SE-2	17	X	X	Yes	Yes(b)
1,4-Dichlorobenzene	ug/kg	OCN	3100	29326	34	9.5	H-SE-3	12		X	Yes	Yes
Benzyl alcohol	ug/kg	Dry-Wt.	57	190	34	3.3	A-SE-6	32		X	Yes	No
1,2-Dichlorobenzene	ug/kg	OCN	2300	4451	34	1.9	B-SE-4	12		X	Yes	No
2,4-Dimethylphenol	ug/kg	Dry-Wt.	29	890	34	31	F-SE-2	18	X	X	Yes	No
1,2,4-Trichlorobenzene	ug/kg	OCN	810	1667	34	2.1	B-SE-3	8.8			No	No
Naphthalene	ug/kg	OCN	99000	539683	34	5.5	F-SE-2	2.9			No	Yes
2-Methylnaphthalene	ug/kg	OCN	38000	1968254	34	52	F-SE-2	2.9	X		Yes	Yes
Acenaphthene	ug/kg	OCN	16000	50980	34	3.2	I-SE-5	11.8		X	Yes	No
Dibenzofuran	ug/kg	OCN	15000	50794	34	3.4	F-SE-2	2.9			No	No
Fluorene	ug/kg	OCN	23000	158730	34	6.9	F-SE-2	5.9			No	No
N-Nitrosodiphenylamine	ug/kg	OCN	11000	97297	34	8.8	G-SE-5	2.9			No	No
Pentachlorophenol	ug/kg	Dry-Wt.	360	880	34	2.4	G-SE-5	5.9			No	Yes
Phenanthrene	ug/kg	OCN	100000	215873	34	2.2	F-SE-2	2.2			No	No
Butylbenzylphthalate	ug/kg	OCN	4900	9189	34	1.9	G-SE-5	2.9			No	No
bis(2-Ethylhexyl)phthalate	ug/kg	OCN	47000	151351	34	3.2	G-SE-5	8.8			No	Yes
B(a)Peq. (TEQ)	ug/kg	Dry. Wt.	90	717	34	8	B-SE-3	32		X	Yes	No
LPAH	ug/kg	OCN	370000	959365	34	2.6	F-SE-2	2.9			No	No
Total PCBs	ug/kg	OCN	12000	1308605	48	109	B-SE-4	40	X	X	Yes	Yes
Total PCBs	ug/kg	Dry Wt.	2	44100	46	22055	B-SE-4	61	X	X	Yes	Yes

Notes:
OCN - Organic carbon normalized
EF - Exceedance Factor
FOE - Frequency of Exceedance
COPC - Constituent of Potential Concern
B(a)Peq. - Benzo(a)pyrene equivalent concentration
[yellow box] - Constituent Identified as a COPC
(a) - Constituent detected in one or more samples above screening level
(b) - For monitoring purposes (to confirm or not as a GW-COPC)
(c) - 6.7% = 2 of 30 samples

TABLE A5.8 - Sediment TCLP Test Results

Comparison of Total and Leachable Concentrations

Constituent	SED-1		SED-2		SED-4		LDWSS84		B5a2		DSS26	
	Total (mg/kg)	TCLP (mg/l)	Total (mg/kg)	TCLP (mg/l)	Total (mg/kg)	TCLP (mg/l)	Total (mg/kg)	TCLP (mg/l)	Total (mg/kg)	TCLP (mg/l)	Total (mg/kg)	TCLP (mg/l)
Arsenic	<30	<0.2	**30**	<0.2	<6	<0.2	<9	<0.2	<8	<0.2	<20	<0.2
Barium	**361**	**1.39**	**221**	**0.64**	**18.5**	**0.02**	**77.8**	**0.06**	**49.7**	**0.18**	**107**	**0.22**
Cadmium	**47**	<0.01	**3.7**	<0.01	<0.3	<0.01	**1**	<0.01	**0.6**	<0.01	**0.9**	<0.01
Chromium	**2940**	**0.03**	**465**	<0.02	**17.7**	<0.02	**60.7**	<0.02	**55.5**	<0.02	**151**	<0.02
Lead	**6330**	<0.1	**4080**	<0.1	**30**	<0.1	**226**	**0.2**	**136**	**0.6**	**665**	**0.2**
Mercury	**61**	<0.0001	**9**	<0.0001	**0.06**	<0.0001	**0.78**	<0.0001	**0.18**	<0.0001	**0.47**	<0.0001
Selenium	<30	<0.2	<20	<0.2	<6	<0.2	<9	<0.2	<8	<0.2	<20	<0.2
Silver	**5**	<0.02	<1	<0.02	<0.4	<0.02	<1	<0.02	<0.5	<0.02	<1	<0.02

Comparison With DW Criteria

Constituent	DW Threshold (mg/l)	SED-1 TCLP (mg/l)	SED-2 TCLP (mg/l)	SED-4 TCLP (mg/l)	LDWSS84 TCLP (mg/l)	B5a2 TCLP (mg/l)	DSS26 TCLP (mg/l)
Arsenic	5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Barium	100	**1.39**	**0.64**	**0.02**	**0.06**	**0.18**	**0.22**
Cadmium	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	5	**0.03**	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	5	<0.1	<0.1	<0.1	**0.2**	**0.6**	**0.2**
Mercury	0.2	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Silver	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Note: DW - Dangerous Waste

TABLE A5.9 - Summary of Analytical Constituents, Screening Levels and Groundwater Sample Data - Through September 2016 (A) Rev. 6-10-19

Analytical Constituent (N=173)	Units	Number of Samples	Number of Detections	Percent Detected	Possible Groundwater Screening Levels (GW-SLs) (a)				Project PQL	Workbook PQL	Highest Concen-tration	Screening Level (SL)	EF	Carry Forward for Further Evaluation	Basis
					Protect Surface Water	Protect Sediment	Protect Indoor Air	Natural Background							
Conventionals															
Chloride	mg/L	59	59	100.0%	-----	-----	-----	-----	-----	-----	8220	-----	-----	No	GW discharge to marine waters
Sulfate	mg/L	59	57	96.6%	-----	-----	-----	-----	-----	-----	589	-----	-----	No	GW discharge to marine waters
Hardness	mg-$CaCO_3$/L	84	84	100.0%	-----	-----	-----	-----	-----	-----	4600	-----	-----	No	GW discharge to marine waters
Metals															
Antimony	diss. µg/L	35	4	11.4%	90	-----	-----	-----	0.2	0.05	0.8	90	0.01	No	Highest Conc. < SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	33	7	21.2%	-----	-----	-----	-----	0.2	0.05	3.5	90	0.04		
Arsenic	diss. µg/L	108	102	94.4%	0.14	220	-----	8	0.5	0.5	28.6	8	3.6	Yes	Detection >5%; Highest Conc. > SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	106	104	98.1%	-----	-----	-----	-----	0.5	0.5	28	8	3.5		
Beryllium	diss. µg/L	35	3	8.6%	76	4.4	-----	-----	0.2	0.02	0.8	4.4	0.18	No	Highest Conc. < SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	33	10	30.3%	-----	-----	-----	-----	0.2	0.02	0.8	4.4	0.18		
Cadmium	diss. µg/L	108	27	25.0%	7.9	1.2	-----	-----	0.1	0.02	0.2	1.2	0.17	Yes	Detection >5%; Highest Conc. = SL <2x SL); SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	106	47	44.3%	-----	-----	-----	-----	0.1	0.02	1.2	1.2	1.0		
Calcium	diss. µg/L	2	2	100.0%	-----	-----	-----	-----	-----	-----	76200	-----	-----	No	GW discharge to marine waters
	total µg/L	82	82	100.0%	-----	-----	-----	-----	-----	-----	643000	-----	-----		
Total Chromium (as Cr III)	diss. µg/L	108	95	88.0%	27	0.06	-----	-----	0.2	0.02	75	0.2	375	Yes	Detection >5%; Highest Conc. > 2x SL; SL based on dissolved fraction. Preliminary screening used total.
	total µg/L	106	105	99.1%	-----	-----	-----	-----	0.2	0.02	121	0.2	605		
Hexavalent Chromium	diss. µg/L	22	0	0.0%	50	45000	-----	-----	10	10	<34.0	50	-----	No	Not detected
Copper	diss. µg/L	108	82	75.9%	3.1	14	-----	-----	0.5	0.1	27	3.1	8.7	Yes	Detection >5%; Highest Conc. >2x SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	106	98	92.5%	-----	-----	-----	-----	0.5	0.1	116	3.1	37.4		
Lead	diss. µg/L	108	71	65.7%	8.1	19	-----	-----	0.1	0.02	5	8.1	0.62	Yes	Detection >5%; Highest Conc. >2x SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	106	99	93.4%	-----	-----	-----	-----	0.1	0.02	197	8.1	24.3		
Magnesium	diss. µg/L	2	2	100.0%	-----	-----	-----	-----	-----	-----	179000	-----	-----	No	GW discharge to marine waters
	total µg/L	81	81	100.0%	-----	-----	-----	-----	-----	-----	755000	-----	-----	No	GW discharge to marine waters
Mercury	diss. ng/L	108	32	29.6%	25	2000	290	-----	0.1	0.1	26.3	25	1.1	Yes	Detection >5%; Highest Conc. >2x SL; SL based on total fraction.
	total ng/L	106	53	50.0%	-----	-----	-----	-----	0.1	0.1	218	25	8.7		
Nickel	diss. µg/L	106	103	97.2%	8.2	2300	-----	-----	0.2	0.2	18	8.2	2.2	Yes	Detection >5%; Highest Conc. >2x SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	104	103	99.0%	-----	-----	-----	-----	0.2	0.2	46	8.2	5.6		
Silver	diss. µg/L	108	41	38.0%	1.9	55	-----	-----	0.2	0.02	0.2	1.9	0.11	No	Highest Conc. < SL; SL Based on the dissolved fraction. Preliminary screening used total.
	total µg/L	104	47	45.2%	-----	-----	-----	-----	0.2	0.02	0.7	1.9	0.37		
Sodium	total µg/L	71	71	100.0%	-----	-----	-----	-----	-----	-----	4080000	-----	-----	No	GW discharge to marine waters
Zinc	diss. µg/L	108	75	69.4%	81	770	-----	-----	0.5	0.5	210	81	2.6	Yes	Detection >5%; Highest Conc. >2x SL; SL based on the dissolved fraction. Preliminary screening used total.
	total µg/L	105	89	84.8%	-----	-----	-----	-----	0.5	0.5	320	81	4.0		
Petroleum Hydrocarbons															
TPH-Gasoline-range	mg/L	107	31	29.0%	0.8(b)	-----	-----	-----	0.25	0.05	2.8	0.8	3.5	Yes	Detection >5%; Highest Conc. >2x SL
TPH-Diesel-range	mg/L	105	14	13.3%	0.5(b)	-----	-----	-----	0.1	0.1	2.2	0.5	4.4	Yes	Detection >5%; Highest Conc. >2x SL
TPH-Lube-range	mg/L	105	8	7.6%	0.5(b)	-----	-----	-----	0.2	0.2	1.2	0.5	2.4	Yes	Detection >5%; Highest Conc. >2x SL
VOCs															
1,1,1,2-Tetra-chloroethane	µg/L	119	0	0.0%	-----	-----	7.4	-----	0.2	0.2	<0.2	7.4	-----	No	Not detected
1,1,1-Trichloroethane	µg/L	119	0	0.0%	50000	-----	5500	-----	0.2	0.2	<0.2	5500	-----	No	Not detected
1,1,2,2-Tetra-chloroethane	µg/L	119	0	0.0%	0.3	-----	6.2	-----	0.2	0.2	<0.2	0.3	-----	No	Not detected

TABLE A5.9 - Summary of Analytical Constituents, Screening Levels and Groundwater Sample Data - Through September 2016 (A) Rev. 6-10-19

Analytical Constituent (N=173)	Units	Number of Samples	Number of Detections	Percent Detected	Possible Groundwater Screening Levels (GW-SLs) (a)				Project PQL	Workbook PQL	Highest Concen-tration	Screening Level (SL)	EF	Carry Forward for Further Evaluation	Basis
					Protect Surface Water	Protect Sediment	Protect Indoor Air	Natural Background							
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	119	2	1.7%	-----	-----	-----	-----	0.2	-----	0.3	-----	-----	No	Detection <5%; Screening level not available
1,1,2-Trichloroethane	µg/L	119	0	0.0%	0.9	-----	4.6	-----	0.2	0.2	<0.2	0.9	0.22	No	Not detected
1,1-Dichloroethane	µg/L	119	53	44.5%	-----	-----	11	-----	0.2	0.2	69	11	6.3	Yes	Detection >5%; Highest Conc. >2x SL
1,1-Dichloroethene	µg/L	119	2	1.7%	4000	-----	130	-----	0.2	0.1	0.24	130	0.00	No	Detection <5%
1,1-Dichloropropene	µg/L	119	1	0.8%	-----	-----	-----	-----	0.2	0.1	0.21	-----	-----	No	Detection <5%; Screening level not available
1,2,3-Trichlorobenzene	µg/L	119	1	0.8%	-----	-----	-----	-----	0.5	0.5	0.39	-----	-----	No	Detection <5%; Screening level not available
1,2,3-Trichloropropane	µg/L	119	0	0.0%	0.0015(b)	-----	-----	-----	0.5	0.2	<0.5	0.5	1.0	No	Detection <5%; SL = project PQL
1,2,4-Trichlorobenzene	µg/L	121	5	4.1%	0.037	0.96	39	-----	0.5	0.4	1.3	0.5	2.6	No	Detection <5%; SL = project PQL
1,2,4-Trimethylbenzene	µg/L	119	38	31.9%	-----	-----	240	-----	0.2	0.2	53	240	0.22	No	Highest Conc. < SL
1,2-Dibromoethane	µg/L	118	0	0.0%	-----	-----	-----	-----	0.2	-----	<0.2	-----	-----	No	Not detected; Screening level not available
1,2-Dichlorobenzene	µg/L	121	25	20.7%	800	4.6	2600	-----	0.2	0.4	8.4	4.6	1.8	No	Compound is not a sediment COPC. Highest Conc. <2x SL to protect surface water
1,2-Dichloroethane	µg/L	119	5	4.2%	73	-----	4.2	-----	0.2	0.2	0.44	4.2	0.10	No	Detection <5%
1,2-Dichloropropane	µg/L	119	5	4.2%	3.1	-----	1	-----	0.2	0.2	0.77	1	0.77	No	Detection <5%
1,3,5-Trimethylbenzene	µg/L	119	18	15.1%	80(b)	-----	-----	-----	0.2	0.2	12	80	0.15	No	Highest Conc. < SL
1,3-Dichlorobenzene	µg/L	119	14	11.8%	2	-----	-----	-----	0.2	0.4	5.2	2	2.6	Yes	Detection >5%; Highest Conc. >2x SL
1,3-Dichloropropane	µg/L	119	0	0.0%	-----	-----	-----	-----	0.2	0.2	<0.2	-----	-----	No	Not detected; Screening level not available
1,4-Dichlorobenzene	µg/L	121	23	19.0%	60	8.9	4.9	-----	0.2	0.4	22	4.9	4.5	Yes	Detection >5%; Highest Conc. >2x SL
2,2-Dichloropropane	µg/L	119	0	0.0%	-----	-----	-----	-----	0.2	0.2	<0.2	-----	-----	No	Not detected; Screening level not available
2-Butanone (MEK)	µg/L	119	3	2.5%	-----	-----	1700000	-----	5	5	3.9	1700000	0.00	No	Detection <5%
2-Chlorotoluene	µg/L	119	3	2.5%	160(b)	-----	-----	-----	0.2	0.2	0.86	160	0.01	No	Detection <5%
2-Hexanone	µg/L	119	1	0.8%	40(b)	-----	-----	-----	5	2	1.6	40	0.04	No	Detection <5%
4-Chlorotoluene	µg/L	119	1	0.8%	-----	-----	-----	-----	0.2	0.2	0.03	-----	-----	No	Detection <5%; Screening level not available
4-Isopropyltoluene	µg/L	119	19	16.0%	-----	-----	-----	-----	0.2	0.2	5.2	-----	-----	No	Screening level not available
4-Methyl-2-pentanone	µg/L	119	4	3.4%	-----	-----	-----	-----	5	-----	27	-----	-----	No	Detection <5%; Screening level not available
Acetone	µg/L	119	39	32.8%	7200(b)	-----	-----	-----	5	2	110	7200	0.02	No	Highest Conc. <SL
Acrolein	µg/L	119	0	0.0%	1.1	-----	2.9	-----	5	5	<5.0	1.1	-----	No	Not detected
Benzene	µg/L	119	45	37.8%	1.6	-----	2.4	-----	0.2	0.2	70	1.6	43.8	Yes	Detection >5%; Highest Conc. >2x SL
Bromobenzene	µg/L	119	0	0.0%	64(b)	-----	-----	-----	0.2	0.2	<0.2	64	0.00	No	Not detected
Bromochloromethane	µg/L	119	0	0.0%	-----	-----	-----	-----	0.2	0.2	<0.2	-----	-----	No	Not detected; Screening level not available
Bromodichloromethane	µg/L	119	0	0.0%	-----	-----	-----	-----	0.2	0.2	<0.2	-----	-----	No	Not detected; Screening level not available
Bromoethane	µg/L	119	0	0.0%	-----	-----	-----	-----	0.2	0.2	<0.2	-----	-----	No	Not detected; Screening level not available

TABLE A5.9 - Summary of Analytical Constituents, Screening Levels and Groundwater Sample Data - Through September 2016 (A) Rev. 6-10-19

Analytical Constituent (N=173)	Units	Number of Samples	Number of Detections	Percent Detected	Possible Groundwater Screening Levels (GW-SLs) (a)				Project PQL	Workbook PQL	Highest Concen-tration	Screening Level (SL)	EF	Carry Forward for Further Evaluation	Basis
					Protect Surface Water	Protect Sediment	Protect Indoor Air	Natural Background							
Bromoform	µg/L	119	0	0.0%	12	-----	200	-----	0.2	0.2	<0.2	12	-----	No	Not detected
Bromomethane	µg/L	119	0	0.0%	270	-----	13	-----	0.5	0.5	<1.0	13	-----	No	Not detected
Carbon disulfide	µg/L	119	28	23.5%	-----	-----	400	-----	0.2	0.2	1.6	400	0.00	No	Highest Conc. <2x SL
Carbon tetrachloride	µg/L	119	0	0.0%	0.35	-----	0.56	-----	0.2	0.2	<0.2	0.35	-----	No	Not detected
Chlorobenzene	µg/L	119	25	21.0%	200	-----	290	-----	0.2	0.2	13	200	0.07	No	Highest Conc. <2x SL
Chloroethane	µg/L	119	28	23.5%	-----	-----	19000	-----	0.2	0.2	15	19000	0.00	No	Highest Conc. <2x SL
Chloroform	µg/L	119	7	5.9%	150	-----	1.2	-----	0.2	0.2	0.16	1.2	0.13	No	Highest Conc. <2x SL
Chloromethane	µg/L	119	13	10.9%	-----	-----	150	-----	0.5	0.3	0.21	150	0.00	No	Highest Conc. <2x SL
cis -1,2-Dichloroethene	µg/L	119	68	57.1%	16(b)	-----	-----	-----	0.2	0.2	25	16	1.6	Yes	Detection >5%; Highest conc. <2x SL; potential source of vinyl chloride
cis -1,3-Dichloropropene	µg/L	119	0	0.0%	2	-----	-----	-----	0.2	0.2	<0.2	2	-----	No	Not detected
Dibromochloromethane	µg/L	119	0	0.0%	2.8	-----	1.8	-----	0.2	0.2	<0.2	1.8	-----	No	Not detected
Dibromomethane	µg/L	119	0	0.0%	80(b)	-----	-----	-----	0.2	0.2	<0.2	80	-----	No	Not detected
Ethylbenzene	µg/L	119	38	31.9%	31	-----	2800	-----	0.2	0.2	420	31	13.5	Yes	Detection >5%; highest conc. > 2x SL
Isopropybenzene	µg/L	119	26	21.8%	800(b)	-----	-----	-----	0.2	0.2	4.9	800	0.01	No	Highest Conc. <2x SL
m - & *p* -Xylenes	µg/L	119	49	41.2%	1600(b)	-----	-----	-----	0.4	0.4	160	1600	0.10	No	Highest Conc. <2x SL; also see total xylenes
Methylene chloride	µg/L	119	16	13.4%	100	-----	4400	-----	1	0.5	1.2	100	0.01	No	Highest Conc. <2x SL
n-Butylbenzene	µg/L	119	12	10.1%	400(b)	-----	-----	-----	0.2	0.2	1.3	400	0.00	No	Highest Conc. <2x SL
n-Propylbenzene	µg/L	119	21	17.6%	800(b)	-----	-----	-----	0.2	0.2	8.6	800	0.01	No	Highest Conc. <2x SL
o -Xylene	µg/L	119	40	33.6%	-----	-----	430	-----	0.2	0.2	81.9	430	0.19	No	Highest Conc. <2x SL; also see total xylene
sec -Butylbenzene	µg/L	119	16	13.4%	800(b)	-----	-----	-----	0.2	0.2	1.7	800	0.00	No	Highest Conc. <2x SL
Styrene	µg/L	119	7	5.9%	-----	-----	8200	-----	0.2	0.2	19	8200	0.00	No	Highest Conc. <2x SL
tert -Butylbenzene	µg/L	119	6	5.0%	800(b)	-----	-----	-----	0.2	0.2	0.12	800	0.00	No	Highest Conc. <2x SL
Tetrachloroethene	µg/L	119	14	11.8%	2.9	-----	24	-----	0.2	0.2	8.95	2.9	3.1	Yes	Detection >5%; Highest Conc. >2x SL; Possible source of vinyl chloride
Toluene	µg/L	119	52	43.7%	130	-----	15000	-----	0.2	0.2	480	130	3.7	Yes	Detection >5%; Highest Conc. >2x SL
Total Xylenes	ug/l	119	49	41.2%	-----	-----	330	-----	0.4	0.4	242	330	0.7	No	Highest Conc. <2x SL
trans -1,2-Dichloroethene	µg/L	119	27	22.7%	1000	-----	-----	-----	0.2	0.2	27	1000	0.0	No	Highest Conc. <2x SL
trans -1,3-Dichloropropene	µg/L	119	0	0.0%	2	-----	-----	-----	0.2	0.2	<0.2	2	-----	No	Not detected
trans -1,4-Dichloro-2-butene	µg/L	119	0	0.0%	-----	-----	-----	-----	1	1	<1.0	-----	-----	No	Not detected; Screening level not available
Trichloroethene	µg/L	119	15	12.6%	0.7	-----	1.5	-----	0.2	0.2	2.26	0.7	3.2	Yes	Detection >5%; Highest Conc. >2x SL; Possible source of vinyl chloride

TABLE A5.9 - Summary of Analytical Constituents, Screening Levels and Groundwater Sample Data - Through September 2016 (A) Rev. 6-10-19

Analytical Constituent (N=173)	Units	Number of Samples	Number of Detections	Percent Detected	Possible Groundwater Screening Levels (GW-SLs) (a)				Project PQL	Workbook PQL	Highest Concen-tration	Screening Level (SL)	EF	Carry Forward for Further Evaluation	Basis
					Protect Surface Water	Protect Sediment	Protect Indoor Air	Natural Background							
Trichlorofluoro-methane	µg/L	119	5	4.2%	-----	-----	120	-----	0.2	0.2	<0.2	120	0.0	No	Detection <5%
Vinyl chloride	µg/L	119	27	22.7%	0.18	-----	0.35	-----	0.2	0.02	19	0.18	106	Yes	Detection >5%; Highest Conc. >2x SL
SVOCs															
2,4,5-Trichlorophenol	µg/L	109	1	0.9%	600	57000	-----	-----	1	0.4	0.4	600	0.0	No	Detection <5%;
2,4,6-Trichlorophenol	µg/L	110	2	1.8%	0.28	590	-----	-----	0.25	0.6	0.43	0.28	1.5	No	Detection <5%;
2,4-Dichlorophenol	µg/L	109	3	2.8%	10	7000	-----	-----	1	0.4	3	10	0.3	No	Detection <5%
2,4-Dimethylphenol	µg/L	111	10	9.0%	97	6.3	-----	-----	1	1	65	6.3	10.3	Yes	Detection >5%; Highest Conc. > 2x SL
2,4-Dinitrotoluene	µg/L	109	0	0.0%	0.18	1100	-----	-----	1	0.4	<1.0	0.18	-----	No	Not detected
2,6-Dinitrtoluene	µg/L	109	0	0.0%	-----	300	-----	-----	1	0.4	<1.0	300	-----	No	Not detected
2-Chloronaphthalene	µg/L	109	1	0.9%	100	-----	-----	-----	0.2	0.06	0.1	100	0.0	No	Detection <5%
2-Chlorophenol	µg/L	109	0	0.0%	17	2900	-----	-----	0.2	0.4	<0.2	17	-----	No	Not detected
2-Methylnaphthalene	µg/L	111	16	14.4%	32(b)	-----	-----	-----	0.2	0.02	80	32	2.5	Yes	Highest conc. >SL
2-Methylphenol	µg/L	111	8	7.2%	-----	27	-----	-----	0.2	0.4	36	27	1.3	Yes	Detection >5%; Highest Conc. > SL
4-Chloro-3-methylphenol	µg/L	109	0	0.0%	36	-----	-----	-----	1	0.4	<1.0	36	-----	No	Not detected
4-Chlorophenyl-phenylether	µg/L	109	0	0.0%	-----	-----	-----	-----	0.2	0.4	<0.2	-----	-----	No	Not detected; Screening level not available
4-Methylphenol	µg/L	111	12	10.8%	800(b)	-----	-----	-----	0.2	0.8	150	800	0.2	No	Highest conc. <2x SL
Acenaphthene	µg/L	111	31	27.9%	30	5.3	-----	-----	0.2	0.02	3.4	5.3	0.6	No	Highest Conc. <2x SL
Acenaphthylene	µg/L	111	9	8.1%	-----	-----	-----	-----	0.01	0.02	0.12	-----	-----	No	Screening level not available
Anthracene	µg/L	111	16	14.4%	100	2.1	-----	-----	0.01	0.02	0.5	2.1	0.2	No	Highest conc. <2x SL
Benzo(a)anthracene	µg/L	111	5	4.5%	0.00016	0.19	-----	-----	0.01	0.02	0.1	0.01	10	No	Detection <5%
Benzo(a)pyrene	µg/L	111	3	2.7%	0.000016	0.087	-----	-----	0.01	0.02	0.07	0.01	7.0	No	Detection <5%
Benzo(g,h,i)-perylene	µg/L	111	3	2.7%	-----	-----	-----	-----	0.01	0.02	0.05	-----	-----	No	Detection <5%; Screening level not available
Benzoic acid	µg/L	111	24	21.6%	-----	590	-----	-----	2	3	18	590	0.0	No	Highest conc. <2x SL
Benzyl alcohol	µg/L	109	0	0.0%	800(b)	-----	-----	-----	0.2	0.4	<0.2	800	-----	No	Not detected
bis (2-Ethylhexyl)-phthalate	µg/L	111	26	23.4%	0.046	0.62	-----	-----	0.2	3	10	0.2	50	Yes	Detection >5%; Highest Conc. >2x SL
Butylbenzylphthalate	µg/L	111	0	0.0%	0.013	0.24	-----	-----	0.2	0.6	<0.2	0.2	-----	No	Not detected
Carbazole	µg/L	109	4	3.7%	-----	-----	-----	-----	0.2	0.4	1.6	-----	-----	No	Detection <5%; Screening level not available
Chrysene	µg/L	111	5	4.5%	0.016	0.19	-----	-----	0.01	0.02	0.09	0.016	5.6	No	Detection <5%
Dibenz(a,h)-anthracene	µg/L	111	1	0.9%	0.000016	0.0068	-----	-----	0.01	0.02	0.007	0.01	0.7	No	Detection <5%

Analytical Constituent (N=173)	Units	Number of Samples	Number of Detections	Percent Detected	Possible Groundwater Screening Levels (GW-SLs) (a)				Project PQL	Workbook PQL	Highest Concen-tration	Screening Level (SL)	EF	Carry Forward for Further Evaluation	Basis
					Protect Surface Water	Protect Sediment	Protect Indoor Air	Natural Background							
Dibenzofuran	µg/L	111	12	10.8%	16(b)	-----	-----	-----	0.01	0.02	0.42	16	0.0	No	Highest conc. <2x SL
Diethylphthalate	µg/L	111	12	10.8%	200	93	-----	-----	0.2	0.4	0.8	93	0.0	No	Highest conc. <2x SL
Dimethylphthalate	µg/L	111	1	0.9%	600	-----	-----	-----	0.2	0.4	0.01	600	0.0	No	Highest conc. <2x SL
Di-n-butyl-phthalate	µg/L	111	4	3.6%	8	46	-----	-----	0.2	-----	0.5	8	0.1	No	Detection <5%
Di-n-octyl-phthalate	µg/L	111	1	0.9%	-----	0.0039	-----	-----	0.2	0.4	0.7	0.2	3.5	No	Detection <5%
Fluoranthene	µg/L	111	23	20.7%	6	1.8	-----	-----	0.01	0.02	0.3	1.8	0.2	No	Highest conc. <2x SL
Fluorene	µg/L	111	20	18.0%	10	3.7	-----	-----	0.01	0.02	1.1	3.7	0.3	No	Highest conc. <2x SL
Hexachloroethane	µg/L	109	0	0.0%	0.02	620	3.1	-----	0.2	0.6	<0.2	0.2	-----	No	Not detected
Indeno(1,2,3-cd)pyrene	µg/L	111	2	1.8%	0.00016	0.0091	-----	-----	0.01	0.02	0.009	0.01	0.9	No	Detected <5%
Isophorone	µg/L	109	0	0.0%	110	600000	-----	-----	0.2	0.4	<0.2	110	-----	No	Not detected
Naphthalene	µg/L	111	45	40.5%	1.4	90	8.9	-----	0.01	0.02	25	1.4	17.9	Yes	Detection >5%; Highest Conc. >2x SL
Nitrobenzene	µg/L	109	0	0.0%	100	120000	160	-----	0.2	0.4	<0.2	100	-----	No	Not detected
N-Nitroso-di-n-propylamine	µg/L	107	0	0.0%	0.058	120	-----	-----	0.2	0.4	<0.2	0.2	-----	No	Not detected
N-Nitrosodi-phenylamine	µg/L	111	2	1.8%	0.69	1.1	-----	-----	0.2	0.4	1.9	0.69	2.8	No	Detection <5%
Pentachlorophenol	µg/L	111	20	18.0%	0.002	0.88	-----	-----	0.025	0.7	240	0.025	9600	Yes	Detection >5%; Highest Conc. >2x SL
Phenanthrene	µg/L	111	28	25.2%	-----	-----	-----	-----	0.01	0.02	1.5	-----	-----	No	Screening level not available
Phenol	µg/L	111	4	3.6%	70000	370	-----	-----	0.2	0.6	20	370	0.1	No	Detection <5%
Pyrene	µg/L	111	21	18.9%	8	2	-----	-----	0.01	0.02	0.2	2	0.1	No	Highest Conc. <2x SL
total Benzofluoranthenes	µg/L	111	3	2.7%	0.00016	-----	-----	-----	0.01	-----	0.08	0.01	8	No	Detection <5%
Pesticides															
alpha-BHC	µg/L	105	0	0.0%	0.000048	4	-----	-----	0.00063	0.01	<0.0006	0.0006	-----	No	Not detected
beta-BHC	µg/L	105	1	1.0%	0.0014	11	-----	-----	0.00063	0.01	0.0016	0.0014	1.1	No	Detection <5%
delta-BHC	µg/L	105	0	0.0%	-----	-----	-----	-----	0.00063	0.01	<0.0006	-----	-----	No	Not detected; Screening level not available
gamma-BHC (Lindane)	µg/L	107	2	1.9%	0.13	30	-----	-----	0.00063	0.01	0.0021	0.13	-----	No	Detection <5%
Heptachlor	µg/L	105	0	0.0%	0.00000034	0.00055	-----	-----	0.00063	0.01	<0.0006	0.0006	-----	No	Not detected
Aldrin	µg/L	107	0	0.0%	4.1E-08	0.00011	0.32	-----	0.00063	0.01	<0.0006	0.0006	-----	No	Not detected
Heptachlor epoxide	µg/L	105	0	0.0%	0.0000024	-----	-----	-----	0.00063	0.01	<0.0006	0.0006	-----	No	Not detected
Endosulfan I	µg/L	105	0	0.0%	0.0087	26000	-----	-----	0.00063	0.01	<0.0006	0.0006	-----	No	Not detected
Dieldrin	µg/L	105	2	1.9%	0.0000012	0.00021	-----	-----	0.0013	0.01	0.14	0.0013	108	No	Detection <5%
4,4'-DDE	µg/L	107	11	10.3%	0.00000088	1.5	-----	-----	0.0013	0.01	0.033	0.0013	25	Yes	Detection >5%; Highest Conc. > SL; SL=PQL
Endrin	µg/L	105	0	0.0%	0.002	250	-----	-----	0.0013	0.01	<0.0012	0.002	-----	No	Not detected
Endosulfan II	µg/L	105	0	0.0%	0.0087	26000	-----	-----	0.0013	0.01	<0.0012	0.0087	-----	No	Not detected
4,4'-DDD	µg/L	107	8	7.5%	0.0000079	4.1	-----	-----	0.0013	0.01	0.04	0.0013	31	Yes	Detection >5%; Highest Conc. > SL; SL=PQL

TABLE A5.9 - Summary of Analytical Constituents, Screening Levels and Groundwater Sample Data - Through September 2016 (A) Rev. 6-10-19

Analytical Constituent (N=173)	Units	Number of Samples	Number of Detections	Percent Detected	Possible Groundwater Screening Levels (GW-SLs) (a)				Project PQL	Workbook PQL	Highest Concen-tration	Screening Level (SL)	EF	Carry Forward for Further Evaluation	Basis
					Protect Surface Water	Protect Sediment	Protect Indoor Air	Natural Background							
Endosulfan sulfate	µg/L	105	0	0.0%	10	-----	-----	-----	0.0013	0.01	<0.0012	10	-----	No	Not detected
4,4'-DDT	µg/L	107	3	2.8%	0.0000012	0.0000078	-----	-----	0.0013	0.01	0.005	0.0013	3.8	No	Detection <5%
Methoxychlor	µg/L	105	0	0.0%	0.02	560	-----	-----	0.0013	0.01	<0.0006	0.02	-----	No	Not detected
Endrin ketone	µg/L	105	0	0.0%	-----	-----	-----	-----	0.0013	0.01	<0.0012	-----	-----	No	Not detected;Screening level not available
Endrin aldehyde	µg/L	105	0	0.0%	0.035	-----	-----	-----	0.0013	0.01	<0.0012	0.035	-----	No	Not detected
trans-Chlordane	µg/L	105	9	8.6%	0.00036	0.0001	-----	-----	0.00063	0.1	0.016	0.0006	27	Yes	Detection >5%; Highest Conc. >SL; SL=PQL
cis-Chlordane	µg/L	106	7	6.6%	0.00036	0.0001	-----	-----	0.00063	0.1	0.029	0.0006	48	Yes	Detection >5%; Highest Conc. >SL; SL=PQL
Toxaphene	µg/L	105	0	0.0%	0.000032	0.43	-----	-----	0.13	0.01	<0.063	0.13	-----	No	Not detected; SL=PQL
Hexachlorobenzene	µg/L	107	1	0.9%	0.000005	0.014	-----	-----	0.0013	0.4	0.002	0.0013	1.5	No	Detection <5%
Hexachlorobutadiene	µg/L	105	0	0.0%	0.01	0.011	0.81	-----	0.0013	0.6	<0.0012	0.01	-----	No	Not detected
PCBs															
Aroclor 1016	µg/L	105	0	0.0%	-----	-----	-----	-----	-----	-----	<0.01	-----	-----	No	Not detected
Aroclor 1242	µg/L	107	17	15.9%	-----	-----	-----	-----	-----	-----	4.4	-----	-----	No	Use total PCBs
Aroclor 1248	µg/L	107	22	20.6%	-----	-----	-----	-----	-----	-----	0.89	-----	-----	No	Use total PCBs
Aroclor 1254	µg/L	107	33	30.8%	-----	-----	-----	-----	-----	-----	1.8	-----	-----	No	Use total PCBs
Aroclor 1260	µg/L	107	52	48.6%	-----	-----	-----	-----	-----	-----	0.85	-----	-----	No	Use total PCBs
Aroclor 1221	µg/L	105	0	0.0%	-----	-----	-----	-----	-----	-----	<0.01	-----	-----	No	Not detected
Aroclor 1232	µg/L	105	0	0.0%	-----	-----	-----	-----	-----	-----	<0.01	-----	-----	No	Not detected
total PCBs (Aroclors)	µg/L	107	58	54.2%	0.000007	0.022	-----	-----	0.01	0.5	6.91	0.01	691	Yes	Detection >5%; Highest Conc. > SL; SL=PQL

Notes: (A) - Statistics include data collected in 2015 and 2016 (R-1 to R-3) but not off-site push-probe data (P34 to P36)
(a) - Screening levels obtained from Lower Duwamish Waterway, Preliminary Cleanup Level Workbook by Ecology (December 2018)
(b) - LDW Workbook to protect drinking water
"<(0.0012)" - Not detected at indicated reporting level (equivalent to "U" flag) when associated with value.
<; > - Less than or greater than.
----- - Not available or constituent not detected
PQL - Practical Quantitation Limit
SL - Screening Level
N = Number of samples
EF - Exceedance Factor
[yellow box] - Carried forward for additional evaluation.

TABLE A5.10a - Identified First-Cut and Proposed Groundwater COPCs - Rev. 7-3-19

Constituent	Adjusted Screening Level (ug/l)(a)	Frequency Detection (%)(b)	Frequency Exceedance %(b)(g)	# Locations Exceeded (g)	Maximum Detected Concentration (ug/l)(g)	Max. EF Detected (g)	GW-COPC	Basis/Comment
LNAPL	-----	-----	-----	1	-----	-----	Yes	Present in well SA-MW1. Not detected in 14 other wells screened across water table.
Metals								
Dissolved Arsenic	8	94	7.4(3.7)	6(1)	28.6(10.1)	3.6(1.3)	No	SL based on dissolved fraction w/FOE <10% and max. EF < 10. EFs for most locations <2. Well sample FOE and max. EF lower than data set including probe samples. Arsenic not migrating to surface water.
Total Arsenic	8	98	9.4(4.9)	8(2)	28(9.9)	3.5(1.2)	-----	SL based on dissolved fraction. See note (c). FOE and EF <10.
Dissolved Cadmium	1.2	25	0(0)	0(0)	0.2(0.07)	0.2(0.06)	No	SL based on dissolved fraction w/ FOE<10% and max. EF<10 (no samples exceeded SL).
Total Cadmium	1.2	44	0.9(0)	1(0)	1.2(0.2)	1(0.17)	-----	SL based on dissolved fraction. See note (c). No samples exceeded SL.
Dissolved Total Chromium	27	88	12(15)	4(3)	75(75)	2.8(2.8)	Yes	SL adjusted to protect surface water as chromium was not identifed as a COPC in sediment. Max. dissolved fraction FOE >10%.
Total Chromium	27	99	19(16)	11(4)	121(84)	4.5(3.1)	-----	SL based on dissolved fraction. See note (c).
Dissolved Copper	3.1	76	18(22)	8(7)	27(19)	8.7(6.1)	Yes	SL based on dissolved fraction w/FOE>10%.
Total Copper	3.1	83	48(40)	33(15)	116(24)	37(7.7)	-----	SL based on dissolved fraction. See note (c).
Dissolved Lead	8.1	66	0(0)	0(0)	5(4.5)	0.6(0.6)	No	SL based on dissolved fraction w/FOE <10% w/ max. EF<10 (no samples exceeded SL).
Total Lead	8.1	93	11(7.3)	10(4)	197(23)	24(2.9)	-----	SL based on dissolved fraction. See note (c). Most of the total lead exceedances were in push-probe samples with high turbidities. Only one sample had an EF above 10 (P27B) with a turbidity of 372 NTUs.
Dissolved Mercury (ng/l)	25	30	0.9(0)	1(0)	26.3(17)	1.1(0.7)	Yes(e)	SL based on total fraction if in surface water. Dissolved fraction more appropriate to apply to groundwater samples to represent possible migration in soil to surface water. FOE<10% and max. EF<10.

TABLE A5.10a - Identified First-Cut and Proposed Groundwater COPCs - Rev. 7-3-19

Constituent	Adjusted Screening Level (ug/l)(a)	Frequency Detection (%)(b)	Frequency Exceedance %(b)(g)	# Locations Exceeded (g)	Maximum Detected Concentration (ug/l)(g)	Max. EF Detected (g)	GW-COPC	Basis/Comment
Total Mercury (ng/l)	25	50	17(12)	16(8)	218(140)	8.7(5.6)	(e)	SL based on dissolved fraction. See note (c). FOE in well samples >10%.
Dissolved Nickel	8.2	97	5.7(2)	7(2)	18(11)	2.2(1.3)	No	SL based on dissolved fraction w/FOE<10% and max. EF<10. Four of the dissolved exceedances were in push-probe samples and exceedances were not confirmed in 3 of 4 samples from (each) wells SA-MW1 and SA-MW3.
Total Nickel	8.2	99	13(6)	14(3)	46(17)	5.6(2.1)	-----	SL based on dissolved fraction. See note (c). Total mercury in well samples FOE<10%).
Dissolved Zinc	81	69	0.9(0)	1(0)	48(48)	0.6(0.6)	No	SL based on dissolved fraction w/FOE<10% and max. EF<10.
Total Zinc	81	85	3.8(0)	4(0)	320(60)	4.0(0.7)	-----	SL based on dissolved fraction. See note (c). FOE and EF<10%).
Petroleum Hydrocarbons								
TPH- Gasoline Range	800	23	3.7	2	2800	3.5	Yes	FOE <10% and EF<10. Exceedances occurred in water table probe P15 and downgradient well SA-MW1.
TPH- Diesel Range	500	13	5.7	5	2200	4.4	Yes(f)	FOE <10% and EF<10. Four of the 12 sample exceedances occurred at SA-MW1 where LNAPL likely biased the sample results high. Most remaining detections occurred in push-probes and were not confirmed in monitoring well samples, including *"clusters"* P31, SA-MW3, and MW-IL; P30, HC-B1 and SA-MW2. Exceedances in samples from MW-Eu and MW-Ju were not confirmed by other samples. Retained as proposed COPCs because these constituents are significant soil COPCs.
TPH- Lube Range	500	7.6	5.7	5	1200	2.4		

TABLE A5.10a - Identified First-Cut and Proposed Groundwater COPCs - Rev. 7-3-19

Constituent	Adjusted Screening Level (ug/l)(a)	Frequency Detection (%)(b)	Frequency Exceedance %(b)(g)	# Locations Exceeded (g)	Maximum Detected Concentration (ug/l)(g)	Max. EF Detected (g)	GW-COPC	Basis/Comment
Volatiles (VOCs)								
Benzene	1.6	38	18	13	70	44	Yes	FOE>10% and EF>10.
Toluene	130	44	1.7	1	480	3.7	Yes	FOE<10% and EF<10. Exceedances occurred in 2 of 3 samples from SA-MW1.
Ethylbenzene	31	32	3.4	2	420	14	Yes	FOE<10% but EF>10 in two samples from SA-MW1. Detected EF 2.8 at P15.
1,1-Dichloroethane	11	45	0.8	1	69	6.3	No	FOE<10% and EF<10. SL based on in-door air. Exceedance only occurred in a sample from push-probe P15.
1,3-Dichlorobenzene	2	12	3.4	2	5.2	2.6	Yes	FOE<10% and EF<10. Three exceedances occurred in samples from SA-MW1 adjacent to the embayment shoreline. The exceedance at DOF-MW6 not confirmed by later sampling.
1,4-Dichlorobenzene	4.9	19	3.4	2	22	4.5	Yes	FOE<10% and EF<10. Three (3) of the 4 exceedances occurred in samples from SA-MW1 adjacent to embayment shoreline. The fourth and greatest exceedance was not confirmed in 3 later samples from DOF-MW6.
Tetrachloroethene (PCE)	2.9	12	3.4	2	9	3.1	Yes	FOE<10% and EF<10. ID'ed as COPC because PCE appears to be a source of vinyl chloride via reductive dechlorination.
Trichloroethene (TCE)	0.7	13	1.7	4	2.3	3.3	Yes	FOE<10% and EF<10. ID'ed as COPC because PCE appears to be a source of vinyl chloride via reductive dechlorination.
cis-1,2-Dichloroethene	16	57	1.7	2	25	1.6	Yes	FOE<10%and EF<10. ID'ed as COPC because PCE appears to be a source of vinyl chloride via reductive dechlorination.
Vinyl Chloride	0.18	23	19	13	19	106	Yes	FOE >10% spls.and EF >10.

TABLE A5.10a - Identified First-Cut and Proposed Groundwater COPCs - Rev. 7-3-19

Constituent	Adjusted Screening Level (ug/l)(a)	Frequency Detection (%)(b)	Frequency Exceedance %(b)(g)	# Locations Exceeded (g)	Maximum Detected Concentration (ug/l)(g)	Max. EF Detected (g)	GW-COPC	Basis/Comment
Semivolatiles (SVOCs)								
2,4-Dimethyphenol	6.3	9.0	1.8	2	65	10	No	FOE<10% and EF=10. One(1) of the 2 exceedances occurred in the first sample from DOF-MW7 that was not confirmed in three later samples. The second exceedance was in a sample from push-probe P15 but not at any other locations, including downgradient well SA-MW1.
2-Methylnaphthalene	32	14	3.6	2	80	2.5	Yes	FOE<10% and EF<10. Three (3) of the 4 exceedances occurred in samples from SA-MW1 adjacent to the embayment shoreline. The fourth exceedance was not confirmed in 3 later samples from DOF-MW7.
2-Methylphenol	27	7.2	0.9	1	36	1.3	No	FOE<10% and EF<10. The only exceedance was in a sample from push-probe P15 but not at any other locations, including downgradient well SA-MW1.
Naphthalene	1.4	41	6.3	3	25	18	Yes	FOE<10% but EF>10. Exceedance not confirmed at MW-Eu as two later samples were below the SL. The highest concentrations detected in samples from SA-MW1.
bis(2-ethylhexyl)phthalate	0.2	23	11	10	10	50	Yes	FOE>10% and EF>10
Pentachlorophenol	0.025	18	17	17	7.5	300	Yes	FOE>10% and EF>10. The highest reported concentration (240 ug/l) not confirmed in three later samples from DOF-MW7. Max. conc. listed detected in sample from P32A.

TABLE A5.10a - Identified First-Cut and Proposed Groundwater COPCs - Rev. 7-3-19

Constituent	Adjusted Screening Level (ug/l)(a)	Frequency Detection (%)(b)	Frequency Exceedance %(b)(g)	# Locations Exceeded (g)	Maximum Detected Concentration (ug/l)(g)	Max. EF Detected (g)	GW-COPC	Basis/Comment
Pesticides/PCBs								
4,4’-DDE	0.0013	10	10	10	0.033	25	Yes	FOE>10% and EF>10. Apparent exceedances likely caused by the presence of PCBs (d)
4,4’-DDD	0.0013	7.5	7.5	9	0.04	31	Yes	FOE<10% but EF>10. Apparent exceedances likely caused by the presence of PCBs (d)
trans-Chlordane	0.0006	8.6	8.6	7	0.016	27	Yes	FOE<10% but EF>10.
cis-Chlordane	0.0006	6.6	6.6	6	0.029	48	Yes	FOE<10% but EF>10%.
Total Aroclor PCBs	0.01	54	54	32	6.91	691	Yes	FOE >10% and EF>10. By far the most frequently detected constituent above it's SL.

Notes: (a) - From Ecology LDW December 2018 Workbook.

(b) - All data

(c) - SL based on dissolved fraction (EPA 1993). Total concentrations affected by suspended solids/turbidity (see Appendix K).

(d) - 4-4'-DDD and 4-4'-DDE are identified as proposed COPCs, although it is likely the detections are the result of analytical interference in the presence of PCBs. See DMD data valiation report dated November 19, 2016 (Appendix J).

(e) - Mercury is retained as proposed COPC for future monitoring purposes because the total mercury FOE is greater than 10%. The total mercury FOE is very likely affected by turbidity (suspended solids in samples delivered to laboratory).

(f) - Diesel- and heavy-oil range hydrocarbons are retained for monitoring purposes because these constituents are signficant proposed soil COPCs.

(g) - For metals concentrations - 11(7.3) first number is based on both push-probe and monitoring well samples; number in parentheses is based on only the monitoring well samples.

FOE - Frequency of Exceedance

EF - Exceedance Factor.

[Yellow] - Identified as a proposed GW-COPC

[Blue] - Retained as a monitoring parameter to confirm whether a COPC

TABLE A5.10b - Screening Data - Groundwater Constituents w/ FOE <5%

ICS/NW Cooperage Site
Seattle, Washington

Constituent	Adjusted Screening Level (ug/l)(a)	Frequency Detection (%)(b)	Frequency Exceedance %(b)	# Locations Exceeded	Maximum Detected Concentration (ug/l)	Max. EF Detected	GW-COPC	Exceedance Location/Comment
1,2,4 Trichlorobenzene	0.5	4.1	0.8	1	1.3	2.6	No	DOF-MW7; EF<10; Exceeded at only one loc.
2,4,6-Trichlorophenol	0.28	1.8	1.8	1	0.43	1.5	No	SA-MW1; EF<10; Exceeded at only one loc.
Benzo(a)Anthracene	0.01	4.5	3.6	3	0.1	10	No	P18A, SA-MW1, MW-Cp; FOE<5% and EF=10; Exceeded at only three non-contiguous loc.
Benzo(a)Pyrene	0.01	2.7	0.9	1	0.07	7.0	No	P18A; EF<10; Exceeded at only one loc.
Chrysene	0.016	4.5	2.7	2	0.09	5.6	No	P18A, SA-MW1; FOE<5% and EF<10; Exceeded at only two non-contiguous loc.
Total Benzofluoranthenes	0.01	2.7	2.7	3	0.08	8.0	No	P18A, SA-MW1, DOF-MW8; FOE<5% and EF<10; Exceeded at only three non-contiguous loc.
Di-N-Octylphthalate	0.2	0.9	0.9	1	0.7	3.5	No	MW-Ju; EF<10; Exceeded at only one loc.
N-Nitrosodi-phenlamine	0.69	1.8	0.9	1	1.9	2.8	No	SA-MW1; EF<10; Exceeded at only one loc. - not confirmed by later samples
Dieldrin	0.0013	1.9	1.9	2	0.14	108	Yes	P16, P27B; FOE<5%; EF>10. Exceeded at two non-contiguous push-probe locations. However, soil samples appear to contain dieldrin at these locations.
4,4'-DDT	0.0013	2.8	3.7	4	0.005	4	No	HC-B2(R), MW-IL, Seep 1 and Seep 2 (2007 data); FOE<5% and EF<10
Hexachlorbenzene	0.0013	0.9	0.9	1	0.002	1.5	No	DOF-MW2; EF<10; Exceeded at only one loc.

Notes: (a) - From Ecology LDW December 2018 Workbook, adjusted for PQL as appropriate.
(b) - All data
FOE - Frequency of Exceedance
EF - Exceedance Factor.
[yellow box] - Identified as a GW-COPC

TABLE A5.11 - Groundwater Petroleum Hydrocarbon and VOC Detections - First-Cut COPCs - Rev 061019

Location	Date	Depth (feet)	Petroleum Hydrocarbons			Benzene	Toluene	Ethyl-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Tetrachloro-ethene	Trichloro-ethene	*cis*-1,2-Dichloro-ethene	Vinyl chloride	1,1-Dichloro-ethane
			Gasoline-range	Diesel-range	Lube-range	71-43-2	108-88-3	100-41-4	541-73-1	106-46-7	127-18-4	79-01-6	156-59-2	75-01-4	75-34-3
			mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Adj. Screening Level		-----	0.8	0.5	0.5	1.6	130	31	2	4.9	2.9	0.7	16	0.18	11
LDW Workbook PQL			0.05	0.1	0.1	0.2	0.2	0.2	0.4	0.4	0.2	0.2	0.2	0.02	0.2
Project PQL			0.25	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Push-Probes															
P11	11/17/14	6-10	0.25 U	0.10 U	0.20 U	**2.0**	**1.8**	**15**	1.0 U	1.0 U	1.0 U	1.0 U	**0.65**	1.0 U	1.0 U
P12	11/17/14	5-9	0.25 U	0.10 U	0.20 U	**48**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.6**	1.0 U
P13	11/13/14	10-15	0.25 U	**0.12**	0.20 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
P14	11/14/14	10-15	0.25 U	0.10 U	0.20 U	**3.1**	**7.8**	**0.72**	0.20 U	0.20 U	0.20 U	**0.60**	**23**	**2.1**	**1.5**
P15	11/14/14	3-8	**1.8**	**0.17**	0.20 U	**8.2**	**22**	**87**	1.0 U	1.0 U	1.0 U	**1.8**	**11**	**8.8**	**69**
P16	12/10/14	9-14	0.25 U	0.10 U	0.20 U	**0.54**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.26**	**0.44**	0.20 U
P18A	12/16/14	25-30	0.25 U	0.10 U	0.20 U	**8.6**	**0.52**	**0.23**	0.20 U	0.20 U	0.20 U	0.20 U	**0.1**	0.20 U	0.20 U
P18B	12/16/14	45-50	0.25 U	0.10 U	0.20 U	0.20 U	**0.15**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P20	11/12/14	10-15	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.22**	**0.41**	0.20 U	0.20 U
P21A	12/8/14	25-30	0.25 U	**2.2**	**0.84**	**0.61**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.42**	**0.72 Jq**	0.20 U
P21B	12/8/14	45-50	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P23	11/12/14	10-15	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**1.4**	0.20 U	0.20 U	**0.12**	0.20 U	0.20 U
P26	11/13/14	10-15	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P27A	11/11/14	15-20	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P27B	11/11/14	45-50	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P28	12/15/14	25-30	0.25 U	0.10 U	0.20 U	0.20 U	**0.15**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P29	12/10/14	29-34	0.25 U	**0.26**	**0.70**	0.20 U	**0.49**	**1.3**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.22**
P30	12/9/14	25-30	0.25 U	**2.0**	**1.0**	**2.4**	**4.2**	**2.6**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.90**
P31	12/9/14	25-30	0.25 U	**0.51**	**0.32**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.30**
P32A	12/15/14	25-30	0.25 U	**0.12**	0.20 U	0.20 U	**0.74**	**0.54**	0.20 U	0.20 U	0.20 U	0.20 U	**0.52**	**0.42**	**0.31**
P32B	12/15/14	35-40	0.25 U	0.10 U	0.20 U	0.20 U	**0.33**	**0.30**	0.20 U	0.20 U	0.20 U	0.20 U	**0.38**	0.20 U	0.20 U
P33A	12/8/14	26-30	0.25 U	**0.36**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
P33B	12/8/14	36-40	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Monitoring Wells															
DOF-MW-1	11/8/12	12-17	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.1**
DOF-MW-1	11/11/15		**0.04** J_B	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.05 J**	0.20 U	0.20 U
DOF-MW-1	3/22/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-1	9/26/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.15 J**
DOF-MW-2	11/8/12	15-20	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.19**	0.20 U
DOF-MW-2	11/11/15		**0.04** J_B	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-2	3/22/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.08 J**	0.20 U
DOF-MW-2	9/26/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-3	11/8/12	17-22	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.15**	0.20 U
DOF-MW-3	11/20/15		0.25 U	0.10 U	0.20 U	0.20 U	**0.05 J**	0.20 U	0.20 U	0.20 U	**0.07 J**	0.20 U	**0.07 J**	**0.21**	0.20 U
DOF-MW-3	3/24/16		0.20 U	0.10 U	0.20 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
DOF-MW-3	9/26/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.10 J**	**0.19 J**	0.20 U
DOF-MW-4	11/8/12	17-22	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.17**	0.20 U
DOF-MW-4	11/11/15		**0.03** J_B	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-4	3/29/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-4	9/26/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.14 J**	0.20 U
DOF-MW-5	11/8/12	17-22	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-5	11/20/15		0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-5	3/29/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DOF-MW-5	9/26/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U

TABLE A5.11 - Groundwater Petroleum Hydrocarbon and VOC Detections - First-Cut COPCs - Rev 061019

Location	Date	Depth (feet)	Petroleum Hydrocarbons: Gasoline-range	Petroleum Hydrocarbons: Diesel-range	Petroleum Hydrocarbons: Lube-range	Benzene	Toluene	Ethyl-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Tetrachloro-ethene	Trichloro-ethene	*cis*-1,2-Dichloro-ethene	Vinyl chloride	1,1-Dichloro-ethane
						71-43-2	108-88-3	100-41-4	541-73-1	106-46-7	127-18-4	79-01-6	156-59-2	75-01-4	75-34-3
			mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Adj. Screening Level		-----	0.8	0.5	0.5	1.6	130	31	2	4.9	2.9	0.7	16	0.18	11
LDW Workbook PQL			0.05	0.1	0.1	0.2	0.2	0.2	0.4	0.4	0.2	0.2	0.2	0.02	0.2
Project PQL			0.25	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
DOF-MW-6	11/9/12	13-18	0.22	0.10 U	0.20 U	3.6	1.5	2.7	3.6	22	0.20 U	0.20 U	0.22	0.33	0.14
DOF-MW-6	11/19/15		0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.12 J	0.37	0.20 U	0.20 U	0.18 J	0.12 J	0.64
DOF-MW-6	3/24/16		0.10 U	0.10 U	0.20 U	0.16 J	0.09 J	0.20 U	0.22	0.43	0.20 U	0.20 U	0.11 J	0.20 U	0.24
DOF-MW-6	9/27/16		0.10 U	0.10 U	0.20 U	0.59	0.32 J_B	0.17 J	0.34	0.57	0.20 U	0.20 U	0.12 J	0.26	0.28
DOF-MW-7	11/9/12	13-18	0.5	0.41	0.20 U	1.7	28	21	0.20 U	0.12	0.43	0.79	25	2.1	1.2
DOF-MW-7	11/23/15		0.25 U	0.10 U	0.20 U	2.4	1.2	0.53	0.20 U	0.20 U	0.20 U	0.20 U	0.22 J_M	0.43	0.39
DOF-MW-7	3/25/16		0.09 J	0.10 U	0.20 U	2.3	0.63	0.31	0.20 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U	0.39
DOF-MW-7	9/27/16		0.10 U	0.10 U	0.20 U	1.9	0.35 J_B	0.14 J	0.20 U	0.20 U	0.20 U	0.07 J	0.31	0.48	0.64
DOF-MW-8	11/9/12	13-18	0.25 U	0.10 U	0.20 U	61	2.6	2.0	0.20 U	0.20 U	0.20 U	0.20 U	0.42	0.89	0.45
DOF-MW-8	11/20/15		0.25 U	0.10 U	0.20 U	70	0.89	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.45	0.86	0.14 J
DOF-MW-8	3/22/16		0.10	0.10 U	0.20 U	68	0.84	0.17 J	0.20 U	0.20 U	0.20 U	0.20 U	0.38	0.47	0.14 J
DOF-MW-8	9/30/16		0.12	0.10 U	0.20 U	60	0.87	0.15 J	0.20 U	0.20 U	0.20 U	0.20 U	0.43	1.0	0.12 J
HC-B1	11/13/12	16-21	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.16	0.20 U	0.20 U
HC-B1	11/19/15		0.03 J	0.10 U	0.20 U	0.05 J	0.20 U	0.20 U	0.20 U	0.04 J	0.20 U	0.20 U	0.15 J	0.20 U	0.20 U
HC-B1	3/24/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.04 J	0.20 U	0.20 U	0.12 J	0.20 U	0.09 J
HC-B1	9/30/16		0.10 U	0.10 U	0.20 U	0.20 U	0.07 J_B	0.10 J	0.20 U	0.05 J	0.20 U	0.20 U	0.15 J	0.20 U	0.08 J
HC-B2(R)	11/11/15	4.5-9.5	0.03 J_B	-----	-----	0.20 U	0.06 J	0.04 J	0.20 U	0.20 U	0.08 J	0.20 U	0.20 U	0.20 U	0.20 U
HC-B2(R)	3/23/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
HC-B2R	9/30/16		0.10 U	-----	-----	0.20 U	0.38 J_B	0.09 J	0.20 U	0.20 U	0.14 J	0.20 U	0.20 U	0.20 U	0.20 U
SA-MW1	11/23/15	4-24	1.4	0.47	0.30	6.6	54	240	4.7	13	0.20 U	0.20 U	1.5	2.5	5.9
SA-MW1	3/24/16		2.8	0.81	1.2	8.6	480	360	5.2	14	0.20 U	0.93	9.6	19	8.6
SA-MW1	9/30/16		2.5	0.69	0.94	12	290	420	4.6	12	0.20 U	0.26	2.8	6.2	11
SA-MW2	11/9/12	2-24	0.25 U	0.10 U	0.20 U	0.15 J	0.20 U	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
SA-MW2	11/20/15		0.25 U	0.10 U	0.20 U	0.64	0.83	4.8	0.20 U	0.05 J	0.20 U	0.08 J	0.11 J	0.20 U	0.07 J
SA-MW2	3/29/16		0.24	0.15	0.20 U	0.77	1.1	5.6	0.20 U	0.07 J	0.20 U	0.20 U	0.49	0.20 U	0.07 J
SA-MW2	9/30/16		0.10 U	0.10 U	0.20 U	0.44	0.35 J_B	0.93	0.05 J	0.14 J	0.20 U	0.06 J	0.17 J	0.20 U	0.10 J
SA-MW3	11/13/12	2-24	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
SA-MW3	11/19/15		0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
SA-MW3	3/28/16		0.10 U	0.10 U	0.20 U	0.06 J	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.14 J	0.09 J	0.20 U	0.25
SA-MW3	9/27/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.06 J	0.20 U	0.20 U	0.20 U	0.20 U
MW-Ap	11/18/15	4.5-9.5	-----	-----	-----	0.61	0.60	0.20 U	0.22	0.69	0.24	0.20 U	0.16 J	0.20 U	0.20 U
MW-Ap	3/25/16		-----	-----	-----	0.20 U	0.07 J	0.05 J	0.20 U	0.20 U	1.4	0.25	0.20 U	0.20 U	0.06 J
MW-Ap	10/1/16		-----	-----	-----	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.2	0.20 U	0.08 J	0.20 U	0.25
MW-Bp	11/18/15	5.5-10.5	-----	-----	-----	0.20 U	0.18 J	0.20 U	0.20 U	0.20 U	0.49	0.20 U	0.20 U	0.20 U	0.12 J
MW-Bp	3/25/16		-----	-----	-----	0.20 U	0.09 J	0.20 U	0.20 U	0.20 U	1.9	0.09 J	0.20 U	0.20 U	0.20 U
MW-Bp	10/1/16		-----	-----	-----	0.20 U	0.05 J_B	0.20 U	0.20 U	0.20 U	1.6	0.20 U	0.20 U	0.20 U	0.20 U
MW-Cp	11/18/15	3.5-8.5	-----	-----	-----	0.98	0.75	0.40	0.20 U	0.20 U	0.20 U	0.20 U	0.14 J	0.20 U	0.31
MW-Cp	3/25/16		-----	-----	-----	1.8	2.0	0.69	0.20 U	0.20 U	0.20 U	0.20 U	0.10 J	0.20 U	0.42
MW-Cp	10/1/16		-----	-----	-----	1.6	1.2	0.16 J	0.20 U	0.20 U	0.20 U	0.20 U	0.08 J	0.07 J	0.30
MW-Dp	11/18/15	5-10	-----	-----	-----	0.29	0.59	0.20 U	0.25	0.83	0.69	0.20 U	0.39	0.61	0.30
MW-Dp	3/28/16		-----	-----	-----	6.2	42	9.3	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-Dp	10/1/16		-----	-----	-----	0.82	0.18 J_B	0.20 U	0.94	3.6	9.0	2.3	1.4	0.20	0.15 J
MW-Du	11/18/15	11-21	0.04 J	0.10 U	0.20 U	0.21	0.14 J	0.20 U	0.65	2.6	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-Du	3/28/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.21	0.20 U	0.18 J
MW-Du	10/1/16		0.10 U	0.10 U	0.20 U	0.22	0.20 J_B	0.20 U	0.65	2.5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U

TABLE A5.11 - Groundwater Petroleum Hydrocarbon and VOC Detections - First-Cut COPCs - Rev 061019

Location	Date	Depth (feet)	Petroleum Hydrocarbons: Gasoline-range	Petroleum Hydrocarbons: Diesel-range	Petroleum Hydrocarbons: Lube-range	Benzene	Toluene	Ethyl-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Tetrachloro-ethene	Trichloro-ethene	*cis*-1,2-Dichloro-ethene	Vinyl chloride	1,1-Dichloro-ethane
						71-43-2	108-88-3	100-41-4	541-73-1	106-46-7	127-18-4	79-01-6	156-59-2	75-01-4	75-34-3
			mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Adj. Screening Level		-----	0.8	0.5	0.5	1.6	130	31	2	4.9	2.9	0.7	16	0.18	11
LDW Workbook PQL			0.05	0.1	0.1	0.2	0.2	0.2	0.4	0.4	0.2	0.2	0.2	0.02	0.2
Project PQL			0.25	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MW-Eu	11/19/15		**0.06 J**	**0.67**	0.20 U	**2.4**	**0.32**	**0.43**	0.20 U	0.20 U	0.20 U	0.20 U	**0.19 J**	0.20 U	**0.21**
MW-Eu	3/24/16	4.5-14.5	0.10 U	0.10 U	0.20 U	**0.66**	**0.47**	**0.59**	0.20 U	**0.07 J**	0.20 U	0.20 U	**0.21**	0.20 U	**0.12 J**
MW-Eu	9/30/16		0.10 U	0.10 U	0.20 U	**0.57**	**0.25 J_B**	**0.71**	0.20 U	0.20 U	0.20 U	0.20 U	**0.20 J**	0.20 U	**0.11 J**
MW-Fu	11/11/15	4.5-14.5	**0.03 J_B**	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-Fu	3/23/16		0.10 U	0.10 U	0.20 U	**0.03 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-Fu	9/28/16	4.5-14.5	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-FL	11/10/15		**0.03 J_B**	0.10 U	0.20 U	**0.03 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.23**	0.20 U	**0.08 J**
MW-FL	3/23/16	19.5-29.5	0.10 U	0.10 U	0.20 U	**0.06 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.25**	**0.06 J**	**0.08 J**
MW-FL	9/28/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.26**	**0.06 J**	**0.08 J**
MW-Gu	11/10/15		**0.03 J_B**	0.10 U	0.20 U	0.20 U	**0.04 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.38**	0.20 U	0.20 U
MW-Gu	3/23/16	4.5-14.5	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.25**	0.20 U	0.20 U
MW-Gu	9/28/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.42**	0.20 U	0.20 U
MW-GL	11/10/15		**0.03 J_B**	0.10 U	0.20 U	0.20 U	**0.04 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.64**	0.20 U	**0.10 J**
MW-GL	3/23/16	19.6-29.6	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.85**	0.20 U	**0.11 J**
MW-GL	9/28/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.85**	0.20 U	**0.10 J**
MW-HL	11/18/15		0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-HL	3/29/16	19.6-29.6	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.06 J**	0.20 U	0.20 U
MW-HL	9/27/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.09 J**	**0.07 J**	0.20 U
MW-IL	11/20/15		0.25 U	0.10 U	0.20 U	0.20 U	**0.04 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.26**	0.20 U	**0.12 J**
MW-IL	3/28/16	24.5-34.5	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-IL	9/27/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.26**	**0.12 J**	**0.20**
MW-Ju	11/20/15		0.25 U	0.10 U	0.20 U	**0.13 J**	**0.05 J**	**0.16 J**	0.20 U	0.20 U	**0.12 J**	**0.15 J**	**0.32**	**0.06 J**	**0.07 J**
MW-Ju	3/28/16	5-15	0.10 U	0.10 U	**0.32**	0.20 U	0.20 U	0.20 U	**0.06 J**	**0.27**	**6.1**	**0.35**	**0.70**	0.20 U	0.20 U
MW-Ju	9/27/16		0.10 U	0.11	**0.63**	**0.05 J**	**0.04 J_B**	**0.05 J**	0.20 U	0.20 U	0.20 U	0.20 U	**0.23**	**0.09 J**	**0.13 J**
MW-Ku	11/10/15		**0.03 J_B**	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
MW-Ku	3/22/16	4.5-14.5	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.07 J**	0.20 U	0.20 U
MW-Ku	9/28/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.15 J**	0.20 U	0.20 U
MW-KL	11/10/15		**0.03 J_B**	0.10 U	0.20 U	0.20 U	**0.04 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**1.7**	0.20 U	0.20 U
MW-KL	3/22/16	19.7-29.7	0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**4.0**	**0.07 J**	**0.08 J**
MW-KL	9/28/16		0.10 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**3.4**	**0.07 J**	**0.07 J**
Seep 1	5/4/07	0	-	-	-	-	-	-	-	**1.3**	-	-	-	-	-
Seep 1	7/5/12	0	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Seep 2	5/7/07	0	-	-	-	-	-	-	-	0.02 U	-	-	-	-	-
Seep 2	7/5/12	0	0.25 U	0.10 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Number of Samples			107	105	105	119	119	119	119	121	119	119	119	119	119
Number of Detects			23	14	8	45	52	38	14	23	14	15	68	27	53
Percent Detected			21.5%	13.3%	7.6%	37.8%	43.7%	31.9%	11.8%	19.0%	11.8%	12.6%	57.1%	22.7%	44.5%
Highest Conc.			2.8	2.2	1.2	70	480	420	5.2	22	9.0	2.3	25	19	69

U = Nondetected at the associated lower reporting limit.

J = Estimate associated with value less than the verifiable lower quantitation limit.

J_B = Estimate; associated value may be biased high due to contribution from laboratory background or method blank

J_Q = Estimate; due to noncompliant CCV check.

Jp = Estimated value due to high variability exhibited between duel column responses on GC/ECD (M.8081B)

Screening levels based on LDW Workbook (December 2018)

SL - Screening Level (yellow highlight)

----- - Not analyzed

TABLE A5.12 - Groundwater SVOC, Chlorinated Pesticide and PCB Detections - First Cut COPCs - Rev. 061019

Location	Date	Depth (feet)	2-Methyl-phenol	2,4-Dimethyl-phenol	Naphthalene	2-Methyl-naphthalene	Pentachloro-phenol	*bis* (2-Ethylhexyl)-phthalate	4,4'-DDE	4,4'-DDD	trans-Chlordane	cis-Chlordane	total PCBs (Aroclors)
			95-48-7	105-67-9	91-20-3	91-57-6	87-86-5	117-81-7	72-55-9	72-54-8	5103-74-2	5103-71-9	
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Adj. Screening Level		-----	27	6.3	1.4	32	0.025	0.2	0.0013	0.0013	0.0006	0.0006	0.01
LDW Workbook PQL			0.4	1	0.02	0.02	0.7	3	0.01	0.01	0.1	0.1	0.5
Project PQL			0.2	1	0.01	0.2	0.025	0.2	0.0013	0.0013	0.00063	0.00063	0.01
Push-Probes													
P11	11/17/14	6-10	1.0 U	3.0 U	**0.57**	1.0 U	**0.36**	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	0.010 U
P12	11/17/14	5-9	1.0 U	3.0 U	**0.14**	**3.1**	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.006**
P13	11/13/14	10-15	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.033**
P14	11/14/14	10-15	**4.1**	**4.2**	**0.14**	1.0 U	0.25 U	**10**	0.0050 U	0.0050 U	0.0025 U	0.0025 U	0.010 U
P15	11/14/14	3-8	**36**	**65**	**1.4**	**1.7**	**0.78**	3.0 U	0.011 U	0.0050 U	0.0098 U	0.0054 U	0.012 U
P16	12/10/14	9-14	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.050 U	0.050 U	0.025 U	0.025 U	**0.16**
P18A	12/16/14	25-30	1.0 U	3.0 U	**0.19**	**0.21**	0.25 U	3.0 U	**0.020 Jp**	**0.016 Jp**	0.0025 U	0.0025 U	**0.59**
P18B	12/16/14	45-50	1.0 U	3.0 U	**0.09**	**0.07**	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.11**
P20	11/12/14	10-15	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	0.010 U
P21A	12/8/14	25-30	1.0 U	3.0 U	**0.11**	1.0 U	0.25 U	3.0 U	**0.029 Jp**	**0.040 Jp**	0.0025 U	0.0038 U	**0.85**
P21B	12/8/14	45-50	1.0 U	3.0 U	**0.05**	1.0 U	0.25 U	3.0 U	**0.010**	**0.016 Jp**	0.0025 U	0.0025 U	**0.38**
P23	11/12/14	10-15	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	0.010 U
P26	11/13/14	10-15	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.020**
P27A	11/11/14	15-20	1.0 U	3.0 U	0.10 U	1.0 U	**0.42**	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	0.010 U
P27B	11/11/14	45-50	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0050 U	0.0050 U	**0.0087**	**0.010**	**0.016**
P28	12/15/14	25-30	1.0 U	3.0 U	0.10 U	1.0 U	**0.39**	3.0 U	0.0050 U	0.0050 U	**0.016**	**0.029 J**	**0.70**
P29	12/10/14	29-34	1.0 U	3.0 U	**0.15**	**2.2**	0.25 U	3.0 U	**0.030 Jp**	0.0050 U	0.0025 U	0.0025 U	**1.8**
P30	12/9/14	25-30	1.0 U	3.0 U	**0.05**	1.0 U	0.25 U	3.0 U	0.038 U	0.0050 U	0.0025 U	0.0025 U	**0.16**
P31	12/9/14	25-30	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	**0.033 Jp**	**0.039 Jp**	0.0025 U	0.0025 U	**0.35**
P32A	12/15/14	25-30	1.0 U	3.0 U	**0.09**	**2.0**	**7.5**	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.43**
P32B	12/15/14	35-40	1.0 U	3.0 U	**0.06**	**1.3**	**2.0**	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.20**
P33A	12/8/14	26-30	1.0 U	3.0 U	**0.05**	1.0 U	0.25 U	3.0 U	0.0050 U	0.0050 U	0.0025 U	0.0025 U	**0.30**
P33B	12/8/14	36-40	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Monitoring Wells													
DOF-MW-1	11/8/12	12-17	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.42**
DOF-MW-1	11/11/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.494**
DOF-MW-1	3/22/16		0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	0.2 U	0.0012 U	0.041 U	0.0029 U	0.0072 U	**1.51**
DOF-MW-1	9/26/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	**2.3**	**0.0024**	**0.0024 Jp**	0.00063 U	0.00063 U	**0.16**
DOF-MW-2	11/8/12	15-20	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	0.010 U
DOF-MW-2	11/11/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00072 U	0.00062 U	0.010 U
DOF-MW-2	3/22/16		0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-2	9/26/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	**0.9**	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
DOF-MW-3	11/8/12	17-22	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	0.010 U
DOF-MW-3	11/20/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-3	3/24/16		0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-3	9/26/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	**0.2**	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
DOF-MW-4	11/8/12	17-22	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	0.010 U
DOF-MW-4	11/11/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00064 U	0.00062 U	0.010 U
DOF-MW-4	3/29/16		0.2 U	1.0 U	0.01 U	0.2 U	**0.015 J**	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-4	9/26/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
DOF-MW-5	11/8/12	17-22	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	**1.6 J**	0.10 U	0.10 U	0.050 U	0.050 U	0.010 U
DOF-MW-5	11/20/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-5	3/29/16		0.2 U	1.0 U	0.01 U	0.2 U	**0.032**	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-5	9/26/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	**0.3**	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U

TABLE A5.12 - Groundwater SVOC, Chlorinated Pesticide and PCB Detections - First Cut COPCs - Rev. 061019

Location	Date	Depth (feet)	2-Methyl-phenol	2,4-Dimethyl-phenol	Naphthalene	2-Methyl-naphthalene	Pentachloro-phenol	*bis* (2-Ethylhexyl)-phthalate	4,4'-DDE	4,4'-DDD	trans-Chlordane	cis-Chlordane	total PCBs (Aroclors)
			95-48-7	105-67-9	91-20-3	91-57-6	87-86-5	117-81-7	72-55-9	72-54-8	5103-74-2	5103-71-9	
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Adj. Screening Level			27	6.3	1.4	32	0.025	0.2	0.0013	0.0013	0.0006	0.0006	0.01
LDW Workbook PQL		-----	0.4	1	0.02	0.02	0.7	3	0.01	0.01	0.1	0.1	0.5
Project PQL			0.2	1	0.01	0.2	0.025	0.2	0.0013	0.0013	0.00063	0.00063	0.01
DOF-MW-6	11/9/12	13-18	1.0 U	3.0 U	**0.48**	**1.4**	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.068**
DOF-MW-6	11/19/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	**0.0046**	**0.0046**	**0.008**
DOF-MW-6	3/24/16		0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	**0.3 J_B**	0.0012 U	0.0012 U	**0.0032**	**0.0027**	0.025 U
DOF-MW-6	9/27/16		0.2 U	1.0 U	**0.018 J_{RB}**	0.2 U	**0.031**	0.2 U	0.0013 U	0.0013 U	**0.0040**	0.00063 U	0.035 U
DOF-MW-7	11/9/12	13-18	1.0 U	**8.5**	**1.7**	**59**	**240**	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.14**
DOF-MW-7	11/23/15		1.0 U	3.0 U	**2.8**	**3.7**	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.043**
DOF-MW-7	3/25/16		0.2 U	**0.6 J**	**2.3**	**2.0**	**0.4 J**	**0.1 J**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.057**
DOF-MW-7	9/27/16		0.2 U	**0.3 J**	**0.076**	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	**0.059**
DOF-MW-8	11/9/12	13-18	1.0 U	3.0 U	**0.10**	1.0 U	**0.76**	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.079**
DOF-MW-8	11/20/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.029**
DOF-MW-8	3/22/16		0.2 U	1.0 U	**0.03**	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
DOF-MW-8	9/30/16		**0.07 J**	1.0 U	**0.018 J_B**	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
HC-B1	11/13/12	16-21	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.052**
HC-B1	11/19/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.0010 U	0.00062 U	**0.103**
HC-B1	3/24/16		0.2 U	1.0 U	**0.018**	0.2 U	0.25 U	**0.1 J_B**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.054**
HC-B1	9/30/16		0.2 U	1.0 U	**0.010 J_B**	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	**0.048**
HC-B2(R)	11/11/15	4.5-9.5	-----	-----	-----	-----	0.25 U	-----	-----	-----	-----	-----	0.015 U
HC-B2(R)	3/23/16		0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	**0.4 J_B**	**0.0012 J**	**0.0026 J_P**	0.00062 U	0.00062 U	**0.028**
HC-B2R	9/30/16		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SA-MW1	11/23/15	4-24	1.0 U	**1.8 J**	**23**	**80**	0.25 U	3.0 U	0.011 U	0.0021 U	0.00062 U	0.0034 U	**6.91**
SA-MW1	3/24/16		**0.6**	**1.7**	**25**	**46**	0.025 U	**0.6**	0.021 U	0.0012 U	0.0082 U	0.0098 U	**2.53**
SA-MW1	9/30/16		**1.2**	**3.5**	**23**	**49**	0.025 U	0.2 U	**0.058 J_P**	0.010 U	0.50 U	0.00063 U	**3.2**
SA-MW2	11/9/12	2-24	1.0 U	3.0 U	**0.06**	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.115**
SA-MW2	11/20/15		1.0 U	3.0 U	**0.61**	1.0 U	**0.16 J**	3.0 U	0.0014 U	0.0012 U	0.00062 U	0.00062 U	**0.107**
SA-MW2	3/29/16		**1.1**	**0.71 J**	**0.10**	0.2 U	**0.3 J**	**0.1 J**	0.0037 U	0.0035 U	0.0017 U	0.00062 U	**0.191**
SA-MW2	9/30/16		**0.05 J**	1.0 U	**0.6**	**0.3**	0.025 U	**0.4**	0.010 U	**0.0044**	0.00063 U	0.00063 U	**0.40**
SA-MW3	11/13/12	2-24	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.10 U	0.10 U	0.050 U	0.050 U	0.010 U
SA-MW3	11/19/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
SA-MW3	3/28/16		0.2 U	1.0 U	**0.1 J**	0.2 U	0.025 U	**0.1 J**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
SA-MW3	9/27/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	**3.1**	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-Ap	11/18/15	4.5-9.5	-----	-----	-----	-----	0.25 U	-----	-----	-----	-----	-----	0.010 U
MW-Ap	3/25/16		0.2 U	1.0 U	0.2 U	0.2 U	1.0 U	**0.2 J**	-----	-----	-----	-----	0.010 U
MW-Ap	10/1/16		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
MW-Bp	11/18/15	5.5-10.5	-----	-----	-----	-----	0.25 U	-----	-----	-----	-----	-----	0.010 U
MW-Bp	3/25/16		0.2 U	1.0 U	**0.04 J**	0.2 U	1.0 U	**0.2 J**	-----	-----	-----	-----	0.010 U
MW-Bp	10/1/16		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
MW-Cp	11/18/15	3.5-8.5	-----	-----	-----	-----	**0.18 J**	-----	-----	-----	-----	-----	**0.072**
MW-Cp	3/25/16		0.2 U	**0.3 J**	**0.4**	**0.1 J**	1.0 U	**0.2 J**	-----	-----	-----	-----	**0.041**
MW-Cp	10/1/16		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	**0.043**
MW-Dp	11/18/15	5-10	-----	-----	-----	-----	0.25 U	-----	-----	-----	-----	-----	0.025 U
MW-Dp	3/28/16		0.2 U	1.0 U	0.2 U	0.2 U	1.0 U	**0.2**	-----	-----	-----	-----	**0.008**
MW-Dp	10/1/16		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.015 U
MW-Du	11/18/15	11-21	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	**0.0023**	**0.0018**	**0.007**
MW-Du	3/28/16		0.2 U	1.0 U	**0.016**	0.2 U	0.025 U	**0.2**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.004**
MW-Du	10/1/16		0.2 U	1.0 U	**0.010 J_B**	0.2 U	**0.017 J**	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U

TABLE A5.12 - Groundwater SVOC, Chlorinated Pesticide and PCB Detections - First Cut COPCs - Rev. 061019

Location	Date	Depth (feet)	2-Methyl-phenol	2,4-Dimethyl-phenol	Naphthalene	2-Methyl-naphthalene	Pentachloro-phenol	*bis* (2-Ethylhexyl)-phthalate	4,4'-DDE	4,4'-DDD	trans-Chlordane	cis-Chlordane	total PCBs (Aroclors)
			95-48-7	105-67-9	91-20-3	91-57-6	87-86-5	117-81-7	72-55-9	72-54-8	5103-74-2	5103-71-9	
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Adj. Screening Level			27	6.3	1.4	32	0.025	0.2	0.0013	0.0013	0.0006	0.0006	0.01
LDW Workbook PQL		-----	0.4	1	0.02	0.02	0.7	3	0.01	0.01	0.1	0.1	0.5
Project PQL			0.2	1	0.01	0.2	0.025	0.2	0.0013	0.0013	0.00063	0.00063	0.01
MW-Eu	11/19/15		1.0 U	3.0 U	**1.6**	1.0 U	0.25 U	3.0 U	**0.013 J_P**	0.0012 U	0.00074 U	0.00062 U	**0.236**
MW-Eu	3/24/16	4.5-14.5	0.2 U	1.0 U	**0.4**	0.2 U	**0.12 J_P**	**1.2**	0.033 U	0.015 U	0.0021 U	0.00062 U	**0.387**
MW-Eu	9/30/16		**0.03 J**	1.0 U	**0.041**	0.2 U	0.025 U	0.2 U	0.020 U	**0.010**	0.00063 U	0.00063 U	**0.21**
MW-Fu	11/11/15	4.5-14.5	1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-Fu	3/23/16		0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-Fu	9/28/16	4.5-14.5	0.2 U	1.0 U	0.010 U	0.2 U	**0.028**	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-FL	11/10/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00068 U	0.00062 U	0.010 U
MW-FL	3/23/16	19.5-29.5	0.2 U	1.0 U	**0.039**	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-FL	9/28/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-Gu	11/10/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00094 U	0.00062 U	0.010 U
MW-Gu	3/23/16	4.5-14.5	0.2 U	1.0 U	**0.040**	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-Gu	9/28/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-GL	11/10/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-GL	3/23/16	19.6-29.6	0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-GL	9/28/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-HL	11/18/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	**0.0058**	**0.0086 J_P**	**0.020**
MW-HL	3/29/16	19.6-29.6	0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-HL	9/27/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-IL	11/20/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	**0.0044**	**0.0058 J_P**	**0.006**
MW-IL	3/28/16	24.5-34.5	0.2 U	1.0 U	**0.04 J**	0.2 U	0.025 U	**0.2**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-IL	9/27/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	**0.2 J_B**	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-Ju	11/20/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0020 U	0.0012 U	0.0016 U	0.0018 U	**0.289**
MW-Ju	3/28/16	5-15	0.2 U	1.0 U	**0.015**	0.2 U	0.025 U	**0.4**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	**0.006**
MW-Ju	9/27/16		0.2 U	1.0 U	**0.023**	0.2 U	0.025 U	**5.1**	**0.0026 J_P**	0.0013 U	**0.0021 J_P**	0.00063 U	0.051 U
MW-Ku	11/10/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00083 U	0.00062 U	0.010 U
MW-Ku	3/22/16	4.5-14.5	0.2 U	1.0 U	0.01 U	0.2 U	**0.035**	0.2 U	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-Ku	9/28/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
MW-KL	11/10/15		1.0 U	3.0 U	0.10 U	1.0 U	0.25 U	3.0 U	0.0012 U	0.0012 U	0.00080 U	0.00062 U	0.010 U
MW-KL	3/22/16	19.7-29.7	0.2 U	1.0 U	0.01 U	0.2 U	0.025 U	**0.5**	0.0012 U	0.0012 U	0.00062 U	0.00062 U	0.010 U
MW-KL	9/28/16		0.2 U	1.0 U	0.010 U	0.2 U	0.025 U	0.2 U	0.0013 U	0.0013 U	0.00063 U	0.00063 U	0.010 U
Seep 1	5/4/07	0	0.56 U	2.3 U	0.23 U	0.23 U	**0.06 J**	1.2 U	**0.016**	**0.013 J**	-	-	**0.5**
Seep 1	7/5/12	0	1.0 U	1.0 U	1.0 U	1.0 U	0.25 U	1.0 U	0.10 U	0.10 U	0.050 U	0.050 U	0.075 U
Seep 2	5/7/07	0	0.49 U	2 U	**0.12 J**	0.2 U	0.98 U	0.98 U	**0.0022**	0.00049 U	-	0.0049 U	**0.026**
Seep 2	7/5/12	0	1.0 U	1.0 U	1.0 U	1.0 U	0.25 U	1.0 U	0.10 U	0.10 U	0.050 U	0.050 U	**0.30**
Number of Samples			111	111	111	111	111	111	107	107	105	106	107
Number of Detects			8	10	45	16	20	26	11	8	9	7	58
Percent Detected			7.2%	9.0%	40.5%	14.4%	18.0%	23.4%	10.3%	7.5%	8.6%	6.6%	54.2%
Highest Conc.			36	65	25	80	240	10	0.03	0.04	0.02	0.03	6.91

U = Nondetected at the associated lower reporting limit.

J = Estimate associated with value less than the verifiable lower quantitation limit.

J_B = Estimate; associated value may be biased high due to contribution from laboratory background or method blank

J_Q = Estimate; due to noncompliant CCV check.

Jp = Estimated value due to high variability exhibited between duel column responses on GC/ECD (M.8081B)

SLs from Ecology LDW Workbook (December 2018)

(yellow) - Constituent exceeds available screening level concentration

SL - Screening Level

na - Not Available

----- - Not analyzed

Table A5.13a - Groundwater Push-Probe Metals Data - ICS/NWC Property

ICS/NW Cooperage Site
Seattle, Washington

Location	Date	Screen Depth	pH	Turbidity	Arsenic		Cadmium		Total Chromium		Copper		Lead		Mercury		Nickel		Zinc	
					7440-38-2		7440-43-9		7440-47-3		7440-50-8		7439-92-1		7439-97-6		7440-02-0		7440-66-6	
		(feet)	Std. Units	NTU	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. ng/L	total ng/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L
Screening Level (SL)			-----	-----	8	8	1.2	1.2	27	27	3.1	3.1	8.1	8.1	25	25	8.2	8.2	81	81
Number of Samples			28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Concentration Average			7	161	4.7	6.6	<0.2	<0.3	4.9	21.3	<2.5	19.7	<0.5	13.9	<20	46.6	4.6	11.7	12.3	41.8
Highest Concentration			8	586	29	28	<0.5	1.2	36	121	27	116	5	197	26	218	18	46	30	320
Exceedance Frequency (%)			-----	-----	18	29	0	0	3.6	29	7.1	79	0	25	3.6	32	18	39	0	14
Number Locations > SL			-----	-----	5	8	0	0	1	8	2	21	0	7	1	9	5	11	0	4
Highest Exceedance Factor (EF)			-----	-----	3.6	3.5	<1	1.0	1.3	4.5	8.7	37	0.6	24	1.1	8.7	2.2	5.6	0.4	4.0
P11	11/17/14	6-10	6.8	22.8	**29**	**28**	<0.2	<0.2	**3**	**3**	**0.6**	**1.7**	<0.1	**1.5**	<20	<20	**1.6**	**1.7**	**4**	**5**
P12	11/17/14	5-9	6.8	40.1	**28**	**27**	<0.5	<0.5	**22**	**20**	**3**	**5**	**0.4**	**1.1**	<20	<20	**5**	**6**	<10	<10
P13	11/13/14	10-15	6.8	73	**11**	**11**	<0.2	<0.2	**8**	**8**	**0.8**	**4.3**	**0.1**	**0.7**	<20	<20	**3.5**	**3.5**	**9**	**10**
P14	11/14/14	10-15	6.7	44.2	**0.4**	**0.8**	<0.1	<0.1	<2.0	**5**	<0.5	**2.0**	**0.3**	**7.0**	<20	<20	**1.5**	**1.8**	**6**	**12**
P15	11/14/14	3-8	6.6	9.8	**12**	**13**	<0.1	<0.1	**10**	**10**	<0.5	**2.2**	**0.1**	**3.3**	<20	<20	**4.8**	**5.1**	<4	**7**
P16	12/10/14	9-14	7.0	575	**2.4**	**5.4**	<0.1	<0.1	<1	**17**	<0.5	**24**	<0.1	**13**	<20	**52**	**3.9**	**14**	<4	**37**
P18A	12/16/14	25-30	7.0	275	**2**	**5**	<0.1	**0.2**	**5**	**45**	**0.5**	**31**	<0.1	**39**	<20	**211**	**4.4**	**18**	<4	**80**
P18B	12/16/14	45-50	6.9	51.9	<2	**3**	<0.5	<0.5	<2.0	**11**	<2	**7**	<0.5	**7.9**	<20	<20	**12**	**14**	<20	<20
P20	11/12/14	10-15	6.8	77	**1.6**	**3.6**	<0.1	<0.1	<0.5	**6**	**1.0**	**14**	<0.1	**1.6**	<20	<20	**2.0**	**14**	<4	**20**
P21A	12/8/14	25-30	6.9	190	**1.0**	**1.2**	<0.1	<0.1	**3**	**11**	<0.5	**9.4**	<0.5	**5**	<20	**33**	**4.1**	**8.3**	**6**	**18**
P21B	12/8/14	45-50	6.8	119	<2	**3**	<1.0	<1.0	<5	**30**	<5	**18**	<1	**9**	<20	**76**	**9**	**18**	<40	**40**
P23	11/12/14	10-15	6.8	122	**3.3**	**4.1**	<0.1	<0.1	<0.5	**2.1**	<0.5	**4**	<0.1	**0.6**	<20	<20	**1.4**	**5**	**5**	**10**
P26	11/13/14	10-15	7.0	255	**15**	**14**	<0.5	<0.5	<2.0	**3**	**3**	**4**	<0.5	**0.6**	<20	<20	**6**	**6**	<20	<20
P27A	11/11/14	15-20	7.2	74.8	**3**	**3**	<0.2	<0.2	**1**	**8**	**2**	**12**	<0.2	**1.8**	<20	<20	**2**	**7**	<10	**20**
P27B	11/11/14	45-50	7.2	372	**2**	**11**	<0.2	**1.2**	<1	**57**	**2**	**116**	<0.2	**197**	<20	**182**	**14**	**46**	**30**	**320**
P28	12/15/14	25-30	6.8	229	<1	**3**	<0.2	<0.2	**2**	**32**	**1**	**14**	<0.2	**1.6**	<20	**23**	**3**	**8**	<10	**20**
P29	12/10/14	29-34	6.8	401	**2**	**12**	<0.2	**0.3**	**3**	**81**	**1**	**66**	**0.4**	**62**	<20	**218**	**3**	**39**	<10	**130**
P30	12/9/14	25-30	7.4	182	**5**	**8**	<0.5	<0.5	**36**	**38**	**27**	**30**	**5.0**	**5.7**	**26**	**48**	**18**	**19**	**40**	**40**
P31	12/9/14	25-30	6.9	65	<1	<1	<0.2	<1.0	<5	**6**	<1	**1**	<0.2	<1	<20	<20	**2**	**3**	<10	**90**
P32A	12/15/14	25-30	6.6	312	<0.5	**5.1**	<0.1	**0.1**	**7.3**	**121**	**0.6**	**52**	<0.1	**8.6**	<20	**35**	**2.0**	**23**	**6**	**59**
P32B	12/15/14	35-40	6.8	183	**2**	**2**	<0.2	<0.2	**2**	**22**	<1	**21**	<0.2	**2.8**	<20	<20	**2**	**8**	<10	**40**
P33A	12/8/14	26-30	6.7	586	**0.3**	**0.8**	<0.1	<0.1	<2.0	**10**	**0.6**	**7.2**	<0.5	**5.1**	<20	**22**	**3.8**	**7.8**	**8**	**29**
ICS-P34 (a)	6/9/15	10-14	7.9	78	**0.3**	**0.9**	<0.1	<0.1	**0.8**	**1.8**	<0.5	**6.6**	<0.1	**2.1**	<20	<20	**0.9**	**1.3**	<4	**4**
ICS-P34(a)	6/9/15	20-24	7.5	33	<0.5	**0.6**	<0.2	<0.2	**3**	**3**	<1	<1	<0.2	**0.4**	<20	<20	**1**	<1	<10	<10
ICS-P35(a)	6/9/15	10-14	6.7	6.6	**0.9**	**1.0**	<0.2	<0.2	<1	<1	<1	<1	<0.2	<0.2	<20	<20	**2**	**2**	<10	<10
ICS-P35(a)	6/8/15	20-24	6.8	9	**2.0**	**10.8**	<0.2	<0.2	**6**	**32**	**10**	**69**	**1.4**	**8.5**	<20	**65**	**11**	**33**	**30**	**80**
ICS-P36(a)	6/8/15	10-14	6.6	6.9	**1.3**	**2.7**	<0.2	<0.2	**2**	**5**	<1	**9**	<0.2	**0.8**	<20	<20	**2**	**5**	<10	<10
ICS-P36(a)	6/8/15	20-14	6.5	127	**0.5**	**3.0**	<0.2	<0.2	<1	**8**	<1	**20**	<0.2	**2.1**	<20	<20	**2**	**8**	<10	**20**

Notes: (a) - Off-site push-probe
< - Not detected at the indicated reporting limit
Less than values were assumed at the reporting limit in calculating concentration averages
[yellow box] - Concentration exceeds screening level
Bold value = Detected concentration

TABLE A5.13b - Monitoring Well Metals Data - ICS/NWC Property

Location	Date	Screen Depth	Field Parameters		Arsenic		Cadmium		Total Chromium		Copper		Lead		Mercury		Nickel		Zinc	
			pH	Turbidity	7440-38-2		7440-43-9		7440-47-3		7440-50-8		7439-92-1		7439-97-6		7440-02-0		7440-66-6	
		(feet)	Std. Units	NTU	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. ng/L	total ng/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L
Screening Level (SL)			-----	-----	8	8	1.2	1.2	27	27	3.1	3.1	8.1	8.1	25	25	8.2	8.2	81	81
Number of Samples			82	82	82	82	81	82	82	82	82	82	82	82	82	82	82	82	81	80
Concentration Average			6.8	13.6	2.0	2.2	<0.2	<0.2	13	15.3	3.4	4.9	0.5	1.9	12.9	18.9	2.4	2.9	8.6	10.9
Highest Concentration			8.7	121	10.1	9.9	0.09	0.20	75	84	19	24	4.5	23	17	140	11	17	48	60
Exceedance Frequency (%)			-----	-----	3.7	4.9	0	0	15	16	22	40	0	7.3	0	12.2	2.4	6.1	0	0
Number Locations > SL			-----	-----	1	2	0	0	3	4	7	15	0	4	0	8	2	3	0	0
Highest Exceedance Factor			-----	-----	1.3	1.2	0.08	0.17	2.8	3.1	6.1	7.7	0.6	2.9	0.7	5.6	1.3	2.1	0.6	0.7
DOF-MW-1	11/8/12	12-17	7.0	13.4	2	2	-----	<1	<5	<5	<5	4	<1	2	<0.1	<0.1	8	8	<40	<40
DOF-MW-1	11/11/15		7.5	4.4	4	6	<1.0	0.2	5	24	1.1	22	1	20	9.5	77	2	12	4.5	40
DOF-MW-1	3/22/16		6.5	121	4	9	<0.5	0.2	7	26	0.5	24	0.2	15	4.0	58	6	17	3	60
DOF-MW-1	9/26/16		6.5	7.2	1.7	1.9	<0.2	<0.5	3.8	4.5	<1	2.2	<0.2	0.62	<20	<20	7.6	8.6	2	<20
DOF-MW-2	11/8/12	15-20	6.5	9.8	2.6	4.3	<0.1	<0.1	47.2	68.3	5.2	23	0.3	1.1	<0.1	<0.1	1.7	2.1	<4	7
DOF-MW-2	11/11/15		7.5	5.8	3.9	4.2	0.01	0.01	66.9	65.7	15	15	1.0	1.0	14	15	1.5	1.8	3.8	5
DOF-MW-2	3/22/16		6.6	5.7	4.1	4	<0.2	0.01	69	76	15	16	1.1	1.2	12	14	1	1.4	4	3
DOF-MW-2	9/26/16		6.6	4	3.8	3.6	<0.2	<0.2	62	69	15	16	1.1	1.0	<20	<20	1.5	1.5	4	4
DOF-MW-3	11/8/12	17-22	6.5	10.5	2.0	3.1	<0.1	<0.1	28.3	37.1	1.7	5.3	<0.1	0.7	<0.1	<0.1	1.4	1.4	<4	4
DOF-MW-3	11/20/15		7.2	10	5.3	5.1	<0.2	<0.2	62	75	9	10	0.7	0.7	13	14	2	2	3.3	3
DOF-MW-3	3/24/16		6.5	4.9	6.0	6	0.04	0.02	75	82	11	11	0.8	1.8	15	15	2	2	4	5
DOF-MW-3	9/26/16		6.5	2.5	5.5	5.8	<0.2	<0.2	74	84	11	11	0.94	0.88	<20	<20	1.7	2.0	5	3
DOF-MW-4	11/8/12	17-22	6.3	10.3	2	3.6	<0.1	<0.1	46.0	55.5	7.4	15	0.4	0.9	<0.1	<0.1	1.5	1.7	5	5
DOF-MW-4	11/11/15		7.3	6.5	2.9	3	<0.1	0.01	48.8	46.4	15	16	1.0	0.9	12	14	1.3	1.3	3.3	3
DOF-MW-4	3/29/16		6.3	4.5	2.8	3	0.01	0.01	67	64	14	16	0.9	0.9	10	22	1.3	1.3	3	3
DOF-MW-4	9/26/16		6.4	2.7	3.3	2.9	<0.2	<0.2	59	64	19	18	1.2	1.1	<20	<20	1.4	1.2	5	5
DOF-MW-5	11/8/12	17-22	6.5	11.2	<0.5	0.7	<0.1	<0.1	10.9	13.6	2.1	7.0	0.1	0.3	<0.1	<0.1	0.8	1.0	<4	<4
DOF-MW-5	11/20/15		7.2	3.5	0.5	0.5	<0.1	<0.1	8.9	11	2.7	3.7	0.2	0.2	<20	<20	0.47	0.6	1.1	1
DOF-MW-5	3/29/16		6.3	4.3	0.5	0.6	0.02	0.02	12	12	2.8	3	4.5	0.2	3	<20	0.50	0.4	1.3	1.0
DOF-MW-5	9/26/16		6.3	4.8	0.60	0.68	<0.2	<0.2	12	14	4.1	4.1	0.30	0.29	<20	<20	1	0.4	3	<8
DOF-MW-6	11/9/12	13-18	6.9	22.3	0.8	1.3	<0.1	<0.1	7.7	17	<1	6.6	0.1	1.4	<0.1	<0.1	1.7	2.3	<4	<4
DOF-MW-6	11/19/15		7.8	13.2	0.6	0.4	<0.1	0.01	7.6	9	1.9	2.5	0.1	0.2	3.3	3.8	0.8	0.8	48	52
DOF-MW-6	3/24/16		6.4	16.3	0.4	0.5	0.02	0.02	8	10	2	3	0.1	0.3	<20	<20	0.90	1	-----	-----
DOF-MW-6	9/27/16		6.5	4.3	0.45	0.41	<0.1	<0.1	7.8	7.0	1.7	1.7	0.15	0.17	<20	65	1.0	1.0	29	31
DOF-MW-7	11/9/12	13-18	6.2	5.9	1.6	1.4	<0.1	<0.1	10	14	1.8	3.6	<0.1	0.4	<0.1	<0.1	2	2.4	<4	<4
DOF-MW-7	11/23/15		6.5	3	1.0	0.9	<0.1	<0.1	6.1	7	0.25	0.3	0.1	0.02	<20	<20	1.4	1.5	0.96	0.5
DOF-MW-7	3/25/16		6.1	2.8	1.1	1.2	<0.2	<0.1	7	6.3	0.1	0.1	0.02	0.04	<20	<20	1	1.4	0.6	<4
DOF-MW-7	9/27/16		6.2	11.4	0.96	0.98	<0.1	<0.1	4.8	4.6	<5	<0.5	<0.1	0.15	<20	<20	2	1.4	<4	1
DOF-MW-8	11/9/12	13-18	6.4	48.8	6	5.6	<0.1	<0.1	2	5	0.6	3.4	0.5	13.5	<0.1	<0.1	7	7.6	<4	11
DOF-MW-8	11/20/15		6.8	15.6	8.8	9.9	<0.1	<0.1	1.7	3	0.26	1.0	0.2	2.8	<20	15	4.5	5.2	0.6	3
DOF-MW-8	3/22/16		6.4	16.1	10.1	9	0.02	0.01	4	2.6	0.2	0.8	0.0	2.7	<20	11	5	5	1	1
DOF-MW-8	9/30/16		6.4	25.7	9.5	9.6	<0.1	<0.1	1.4	2.3	<0.5	1.1	<0.1	3.1	<20	<20	4.7	5.1	1	3

TABLE A5.13b - Monitoring Well Metals Data - ICS/NWC Property

Location	Date	Screen Depth	Field Parameters		Arsenic		Cadmium		Total Chromium		Copper		Lead		Mercury		Nickel		Zinc	
			pH	Turbidity	7440-38-2		7440-43-9		7440-47-3		7440-50-8		7439-92-1		7439-97-6		7440-02-0		7440-66-6	
		(feet)	Std. Units	NTU	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. ng/L	total ng/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L
Screening Level (SL)			-----	-----	8	8	1.2	1.2	27	27	3.1	3.1	8.1	8.1	25	25	8.2	8.2	81	81
HC-B1	11/13/12	16-21	8.0	5.1	**4**	**4**	<0.5	<0.5	**6**	**6**	<2	<2	<0.5	<0.5	<0.1	<0.1	**6**	**7**	<20	<20
HC-B1	11/19/15		8.3	5.9	**0.45**	**0.3**	**0.05**	<1	**2.8**	**3**	**0.3**	<5	**0.06**	**0.04**	<20	<20	**0.3**	**0.3**	**1.1**	<40
HC-B1	3/24/16		7.7	4.6	**0.8**	**0.8**	**0.05**	**0.05**	**4**	**6**	**0.3**	**0.5**	**0.2**	**0.3**	**3**	<20	**0.40**	**0.4**	<20	**5**
HC-B1	9/30/16		7.5	6.8	**0.64**	**0.5**	<1.0	<2.0	**2.4**	**2.3**	<5	<10	<1.0	<2.0	<20	<20	**0.50**	**2.4**	<40	<80
HC-B2(R)	11/11/15	4.5-9.5	7.4	15.9	**2.7**	**2.6**	**0.03**	**0.04**	**0.5**	**0.3**	**0.4**	**0.4**	**0.03**	**0.2**	<20	**3.1**	**2.3**	**2.3**	**9**	**10**
HC-B2(R)	3/23/16		6.1	8.1	**0.1**	**0.5**	**0.1**	**0.1**	**0.2**	**1.4**	**2.7**	**3.6**	**0.02**	**5.9**	**3.0**	**20**	**2.3**	**2.5**	**16**	**19**
HC-B2R	9/30/16		ISV	ISV	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SA-MW1	11/23/15	4-24	7.6	16.8	**3.6**	**4.1**	<0.1	**0.02**	**13.5**	**20**	**1.8**	**3.3**	**1.0**	**2.0**	**16.6**	**51.5**	**10**	**10**	**2.3**	**5**
SA-MW1	3/24/16		8.7	15.4	**2.3**	**2**	<0.2	<0.2	**13**	**15**	**1**	**3**	**0.7**	**1.8**	**6**	**15**	**2**	**3**	**4**	**5**
SA-MW1	9/30/16		8.6	5	**4.2**	**4.1**	<0.1	<0.1	**25**	**29**	**1.5**	**2.7**	**1.6**	**2.4**	<20	<20	**3.2**	**3.4**	**6.9**	**8.6**
SA-MW2	11/9/12	2-24	6.7	5.1	**0.5**	<0.5	<0.1	<0.1	**2.5**	**5**	<2	**1.0**	<0.1	**0.6**	<0.1	<0.1	**4.7**	**4.1**	<4	<4
SA-MW2	11/20/15		6.5	5.2	**1**	**2**	**0.05**	<0.5	**3**	**3**	**0.4**	**1.0**	**0.1**	**0.6**	<20	**4.1**	**3**	**4**	**1.6**	**2**
SA-MW2	3/29/16		6.4	5.3	**3.7**	**4**	**0.01**	**0.02**	**5**	**6**	**0.3**	**0.7**	**0.1**	**0.8**	<20	**6.0**	**2.7**	**3**	**0.6**	**4**
SA-MW2	9/30/16		6.4	5.7	**1.3**	**1.5**	<1.0	**0.04**	**2.5**	**3.1**	<5	**0.54**	<1	**0.96**	<20	<20	**1.5**	**1.8**	<40	**3**
SA-MW3	11/13/12	2-24	5.9	37.1	**4**	**3**	<0.5	<0.5	**4**	**4**	**4**	**4**	<0.5	<0.5	<0.1	<0.1	**11**	**10**	**30**	-----
SA-MW3	11/19/15		7.9	64.4	**0.3**	**0.7**	**0.2**	**0.2**	**0.7**	**1.0**	**4.3**	**5**	**0.01**	**0.05**	**6.8**	**7.3**	**2.0**	**3**	**7**	**12**
SA-MW3	3/28/16		6.8	20.6	**0.4**	**0.7**	**0.02**	**0.04**	**1**	**2**	**4**	**5**	**0.08**	**0.2**	**9.0**	**10**	**0.8**	**0.9**	**9**	**4**
SA-MW3	9/27/16		6.5	31	**0.41**	**0.62**	**0.09**	**0.12**	**3.3**	**1.7**	**9.2**	**7.4**	<0.5	**0.12**	<20	**36**	**2.6**	**2.6**	**5.9**	**6.4**
MW-Du	11/18/15	11-21	7.6	16.3	**1.4**	**1.6**	**0.01**	<0.1	**8.3**	**10**	**3.1**	**4**	**0.7**	**1.0**	**5.9**	**6.6**	**1.7**	**2.1**	**5**	**6**
MW-Du	3/28/16		6.4	16.6	**1.8**	**2**	**0.0**	**0.01**	**10**	**13**	**3**	**4**	**0.3**	**1.2**	**4**	**17**	**0.80**	**1.0**	**3**	**2**
MW-Du	10/1/16		6.4	5.6	**1.8**	**2.1**	<0.1	<0.1	**11**	**12**	**4.1**	**4.7**	**0.29**	**0.62**	<20	<20	**0.74**	**1.3**	**1**	**5.2**
MW-Eu	11/19/15	4.5-14.5	8.3	11.1	**2**	**3**	<1	**0.05**	**1.6**	**13**	**0.5**	**8**	**1.0**	**23.4**	**4.4**	**48.7**	**3**	**8**	**3.4**	**27**
MW-Eu	3/24/16		6.8	17.5	**3**	**3**	**0.1**	**0.05**	**4**	**9**	**0.4**	**2**	**0.1**	**9.4**	**5**	**15**	**2.0**	**3**	<40	**16**
MW-Eu	9/30/16		6.8	19	**2.8**	**2.4**	<1.0	<1.0	**2.3**	**2.1**	<5	<5	<1	<1	<20	<20	**0.8**	**1.4**	<40	<40
MW-Fu	11/11/15	4.5-14.5	7.3	1.3	**0.7**	**0.7**	**0.03**	**0.02**	**0.25**	**0.2**	**2.2**	**2.2**	**0.01**	**0.01**	**5**	<20	**3.0**	**3**	**1.4**	**2**
MW-Fu	3/23/16		6.4	13	**0.2**	**0.2**	**0.02**	**0.02**	**0.20**	**0.20**	**2.1**	**1.9**	**0.01**	**0.01**	<20	<20	**1.3**	**1.3**	**1**	**0.7**
MW-Fu	9/28/16		6.5	52	**0.36**	**0.36**	**0.06**	**0.04**	**0.35**	**0.37**	**3.3**	**3.1**	<0.1	<0.1	<20	<20	**3.4**	**3.3**	**2**	**2**
MW-FL	11/10/15	19.5-29.5	7.3	13	**1.0**	**1.3**	<0.2	**0.01**	**19**	**21**	**0.8**	**2.1**	**0.09**	**0.4**	**2.7**	**6.4**	**1.0**	**3.1**	**0.96**	**2**
MW-FL	3/23/16		6.6	4	**0.9**	**1.0**	<0.5	**0.1**	**20**	**21**	**0.9**	**4**	**0.1**	**0.3**	**4.0**	**5.0**	**1.0**	**1.0**	**1**	**7**
MW-FL	9/28/16		6.6	6	**0.75**	**0.75**	<0.2	<0.1	**14**	**12**	<1	**0.75**	<0.2	**0.08**	<20	**49**	**0.82**	**1.4**	<8	**1**
MW-Gu	11/10/15	4.5-14.5	7.1	20.5	**0.8**	**0.9**	<0.1	**0.01**	**1.2**	**2**	**0.17**	**0.6**	**0.07**	**0.2**	<20	**5.9**	**0.7**	**1.8**	**1.9**	**3**
MW-Gu	3/23/16		6.5	11.1	**1.8**	**1.8**	<0.2	**0.01**	**3**	**3.3**	**0.8**	**1.3**	**0.3**	**0.5**	**3**	<20	**1**	**1.3**	**1**	**2**
MW-Gu	9/28/16		6.4	6.3	**0.71**	**0.55**	<0.1	<0.1	**0.85**	**0.80**	<10	**1.5**	<0.1	**0.14**	<20	<20	<10	**1.1**	**1**	**1**
MW-GL	11/10/15	19.6-29.6	7.3	27	**0.6**	**0.7**	<0.5	**0.01**	**1.4**	**2**	**0.18**	**1.0**	**0.03**	**0.1**	<20	**2.7**	**0.52**	**0.9**	**3.1**	**1**
MW-GL	3/23/16		6.7	1.1	**0.8**	**1**	**0.05**	**0.05**	**3**	**4**	**0.3**	**0.4**	**0.05**	**0.2**	<20	<20	**0.40**	**0.4**	<20	**6**
MW-GL	9/28/16		6.5	2.7	**1**	**0.6**	<1.0	<1.0	**2.5**	**0.90**	<5	<10	<1.0	<1.0	<20	<20	<5	<10	<40	<40
MW-HL	11/18/15	19.6-29.6	7.5	6	**0.25**	**0.3**	<0.5	<0.2	**2**	**2**	**0.35**	**0.4**	**1.0**	**1.1**	**7**	**6.7**	**0.28**	**0.7**	**2.6**	**3**
MW-HL	3/29/16		6.3	10.4	**0.2**	**0.4**	<0.2	<0.5	**2.0**	**3**	**0**	**0.7**	**0.04**	**0.3**	<20	**10**	**0.20**	**0.4**	**3**	**6**
MW-HL	9/27/16		6.3	4.2	**0.16**	**0.19**	<0.1	<0.1	**2**	**1.0**	<2.5	**2.4**	<0.5	**0.1**	<20	<20	<2.5	**0.23**	**1**	**1**

TABLE A5.13b - Monitoring Well Metals Data - ICS/NWC Property

Location	Date	Screen Depth	Field Parameters		Arsenic		Cadmium		Total Chromium		Copper		Lead		Mercury		Nickel		Zinc	
			pH	Turbidity	7440-38-2		7440-43-9		7440-47-3		7440-50-8		7439-92-1		7439-97-6		7440-02-0		7440-66-6	
		(feet)	Std. Units	NTU	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L	diss. ng/L	total ng/L	diss. µg/L	total µg/L	diss. µg/L	total µg/L
Screening Level (SL)			-----	-----	8	8	1.2	1.2	27	27	3.1	3.1	8.1	8.1	25	25	8.2	8.2	81	81
MW-IL	11/20/15	24.5-34.5	7	10.6	**0.4**	**0.4**	<1.0	<0.5	**3**	**4**	**0.4**	**0.8**	**0.1**	**0.3**	<20	**5.1**	**0.5**	**0.5**	**1.6**	**1**
MW-IL	3/28/16		6.4	9.3	**0.7**	**0.8**	<0.5	**0.05**	**5**	**6**	**0.3**	**0.6**	**0.1**	**0.5**	**13**	**37**	**1**	**1**	**11**	**11**
MW-IL	9/27/16		6.3	3.3	**0.33**	**0.31**	<0.1	0.1	**3.2**	**1.9**	<2.5	<0.5	<0.5	**0.07**	<20	**140**	**0.60**	**0.56**	**1**	**1**
MW-Ju	11/20/15	5-15	7	43	**2.0**	**2.2**	**0.01**	**0.02**	**2.5**	**3**	**1.2**	**2.0**	**2.4**	**2.8**	**15**	**13**	**4.6**	**5**	**2.6**	**3**
MW-Ju	3/28/16		6.3	6	**3.3**	**3**	<0.2	**0.0**	**2**	**2**	**1**	**3**	**1.3**	**4.4**	**7**	**13**	**3.0**	**3**	**19**	**30**
MW-Ju	9/27/16		6.3	22	**1.2**	**2.5**	<0.1	**0.12**	**2**	**3.4**	<2.5	**5.0**	<0.5	**9.8**	<20	**59**	**1**	**2.9**	**1**	**48**
MW-Ku	11/10/15	4.5-14.5	6.5	14.9	**0.4**	**0.5**	**0.02**	**0.03**	**0.42**	**0.6**	**3.0**	**3.3**	**0.02**	**0.05**	<20	<20	**3.6**	**3.6**	**2.7**	**3**
MW-Ku	3/22/16		6.4	12.2	**0.5**	**0.7**	**0.1**	**0.07**	**0.5**	**0.9**	**2.7**	**3**	**0.01**	**0.2**	<20	<20	**3.1**	**3**	**10**	**11**
MW-Ku	9/28/16		6.5	12.7	**1.1**	**1.2**	<0.2	**0.04**	**1.5**	**1.4**	**1.5**	**2.0**	<0.2	**0.07**	<20	<20	**2.8**	**3.9**	**5**	**3**
MW-KL	11/10/15	19.7-29.7	7.5	22.8	**0.3**	**0.5**	<0.2	**0.01**	**3**	**3**	**0.7**	**1.5**	**0.6**	**0.8**	**3.6**	**5.8**	**0.6**	**1.0**	**1.8**	**18**
MW-KL	3/22/16		6.8	2.2	**0.5**	**0.3**	<0.5	**0.05**	**3**	**3**	**0.20**	**0.40**	**0.05**	**0.20**	<20	**5.0**	**0.5**	**0.5**	<20	**3**
MW-KL	9/28/16		6.7	2.7	**0.6**	**0.30**	<1.0	<1.0	**3.6**	**1.3**	<5	**1.2**	<1.0	<1.0	<20	<20	**0.9**	**1.3**	**17**	**1**

Notes: < - Not detected at indicated reporting limit
Less than values were assumed at the reporting limit in calculating concentration averages
[yellow box] - Concentration exceeds screening level
Bold value = Detected concentration

TABLE A5.14 - Groundwater Detections - Lower Zone Wells - Douglas Property

Location	Date	Depth (feet)	Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	Total Petroleum Hydrocarbons			Chloro-methane	Vinyl chloride	Methylene chloride	Carbon disulfide	*cis*-1,2-Dichloroethene	Chloroform	Benzene	Toluene
			7440-38-2	7440-43-9	7440-47-3	7440-50-8	7439-92-1	7439-97-6	7440-02-0	7440-22-4	7440-66-6	Gasoline-range	Diesel-range	Lube-range	74-87-3	75-01-4	75-09-2	75-15-0	156-59-2	67-66-3	71-43-2	108-88-3
			diss. µg/L	diss. µg/L	diss. µg/L	diss. µg/L	diss. µg/L	diss. ng/L	diss. µg/L	diss. µg/L	diss. µg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Screening Level			8	1.2	27	3.1	8.1	25	8.2	1.9	81	0.8	0.5	0.5	150	0.18	100	400	16	1.2	1.6	130
Monitoring Wells																						
DMC-MW-A	11/24/2015	20-30	**3.0**	**0.08 J**	**4.4**	**2.6**	**19.2**	**16.5 J**	**1.4**	**0.02 J**	**12**	**0.35**	**0.75**	**1.2**	0.50 U	**0.13 J**	1.0 U	0.20 U	0.20 U	0.20 U	**31**	**0.26**
DMC-MW-A	3/30/2016	20-30	**2.0**	0.1 U	**3**	**0.3 J**	**0.08 J**	20 U	**0.3 J**	**0.01 J**	4 U	**0.26**	**0.76**	**1.1**	**0.14 J_B**	**0.13 J**	1.0 U	0.20 U	**0.10 J**	0.20 U	**29**	**0.25**
DMC-MW-A	9/29/2016	20-30	**2.3**	0.10 U	**2.2**	0.5 U	0.10 U	20 U	**0.28 J**	0.20 U	**1 J_B**	**0.50**	**1.2**	**2.1**	0.50 U	0.20 U	**0.50 J_B**	**0.08 J_B**	**0.11 J**	0.20 U	**36**	**0.32 J_B**
DMC-MW-B	11/24/2015	23-33	**7.3**	0.5 U	**8**	**2**	**14.4**	**15.3 J**	**1.0**	**0.05 J**	**10**	**0.38**	**0.46**	0.20 U	0.50 U	0.20 U	1.0 U	0.20 U	**0.15 J**	0.20 U	**0.27**	**0.28**
DMC-MW-B	3/30/2016	23-33	**4.5**	**0.02 J**	**4**	**0.5 J**	**0.1 J**	**7 J**	**0.7 J**	0.4 U	**3 J**	**0.50**	0.15	0.20 U	**0.33 J_B**	0.20 U	1.0 U	0.20 U	**0.12 J**	**0.12 J**	**0.33**	**0.58**
DMC-MW-B	9/29/2016	23-33	**4.5**	0.10 U	**6.0**	0.5 U	**0.54**	20 U	**0.72**	**0.02 J**	**1 J_B**	**0.44**	0.20	0.20 U	0.50 U	0.20 U	**0.52 J_B**	**0.11 J_B**	**0.10 J**	0.20 U	**0.25**	**0.36 J_B**
DMC-MW-C	11/24/2015	19-29	**2**	**0.2 J**	**1.8 J**	**2.4 J**	**2.0**	**16.4 J**	**1.5 J**		**5.2 J**	0.25 U	0.10 U	0.20 U	0.50 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DMC-MW-C	3/30/2016	19-29	**1 J**	0.5 U	**2 J**	**1 J**	**0.2 J**	**5 J**	**0.3 J**	1 U	**15 J**	0.10 U	0.10 U	0.20 U	0.50 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
DMC-MW-C	9/29/2016	19-29	**0.58**	0.10 U	**1.7 J**	0.5 U	0.10 U	20 U	**0.21 J**	0.20 U	**1 J_B**	0.10 U	0.10 U	0.20 U	0.50 U	0.20 U	**0.63 J_B**	**0.05 J_B**	0.20 U	**0.14 J**	0.20 U	0.20 U

Location	Date	Depth (feet)	Ethyl-benzene	*m*- & *p*-Xylenes	*o*-Xylene	1,4-Dichloro-benzene	1,3,5-Trimethyl-benzene	1,2,4-Trimethyl-benzene	Isopropyl-benzene	n-Propyl-benzene	*tert*-Butyl-benzene	*sec*-Butyl-benzene	4-Isopropyl-toluene	n-Butyl-benzene	Benzoic acid	Naphthalene	2-Methyl-naphthalene	Acenaph-thylene	Acenaphthene	Dibenzo-furan	Diethyl-phthalate	Fluorene
			100-41-4	179601-23-	95-47-6	106-46-7	108-67-8	95-63-6	98-82-8	103-65-1	98-06-6	135-98-8	99-87-6	104-51-8	65-85-0	91-20-3	91-57-6	208-96-8	83-32-9	132-64-9	84-66-2	86-73-7
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Screening Level			31	1600	430	4.9	80	240	800	800	800	800	na	400	590	1.4	32	na	5.3	16	93	3.7
Monitoring Wells																						
DMC-MW-A	11/24/2015	20-30	**0.99**	**0.84**	**0.83**	0.20 U	0.20 U	**0.82**	**2.3**	**0.96**	0.20 U	**0.63**	**0.60**	**0.59**	20 U	**4.1**	**5.1**	**0.23**	**4.0**	**0.49**	1.0 U	**1.1**
DMC-MW-A	3/30/2016	20-30	**0.15 J**	**0.55**	**0.27**	**0.04 J**	0.20 U	**0.59**	**1.7**	**0.62**	**0.07 J**	**0.41**	**0.22**	**0.37 J_Q**	2.0 U	**3.7**	**0.8**	**0.1 J**	**3.9**	**0.4**	0.2 U	**1.0**
DMC-MW-A	9/29/2016	20-30	0.20 U	**0.86**	**0.74**	0.20 U	**0.05 J**	**0.75**	**2.4**	**1.0**	**0.10 J**	**0.66**	**0.65**	**0.55**	2.0 U	**19**	**14**	**0.11**	**5.9**	**0.6**	0.2 U	**1.3**
DMC-MW-B	11/24/2015	23-33	**2.0**	**2.7**	**0.12 J**	0.20 U	**4.0**	**7.6**	**3.2**	**1.8**	**0.06 J**	**0.69**	**1.1**	**0.63**	20 U	**4.1**	**7.8**	**0.05 J**	**3.0**	**0.16**	1.0 U	**1.0**
DMC-MW-B	3/30/2016	23-33	**1.6**	**6.1**	**1.7**	0.20 U	**4.8**	**12**	**4.1**	**2.2**	**0.10 J**	**0.80**	**1.3**	**0.74 J_Q**	2.0 U	**3.5**	**6.4**	0.01 U	**1.3**	**0.10**	**0.1 J**	**0.6**
DMC-MW-B	9/29/2016	23-33	**0.85**	**3.6**	**0.95**	0.20 U	**2.3**	**5.2**	**2.1**	**1.2**	**0.06 J**	**0.57**	**1.0**	**0.51**	2.0 U	**0.5**	**1.3**	**0.043**	**4.0**	**0.081**	0.2 U	**0.8**
DMC-MW-C	11/24/2015	19-29	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20 U	0.10 U	1.0 U	0.10 U	0.10 U	0.10 U	1.0 U	0.10 U
DMC-MW-C	3/30/2016	19-29	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	**0.03 J_B**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.0 U	0.01 U	0.2 U	0.01 U	0.01 U	0.01 U	**0.1 J**	0.01 U
DMC-MW-C	9/29/2016	19-29	0.20 U	**0.05 J_B**	0.20 U	0.20 U	0.20 U	**0.03 J_B**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.2 J_B**	**0.014 J_B**	0.2 U	0.010 U	**0.007 J**	0.2 U	0.2 U	**0.006 J**

Notes: *U = Nondetected at the associated lower reporting limit.*
J = Estimate associated with value less than the verifiable lower quantitation limit.
J_B = Estimate; associated value may be biased high due to contribution from laboratory background or method blank
J_Q = Estimate; due to noncompliant CCV check.
----- = Not analyzed
nd - Not detected

(yellow) *-Detected above SL*

TABLE A5.14 - Groundwater Detections - Lower Zone Wells - Douglas Property

Location	Date	Depth (feet)	N-Nitrosodi-phenylamine	Phen-anthrene	Carbazole	Anthracene	Fluoranthene	Pyrene	Phenol	Benzo(a)-anthracene	*bis* (2-Ethylhexyl)-phthalate	Chrysene	total Benzo-fluoran-thenes	Benzo(a)-pyrene	Indeno(1,2,3-cd)pyrene	Benzo(g,h,i)-perylene
			86-30-6	85-01-8	86-74-8	120-12-7	206-44-0	129-00-0	108-95-2	56-55-3	117-81-7	218-01-9		50-32-8	193-39-5	191-24-2
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Screening Level			0.69	na	na	2.1	1.8	2	370	0.01	0.2	0.016	na	0.01	0.01	na
Monitoring Wells																
DMC-MW-A	11/24/2015	20-30	**1.2**	**1.1**	**1.0**	**0.59**	**0.33**	**0.38**	**1.6**	**0.08 J**	**4.0**	**0.10 J**	**0.04 J**	**0.07 J**	0.10 U	0.10 U
DMC-MW-A	3/30/2016	20-30	0.2 U	**0.9**	**0.7 J_Q**	**0.4**	**0.4**	**0.6**	**0.4**	**0.088**	**1.4**	**0.2**	**0.2 J**	**0.060**	**0.022 J**	**0.037 J**
DMC-MW-A	9/29/2016	20-30	0.2 U	**1.3**	**1.5 J_Q**	**0.4**	**0.13**	**0.21**	**0.5**	**0.031**	**0.2**	**0.051**	**0.029**	**0.019**	**0.008 J**	**0.013**
DMC-MW-B	11/24/2015	23-33	1.0 U	**0.30**	**1.0**	0.10 U	**0.08 J**	0.10 U	1.0 U	0.10 U	3.0 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
DMC-MW-B	3/30/2016	23-33	0.2 U	**0.12**	**0.7 J_Q**	**0.016**	**0.027**	**0.023**	0.2 U	0.01 U	**0.2**	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U
DMC-MW-B	9/29/2016	23-33	0.2 U	**0.076**	**1.2 J_Q**	**0.011**	**0.031**	**0.028**	0.2 U	**0.004 J**	**0.3**	**0.006 J**	**0.005 J**	0.010 U	0.010 U	0.010 U
DMC-MW-C	11/24/2015	19-29	1.0 U	0.10 U	1.0 U	0.10 U	0.10 U	0.10 U	1.0 U	0.10 U	3.0 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
DMC-MW-C	3/30/2016	19-29	0.2 U	0.01 U	0.2 U	0.01 U	**0.012**	**0.015**	0.2 U	0.01 U	**0.3**	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U
DMC-MW-C	9/29/2016	19-29	0.2 U	**0.005 J**	0.2 U	0.010 U	0.010 U	0.010 U	0.2 U	0.010 U	0.2 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U

Location	Date	Depth (feet)	4,4'-DDE	4,4'-DDD	Hexachloro-benzene	total Aroclor PCBs
			72-55-9	72-54-8	118-74-1	
			µg/L	µg/L	µg/L	µg/L
Screening Level			1.30E-03	1.30E-03	1.30E-03	1.00E-02
Monitoring Wells						
DMC-MW-A	11/24/2015	20-30	**0.039**	**0.14**	0.0062 U	**0.61**
DMC-MW-A	3/30/2016	20-30	**0.030**	**0.11 J_P**	0.0062 U	**0.29**
DMC-MW-A	9/29/2016	20-30	**0.016**	**0.064**	0.0013 U	**0.071**
DMC-MW-B	11/24/2015	23-33	**0.0031**	**0.0077 J_P**	0.0012 U	**0.049**
DMC-MW-B	3/30/2016	23-33	0.0012 U	0.0012 U	**0.0021**	**0.026**
DMC-MW-B	9/29/2016	23-33	0.0013 U	0.0013 U	0.0013 U	**0.020**
DMC-MW-C	11/24/2015	19-29	0.0025 U	0.0025 U	0.0025 U	**0.031**
DMC-MW-C	3/30/2016	19-29	0.0012 U	0.0012 U	0.0012 U	**0.021**
DMC-MW-C	9/29/2016	19-29	0.0013 U	0.0013 U	0.0013 U	0.010 U

Notes: *U = Nondetected at the associated lower reporting limit.*
J = Estimate associated with value less than the verifiable lower quantitation limit.
J_B = Estimate; associated value may be biased high due to contribution from laboratory background or method blank
J_Q = Estimate; due to noncompliant CCV check.
----- = Not analyzed
nd - Not detected

(yellow highlight) -Detected above SL

TABLE A5.15a - SOIL CONTACT SCREENING LEVELS AND SOIL DATA SUMMARY (c)

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		
1,1,1,2-Tetrachloroethane	mg/kg, dry	119	0	0.0%	<0.003	38.5	5050	-----	No	No
1,1,1-Trichloroethane	mg/kg, dry	119	1	0.8%	0.0014	160000	7000000	-----	No	No
1,1,2,2-Tetrachloroethane	mg/kg, dry	119	0	0.0%	<0.003	5	656	-----	No	No
1,1,2-Trichloro-1,2,2-trifluoroethane	mg/kg, dry	119	2	1.7%	0.0025	2400000	105000000	-----	No	No
1,1,2-Trichloroethane	mg/kg, dry	119	0	0.0%	<0.003	17.5	2300	-----	No	No
1,1-Dichloroethane	mg/kg, dry	119	12	10.1%	0.18	175	23000	-----	No	No
1,1-Dichloroethene	mg/kg, dry	119	0	0.0%	<0.003	4000	175000	-----	No	No
1,1-Dichloropropene	mg/kg, dry	119	0	0.0%	<0.003	-----	-----	-----	No	No
1,2,3-Trichlorobenzene	mg/kg, dry	119	2	1.7%	2.3	-----	-----	-----	No	No
1,2,3-Trichloropropane	mg/kg, dry	119	0	0.0%	<0.005	0.03	4.4	-----	No	No
1,2,4-Trichlorobenzene	mg/kg, dry	125	54	43.2%	20	34.5	4530	-----	No	No
1,2,4-Trimethylbenzene	mg/kg, dry	119	40	33.6%	24	800	-----	-----	No	No
1,2-Dibromoethane	mg/kg, dry	119	0	0.0%	<0.003	-----	-----	-----	No	No
1,2-Dichlorobenzene	mg/kg, dry	125	18	14.4%	0.98	7200	315000	-----	No	No
1,2-Dichloroethane	mg/kg, dry	119	0	0.0%	<0.003	11	1440	-----	No	No
1,2-Dichloropropane	mg/kg, dry	119	2	1.7%	0.01	27.8	3650	-----	No	No
1,3,5-Trimethylbenzene	mg/kg, dry	119	24	20.2%	7.5	800	35000	-----	No	No
1,3-Dichlorobenzene	mg/kg, dry	119	8	6.7%	0.77	-----	-----	-----	GW-COPC	No
1,3-Dichloropropane	mg/kg, dry	119	0	0.0%	<0.003	-----	-----	-----	No	No
1,4-Dichlorobenzene	mg/kg, dry	125	16	12.8%	2.4	185	24300	-----	GW-COPC	No
2,2-Dichloropropane	mg/kg, dry	119	0	0.0%	<0.003	-----	-----	-----	No	No
2,4,5-Trichlorophenol	mg/kg, dry	128	2	1.6%	1	8000	350000	-----	No	No
2,4,6-Trichlorophenol	mg/kg, dry	128	0	0.0%	<0.10	80	3500	-----	No	No
2,4-Dichlorophenol	mg/kg, dry	128	4	3.1%	1.1	240	10500	-----	No	No
2,4-Dimethylphenol	mg/kg, dry	134	48	35.8%	5.4	1600	70000	-----	No	No
2,4-Dinitrotoluene	mg/kg, dry	128	0	0.0%	<0.01	3.2	423	-----	No	No
2,6-Dinitrotoluene	mg/kg, dry	128	0	0.0%	<0.01	0.67	87.5	-----	No	No

TABLE A5.15a - SOIL CONTACT SCREENING LEVELS AND SOIL DATA SUMMARY (c)

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		
2-Butanone	mg/kg, dry	119	66	55.5%	0.14	48000	2100000	-----	No	No
2-Chloronaphthalene	mg/kg, dry	128	2	1.6%	0.76	6400	-----	-----	No	No
2-Chlorophenol	mg/kg, dry	128	0	0.0%	<0.02	400	17500	-----	No	No
2-Chlorotoluene	mg/kg, dry	119	2	1.7%	0.0024	1600	70000	-----	No	No
2-Hexanone	mg/kg, dry	119	2	1.7%	0.0098	400	-----	-----	No	No
2-Methylnaphthalene	mg/kg, dry	136	76	55.9%	91	320	14000	-----	GW-COPC	No
2-Methylphenol	mg/kg, dry	134	47	35.1%	3.2	4000	-----	-----	No	No
4,4'-DDD	mg/kg, dry	134	25	18.7%	3	2.4	547	1 (total)	GW-COPC	Yes (as total)
4,4'-DDE	mg/kg, dry	134	27	20.1%	2.9	2.9	386		GW-COPC	
4,4'-DDT	mg/kg, dry	134	4	3.0%	0.49	2.9	386		No	
4-Chloro-3-methylphenol	mg/kg, dry	128	4	3.1%	1.2	-----	-----	-----	No	No
4-Chlorophenyl-phenylether	mg/kg, dry	128	0	0.0%	<0.02	-----	-----	-----	No	No
4-Chlorotoluene	mg/kg, dry	119	0	0.0%	<0.003	-----	-----	-----	No	No
4-Isopropyltoluene	mg/kg, dry	119	24	20.2%	4	-----	-----	-----	No	No
4-Methyl-2-pentanone	mg/kg, dry	119	2	1.7%	0.0079	-----	-----	-----	No	No
4-Methylphenol	mg/kg, dry	134	40	29.9%	7.7	8000	-----	-----	No	No
Acenaphthene	mg/kg, dry	136	42	30.9%	9.7	4800	210000	-----	No	No
Acenaphthylene	mg/kg, dry	136	13	9.6%	0.098	-----	-----	-----	No	No
Acetone	mg/kg, dry	119	97	81.5%	9.9	72000	3150000	-----	No	No
Acrolein	mg/kg, dry	119	0	0.0%	<0.14	40	1750	-----	No	No
Aldrin	mg/kg, dry	144	2	1.4%	0.0012	0.059	7.7	0.17	No	No
alpha-BHC	mg/kg, dry	138	0	0.0%	<0.005	0.16	-----	-----	No	No
Anthracene	mg/kg, dry	136	44	32.4%	7.9	24000	1050000	-----	No	No
Antimony	mg/kg, dry	142	16	11.3%	1.3	32	1400	-----	No	No
Aroclor 1016	mg/kg, dry	189	0	0.0%	-----	see total	see total	-----	No	see total
Aroclor 1221	mg/kg, dry	189	0	0.0%	-----	see total	see total	-----	No	see total
Aroclor 1232	mg/kg, dry	189	0	0.0%	-----	see total	see total	-----	No	see total

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		
Aroclor 1242	mg/kg, dry	189	11	5.8%	-----	see total	see total	-----	No	see total
Aroclor 1248	mg/kg, dry	189	57	30.2%	-----	see total	see total	-----	No	see total
Aroclor 1254	mg/kg, dry	189	80	42.3%	-----	see total	see total	-----	No	see total
Aroclor 1260	mg/kg, dry	189	86	45.5%	-----	see total	see total	-----	No	see total
Arsenic	mg/kg, dry	148	148	100%	25.7	7	87.5	20	No	Yes
BaPEq	mg/kg, dry	136	63	46.3%	16	0.19	131	300	No	Yes
Benzene	mg/kg, dry	119	49	41.2%	1.6	18.2	2390	-----	GW-COPC	No
Benzo(a)anthracene	mg/kg, dry	136	51	37.5%	13	see BaPEq	see BaPEq		No	see BaPEq
Benzo(a)pyrene	mg/kg, dry	136	38	27.9%	10				No	see BaPEq
Benzo(g,h,i)perylene	mg/kg, dry	136	39	28.7%	4.4	-----	-----	-----	No	No
Benzoic acid	mg/kg, dry	134	32	23.9%	1.4	320000	14000000	-----	No	No
Benzyl alcohol	mg/kg, dry	134	15	11.2%	0.066	8000	350000	-----	No	No
Beryllium	mg/kg, dry	142	14	9.9%	0.6	160	7000	-----	No	No
beta-BHC	mg/kg, dry	138	0	0.0%	<0.005	-----	-----	-----	No	No
bis (2-Ethylhexyl)phthalate	mg/kg, dry	134	52	38.8%	55	71.4	9380	-----	GW-COPC	No
Bromobenzene	mg/kg, dry	119	0	0.0%	<0.003	640	-----	-----	No	No
Bromochloromethane	mg/kg, dry	119	0	0.0%	<0.003	-----	-----	-----	No	No
Bromodichloromethane	mg/kg, dry	119	0	0.0%	<0.003	16.1	2120	-----	No	No
Bromoethane	mg/kg, dry	119	0	0.0%	<0.006	-----	-----	-----	No	No
Bromoform	mg/kg, dry	119	0	0.0%	<0.003	127	16600	-----	No	No
Bromomethane	mg/kg, dry	119	6	5.0%	0.098	112	4900	-----	No	No
Butylbenzylphthalate	mg/kg, dry	134	50	37.3%	14	526	69100	-----	No	No
Cadmium	mg/kg, dry	148	60	40.5%	8.1	80	3500	36	No	No
Carbazole	mg/kg, dry	128	27	21.1%	6	-----	-----	-----	No	No
Carbon disulfide	mg/kg, dry	119	79	66.4%	0.13	8000	350000	-----	No	No
Carbon tetrachloride	mg/kg, dry	119	0	0.0%	<0.003	14.3	1880	-----	No	No
Chlorobenzene	mg/kg, dry	119	10	8.4%	0.025	1600	70000	-----	No	No

TABLE A5.15a - SOIL CONTACT SCREENING LEVELS AND SOIL DATA SUMMARY (c)

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		
Chloroethane	mg/kg, dry	119	4	3.4%	0.006	-----	-----	-----	No	No
Chloroform	mg/kg, dry	119	0	0.0%	<0.003	32.3	4230	-----	No	No
Chloromethane	mg/kg, dry	119	4	3.4%	0.047	-----	-----	-----	No	No
Chrysene	mg/kg, dry	136	58	42.6%	14	see BaPEq	see BaPEq		No	see BaPEq
cis -1,2-Dichloroethene	mg/kg, dry	119	17	14.3%	2.4	160	7000	-----	GW-COPC	No
cis -1,3-Dichloropropene	mg/kg, dry	119	0	0.0%	<0.003	10	-----	-----	No	No
cis-Chlordane	mg/kg, dry	144	3	2.1%	0.5	-----	-----	7(total)	GW-COPC	No
Copper	mg/kg, dry	148	148	100.0%	450	3200	140000	550	GW-COPC	No
delta-BHC	mg/kg, dry	138	0	0.0%	<0.005	-----	-----	-----	No	No
Dibenz(a,h)anthracene	mg/kg, dry	136	21	15.4%	2.3	see BaPEq	see BaPEq		No	see BaPEq
Dibenzofuran	mg/kg, dry	136	47	34.6%	7.1	80	3500	-----	No	No
Dibromochloromethane	mg/kg, dry	119	0	0.0%	<0.003	11.9	1560	-----	No	No
Dibromomethane	mg/kg, dry	119	0	0.0%	nd	800	-----	-----	No	No
Dieldrin	mg/kg, dry	144	3	2.1%	0.25	0.06	8.2	0.17	GW-COPC	Yes
Diethylphthalate	mg/kg, dry	134	30	22.4%	2.2	64000	2800000	-----	No	No
Dimethylphthalate	mg/kg, dry	134	5	3.7%	0.54	-----	-----	-----	No	No
Di-n-butylphthalate	mg/kg, dry	134	24	17.9%	16	-----	-----	-----	No	No
Di-n-octylphthalate	mg/kg, dry	134	2	1.5%	2.2	800	35000	-----	No	No
Diesel + Heavy Oil Range Hydrocarbons	mg/kg, dry	176	99	56.3%	65000 (19000 diesel)	2000	2000	15000 (diesel)	(f)	Yes
Endosulfan I	mg/kg, dry	138	0	0.0%	<0.005	480	-----	-----	No	No
Endosulfan II	mg/kg, dry	138	0	0.0%	<0.10	480	-----	-----	No	No
Endosulfan sulfate	mg/kg, dry	138	0	0.0%	<0.10	-----	-----	-----	No	No
Endrin	mg/kg, dry	138	0	0.0%	<0.10	24	1050	0.4	No	No
Endrin aldehyde	mg/kg, dry	138	0	0.0%	<0.10	-----	-----	-----	No	No
Endrin ketone	mg/kg, dry	138	0	0.0%	<0.10	-----	-----	-----	No	No
Ethylbenzene	mg/kg, dry	119	38	31.9%	130	8000	350000	-----	GW-COPC	No

TABLE A5.15a - SOIL CONTACT SCREENING LEVELS AND SOIL DATA SUMMARY (c)

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		
Fluoranthene	mg/kg, dry	136	69	50.7%	32	3200	140000	-----	No	No
Fluorene	mg/kg, dry	136	52	38.2%	12	3200	140000	-----	No	No
gamma-BHC (Lindane)	mg/kg, dry	144	2	1.4%	0.0039	0.91	119	10	No	No
Gasoline Range	mg/kg, dry	122	31	25.4%	3000	30	30	12000	GW-COPC	Yes
Heptachlor	mg/kg, dry	144	0	0.0%	<0.005	0.22	29.2	0.6 (total)	No	No
Heptachlor epoxide	mg/kg, dry	138	0	0.0%	<0.10	0.11	14.4		No	No
Hexachlorobenzene	mg/kg, dry	144	3	2.1%	0.034	0.63	82	31	No	No
Hexachlorobutadiene	mg/kg, dry	131	3	2.3%	0.073	12.8	1680	-----	No	No
Hexachloroethane	mg/kg, dry	128	0	0.0%	<0.02	25	2450	-----	No	No
Indeno(1,2,3-cd)pyrene	mg/kg, dry	136	36	26.5%	4.5	see BaPEq	see BaPEq	-----	No	see BaPEq
Isophorone	mg/kg, dry	128	2	1.6%	0.096	1050	138000	-----	No	No
Isopropylbenzene	mg/kg, dry	119	28	23.5%	2	8000	-----	-----	No	No
Lead	mg/kg, dry	181	180	99.4%	4590	250	1000	220	No	Yes
m - & *p* -Xylenes	mg/kg, dry	119	47	39.5%	120	16000	700000	-----	No	No
Mercury	mg/kg, dry	148	89	60.1%	8.7	24	-----	9	(f)	No
Methoxychlor	mg/kg, dry	138	0	0.0%	<0.005	400	17500	-----	No	No
Methylene chloride	mg/kg, dry	119	74	62.2%	0.086	480	21000	-----	No	No
Naphthalene	mg/kg, dry	136	72	52.9%	51	1600	70000	-----	GW-COPC	No
n-Butyl-benzene	mg/kg, dry	119	17	14.3%	4.4	4000	-----	-----	No	No
Nickel	mg/kg, dry	142	142	100%	156	1600	70000	1850	No	No
Nitrobenzene	mg/kg, dry	128	0	0.0%	<0.02	160	7000	-----	No	No
N-Nitroso-di-n-propylamine	mg/kg, dry	128	0	0.0%	<0.02	0.14	18.8	-----	No	No
N-Nitrosodiphenylamine	mg/kg, dry	134	23	17.2%	1.4	204	26800	-----	No	No
n-Propylbenzene	mg/kg, dry	119	25	21.0%	4.1	8000	350000	-----	No	No
o -Xylene	mg/kg, dry	119	40	33.6%	34	16000	700000	-----	No	No
PCDD/PCDF	ng TEQ/kg, dry	2	2	100%	319	12.8	1680	3	No	Yes

TABLE A5.15a - SOIL CONTACT SCREENING LEVELS AND SOIL DATA SUMMARY (c)

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		
Pentachlorophenol	mg/kg, dry	134	42	31.3%	160	2.5	328	11	GW-COPC	Yes
Phenanthrene	mg/kg, dry	136	84	61.8%	42	-----	-----	-----	No	No
Phenol	mg/kg, dry	134	73	54.5%	2.8	24000	1050000	-----	No	No
Pyrene	mg/kg, dry	136	67	49.3%	23	2400	105000	-----	No	No
sec-Butylbenzene	mg/kg, dry	119	21	17.6%	2.1	8000	350000	-----	No	No
Silver	mg/kg, dry	148	17	11.5%	0.9	400	17500	-----	No	No
Styrene	mg/kg, dry	119	6	5.0%	0.1	16000	700000	-----	No	No
tert-Butylbenzene	mg/kg, dry	119	1	0.8%	0.0011	8000	350000	-----	No	No
Tetrachloroethene	mg/kg, dry	119	10	8.4%	0.0058	476	21000	-----	GW-COPC	No
Toluene	mg/kg, dry	119	81	68.1%	120	6400	280000	-----	GW-COPC	No
total PCBs	mg/kg, dry	188	98	52.1%	119	1	65.6	2	GW-COPC	Yes
total Benzofluoranthenes	mg/kg, dry	136	56	41.2%	18	see BaPEq	see BaPEq	-----	No	see BaPEq
Total Chromium or CrIII	mg/kg, dry	148	148	100%	910	120000	5250000	135	GW-COPC	Yes
Chromium (as Cr+6)	mg/kg, dry	-----	-----	-----	-----	240	10500	-----	No	No
Total Cyanide	mg/kg, dry	8	8	100%	9.8	48	2100	-----	No	No
Toxaphene	mg/kg, dry	138	0	0.0%	<0.025	0.91	119	-----	No	No
trans-1,2-Dichloroethene	mg/kg, dry	119	11	9.2%	0.011	1600	70000	-----	No	No
trans-1,3-Dichloropropene	mg/kg, dry	119	0	0.0%	<0.003	10	-----	-----	No	No
trans-1,4-Dichloro-2-butene	mg/kg, dry	119	0	0.0%	<0.014	-----	-----	-----	No	No
trans-Chlordane	mg/kg, dry	138	2	1.4%	0.46	2.9	-----	7(total)	GW-COPC	No
Trichloroethene	mg/kg, dry	119	20	16.8%	2	12	1750	-----	GW-COPC	No
Trichlorofluoromethane	mg/kg, dry	119	0	0.0%	<0.003	24000	1050000	-----	No	No
Vinyl chloride	mg/kg, dry	119	2	1.7%	0.032	0.67	87.5	-----	GW-COPC	No
Zinc	mg/kg, dry	148	148	100%	2120	24000	1050000	570	No	Yes

Notes: (a) - From Direct Contact - Ecology LDW Workbook (2018) or CLARC (industrial site use SLs). Method A values were used for GRO, DRO+RRO and lead assuming industrial site use.
(b) - From Table 749-2 in WAC 173-340-900

TABLE A5.15a - SOIL CONTACT SCREENING LEVELS AND SOIL DATA SUMMARY (c)

Analytical Constituents (N=159)	Soil Samples (All depths)					Unrestricted Site Use	Industrial Site Use		Ground-water COPC - ICS/NWC?	Carried Forward For Evaluation (Soil Contact)
	Units	Number of Analyses(d)	Number of Detections (d)	Percent Detected	Highest Conc.	Soil Contact (a)	Soil Contact (a)	TEE (b)		

(c) - Soil statistics do not include off-site push-probe data (P34 to P36), data from MW-FL, duplicate samples, or 1986 composite samples, except for the 1986 total cyanide results. These were included as there were limited results for this compound.

(d) - Number of samples approximate (N)

(e) - Adusted for Puget Sound background (Ecology 1994)

(f) - Proposed GW-COPC for future monitoring purposes.

------ - Not available or below restricted site use SL

nd - Not detected

< Less than indicated value

na - not available

GW-COPC - Constituent identified as a groundwater COPC

Yes - Constituent carried forward as a possible soil contact COPC. While the site land use is industrial, constituents carried forward for additional evaluation were based on exceedance of unrestricted site use human contact screening levels and ecologic SLs based on an industrial use.

TABLE A5.15b - Proposed Soil Contact COPCs

ICS/NW Cooperage Site
Seattle, Washington

Constituent	Soil Contact SL (mg/kg) (a)	TEE SL (mg/kg) (b)	Frequency Detection (%)(c)	Frequency Exceedance %(c)	# Loc. >SL	Maximum Detected Concentration (mg/kg)	Max. EF Detected	UCL95% mg/kg	Soil-Contact COPC	Basis/Comment
Metals										
Arsenic	**7***	20	100	7	7	25.7	3.8	4.6	Yes	Lowest SL based on natural background. Three samples at two locations exceed 2X SL (loc. ICS-LP1, P26)
Total Chromium (or Cr+3)	120000	**135***	100	8	7	910	19	81	Yes	Lowest SL based on TEE SL. Two samples from two locations exceeded 2X SL (ICS-LP3, P29).
Lead	250	**220***	99	7	10	4590	21	361	Yes	Lowest SL based on TEE SL. Nine samples from nine locations exceeded 2X SL (loc. SA-MW1, P2, P8, P18, P29, LP1, LP3, LP4, HCB2).
Zinc	24000	**570***	100	7.4	4	2120	7.9	270	Yes	Lowest SL based on TEE SL. Three samples from three locations exceeded 2X SL (loc. LP3, P18, P29).
Petroleum Hydrocarbons										
TPH-Gasoline Range (GRO)	**30***	12000	34	18	10	3000	30	NC	Yes	Lowest SL based on Method A to protect groundwater. Ten samples from eight locations exceed 2X SL (loc. SA-MW1, DOF-MW6, P17, P18, P21, P29, P30 and MW-Ju).
TPH- Diesel Range (DRO)	**2000***	15000	57	21	21	19000	41	2027	Yes	Lowest SL based on Method A to protect groundwater. Ten samples from eight locations exceeded 2x SL (loc. SA-MW1, DOF-MW6, MW-Ju, ICS-LP3, P2, P3, P8, P29)
TPH- Diesel +Lube Range (DRO+RRO)	**2000***	-----	57	12	16	65000	33	7058	Yes	SL based on Method A to protect groundwater. Fourteen samples from eleven locations exceeded 2X SL (loc. SA-MW1, DOF-MW6, MW-Ju, ICS-LP3, P2, P3, P5, P8, P9, P18, P29).

TABLE A5.15b - Proposed Soil Contact COPCs

Constituent	Soil Contact SL (mg/kg) (a)	TEE SL (mg/kg) (b)	Frequency Detection (%)(c)	Frequency Exceedance %(c)	# Loc. >SL	Maximum Detected Concentration (mg/kg)	Max. EF Detected	UCL95% mg/kg	Soil-Contact COPC	Basis/Comment
Semivolatiles (SVOCs)										
BaPEq.	**0.19***	300	56	12	8	13.9	73	1	Yes	Lowest SL based on soil contact to protect young children - unrestricted site use. Six samples from five locations exceeded 2x SL (loc. MW-Ju, ICS-LP3, P18, P21, P30)
Pentachloro-phenol	**2.5***	11	34	1.8	2	160	64	NC	Yes	Lowest SL based on soil contact - unrestricted site use. Two samples from two locations (DOF-MW7, ICS-LP3) exceeded 2x SL.
PCDD/PCDF	12.8	**3**	100	100	2	319	106	NC	No	Lowest SL based on TEE SL. Limited number of samples (two). Compound associated with PCBs which was the basis for analysis of these compounds.
Pesticides/ PCBs										
Dieldrin	**0.06***	0.17	3	2	2	0.25	4.1	NC	No	Lowest SL based on soil contact - unrestricted site use. Two samples at two locations exceeded 2x SL (loc. P16, P27).
4,4'DDD	**2.4**	-----	22	1	1	3	1.3	NC	No	SL based on soil contact - unrestricted site use. One sample exceeded SL at EF=1.3 (loc. ICS-LP3). Not identified as a soil contact COPC low frequency of exceedance and max. concentration is less than 2.
4,4'-DDE+4,4'-DDD+4,4'-DDT	-----	**1**	23	3	3	5.9	5.9	NC	Yes	SL based on TEE SL. One sample exceeded 2x SL (ICS-LP3).

TABLE A5.15b - Proposed Soil Contact COPCs

Constituent	Soil Contact SL (mg/kg) (a)	TEE SL (mg/kg) (b)	Frequency Detection (%)(c)	Frequency Exceedance %(c)	# Loc. >SL	Maximum Detected Concentration (mg/kg)	Max. EF Detected	UCL95% mg/kg	Soil-Contact COPC	Basis/Comment
Total Aroclor PCBs	**1***	2	59	27	27	119	119	11	Yes	Lowest SL based on unrestricted site use. Thirty-four samples from twenty-seven locations exceeded 2x SL.

Notes:

(a) - From Ecology LDW December 2018 Workbook - Direct Contact

(b) -From Table 742-2 (WAC 173-340-900 - Industrial Site Use)

(c) - Soil data above approximately 15 feet.

NC - Not calculated. Exceeds other criteria and/or there are a large number of non-detects.

* - Screening level used to identify soil contact COPCs.

[yellow box] - Identified as a Soil Contact-COPC

EF - Exceedance Factor

----- - Not available

TABLE A5.16 - Proposed Soil Leaching COPCs

Proposed Groundwater COPCs	Soil Leaching Proposed COPC	Exceedances Only Associated with NAPL	Likely Source/Comment
ICS/NWC Property			
Total PCBs	X	-----	Soils along embayment shoreline and filled drainage ditch. Predominantly associated with petroleum hydrocarbons.
Gasoline-Range Organics	X	-----	Soils in VOC release area (P15) and NAPL.
Diesel- Heavy-Oil Range Organics (DRO/RRO)	X	-----	Retained as GW-COPC for monitoring/ confirmation purposes. High DRO/RRO concentrations in soils along embayment shoreline and filled drainage ditch.
Benzene	X	-----	Soils in VOC release area and NAPL
Toluene	-----	X	NAPL in SA-MW1 Area
Ethylbenzene	X		Soil at P15 and NAPL in SA-MW1 Area.
1,3-Dichlorobenzene	-----	X	NAPL in SA-MW1 Area
1,4-Dichlorobenzene	-----	X	NAPL in SA-MW1 Area
Tetrachloroethene (PCE)	X	-----	Soils in VOC release area based on concentration pattern of vinyl chloride
Trichloroethene (TCE)	X	-----	
cis-1,2-Dichloroethene	-----	-----	Reductive dechlorination of PCE and TCE
Vinyl Chloride	-----	-----	
Naphthalene	X	-----	Soils in VOC release area and NAPL
2-Methylnaphthalene	-----	X	NAPL in SA-MW1 Area
bis(2-ethylhexyl)Phthalate	X	-----	High soil concentrations beneath portions of site including location MW-Ju
Pentachlorophenol (PCP)	X	-----	Soils in VOC release area. Highest soil concentration at DOF-MW7
Chromium	-----	-----	Copper and chromium appear associated within southwest portion of site below aquitard. Source not clear
Copper	-----	-----	
Mercury	-----	-----	Retained as GW-COPC for monitoring/ confirmation purposes
4,4'-DDE	-----	-----	Likely analytical artifacts caused by presence of PCBs
4,4'-DDD	-----	-----	
trans-Chlordane	-----	-----	Appears present in samples from DOF-MW6. Only detected in soil on ICS-NWC property in shallow soil at P27 and MW-Ju. Not detected in soil in DOF-MW6 area. Source not clear.
cis-Chlordane	-----	-----	

TABLE A5.16 - Proposed Soil Leaching COPCs

Proposed Groundwater COPCs	Soil Leaching Proposed COPC	Exceedances Only Associated with NAPL	Likely Source/Comment
Dieldrin	X	-----	Exceeded at two non-contiguous push-probe locations (P16 & P27B). Soil at these locations appear to contain dieldrin. Detections could be the result of carry-down. Dieldrin not detected in most soil samples (98%).
Douglas Property Proposed COPC			
Total PCB	X	-----	Detected in deeper monitoring well samples along embayment shoreline
DRO+RRO	X	-----	
Benzene	X	-----	
Naphthalene	X	-----	
cPAHS	X	-----	

TABLE A6.1 - Well Drilling Summary

ICS/NW Cooperage Site
Seattle, Washington

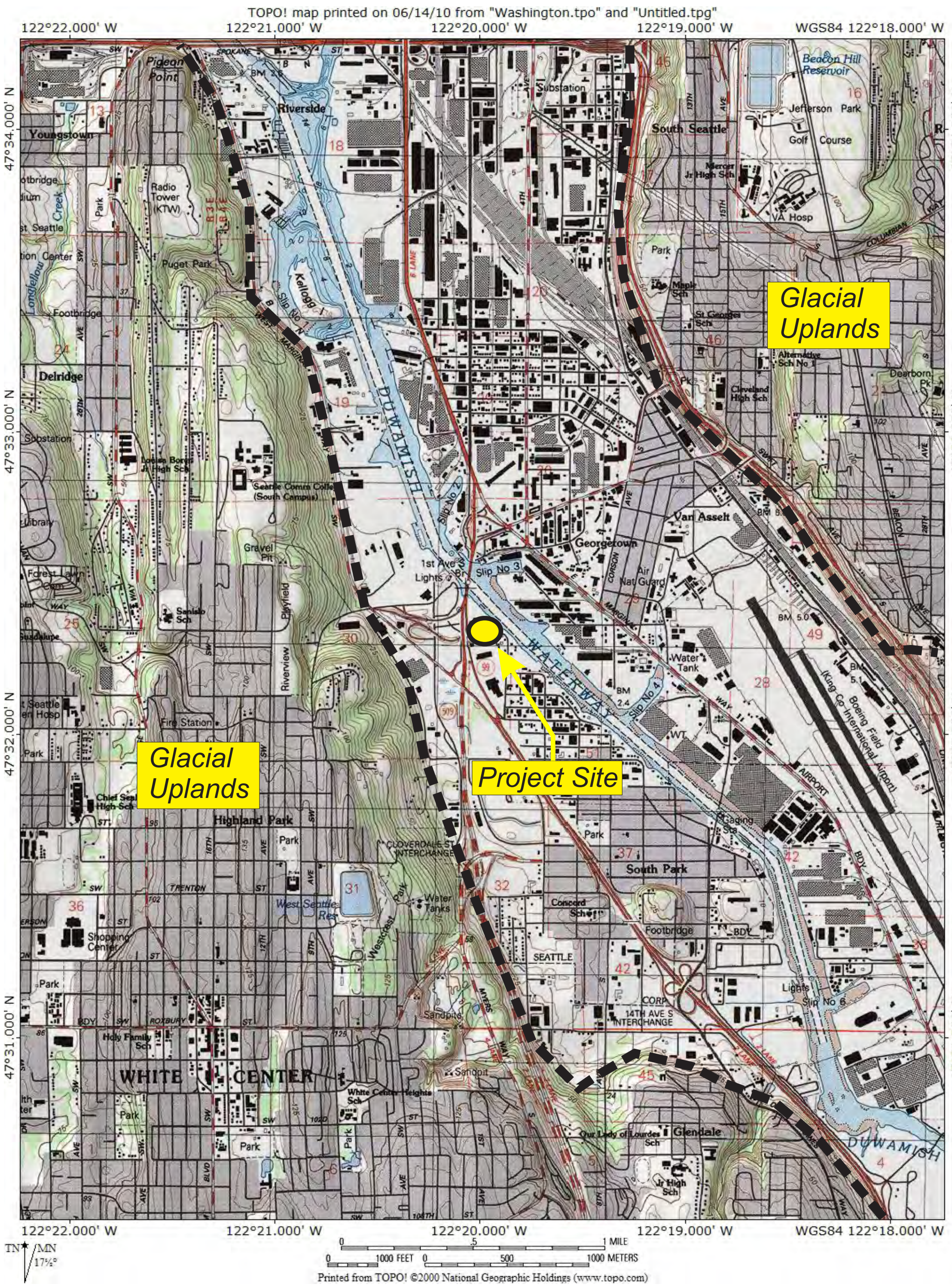
Well	Drilling Depth (ft)	GS Elev. (ft. MLLW)	Bottom of Hole Elev. (ft. MLLW)	Top of Screen (ft)	Bottom of Screen (ft)	Elevation Screen Bottom (ft. MLLW)
DMC-MW1	20	20.5	0.5	10	20	0.5
DMC-MW2R	41	19.6	-21.4	7	22	-2.4
DMC-MW3	20	20.6	0.6	10	20	0.6
DMC-MW4	20	20.1	0.1	10	20	0.1
DMC-MW5	20	18.35	-1.65	10	20	-1.65
DMC-MW8	36.5	19.8	-16.7	10	20	-0.2
DMC-MW9	21.5	19.2	-2.3	10	20	-0.8
DMC-MW10	21.5	19.5	-2	10	20	-0.5
DMC-MW11	21.5	20.3	-1.2	10	20	0.3
DMC-MW12	36.5	20.7	-15.8	10	20	0.7
DMC-MW13	38.5	20.4	-18.1	7	22	-1.6
DMC-MW14	36	18.99	-17.01	7	22	-3.01
DMC-MW15	36	18.4	-17.6	7	22	-3.6
DMC-MW16	36	20.7	-15.3	7	22	-1.3
DMC-MW17	38.5	19.4	-19.1	7	22	-2.6
DMC-MW18	38.5	20.3	-18.2	7	22	-1.7
DMC-MW19	36	19.9	-16.1	7	22	-2.1
DMC-MWA	30	20.2	-9.8	20	30	-9.8
DMC-MWB	33	20.8	-12.2	23	33	-12.2
DMC-MWC	29	20.2	-8.8	19	29	-8.8

[shaded box] - Boring sampled below 0' MLLW

TABLE A6.2 - Summary of Douglas Property Soil Data

Location	GS Elev. (ft-MLLW)	Drilling Depth (ft)	Bottom Hole Elev. (ft-MLLW)	Sheen Depth (ft)	Sheen Elev. (ft-MLLW)	Sheen Type	PID (ppm)	Depth Sample Analyses (ft)	Sample Elevation (ft-MLLW)	Log	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	Benzene (ug/kg)	Naptha-lene (ug/kg)	BapEq (ug/kg)	PCBs (ug/kg)	Lead (mg/kg)	Mercury (mg/kg)
DMC-MW2R	19.6	41	-21.4	-----	-----	none	1	10	9.6	Brown silty fine sand	7.3	8.4	17	15	21	3.4	150	4.1	0.03
				-----	-----	none	1	20	-0.4	Brown silty fine sand	8.3	50	83	14	400	28	304	9.7	0.06
				-----	-----	none	1	32	-12.4	Brown fine to coarse sand	7.4	140	85	0.7	77	8	5.5	3.3	0.03
DMC-MW8	19.8	36.5	-16.7	31	-11.2	moderate	5	31	-11.2	Black silt w fine sand	7.7	670	970	6.8	65	27	180	562	0.165
DMC-MW12	20.7	36.5	-15.8	15	5.7	slight	2.1	16	4.7	Black silty fine sand	100	410	490	71	460	23	240	23	0.098
				26	-5.3	moderate	13.2	26	-5.3	Black silty fine to medium sand	-----	90	290	14	7.5	10	1730	15	0.135
DMC-MW13	20.4	38.5	-18.1	-----	-----	none	1	12.5	7.9	Brown sand w/ silt	7.8	11	22	0.9	3.8	4	60	5.6	0.07
				25	-4.6	slight	1	25	-4.6	Black silty fine sand	10	640	1300	1.4	45	55	5900	49	0.11
				-----	-----	none	1	32.5	-12.1	Black silty fine sand	10	60	170	0.8	37	24	9.6	13	0.16
DMC-MW14	19	36	-17	-----	-----	none	1	7.5	11.5	Brown silty fine sand	8.4	28	66	1.3	4.2	7	160	9.5	0.08
				-----	-----	none	1	17.5	1.5	Black sand w/ silt	10	98	220	1.3	19	16	760	18.9	0.22
				-----	-----	none	1	30	-11	Black sandy silt	97	520	900	1.7	36	96	480	122	0.33
DMC-MW15	18.4	36	-17.6	-----	-----	none	1	12.5	5.9	Brown silty fine sand w/ gravel	8.7	99	450	1.2	13	18	470	8.8	0.07
				-----	-----	none	1	22.5	-4.1	Dk. Brown to black silty fine sand	9.4	500	930	1.8	19	206	2010	125	1.75
				-----	-----	none	1	35	-16.6	Black sandy silt (native?)	11	31	62	1.5	23	55	9.5	11.5	0.16
DMC-MW16	20.7	36	-15.3	-----	-----	none	1	12.5	8.2	Brown silty fine to medium sand	9.1	57	100	52	12	15	239	8.5	0.1
				25	-4.3	high	114	25	-4.3	Black silty fine sand	150	3000	3800	2.7	210	440	590	402	0.37
				-----	-----	none	1	30	-9.3	Black silty fine sand	7.8	30	65	1.3	17	17	3.9	5.3	0.05
DMC-MW17	19.4	38.5	-19.1	-----	-----	none	1	12.5	6.9	Black silty fine sand	7.5	22	57	0.8	12	11	213	5.7	0.07
				25	25	slight	9	-----	-----	Black silty fine sand	-----	-----	-----	-----	-----	-----	-----	-----	-----
				27	-7.6	moderate	81	27.5	-8.1	Black silty fine sand	2400	2100	4400	880	110	91	47800	223	0.83
				-----	-----	none	1	30	-10.6	Black sandy silt	12	52	110	1.8	100	93	350	23	0.27
DMC-MW18	20.3	38.5	-18.2	-----	-----	none	1	12.5	7.8	Brown silty fine to medium sand	8.1	26	47	1.4	14	11	152	7.1	0.06
				27.5	-7.2	slight	23	27.5	-7.2	Black silty fine sand	13	1900	2200	1.8	200	357	1030	508	0.26
				-----	-----	none	1	35	-14.7	Black sand w/ silt (wood debris)	7.9	60	93	1.2	14	13	27	11.7	0.03
DMC-MW19	19.9	36	-16.1	-----	-----	none	1	12.5	7.4	Brown silty fine sand	7.4	110	460	27	510	35	135	8.8	0.16
				-----	-----	none (a)	1	20	-0.1	Black silty fine sand	9.1	100	190	3.1	68	39	236	11.7	0.09
				-----	-----	none	1	32.5	-12.6	Black sandy silt	12	89	170	1.8	66	61	4	12.6	0.19
DMC-MWA	17.7	30.1	-12.4	21	-3.3	moderate	17.3	-----	-----	Gray fine to medium sand	-----	-----	-----	-----	-----	-----	-----	-----	-----
				25	-7.3	slight	3.2	25	-7.3	Black fine to medium sand	-----	-----	-----	-----	-----	-----	45	-----	-----
DMC-MWB	18.4	33.2	-14.8	-----	-----	none	47	-----	-----	Black silt	-----	-----	-----	-----	-----	-----	-----	-----	-----
				-----	-----	none	6.7	25	-6.6	Black silt	-----	-----	-----	-----	-----	-----	48	-----	-----
DMC-MWC	17.8	29.1	-11.3	-----	-----	none	0.2	25	-7.2	Black silty fine sand	-----	-----	-----	-----	-----	-----	28	-----	-----

(a) - Slight sheen at 25'
GS - Ground Surface
MLLW - Mean Lower Low Water
[yellow box] - Concentration/observation appears elevated relative to samples collected from above and below.



N

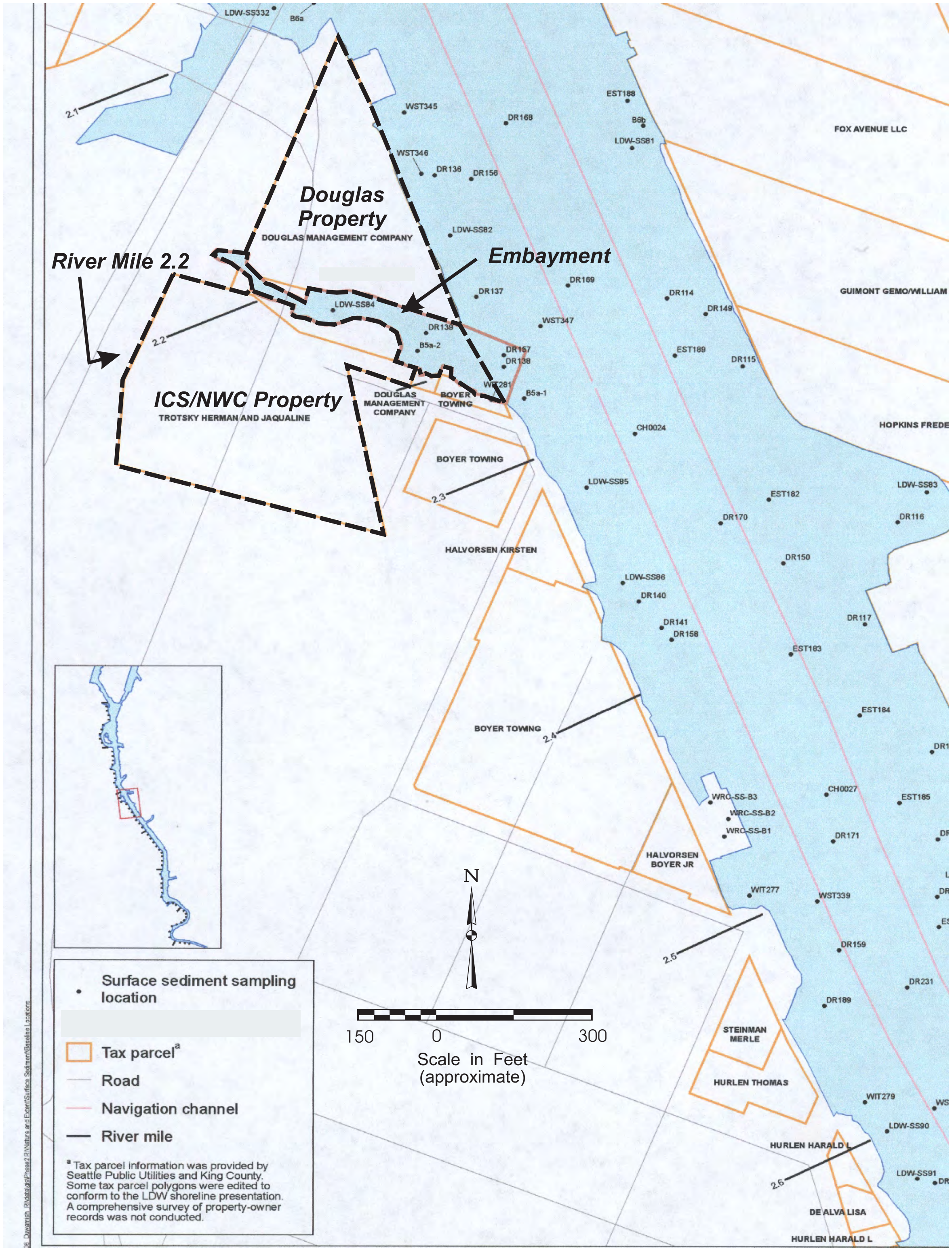
ICS/NW Cooperage Site

Vicinity Map

SUM-008-00 (ICS) *June 2010*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 1-1



Note: Base Windward Environmental Draft RI Map 4-4e

Ref: Map Local.cdr

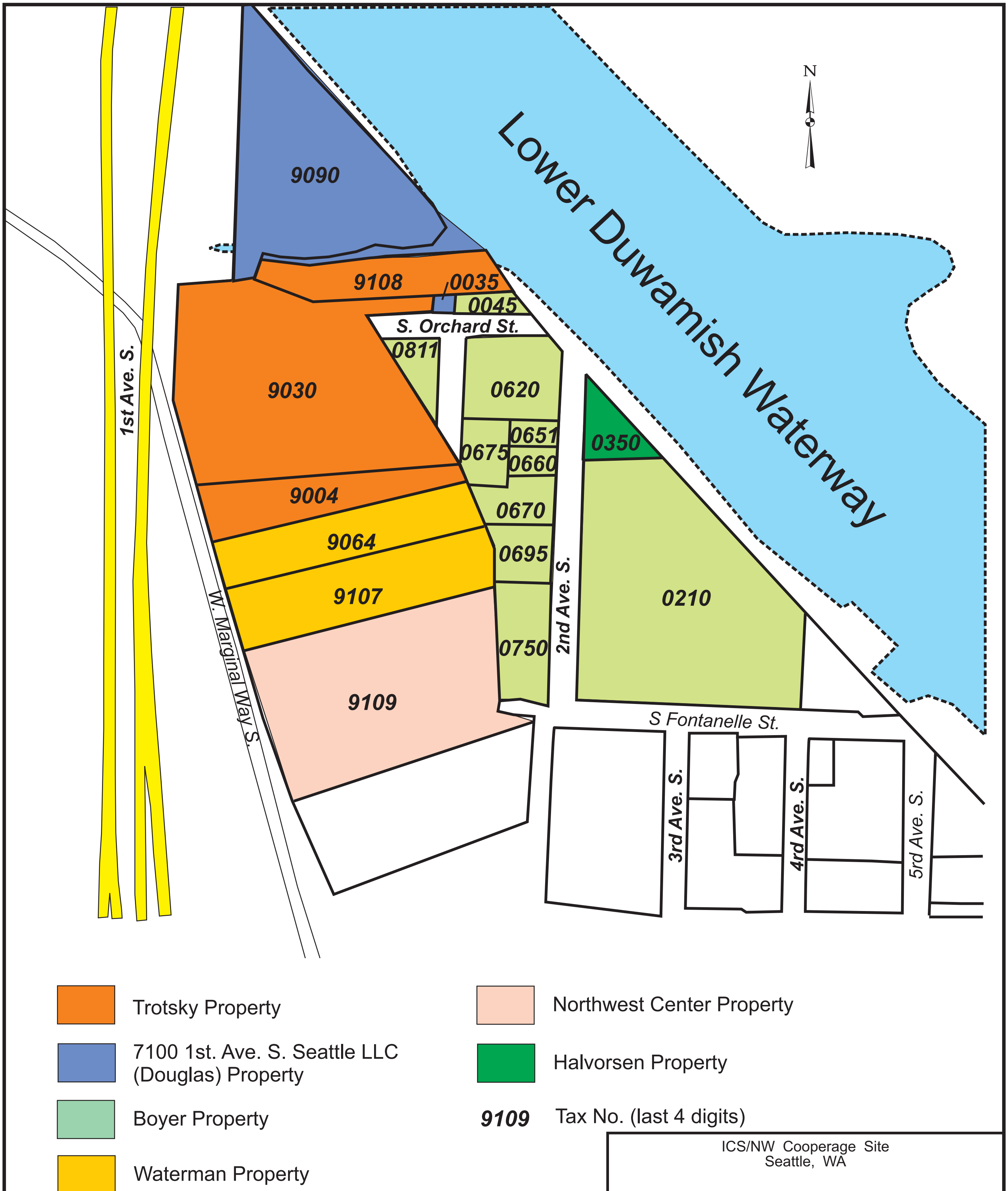
ICS/NW Cooperage Site

Project Site Area and Lower Duwamish Waterway

SUM-008-00 (ICS) ***Sept. 2014***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 1-2



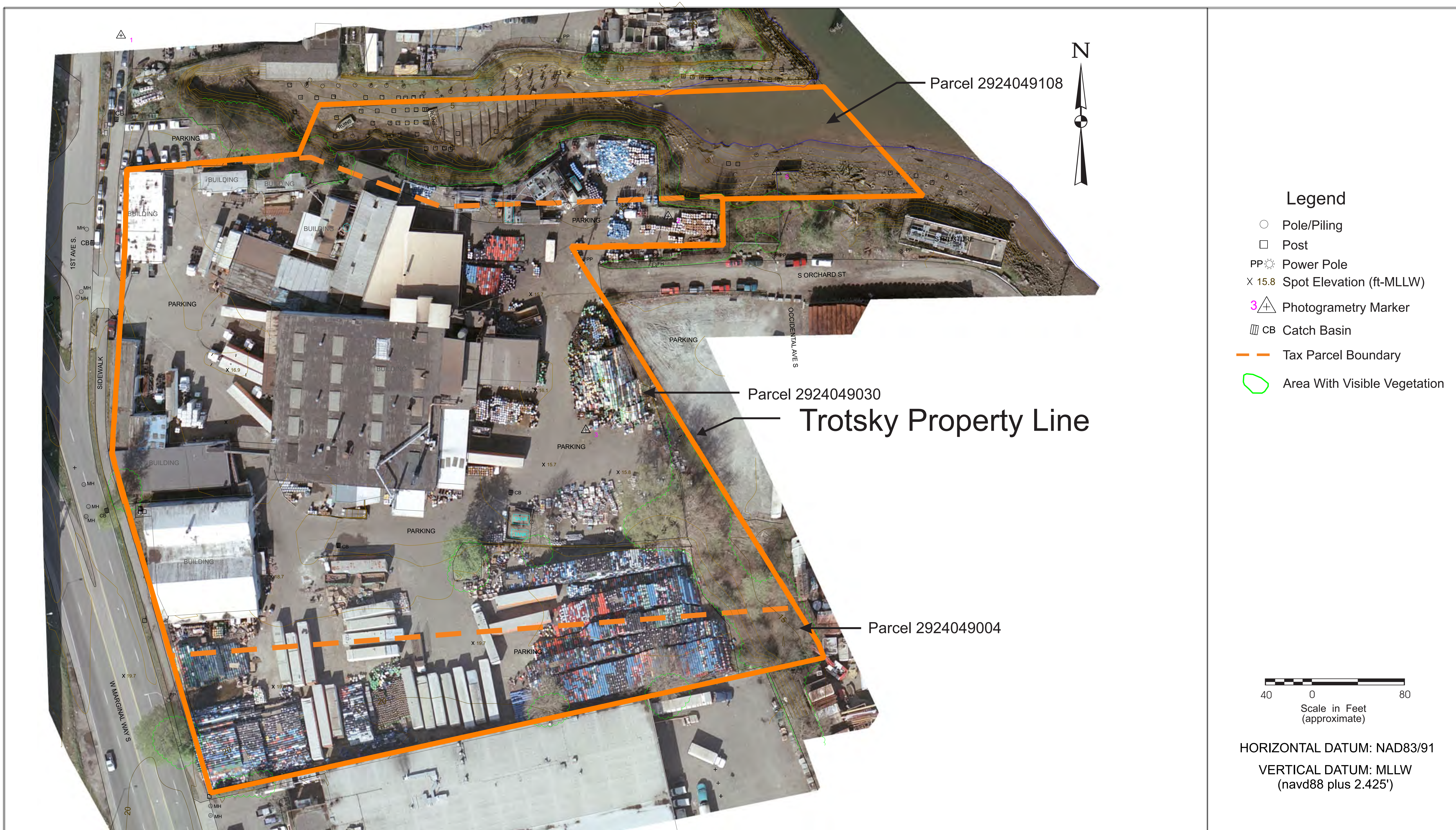
Ref: Tax Parcels.cdr

ICS/NW Cooperage Site
Seattle, WA

Tax Parcels and Property Ownership

SUM-008-00 **FIGURE 1-3** May 2010

Dalton, Olmsted & Fuglevand, Inc.



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: ICS-NW Cooperage Photo Topo.cdr

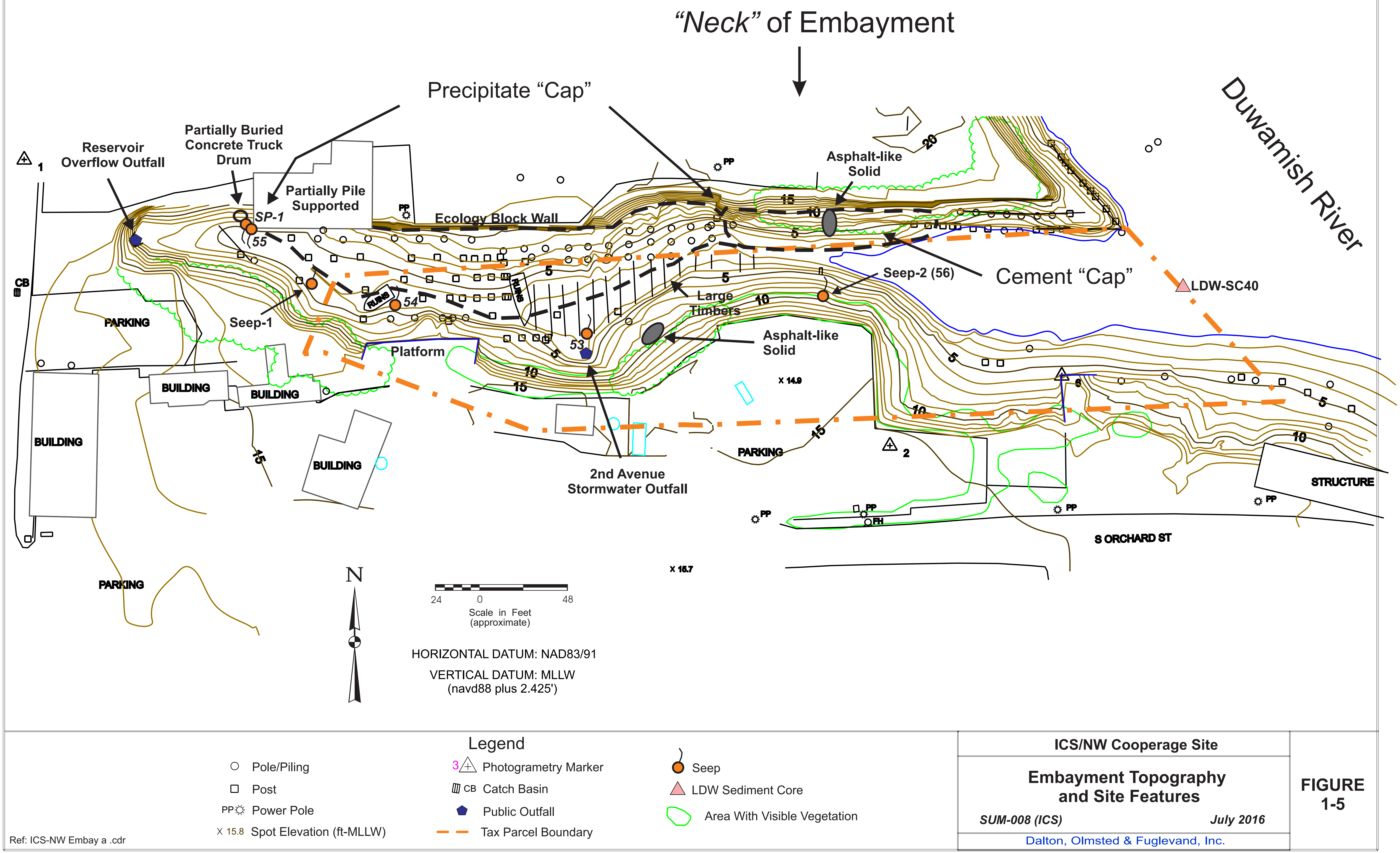
ICS/NW Cooperage Site

Air Photograph - March 18, 2010

SUM-008-00 (ICS) ***June 2010***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 1-4



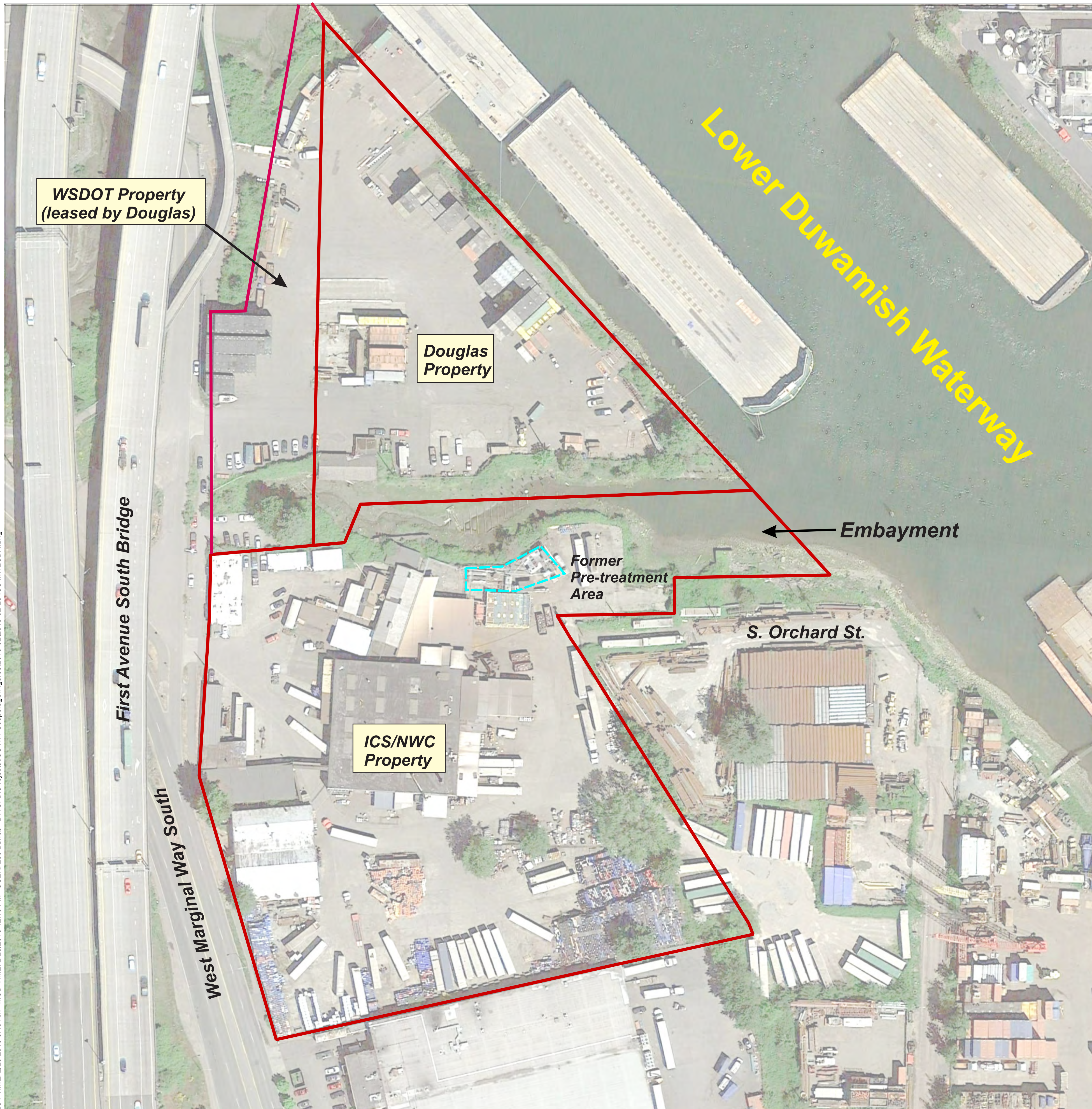
ICS/NW Cooperage Site

Embayment Topography and Site Features

SUM-008 (ICS) *July 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 1-5



Property Boundary

Image: Google Maps Pro
Date: 05-22-17

N

0 120
Scale in Feet

Ref: 2018 Properties.cdr

PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MW2CDR.dwg

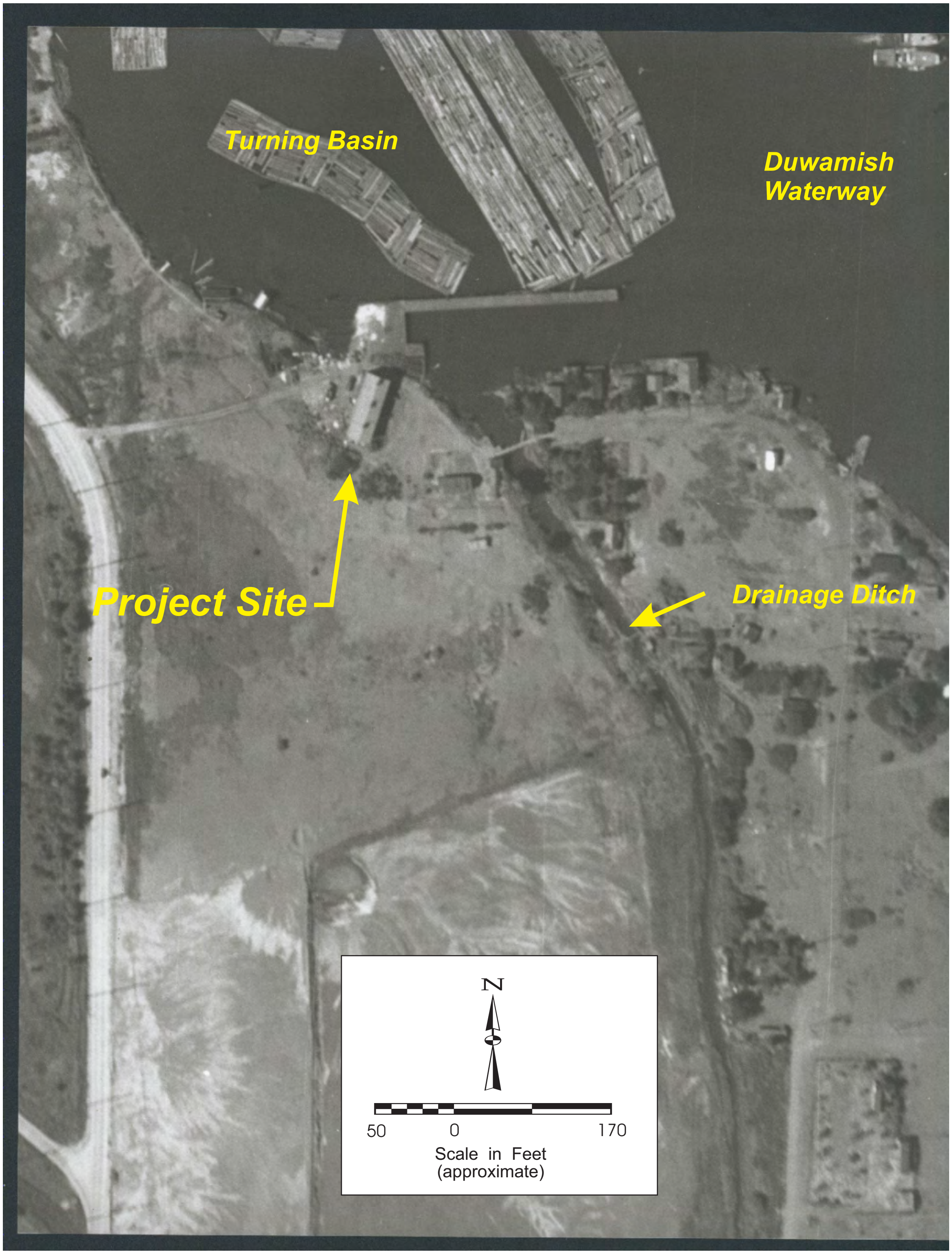
ICS/NW Cooperage Site
Seattle, Washington

Property Lines

DOF DALTON OLMSTED FUGLEVAND

FIGURE
1-6

March 6, 2018



ICS/NW Cooperage Site

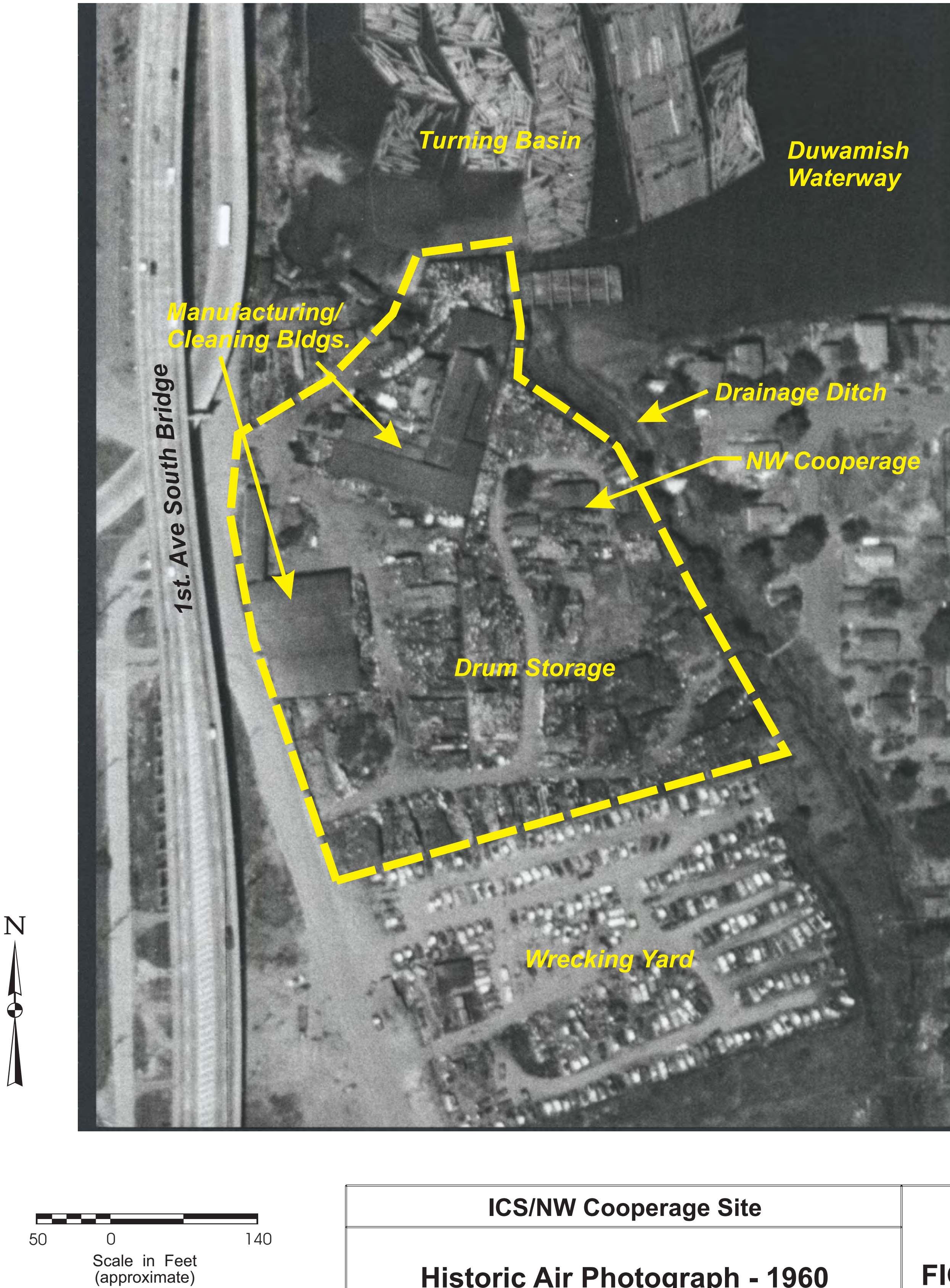
Historic Air Photograph - 1936

SUM-008-00 (ICS) *June 2010*

FIGURE 2-1

Dalton, Olmsted & Fuglevand, Inc.

Ref: 1936 Photo.cdr Source: Aero-Metric



ICS/NW Cooperage Site

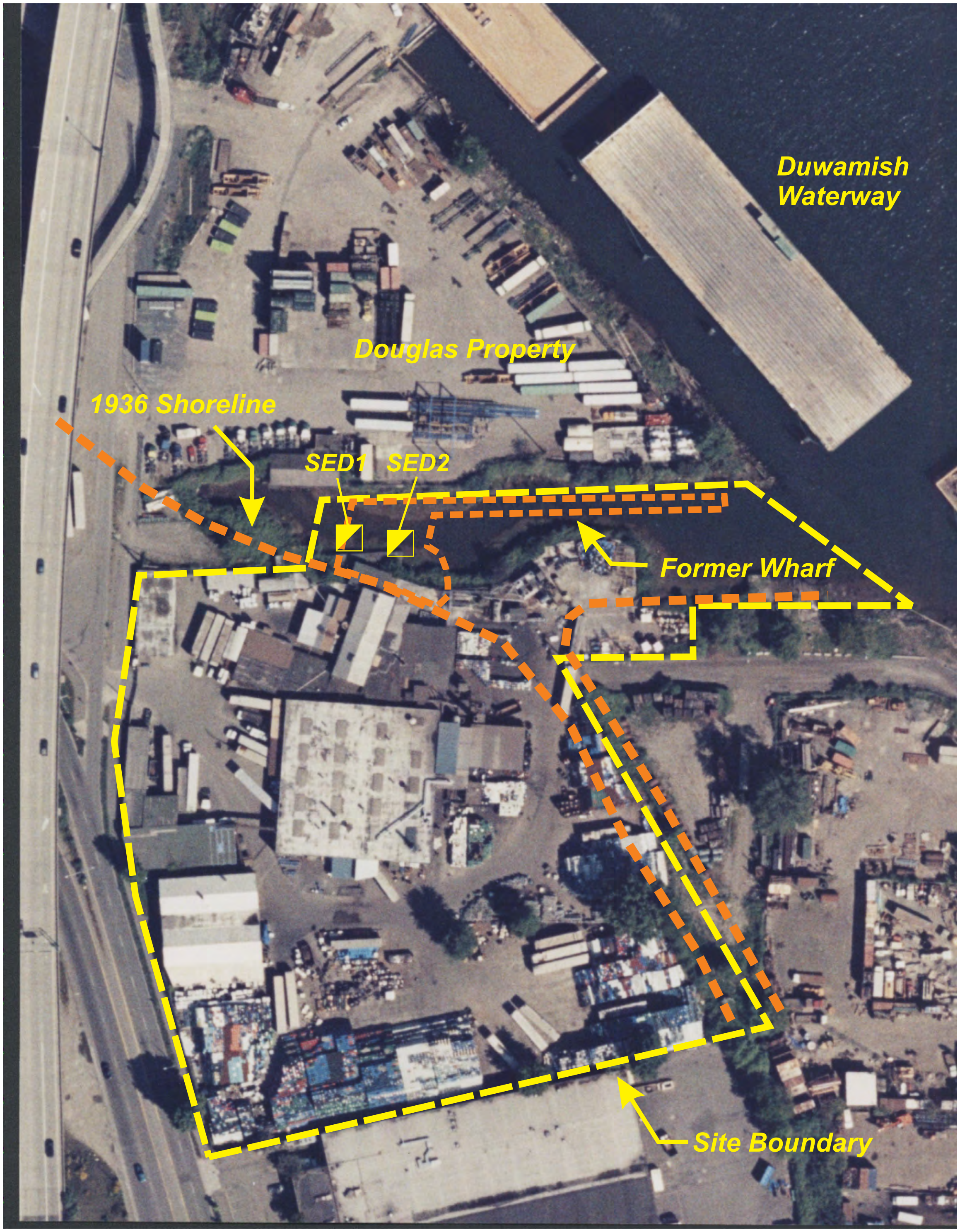
Historic Air Photograph - 1960

SUM-008-00 (ICS) *June 2010*

FIGURE 2-2

Dalton, Olmsted & Fuglevand, Inc.

Ref: 1960 Photo rev.cdr Source: Aero-Metric



50 0 140
Scale in Feet
(approximate)

2007 Surface Sediment Spl.

Ref: 2004 Photo rev.cdr Source: Aero-Metric

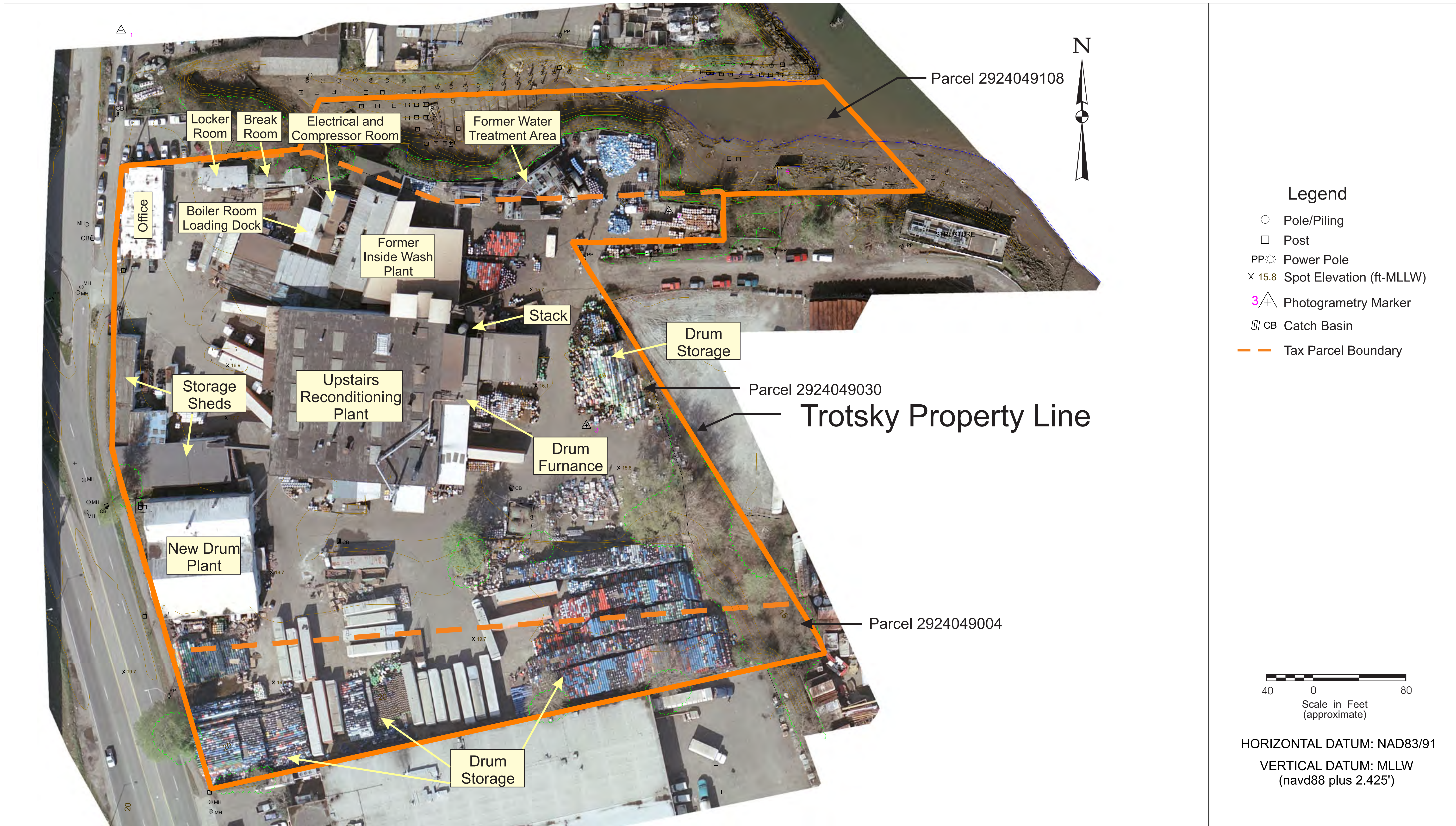
ICS/NW Cooperage Site

Historic Air Photograph - 2004

SUM-008-00 (ICS) ***June 2010***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 2-3



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: ICS-NW Cooperage Photo rev.cdr

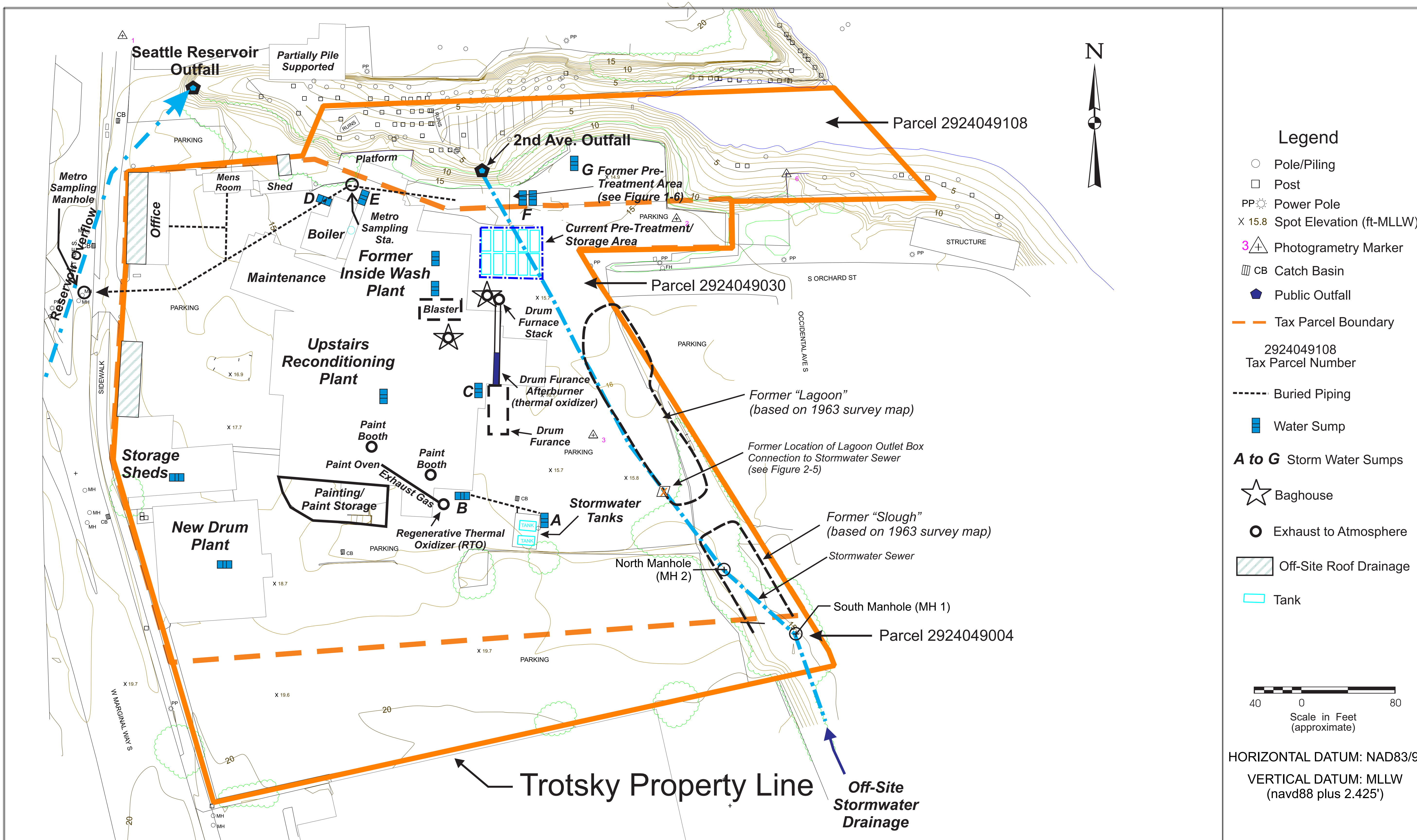
ICS/NW Cooperage Site

Site Layout on Photobase

SUM-008-00 (ICS) *June 2010*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 2-4a



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (Flown 3-18-10)
3) Buried pipe, Metro sampling points, and sump locations have not been surveyed
4) All sump connections are above ground except near stormwater tanks

Ref: ICS-NW Cooperage Working Base rev1.cdr

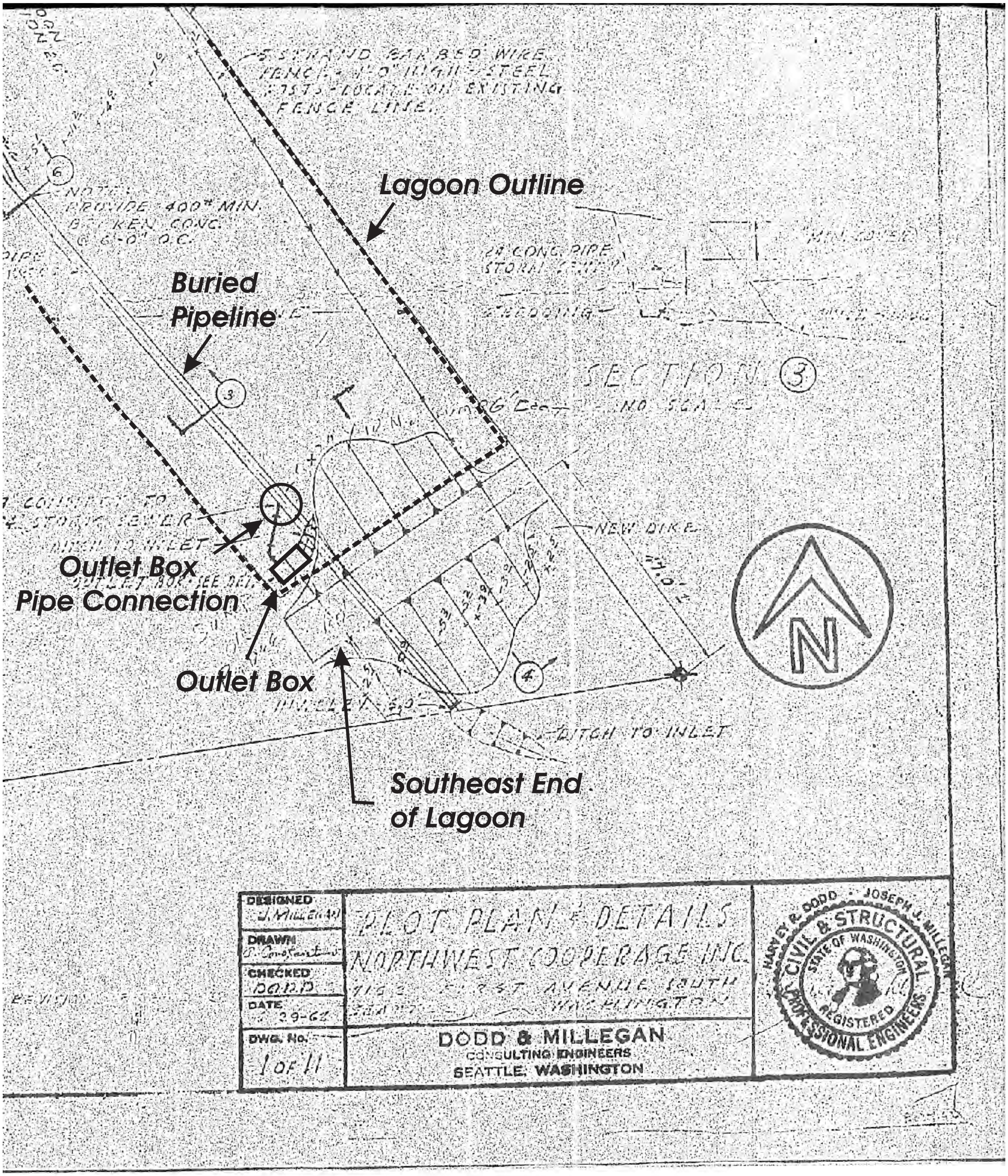
ICS/NW Cooperage Site

Site Layout and Topography

SUM-008 (ICS) *July 2011*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 2-4b



0 Scale in Feet 20
(approximate)

ICS/NW Cooperage Site
Seattle, WA

Outlet Box Location

SUM-008 **FIGURE 2-5** October 2013
Dalton, Olmsted & Fuglevand, Inc.

Ref: Outlet Box a rev.cdr

Notes:

1) All site paving consists of concrete, with many joints, hairline fractures, overlays and patches.
2) Perimeter of paved area is surrounded by 6-inch concrete curbing, except as noted in driveway areas.
3) Areas of pavement damage with multiple fractures/alligatoring shown.

Ref: ICS Paving 8-2016 rev.cdr

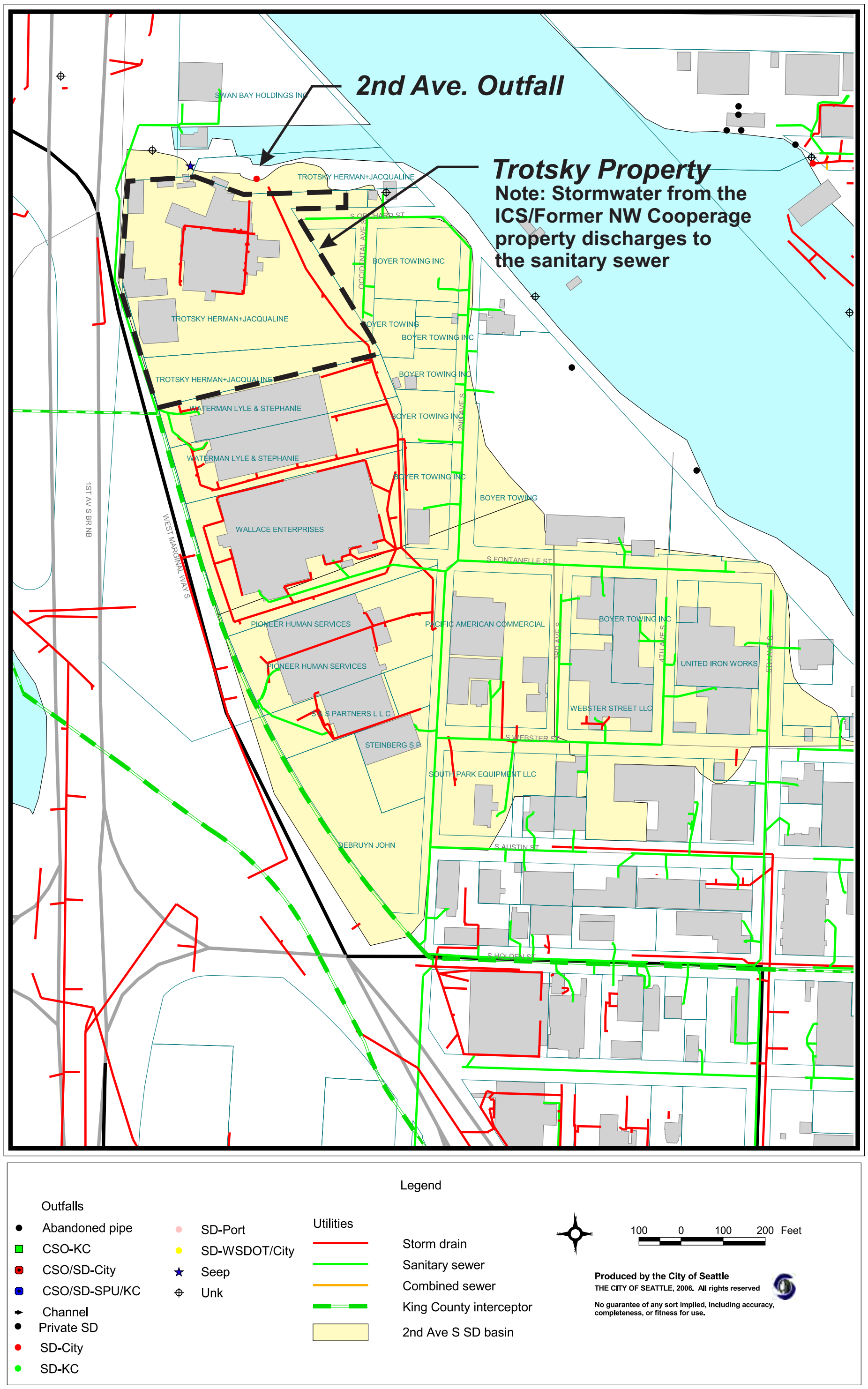
ICS/NW Cooperage Site

Extent of Paving

SUM-008 (ICS) *Aug. 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 2-6



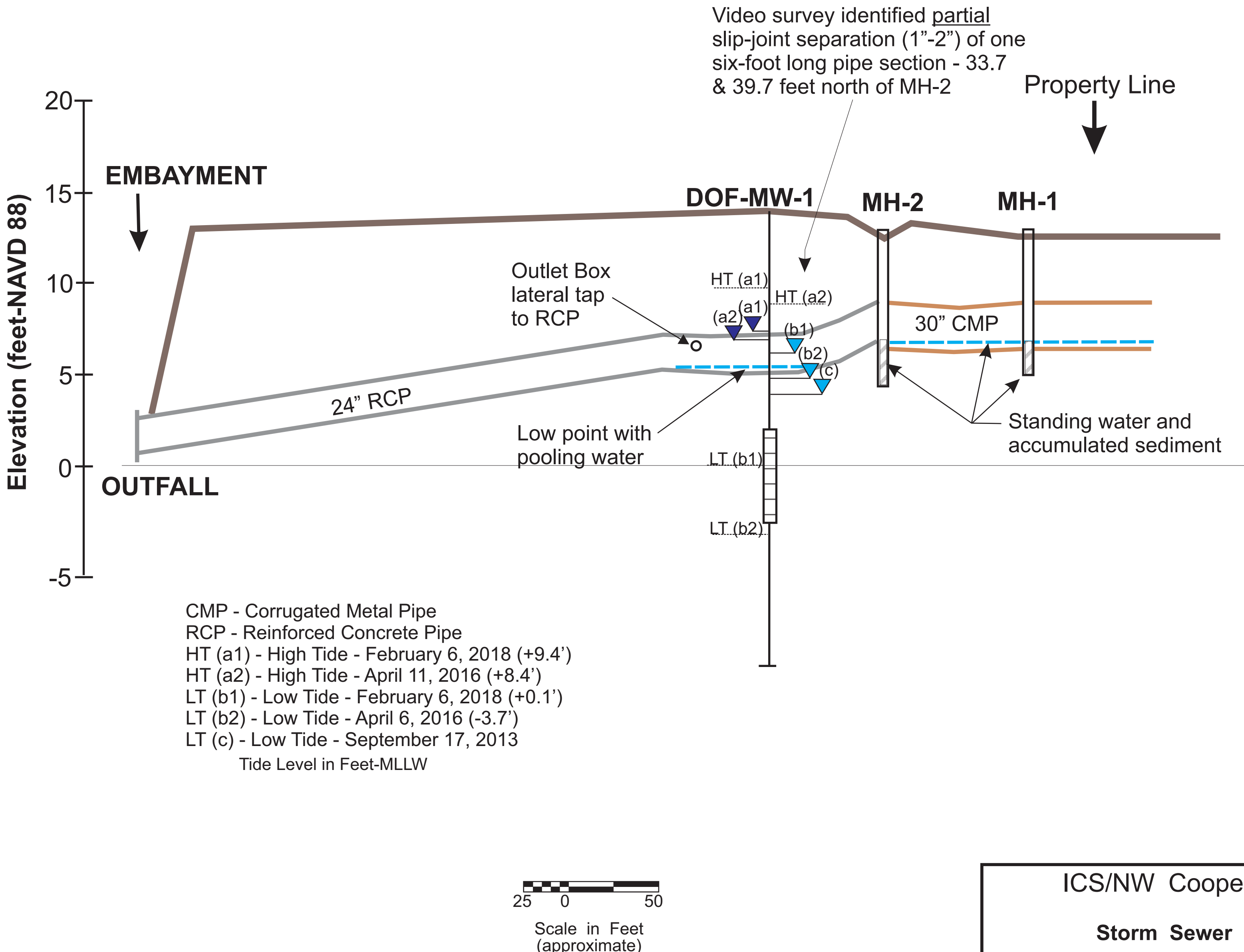
SAIC From Science to Solutions

Figure 6. Early Action Area 2 Drainage Basin

ICS/NW Cooperage Site	FIGURE 2-7
2nd Ave. Drainage Basin	
SUM-008-00 (ICS) *June 2010*	
Dalton, Olmsted & Fuglevand, Inc.	

Source: Ecology 2007

Ref: 2nd Ave Drainage rev.cdr



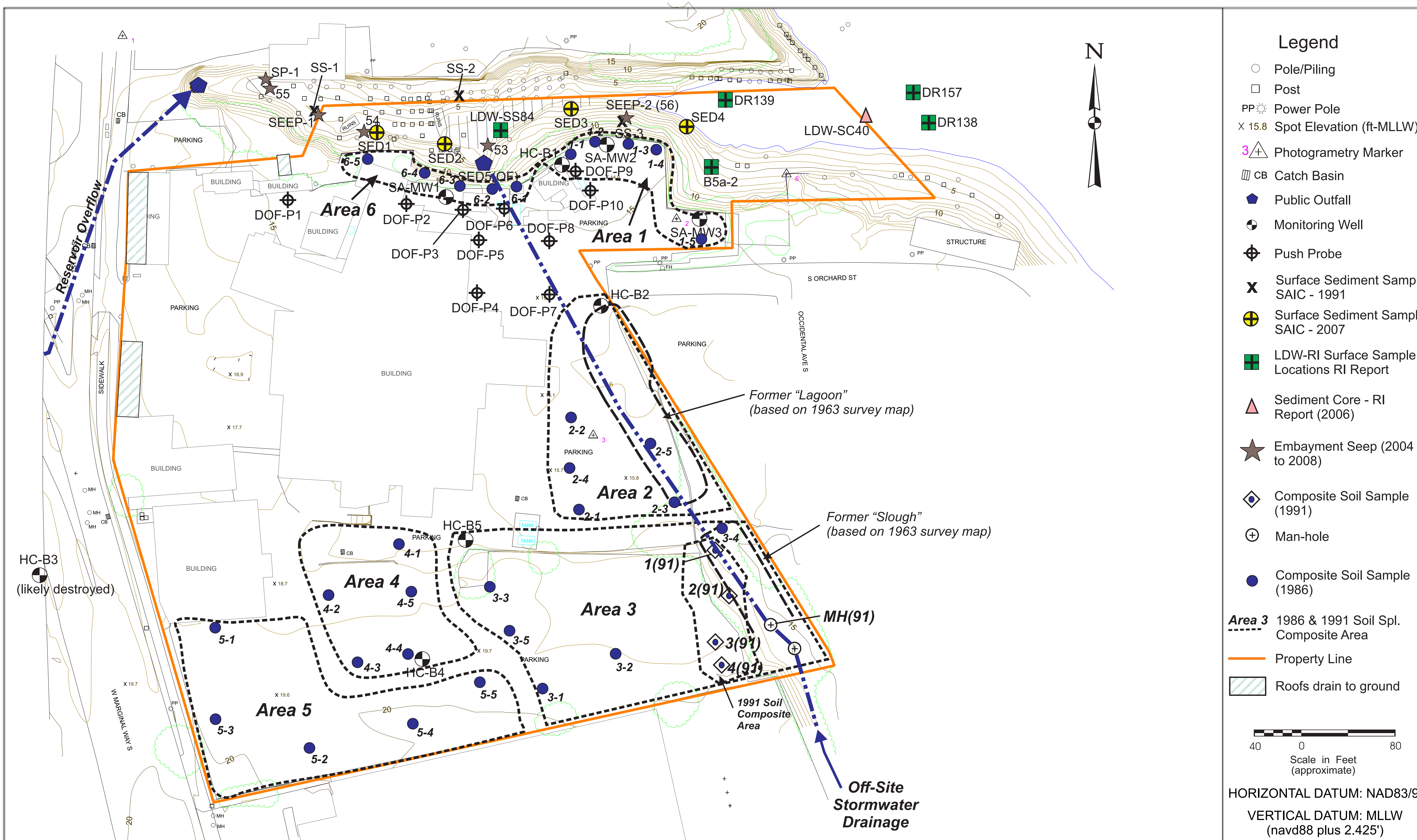
Ref: ICS Storm Section rev.cdr

ICS/NW Cooperage Site

Storm Sewer Section

SUM-008-00 **FIGURE 2-8** Oct. 2013

Dalton, Olmsted & Fuglevand, Inc.



Notes:
1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (Flown 3-18-10)

Ref: ICS-NW Cooperage Sample Loc 12-8-10a.cdr

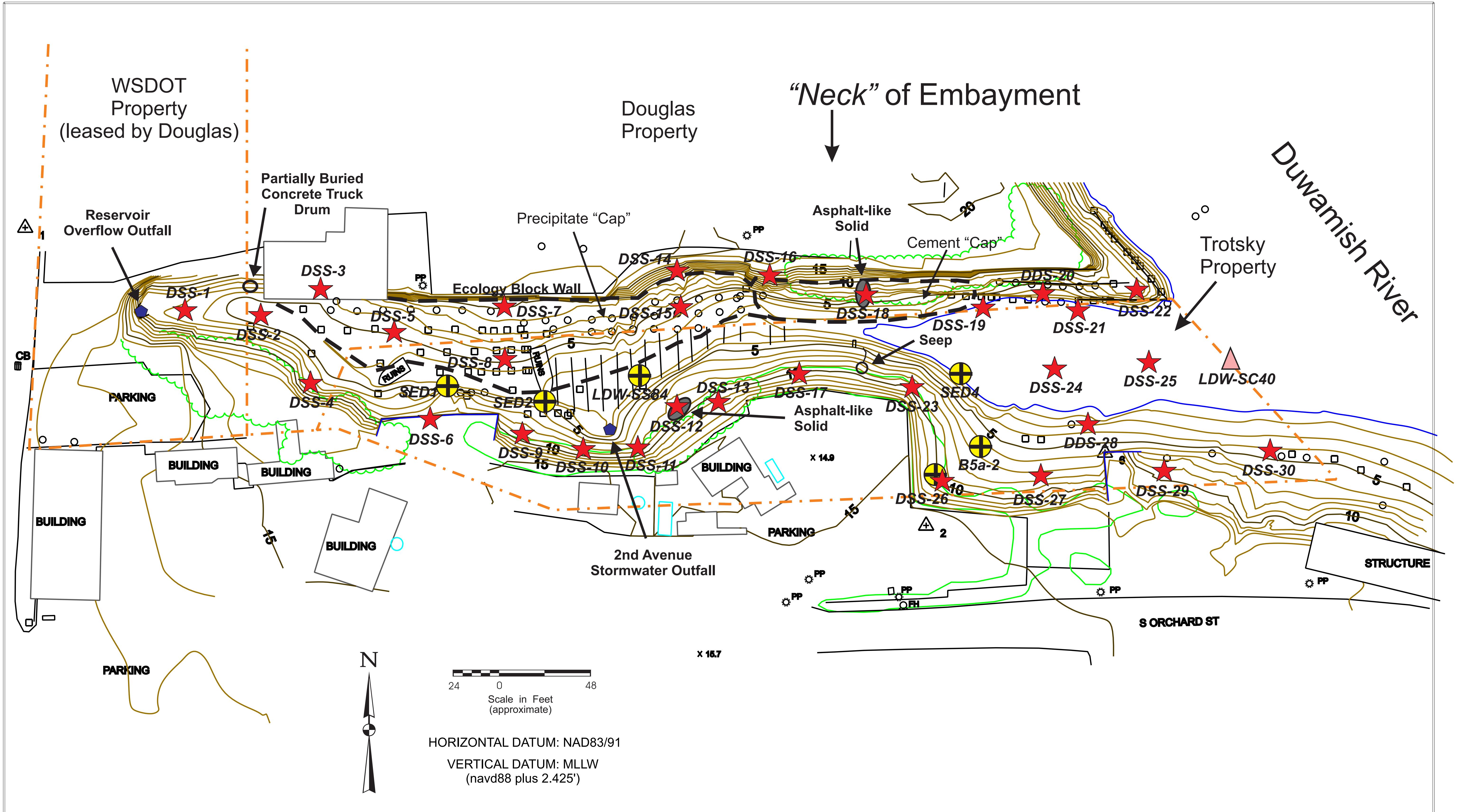
ICS/NW Cooperage Site

Early Sampling Location (1985 to 2007)

SUM-008 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 3-1



Legend

Note: WSDOT - Washington State Department of Transportation

- ○ Pole/Piling
- □ Post
- PP Power Pole
- X 15.8 Spot Elevation (ft-MLLW)
- 3 Photogrametry Marker
- CB Catch Basin
- Public Outfall
- Tax Parcel Boundary
- Surface Sediment Sample Locaton September 2014 (0 to 10 cm)
- Previous Sediment Core (Feb. 2006)
- Surface Sediment Sample Location July 2012 (0 to 10 cm)

Ref: Embay Sur Spls Loc Reconn Base Rev Jan 2012b rev.cdr

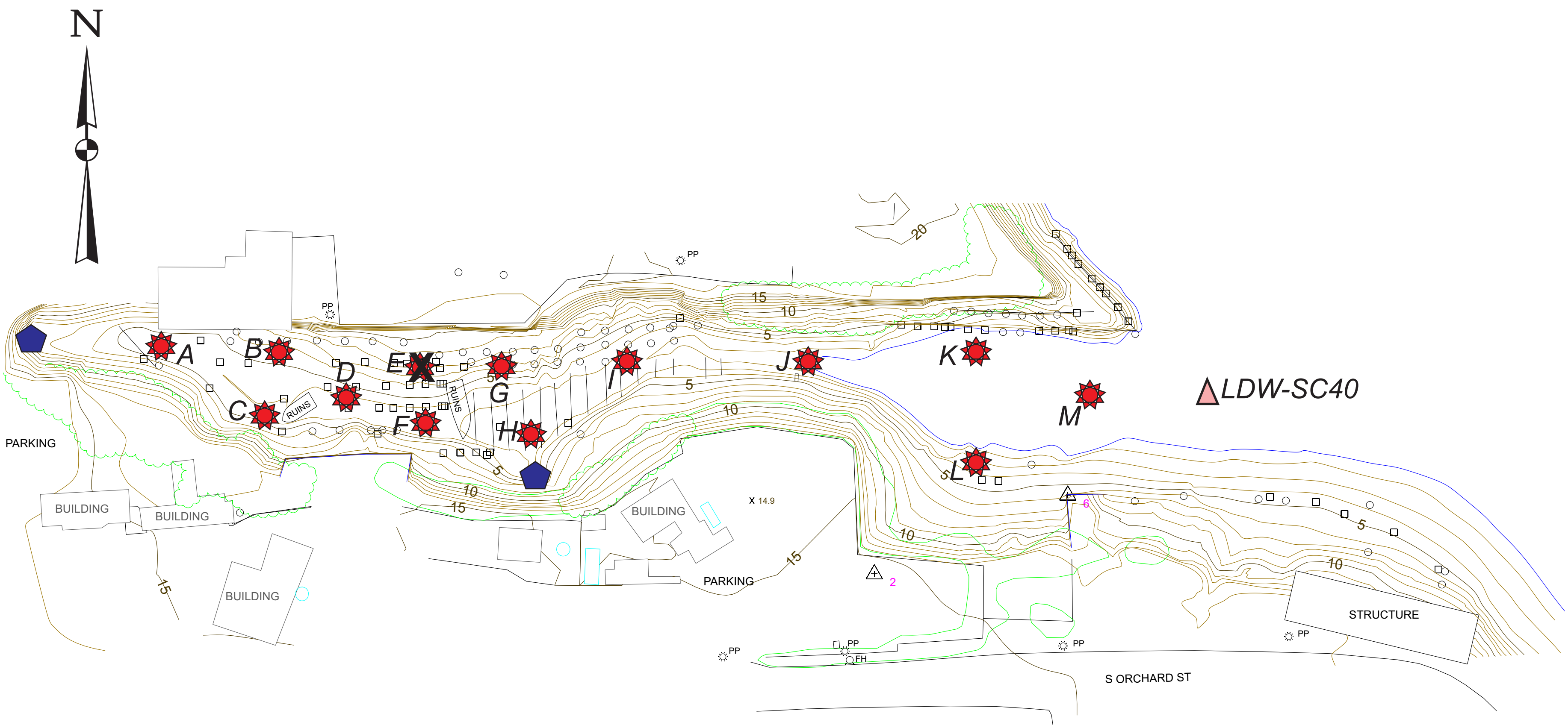
ICS/NW Cooperage Site

Embayment Surface Sediment Sampling Locations

SUM-008 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 3-2



Previous Sediment Core

Public Outfall

Sediment Core Location

Core Not Collected - Obstruction

40 0 80
Scale in Feet
(approximate)

HORIZONTAL DATUM: NAD83/91

VERTICAL DATUM: MLLW
(navd88 plus 2.425')

ICS/NW Cooperage Site

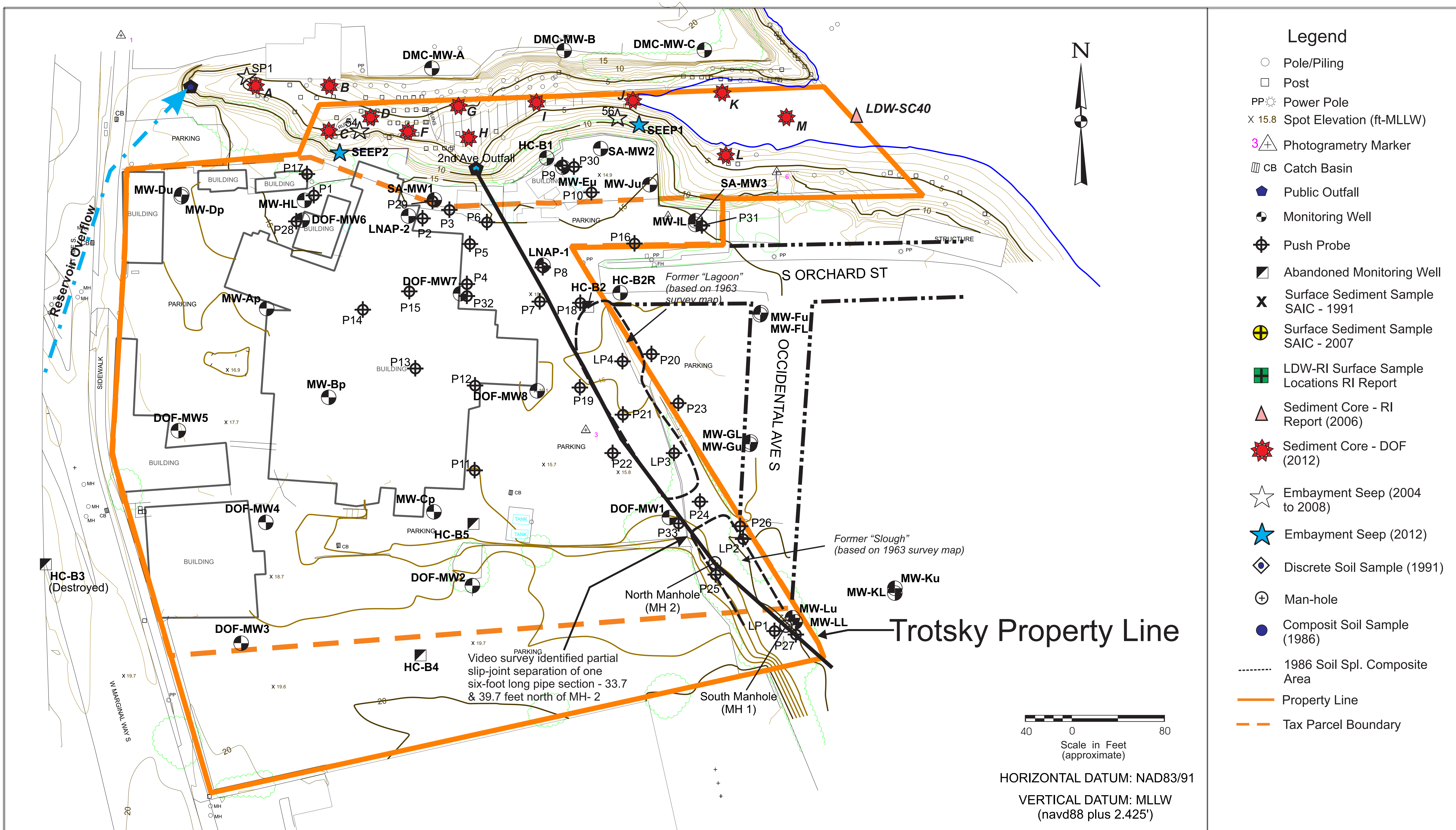
Sediment Core Locations

SUM-008-00 (ICS) ***Jan. 2013***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 3-3

Embay Core Loc Jan 2012brev.cdr



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Subsurface Locations a.cdr

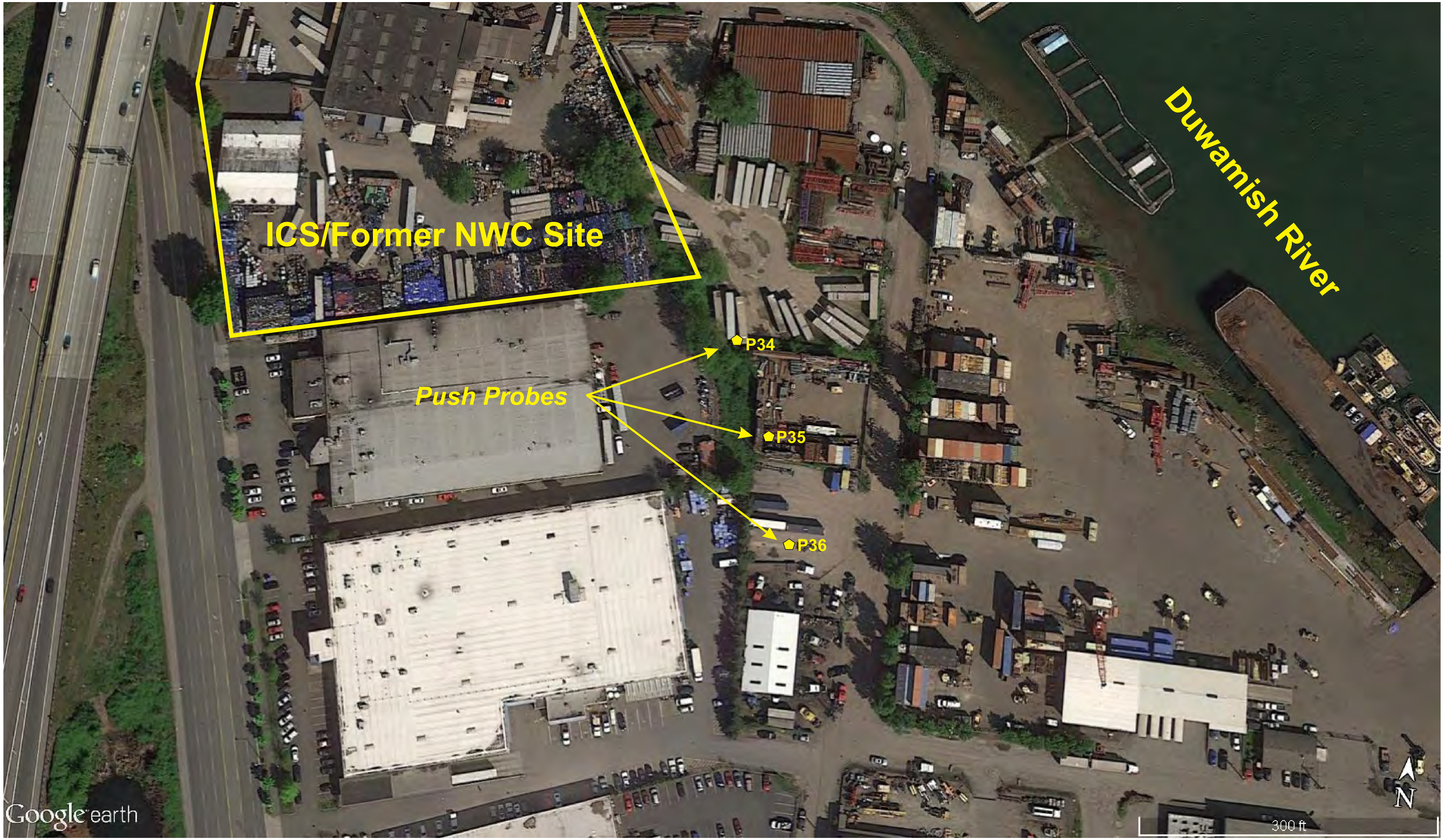
ICS/NW Cooperage Site

Push-Probe, Well and Core Locations

SUM-008-00 (ICS) *July 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 3-4a



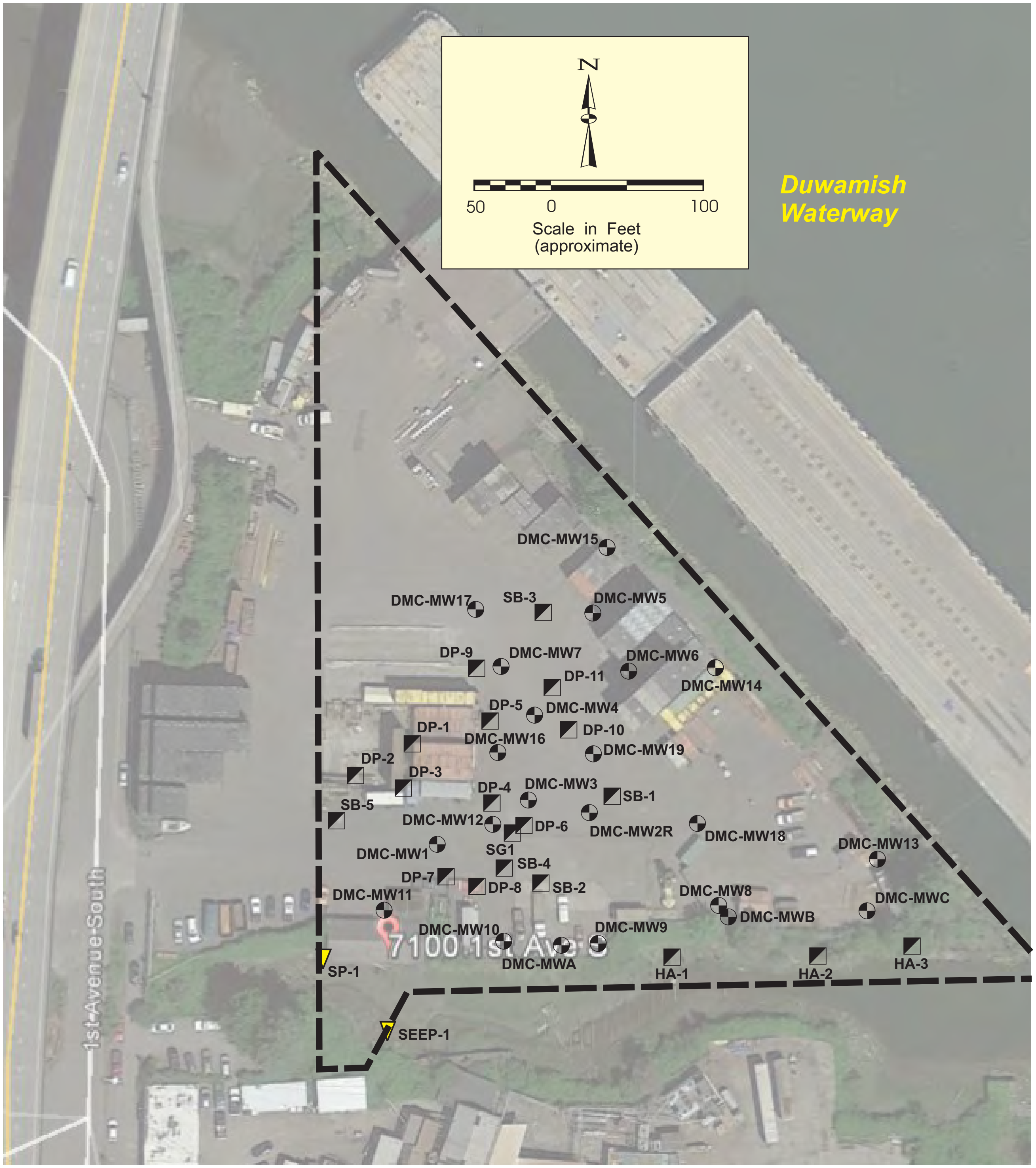
ICS/Former NW Cooperage RI
Seattle, Washington

Off-Site Probe Locatioins

SUM-008 **FIGURE 3-4b** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: ICS_NWC RI Off-site probe locations rev.cdr



DMC-MW11 Monitoring Well

SB-1 Soil Boring

SP-1 Embayment Seep

Ref: Douglas Spl. Locations

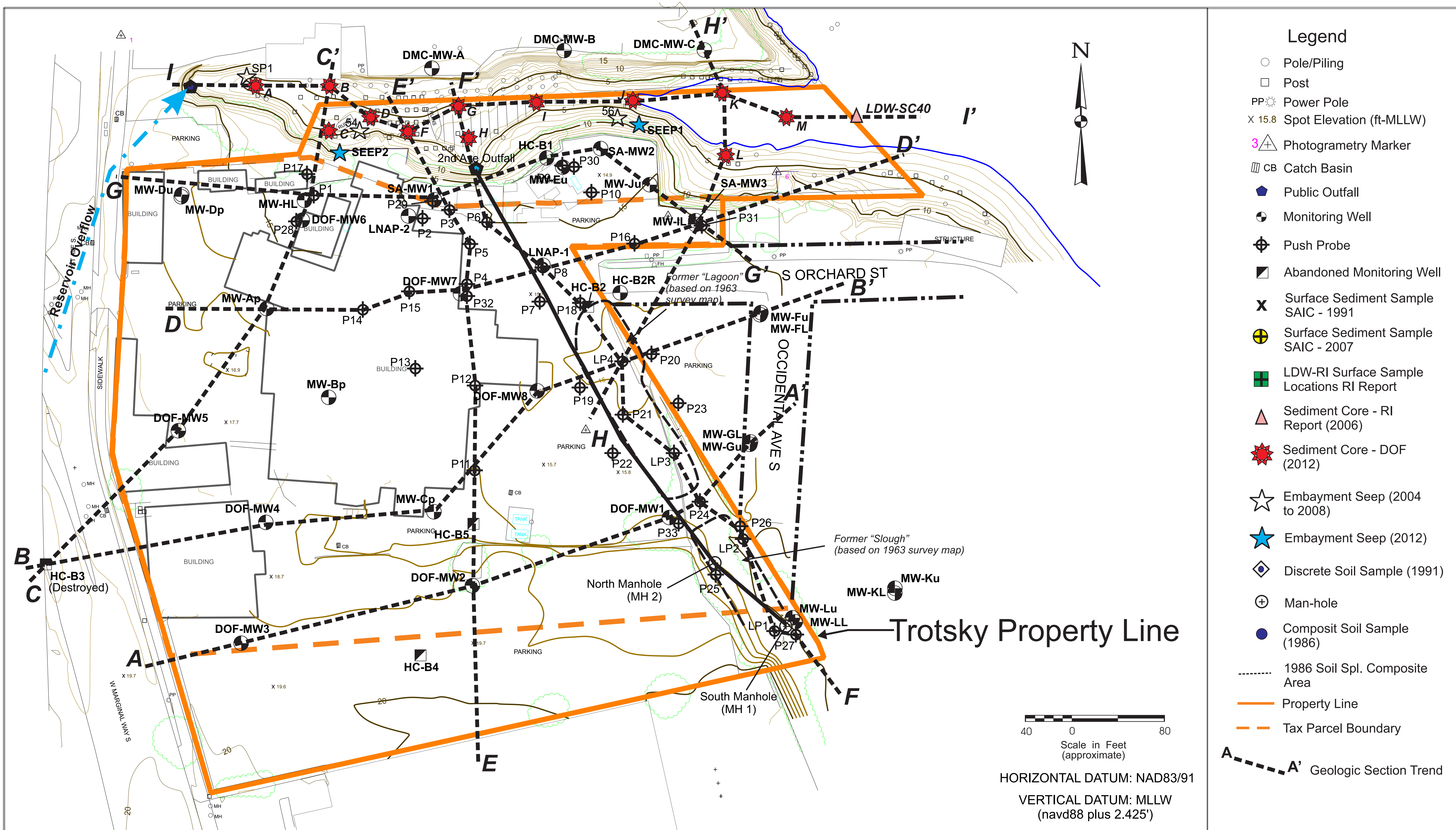
ICS/NW Cooperage Site

Douglas Property Sampling Locations

SUM-008-00 (ICS) ***March 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 3-5



Notes:
1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Geologic Section Trends a rev.cdr

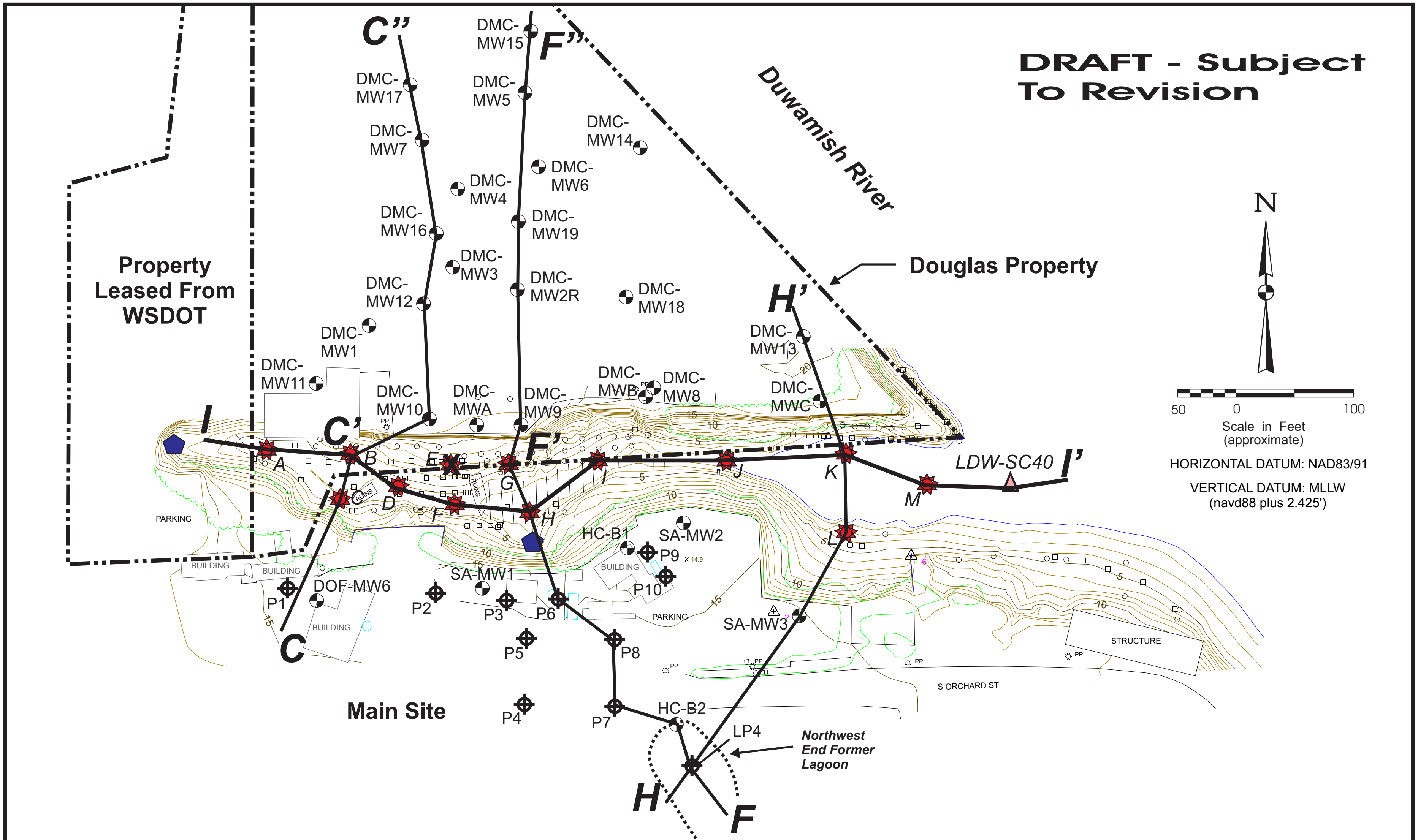
ICS/NW Cooperage Site

Geologic Section Trends Main Site and Embayment

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-1a



Push Probe
Monitoring Well
Previous Sediment Core (2006)
C C' Section Trend
Public Outfall
Sediment Core Location (2012)
Core Not Collected - Obstruction

Section Locations Extended rev.cdr

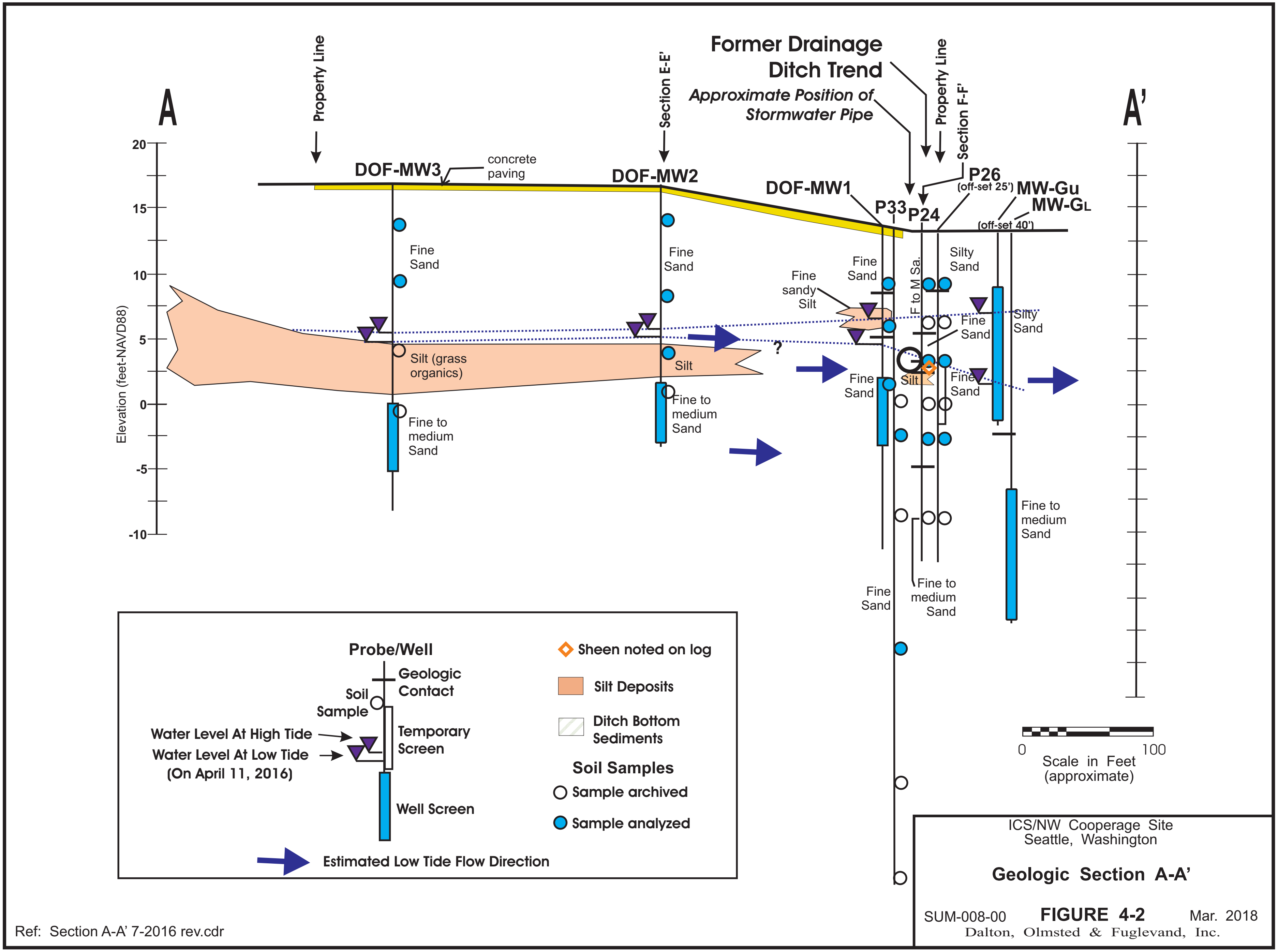
ICS/NW Cooperage Site

Section Trend Locations Douglas Property and Embayment

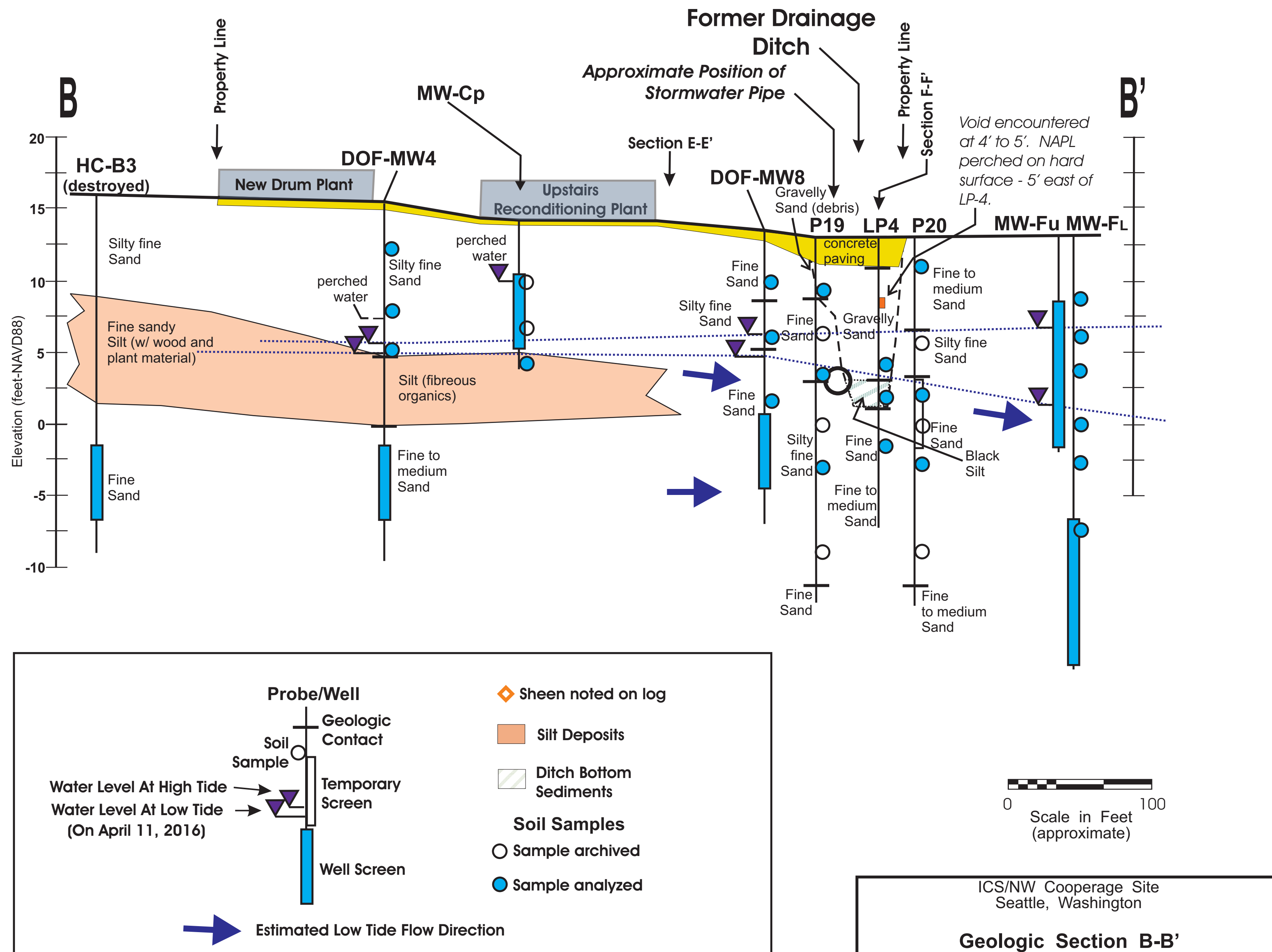
SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-1b



A
A'
Property Line
Section E-E'
Former Drainage Ditch Trend
Approximate Position of Stormwater Pipe
Property Line
Section F-F'
Elevation (feet-NAVD88)
20
15
10
5
0
-5
-10
DOF-MW3
concrete paving
DOF-MW2
DOF-MW1
P33
P24
P26 (off-set 25')
MW-Gu
MW-GL
(off-set 40')
Fine Sand
Silt (grass organics)
Fine to medium Sand
Fine Sand
Silt
Fine to medium Sand
Fine sandy Silt
Fine Sand
F to M Sa.
Silty Sand
Fine Sand
Silty Sand
Fine Sand
Silt
Fine Sand
Fine Sand
Fine to medium Sand
Fine Sand
Fine to medium Sand
?
Probe/Well
Geologic Contact
Soil Sample
Water Level At High Tide
Water Level At Low Tide
(On April 11, 2016)
Temporary Screen
Well Screen
Estimated Low Tide Flow Direction
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample archived
Sample analyzed
0
100
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
Geologic Section A-A'
SUM-008-00
FIGURE 4-2
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Section A-A' 7-2016 rev.cdr



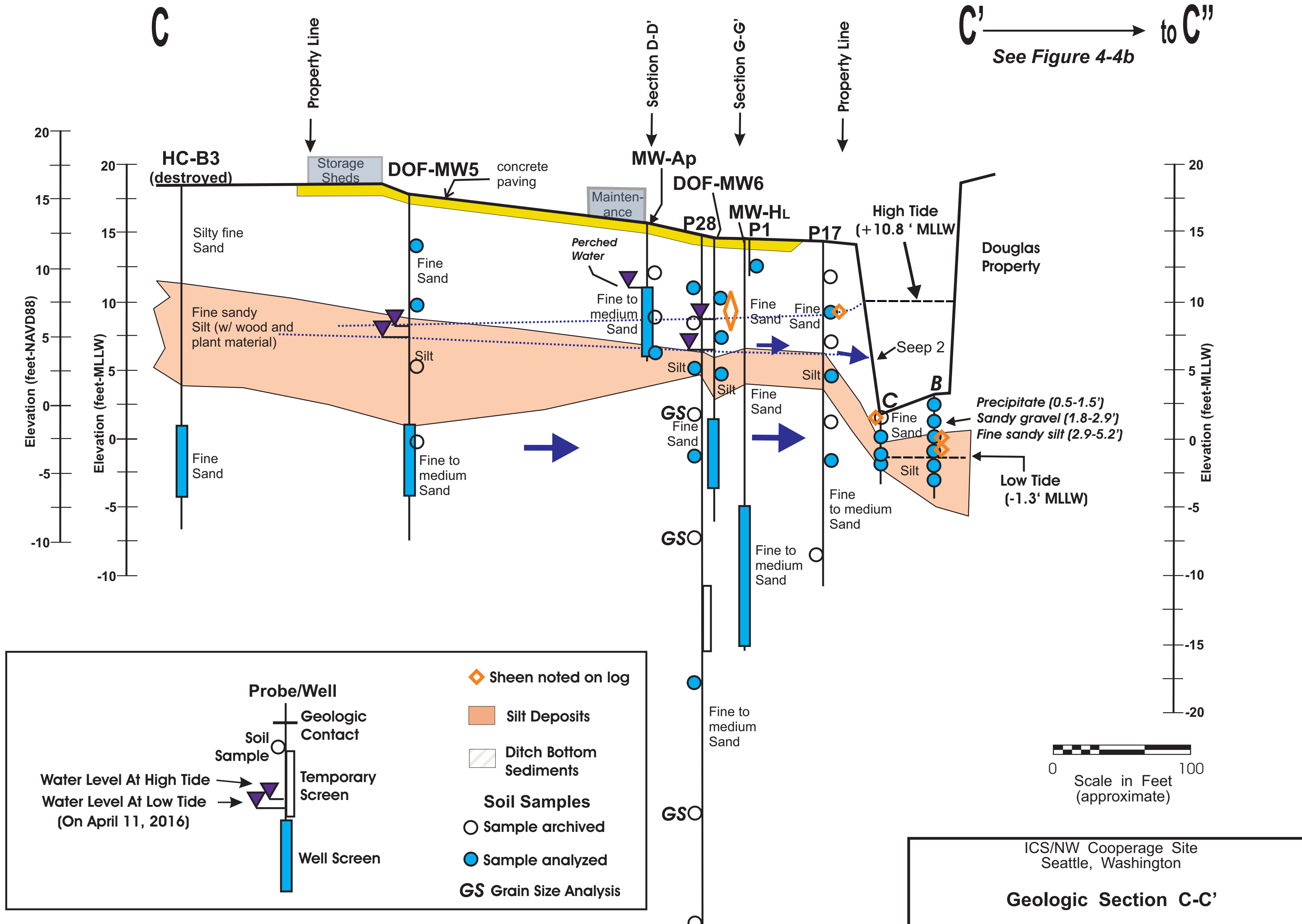
ICS/NW Cooperage Site
Seattle, Washington

Geologic Section B-B'

SUM-008-00 **FIGURE 4-3** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section B-B'7-2016 rev.cdr



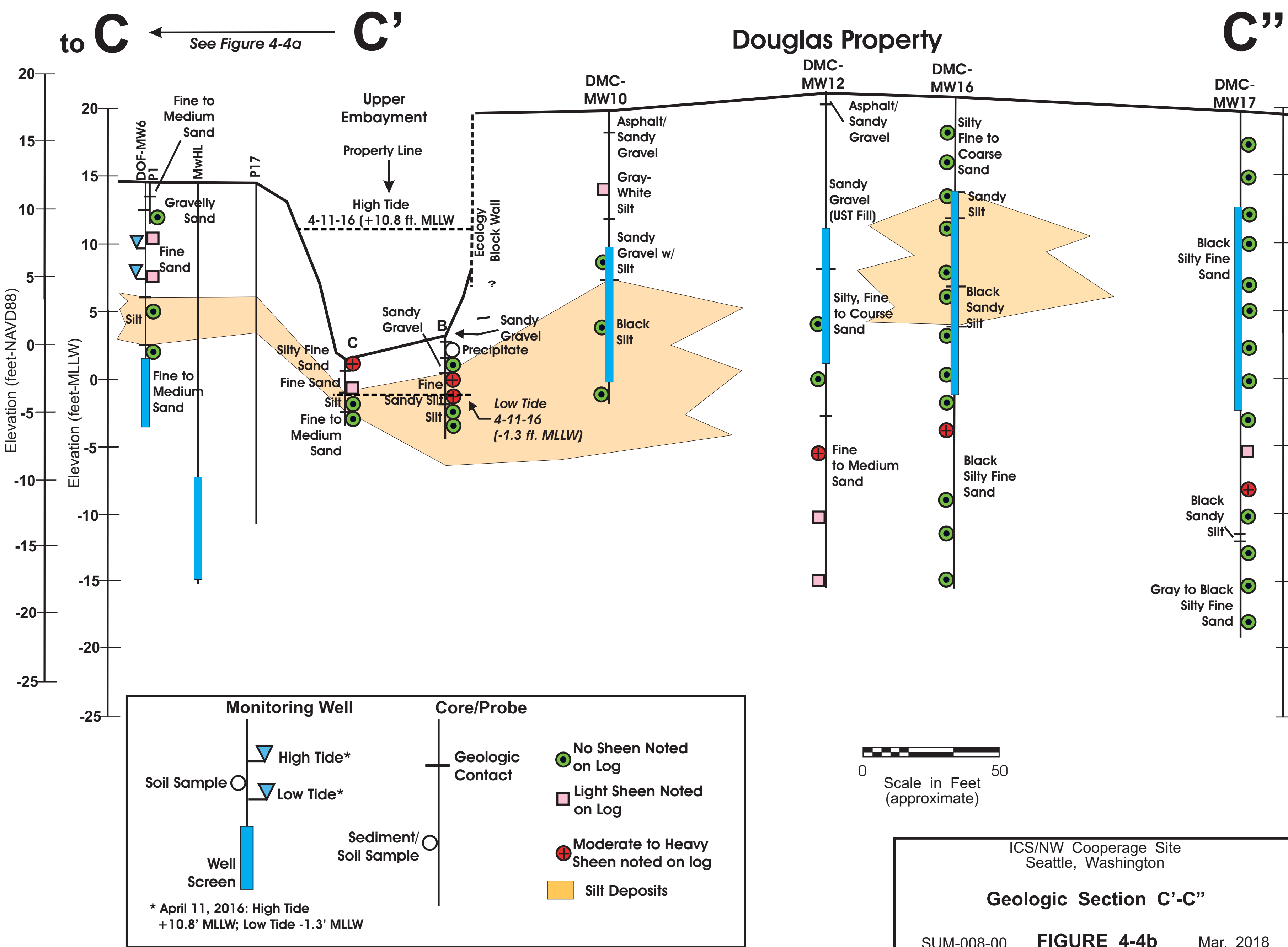
ICS/NW Cooperage Site
Seattle, Washington

Geologic Section C-C'

SUM-008-00 **FIGURE 4-4a** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section C-C'7-2016 rev.cdr



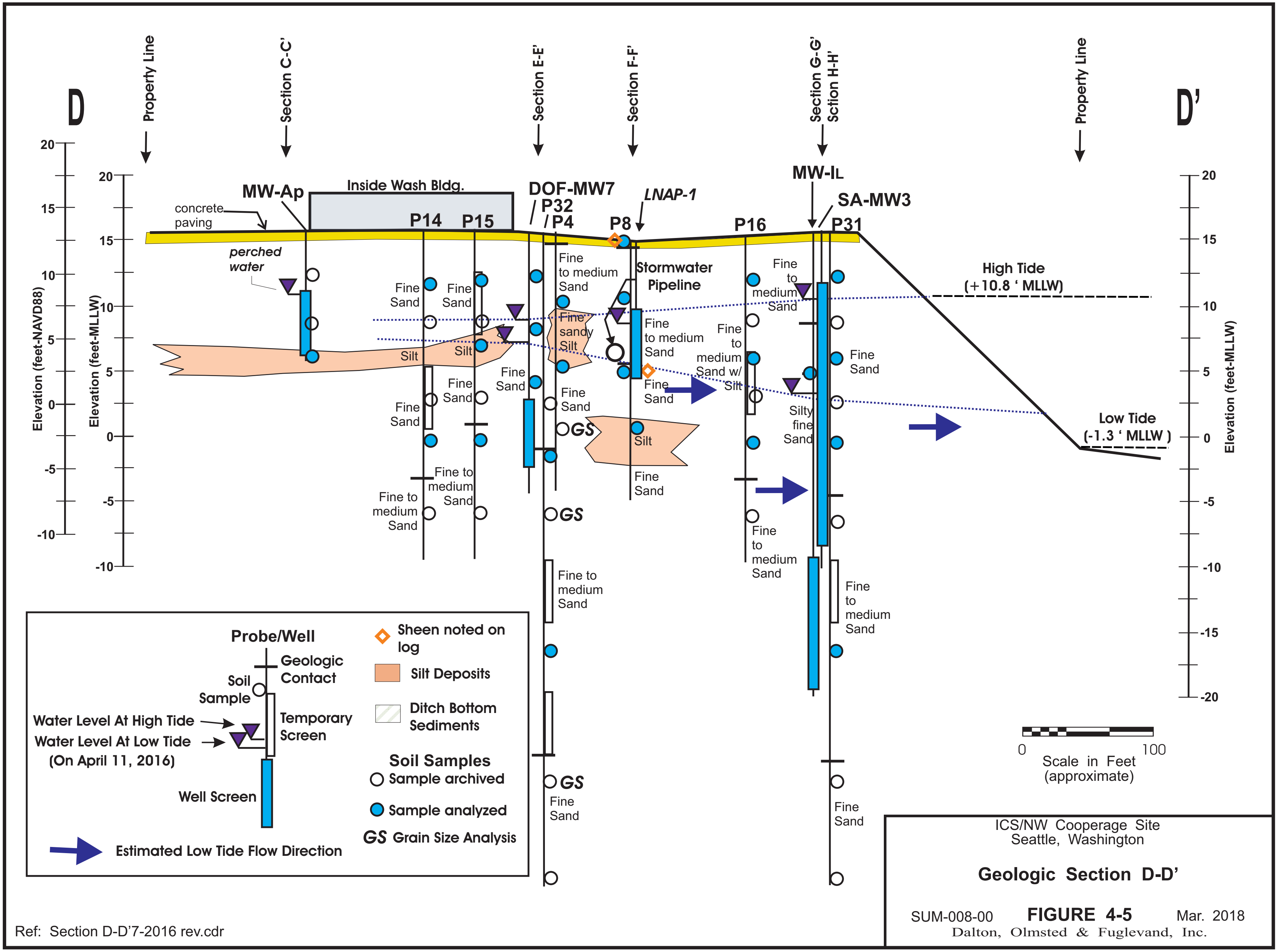
ICS/NW Cooperage Site
Seattle, Washington

Geologic Section C'-C"

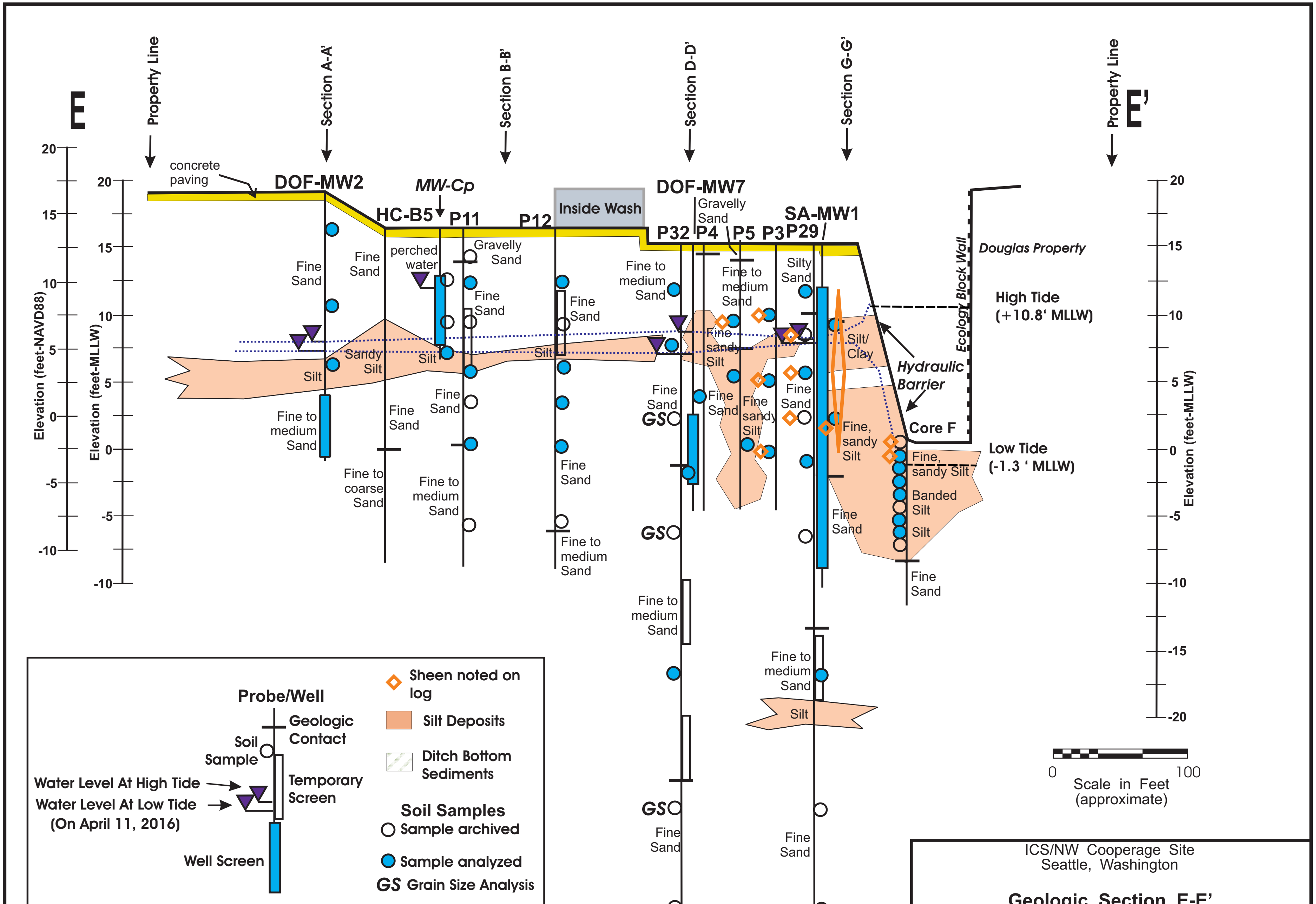
SUM-008-00 **FIGURE 4-4b** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section C-C' Embayment rev c.cdr



D
D'
Property Line
Section C-C'
Section E-E'
Section F-F'
Section G-G'
Sction H-H'
Property Line
Elevation (feet-NAVD88)
Elevation (feet-MLLW)
Elevation (feet-MLLW)
20
15
10
5
0
-5
-10
-15
-20
MW-Ap
Inside Wash Bldg.
concrete paving
perched water
DOF-MW7
/ P32
/ P4
LNAP-1
P8
P14
P15
P16
MW-IL
SA-MW3
P31
Stormwater Pipeline
High Tide (+10.8 ' MLLW)
Low Tide (-1.3 ' MLLW)
Fine Sand
Fine to medium Sand
Fine sandy Silt
Silt
Fine to medium Sand w/ Silt
Silty fine Sand
GS
Probe/Well
Geologic Contact
Soil Sample
Water Level At High Tide
Water Level At Low Tide
(On April 11, 2016)
Temporary Screen
Well Screen
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample archived
Sample analyzed
GS Grain Size Analysis
Estimated Low Tide Flow Direction
0
100
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
Geologic Section D-D'
SUM-008-00
FIGURE 4-5
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Section D-D'7-2016 rev.cdr



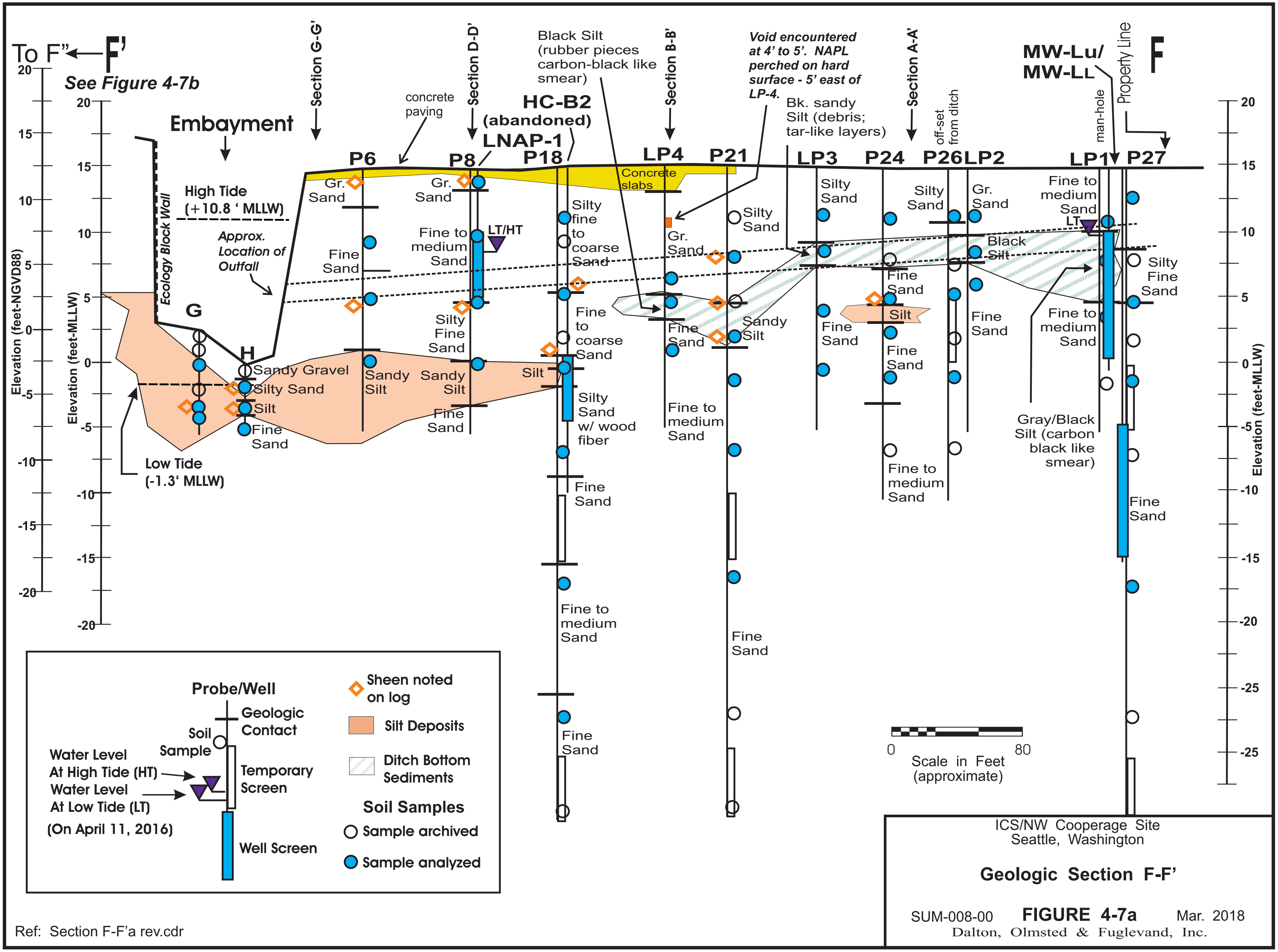
Ref: Section E-E'7-2016 rev.cdr

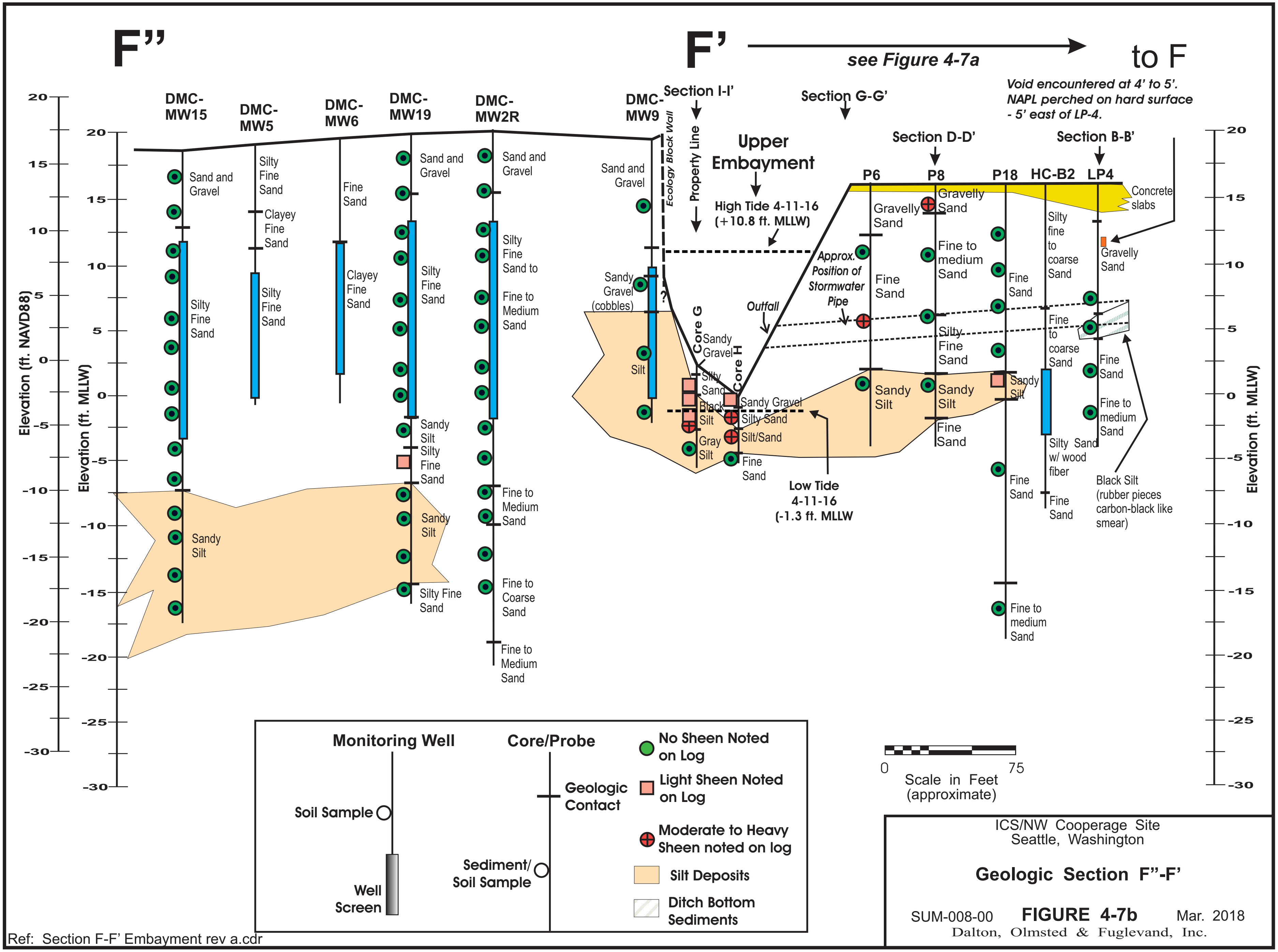
ICS/NW Cooperage Site
Seattle, Washington

Geologic Section E-E'

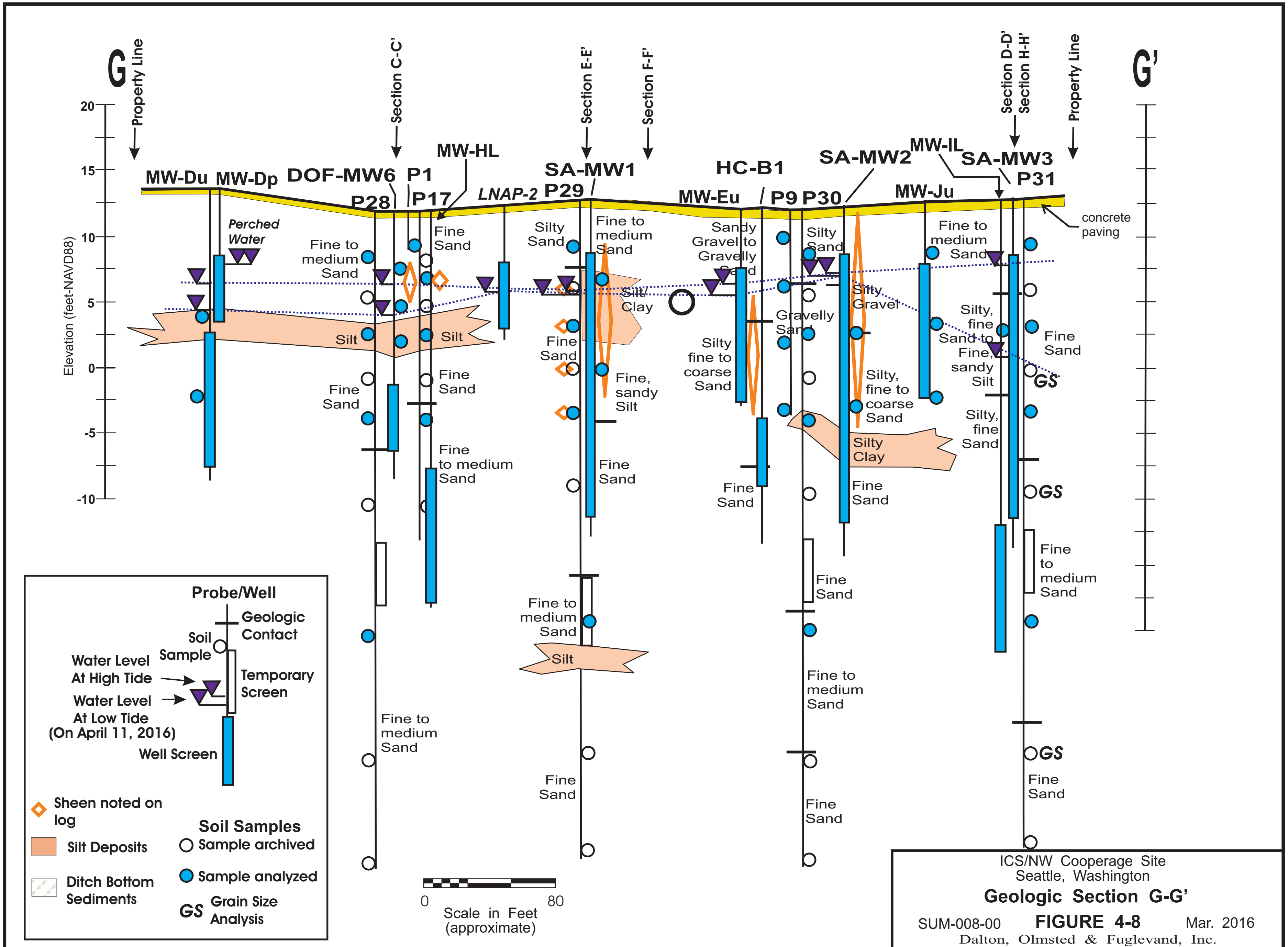
SUM-008-00 **FIGURE 4-6** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.


To F” ← F’
See Figure 4-7b
Embayment
Section G-G’
Section D-D’
Section B-B’
Section A-A’
concrete paving
HC-B2 (abandoned)
LNAP-1
Black Silt (rubber pieces carbon-black like smear)
Void encountered at 4’ to 5’. NAPL perched on hard surface - 5’ east of LP-4.
Bk. sandy Silt (debris; tar-like layers)
off-set from ditch
man-hole
Property Line
MW-Lu/ MW-LL
F
P6
P8
P18
LP4
P21
LP3
P24
P26
LP2
LP1
P27
High Tide (+10.8 ‘ MLLW)
Ecology Block Wall
Approx. Location of Outfall
G
H
Low Tide (-1.3‘ MLLW)
Concrete slabs
Gr. Sand
Fine Sand
Fine to medium Sand
Silty Fine Sand
Silty fine to coarse Sand
Fine to coarse Sand
Silty Sand
Sandy Gravel
Silt
Sandy Silt
Silty Sand w/ wood fiber
Fine to medium Sand
Black Silt
Silty Fine Sand
LT/HT
LT
Gray/Black Silt (carbon black like smear)
Elevation (feet-NGVD88)
Elevation (feet-MLLW)
20
15
10
5
0
-5
-10
-15
-20
-25
Probe/Well
Geologic Contact
Soil Sample
Temporary Screen
Water Level At High Tide (HT)
Water Level At Low Tide (LT)
(On April 11, 2016)
Well Screen
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample archived
Sample analyzed
0
80
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
Geologic Section F-F’
SUM-008-00
FIGURE 4-7a
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Section F-F’a rev.cdr



F''
F'
see Figure 4-7a
to F
Void encountered at 4' to 5'. NAPL perched on hard surface - 5' east of LP-4.
Elevation (ft. NAVD88)
Elevation (ft. MLLW)
DMC-MW15
DMC-MW5
DMC-MW6
DMC-MW19
DMC-MW2R
DMC-MW9
Section I-I'
Section G-G'
Section D-D'
Section B-B'
Ecology Block Wall
Property Line
Upper Embayment
High Tide 4-11-16 (+10.8 ft. MLLW)
Approx. Position of Stormwater Pipe
Outfall
Low Tide 4-11-16 (-1.3 ft. MLLW)
P6
P8
P18
HC-B2
LP4
Concrete slabs
Core G
Core H
Sand and Gravel
Silty Fine Sand
Clayey Fine Sand
Fine Sand
Sandy Silt
Silty Fine Sand
Fine to Medium Sand
Silty Fine Sand to
Silty Fine Sand
Fine to Coarse Sand
Sandy Gravel (cobbles)
Silt
Sandy Gravel
Silty Sand
Black Silt
Gray Silt
Silt/Sand
Gravelly Sand
Fine to medium Sand
Silty fine to coarse Sand
Fine to coarse Sand
Silty Sand w/ wood fiber
Black Silt (rubber pieces carbon-black like smear)
Fine to medium Sand
Monitoring Well
Soil Sample
Well Screen
Core/Probe
Geologic Contact
Sediment/ Soil Sample
No Sheen Noted on Log
Light Sheen Noted on Log
Moderate to Heavy Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
0
75
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
Geologic Section F''-F'
SUM-008-00
FIGURE 4-7b
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Section F-F' Embayment rev a.cdr

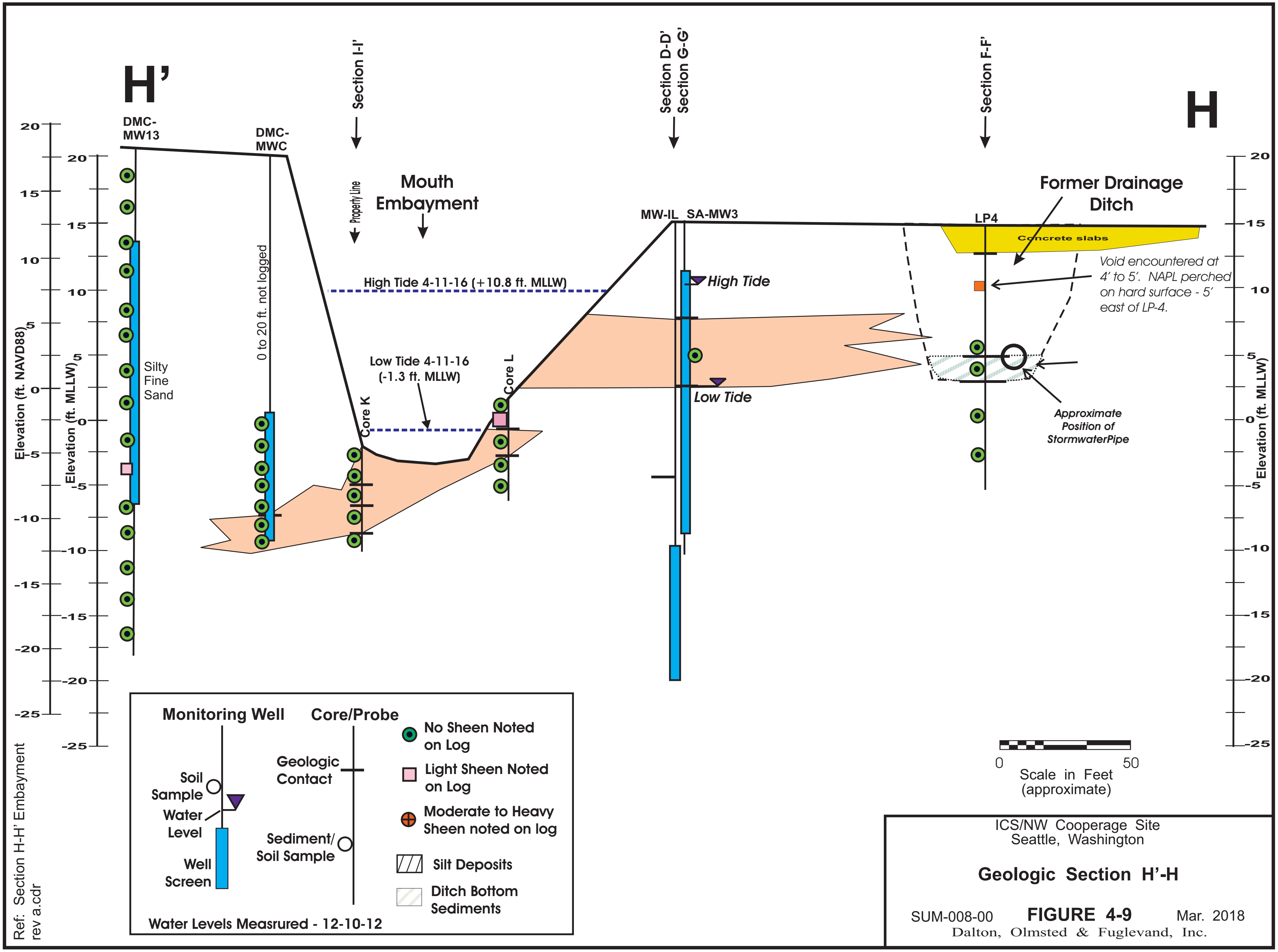


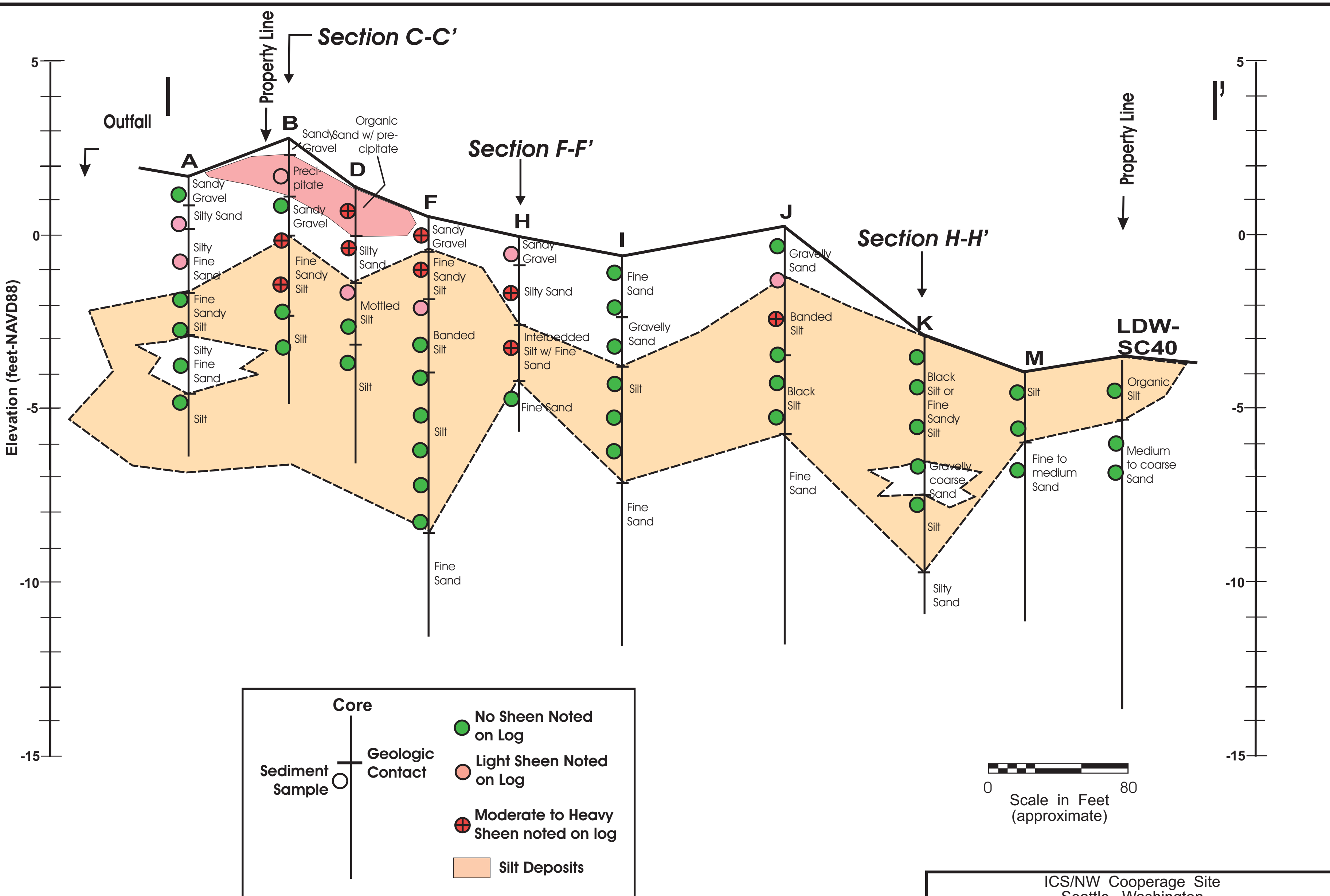
ICS/NW Cooperage Site
Seattle, Washington

Geologic Section G-G'

SUM-008-00 **FIGURE 4-8** Mar. 2016

Dalton, Olmsted & Fuglevand, Inc.


H'
H
DMC-MW13
DMC-MWC
Section I-I'
Section D-D'
Section G-G'
Section F-F'
Property Line
Mouth Embayment
Former Drainage Ditch
MW-IL
SA-MW3
LP4
Concrete slabs
Void encountered at 4' to 5'. NAPL perched on hard surface - 5' east of LP-4.
High Tide 4-11-16 (+10.8 ft. MLLW)
Low Tide 4-11-16 (-1.3 ft. MLLW)
High Tide
Low Tide
0 to 20 ft. not logged
Silty Fine Sand
Core K
Core L
Approximate Position of StormwaterPipe
Elevation (ft. NAVD88)
Elevation (ft. MLLW)
20
15
10
5
0
-5
-10
-15
-20
-25
Monitoring Well
Core/Probe
Soil Sample
Water Level
Well Screen
Geologic Contact
Sediment/ Soil Sample
No Sheen Noted on Log
Light Sheen Noted on Log
Moderate to Heavy Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Water Levels Measrured - 12-10-12
0
50
Scale in Feet (approximate)
Ref: Section H-H' Embayment rev a.cdr
ICS/NW Cooperage Site
Seattle, Washington
Geologic Section H'-H
SUM-008-00
FIGURE 4-9
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.



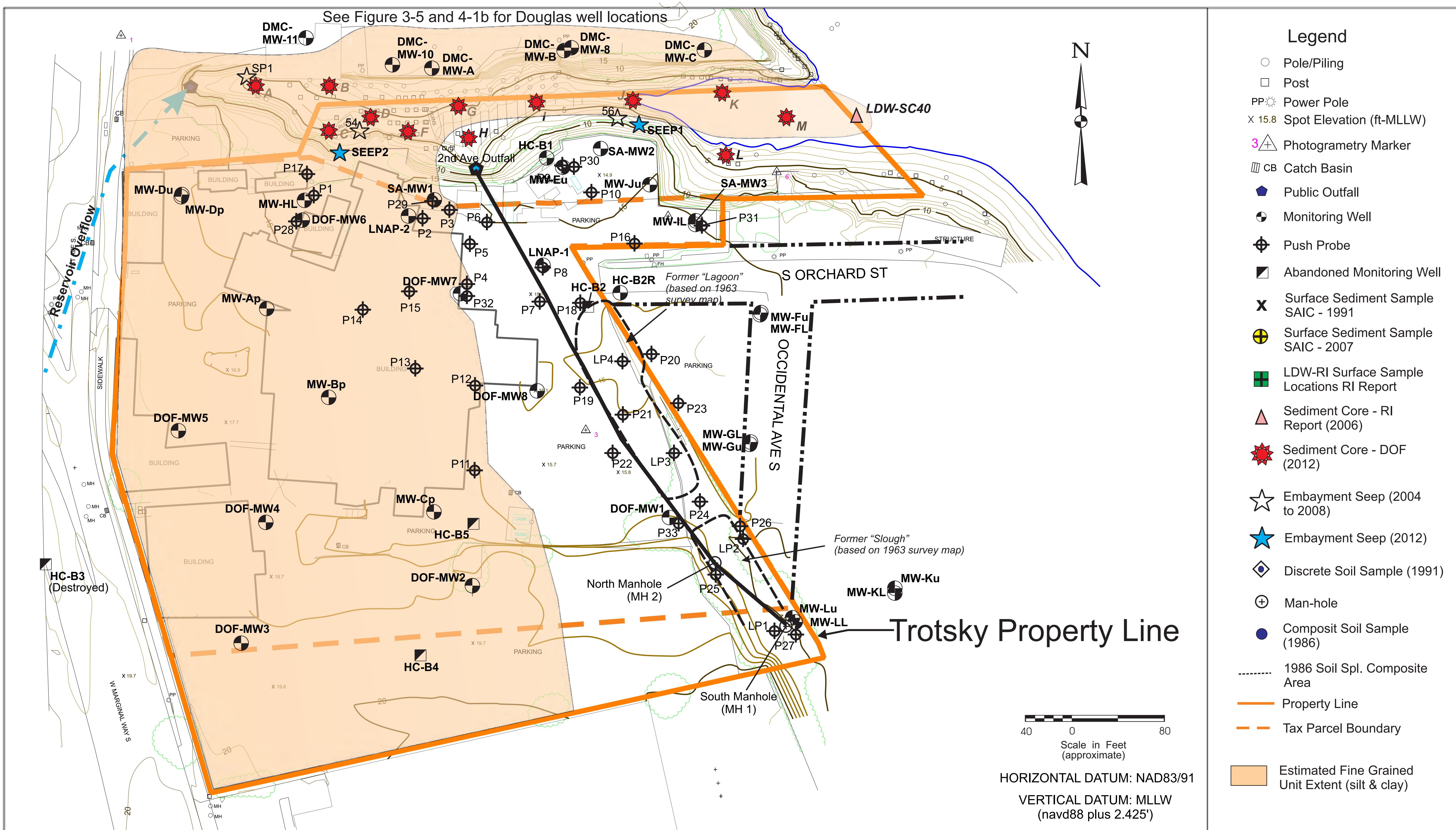
ICS/NW Cooperage Site
Seattle, Washington

Geologic Section I-I'

SUM-008-00 **FIGURE 4-10** June 2021

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section I-I' Embayment rev2.cdr



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Extent of Aquitard A rev.cdr

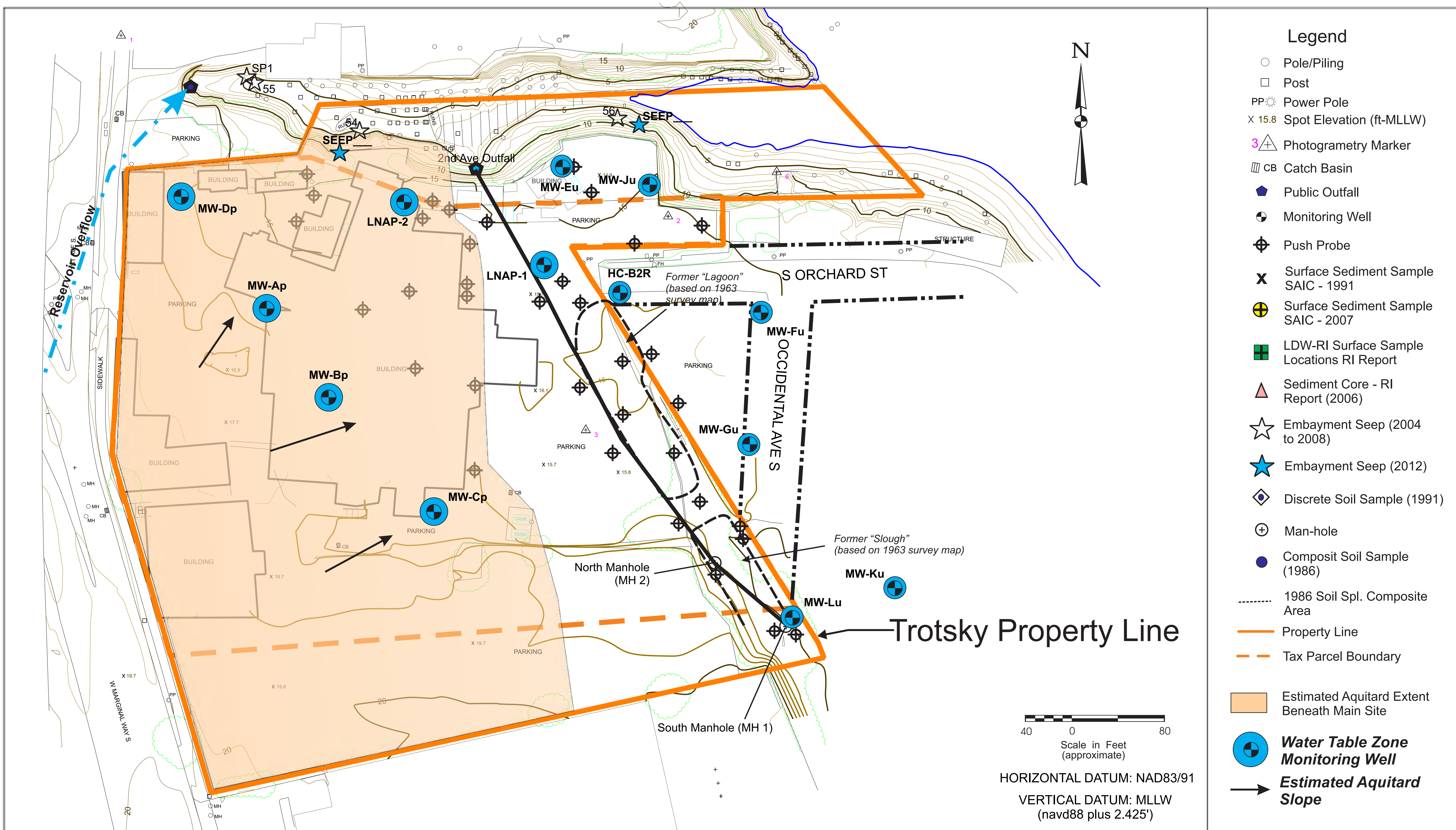
ICS/NW Cooperage Site

Extent of Fine Grained Unit

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-11



Notes:
1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Upland Phase Well Loc by Zone rev.cdr

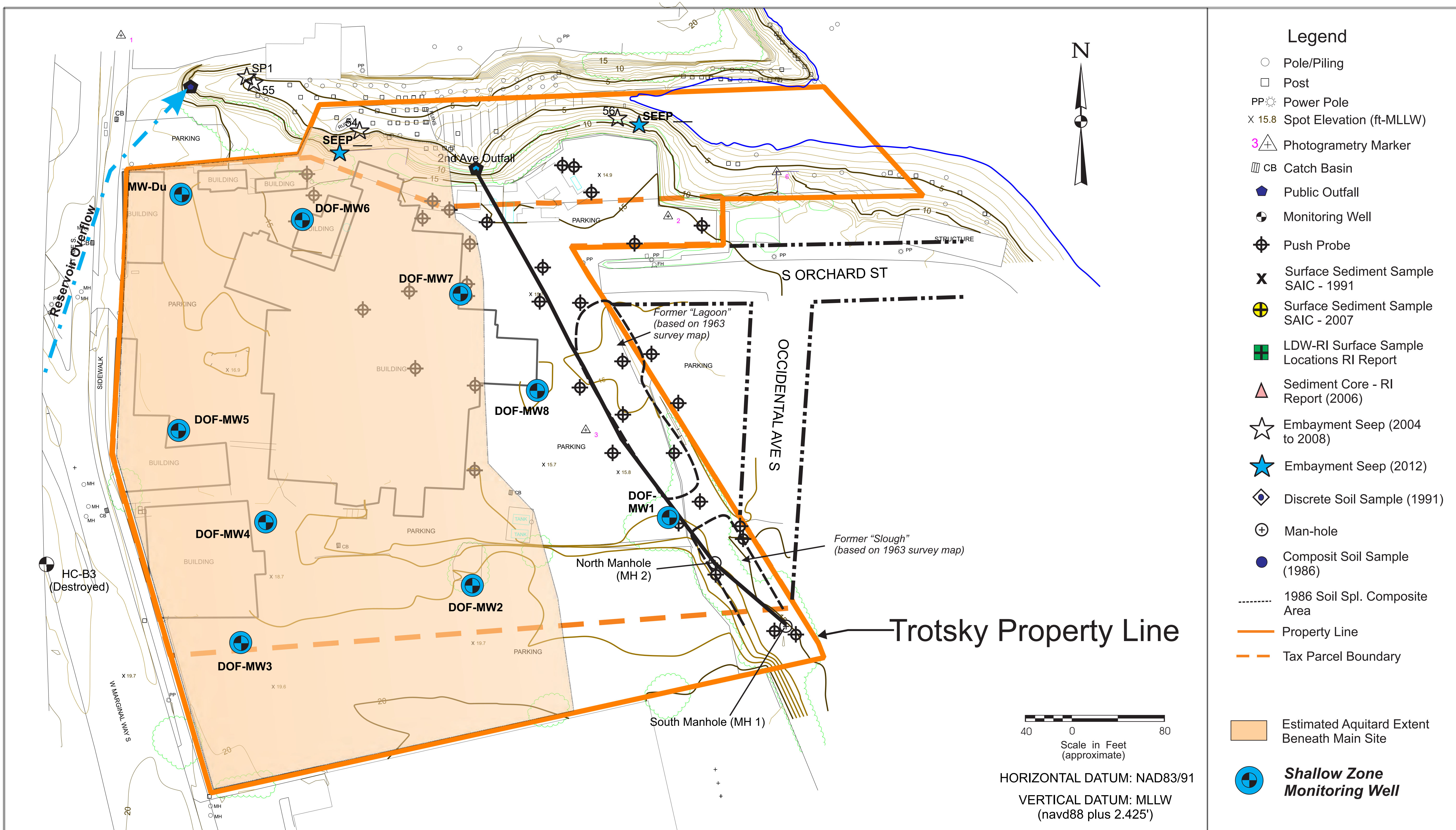
ICS/NW Cooperage Site

Water Table Zone Monitoring Wells ICS-NWC Property

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-12a



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Upland Phase Well Loc by Zone rev.cdr

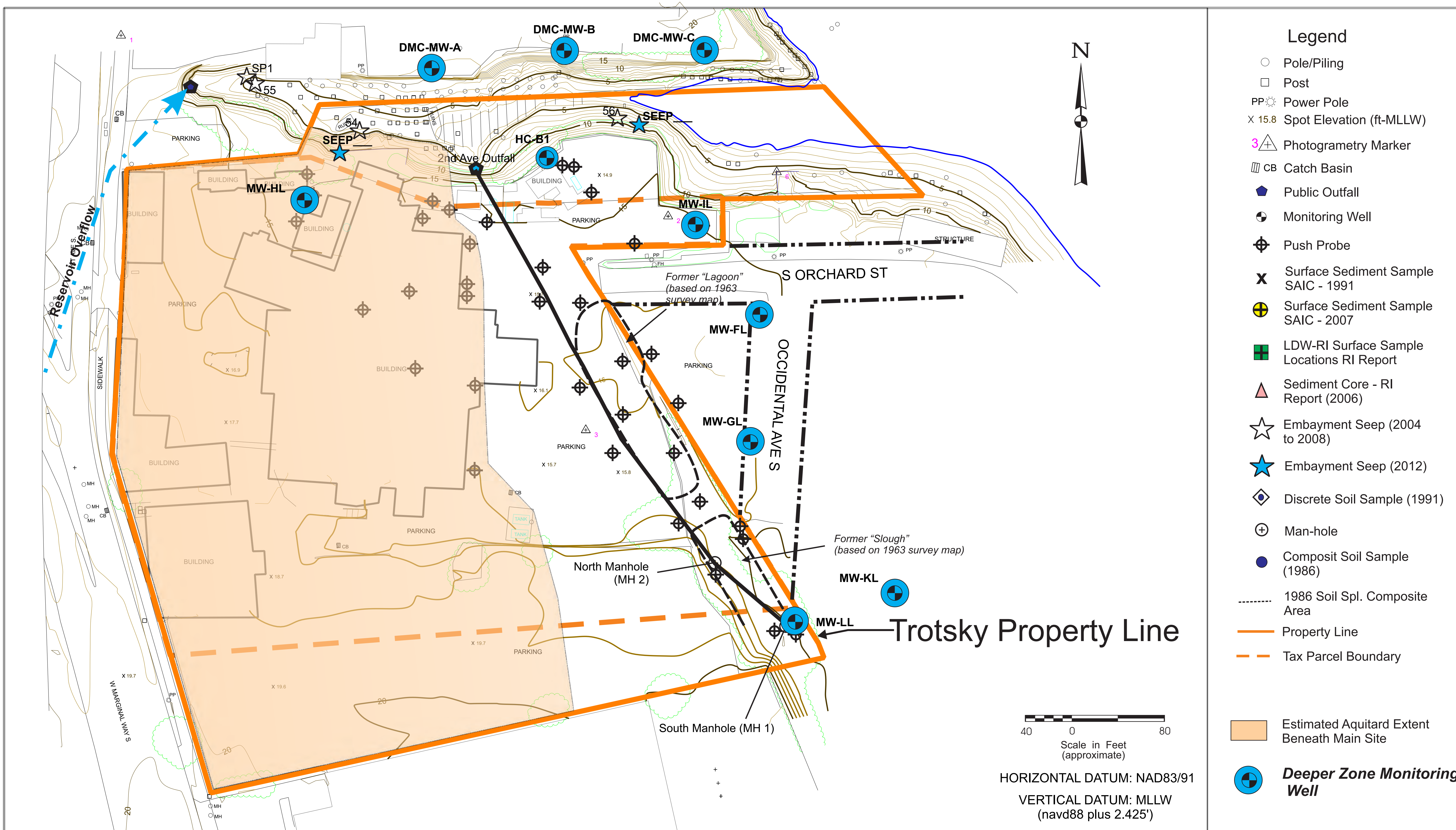
ICS/NW Cooperage Site

Upper Zone Monitoring Wells ICS-NWC Property

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-12b



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Upland Phase Well Loc by Zone rev.cdr

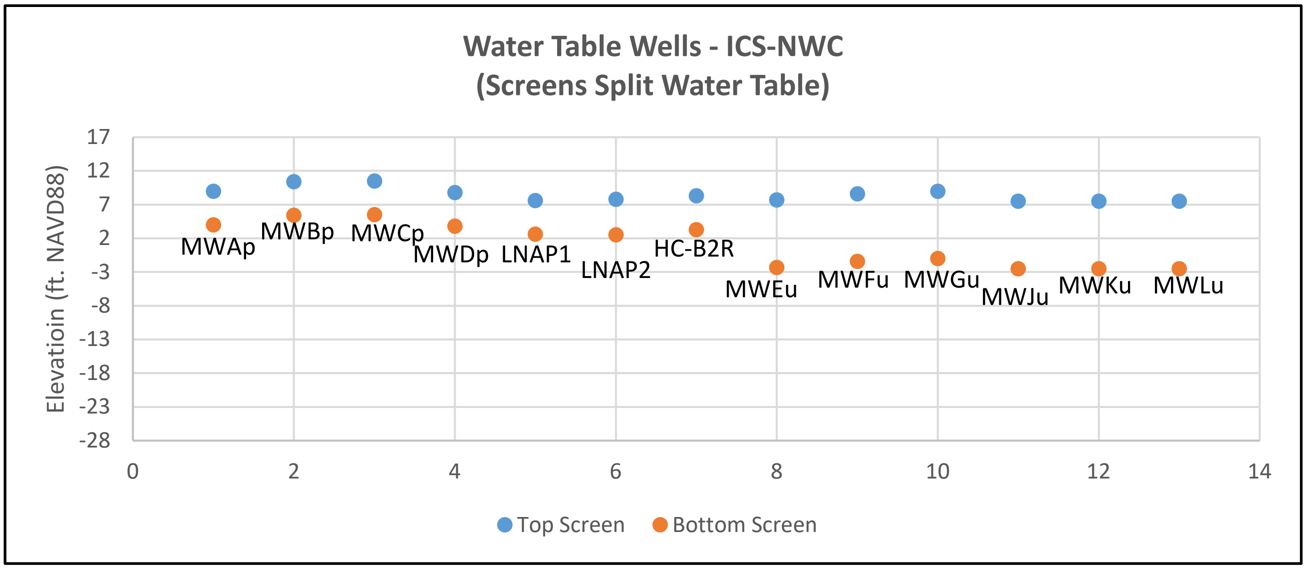
ICS/NW Cooperage Site

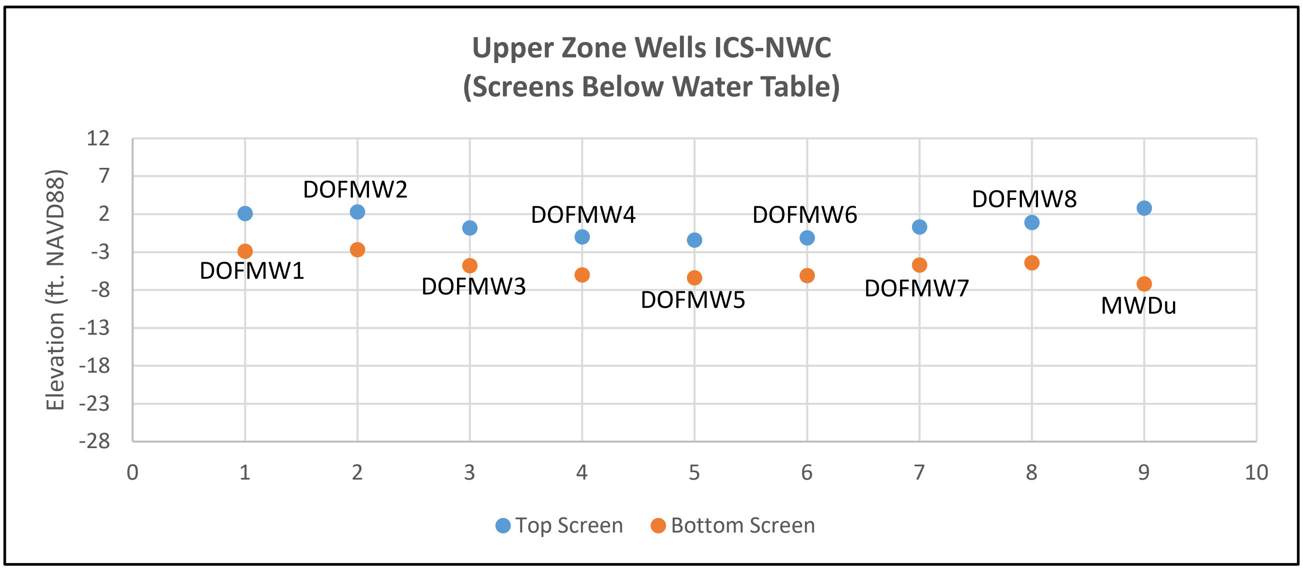
Lower Zone Monitoring Wells ICS-NWC and Douglas Property

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-12c





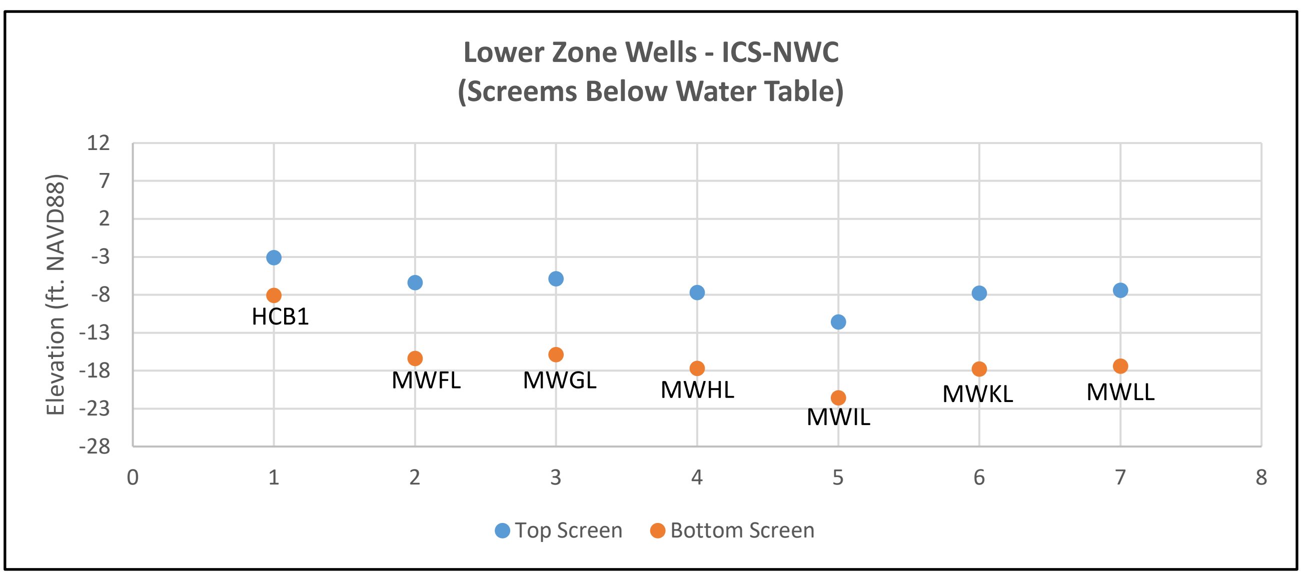
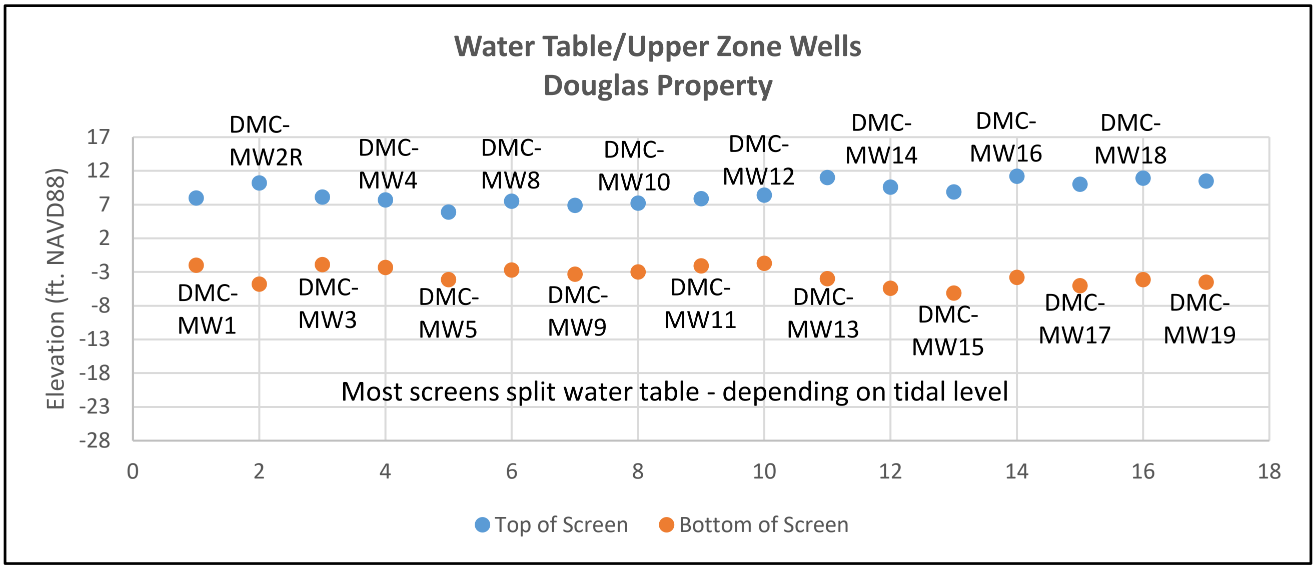
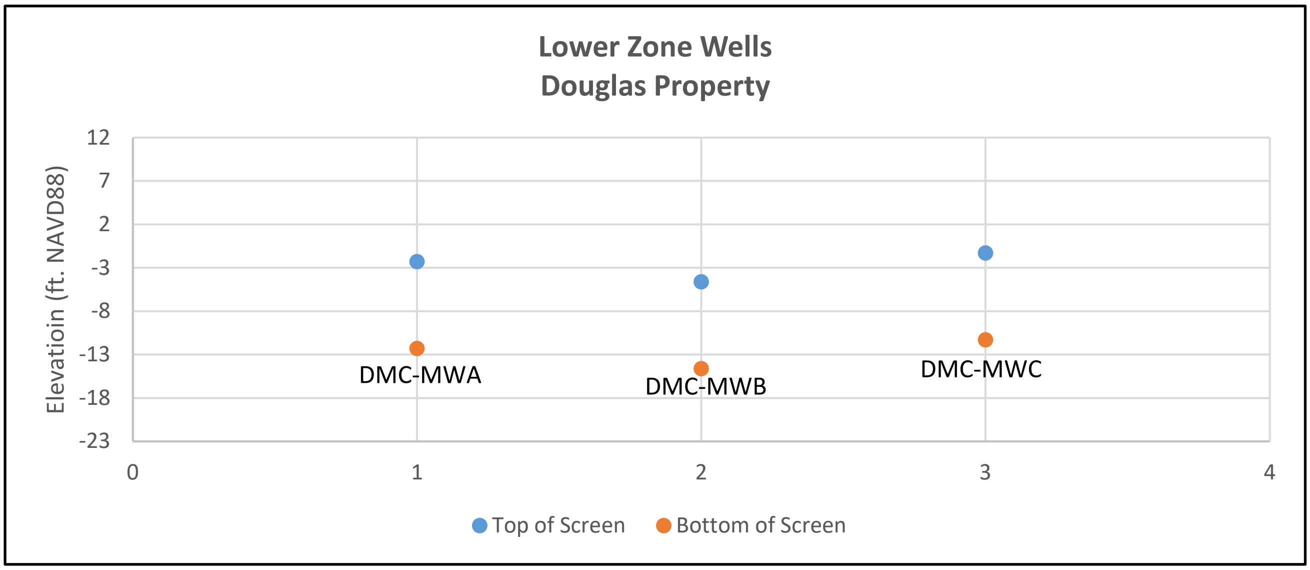
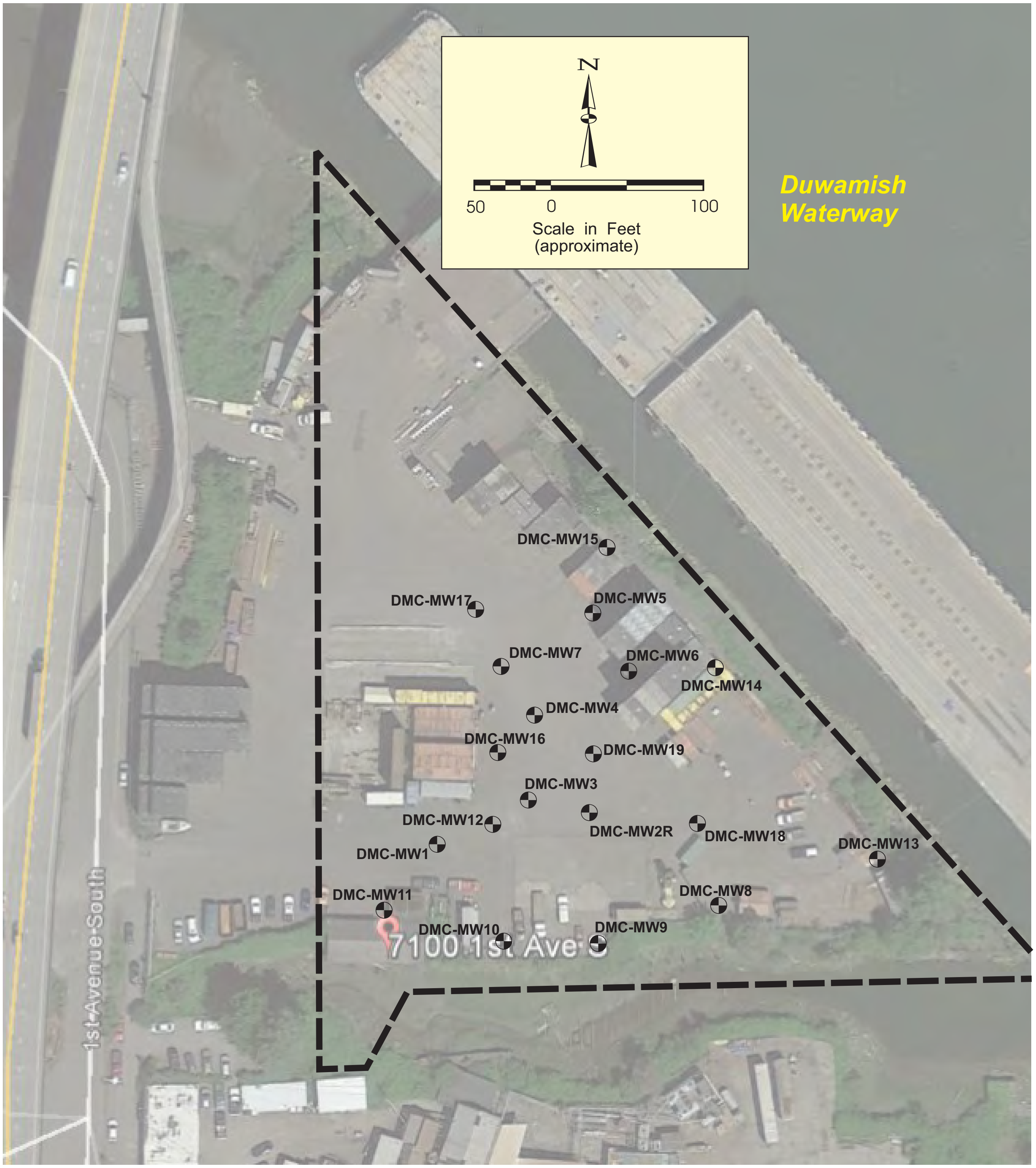


FIGURE 4-13 - Well Screen Elevations


Water Table/Upper Zone Wells
Douglas Property
Elevation (ft. NAVD88)
17
12
7
2
-3
-8
-13
-18
-23
-28
0
2
4
6
8
10
12
14
16
18
DMC-MW1
DMC-MW2R
DMC-MW3
DMC-MW4
DMC-MW5
DMC-MW8
DMC-MW9
DMC-MW10
DMC-MW11
DMC-MW12
DMC-MW13
DMC-MW14
DMC-MW15
DMC-MW16
DMC-MW17
DMC-MW18
DMC-MW19
Most screens split water table - depending on tidal level
Top of Screen
Bottom of Screen


Lower Zone Wells
Douglas Property
Elevatioin (ft. NAVD88)
12
7
2
-3
-8
-13
-18
-23
0
1
2
3
4
DMC-MWA
DMC-MWB
DMC-MWC
Top of Screen
Bottom of Screen



DMC-MW11 Monitoring Well

Ref: Douglas WT Shallow Well Locations.cdr

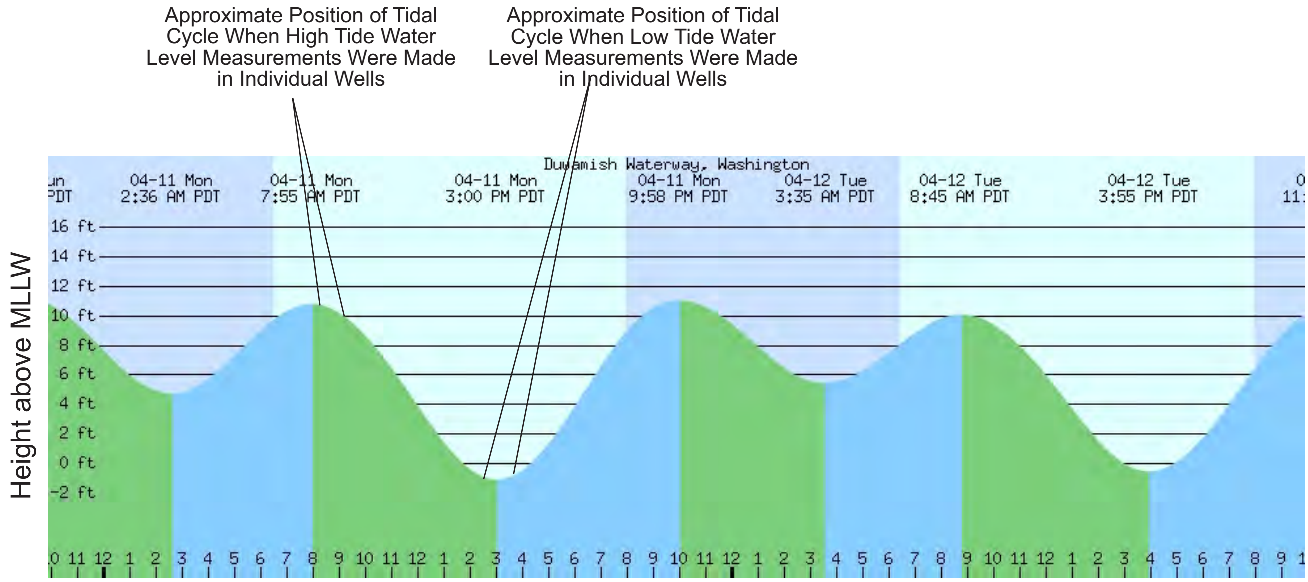
ICS/NW Cooperage Site

Douglas Property Water Table/Upper Zone Well Locations

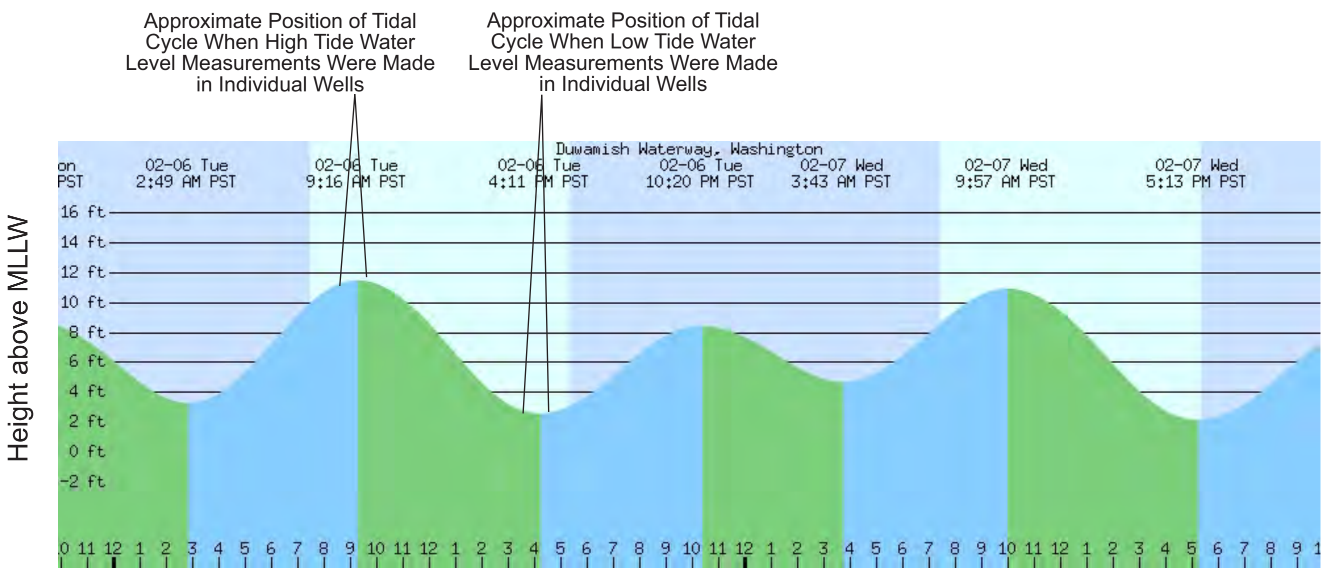
SUM-008-00 (ICS) ***March 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-14



April 2016



February 2018

Notes:
The tide charts shown above are predicted tides for Duwamish Waterway

Tidal heights are relative to the NOAA chart datum Mean Lower Low Water (MLLW)

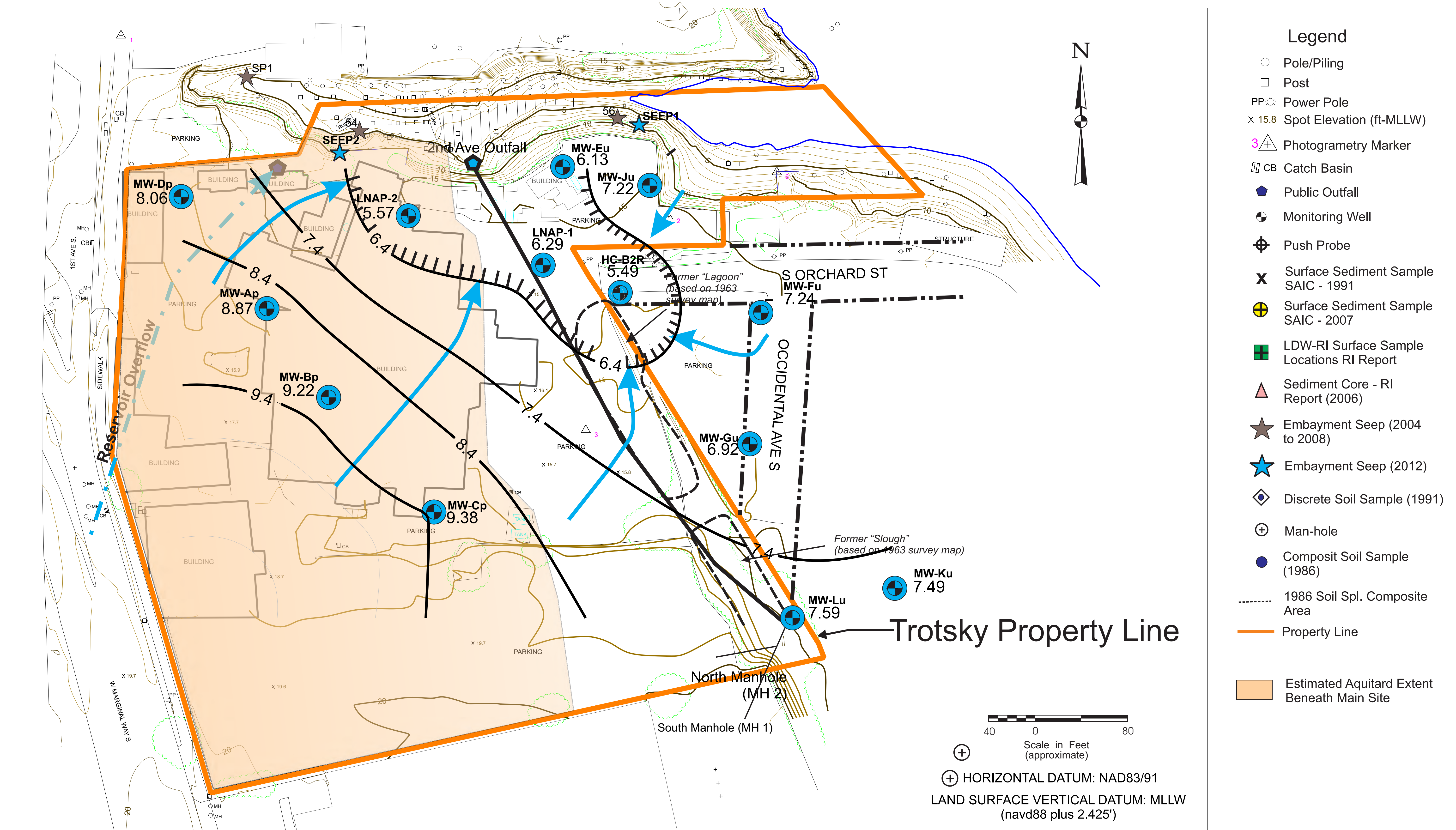
Source:http://www.mobilegeographics.com/locations/1683.html

ICS/NW Cooperage Site
Seattle, Washington

TIDE CHARTS
April 2016 and February 2018

SUM-008-00 **FIGURE 4-15** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)

2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: GW Flow Directions April 11, 2016 rev a.cdr

9.38 *Monitoring Well and Water Level Elevation (NAVD88)*

Estimated Flow Direction Gradient

9.4 *Groundwater Contour*

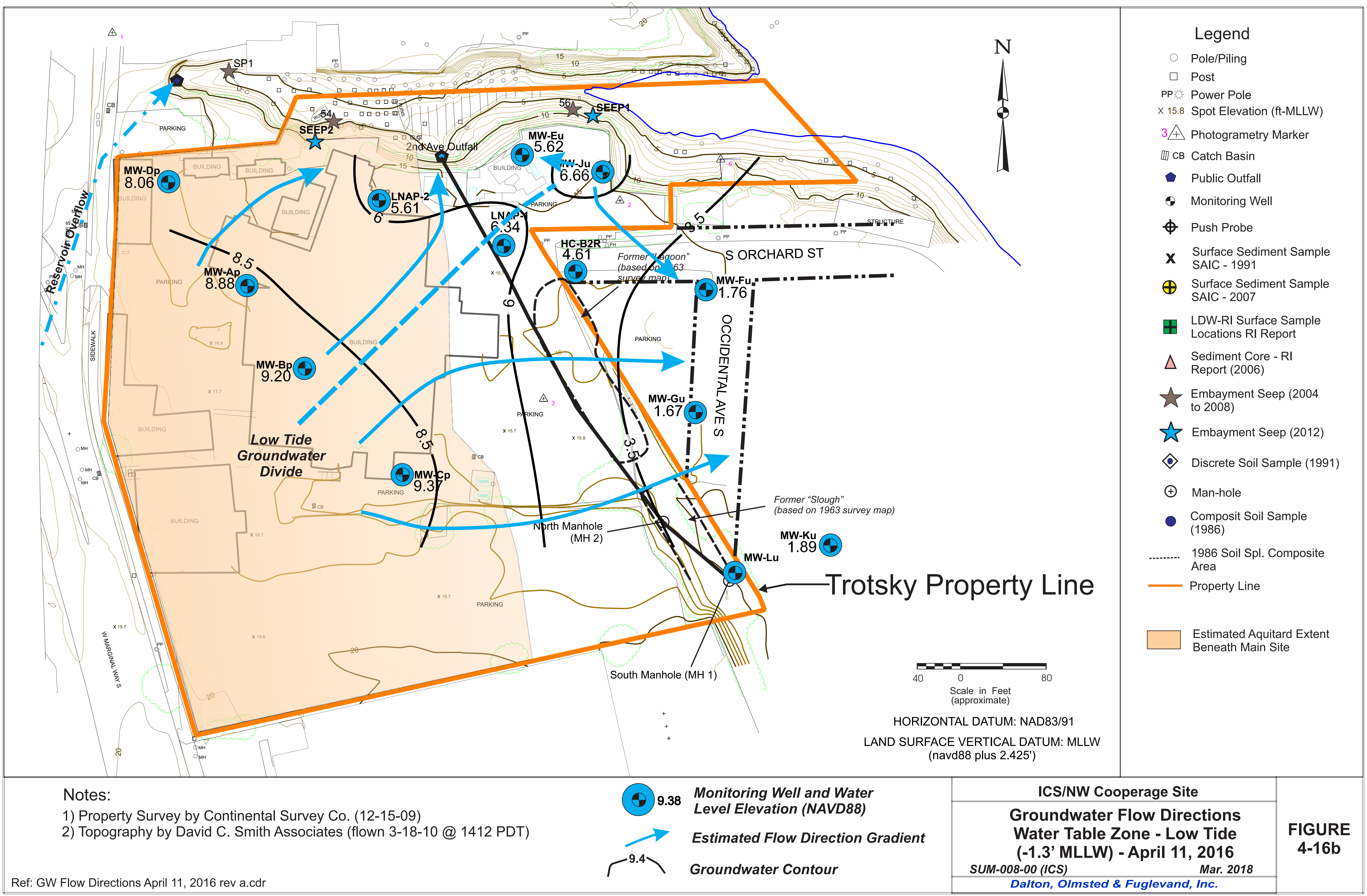
ICS/NW Cooperage Site

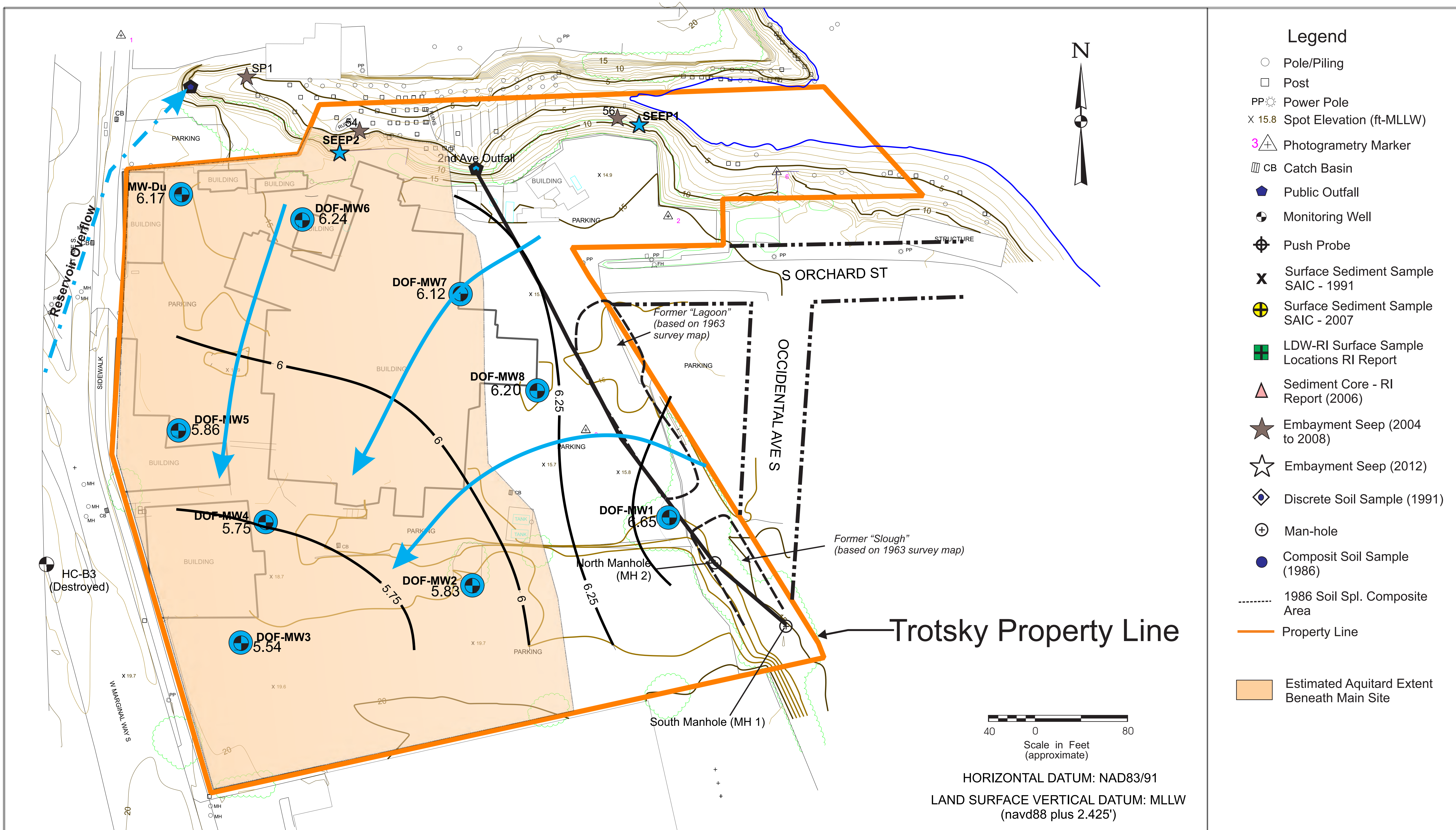
Groundwater Flow Directions Water Table Zone - High Tide (+10.8' MLLW) - April 11, 2016

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-16a


Legend
Pole/Piling
Post
PP Power Pole
X 15.8 Spot Elevation (ft-MLLW)
3 Photogrammetry Marker
CB Catch Basin
Public Outfall
Monitoring Well
Push Probe
Surface Sediment Sample SAIC - 1991
Surface Sediment Sample SAIC - 2007
LDW-RI Surface Sample Locations RI Report
Sediment Core - RI Report (2006)
Embayment Seep (2004 to 2008)
Embayment Seep (2012)
Discrete Soil Sample (1991)
Man-hole
Composite Soil Sample (1986)
1986 Soil Spl. Composite Area
Property Line
Estimated Aquitard Extent Beneath Main Site
N
MW-Dp 8.06
MW-Ap 8.88
MW-Bp 9.20
MW-Cp 9.37
MW-Eu 5.62
6.66
LNAP-2 5.61
6.34
HC-B2R 4.61
MW-Fu 1.76
MW-Gu 1.67
MW-Ku 1.89
MW-Lu
SP1
SEEP1
SEEP2
2nd Ave Outfall
Reservoir Overflow
Low Tide Groundwater Divide
S ORCHARD ST
OCCIDENTAL AVE S
W MARGINAL WAY S
SIDEWALK
Former "Slough" (based on 1963 survey map)
North Manhole (MH 2)
South Manhole (MH 1)
Trotsky Property Line
40 0 80
Scale in Feet (approximate)
HORIZONTAL DATUM: NAD83/91
LAND SURFACE VERTICAL DATUM: MLLW (navd88 plus 2.425')
Notes:
1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)
9.38 Monitoring Well and Water Level Elevation (NAVD88)
Estimated Flow Direction Gradient
9.4 Groundwater Contour
Ref: GW Flow Directions April 11, 2016 rev a.cdr
ICS/NW Cooperage Site
Groundwater Flow Directions
Water Table Zone - Low Tide
(-1.3' MLLW) - April 11, 2016
SUM-008-00 (ICS)
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.
FIGURE 4-16b



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: GW Flow Directions April 11, 2016 rev a.cdr

9.38 *Monitoring Well and Water Level Elevation (NAVD88)*

Estimated Flow Direction Gradient

9.4 *Groundwater Contour*

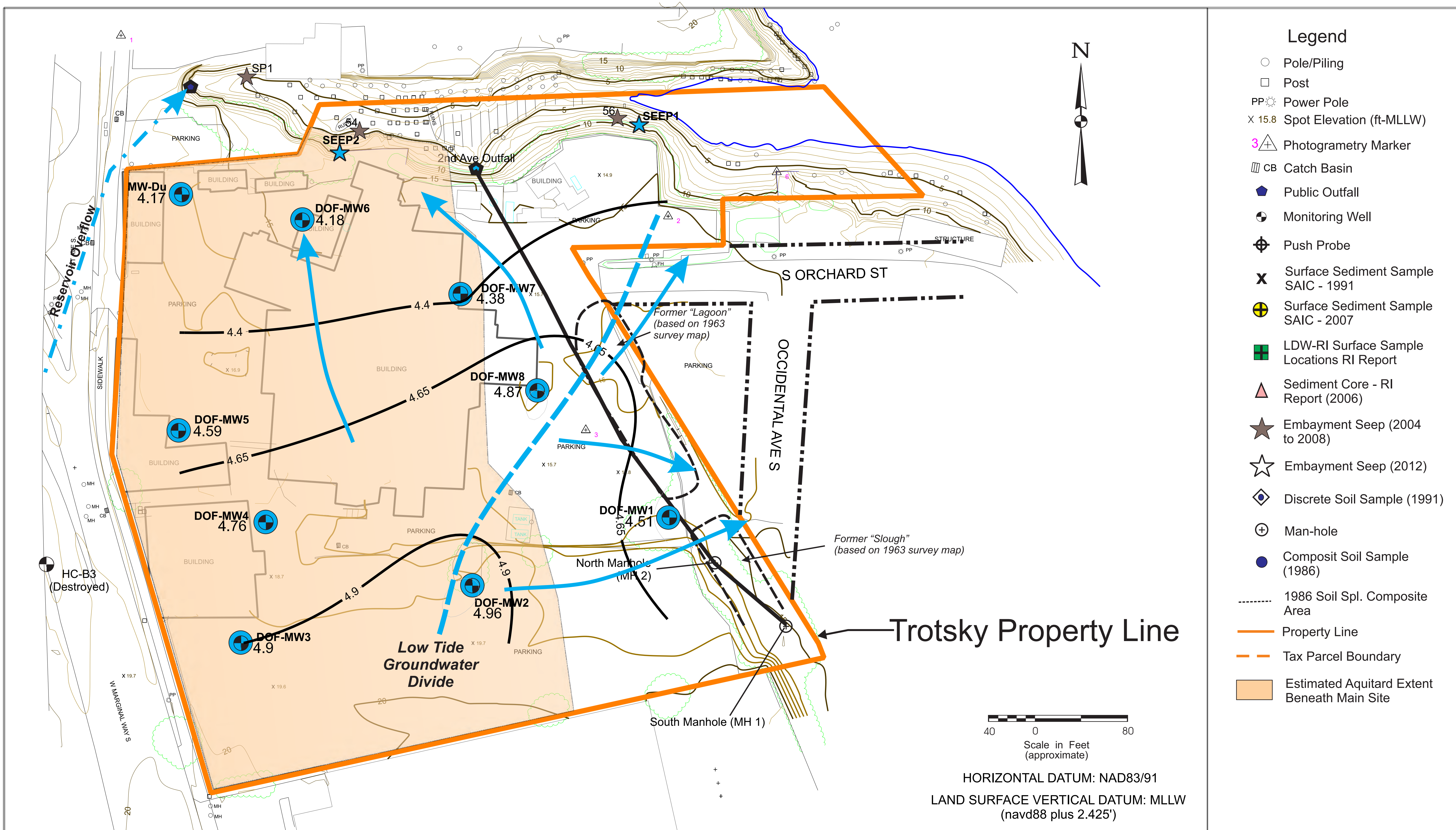
ICS/NW Cooperage Site

Groundwater Flow Directions Upper Zone - High Tide (+10.8' MLLW) - April 11, 2016

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-17a



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

9.38 *Monitoring Well and Water Level Elevation (NAVD88)*

Estimated Flow Direction Gradient

9.4 *Groundwater Contour*

Ref: GW Flow Directions April 11, 2016 rev a.cdr

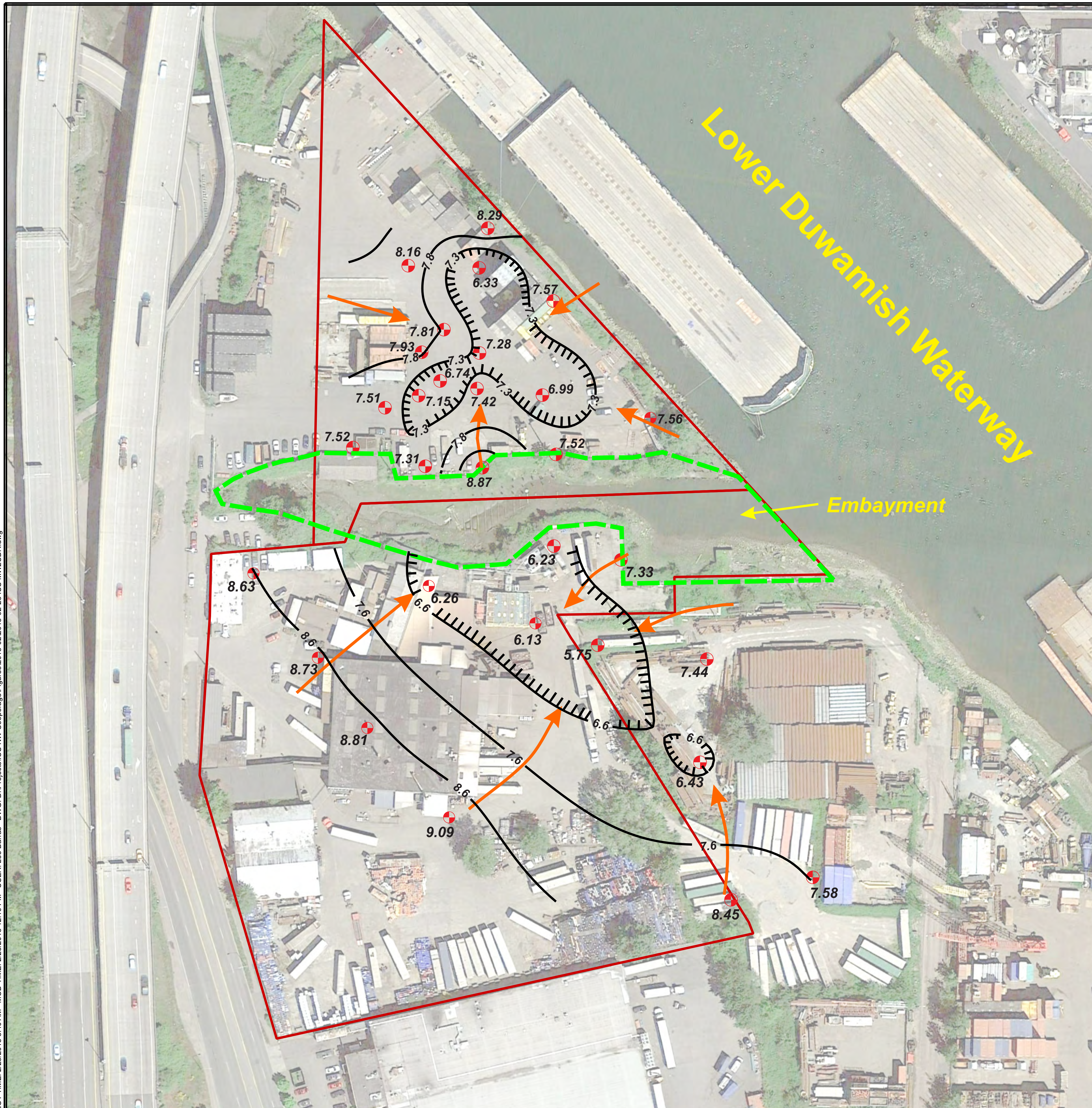
ICS/NW Cooperage Site

Groundwater Flow Directions Upper Zone - Low Tide (-1.3' MLLW) - April 11, 2016

SUM-008-00 (ICS) *Mar. 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-17b



Monitoring Well

7.33 Water Level Elevation (ft. NAVD88)

8.0 Groundwater Contour (ft. NAVD88)

Estimated High Tide Flow Gradient Direction

Property Boundary

1) Water level measurements were made on February 6, 2018 during a predicted high tide of +9.4 feet NAVD88 (11.8 feet MLLW) at 0923 hours between 0852 hours and 0940 hours.

2) The water table and upper zones are not differentiated on the Douglas property.

N

0 120
Scale in Feet

Feb 18 Flow Directions rev 6-9-21.cdr

ICS/NW Cooperage Site
Seattle,Washington

Groundwater Flow Directions - Water Table Zone
High Tide (+11.8' MLLW) - February 6, 2018

DOF DALTON OLMSTED FUGLEVAND

FIGURE
4-18a

March 2018

PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MW2CDR.dwg

Monitoring Well

7.33 Water Level Elevation (ft. NAVD88)

8.0 Groundwater Contour (ft. NAVD88)

Estimated Low Tide Flow Gradient Direction

Property Boundary

1) Water level measurements were made on February 6, 2018 during a predicted high tide of +0.1 feet NAVD88 (2.5 feet MLLW) at 1609 hours between 1541 hours and 1632 hours.

2) The water table and upper zones are not differentiated on the Douglas property.

N

0 120
Scale in Feet

Feb 18 Flow Directions rev 6-9-21.cdr

PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MW2CDR.dwg

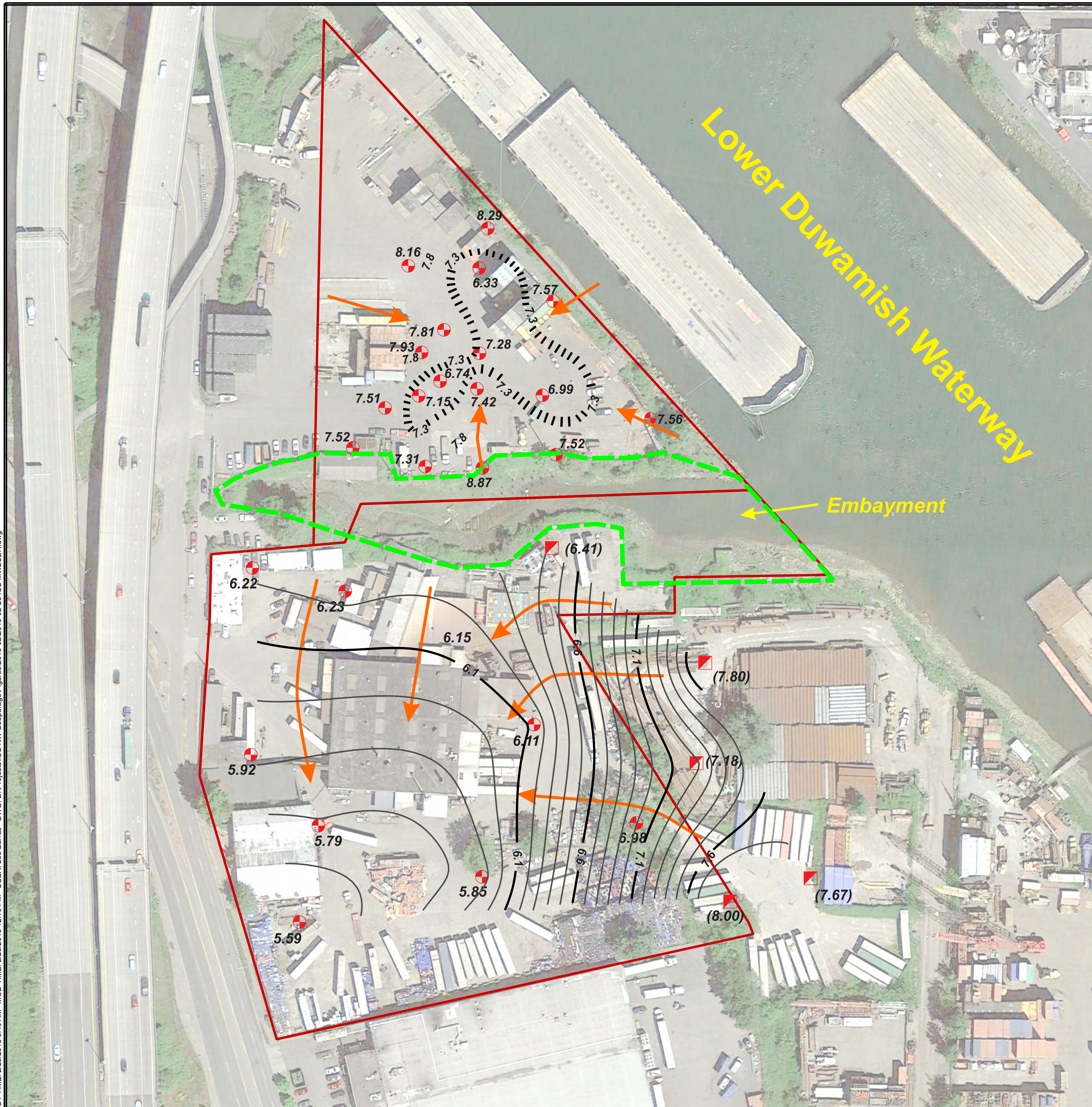
ICS/NW Cooperage Site
Seattle,Washington

Groundwater Flow Directions - Water Table Zone
Low Tide (+2.5' MLLW) - February 6, 2018

DOF DALTON OLMSTED FUGLEVAND

FIGURE
4-18b

March 2018



- Monitoring Well (Upper Zone)
- *7.33* Water Level Elevation (ft. NAVD88)
- Monitoring Location w/ Water Table and Lower Zone Wells
- *(7.33)* Interpolated Water Level Elevation (ft. NAVD88)
- *8.0* Groundwater Contour (ft. NAVD88)
- Estimated High Tide Flow Gradient Direction
- Property Boundary

1) Water level measurements were made on February 6, 2018 during a predicted high tide of +9.4 feet NAVD88 (11.8 feet MLLW) at 0923 hours between 0852 hours and 0940 hours.

2) The water table and upper zones are not differentiated on the Douglas property.

N

0 120
Scale in Feet

ICS/NW Cooperage Site
Seattle,Washington

Groundwater Flow Directions - ICS Upper Zone
High Tide (+11.8' MLLW) - February 6, 2018

DOF DALTON OLMSTED FUGLEVAND

FIGURE
4-19a

March 2018

Monitoring Well (Upper Zone)

7.33 Water Level Elevation (ft. NAVD88)

Monitoring Location w/ Water Table and Lower Zone Wells

(7.33) Interpolated Water Level Elevation (ft. NAVD88)

8.0 Groundwater Contour (ft. NAVD88)

Estimated Low Tide Flow Gradient Direction

Property Boundary

1) Water level measurements were made on February 6, 2018 during a predicted high tide of +0.1 feet NAVD88 (+2.5 feet MLLW) at 1609 hours between 1541 hours and 1632 hours.

2) The water table and upper zones are not differentiated on the Douglas property.

N

0 120
Scale in Feet

Feb 18 Flow Directions rev 6-9-21.cdr

PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MW2CDR.dwg

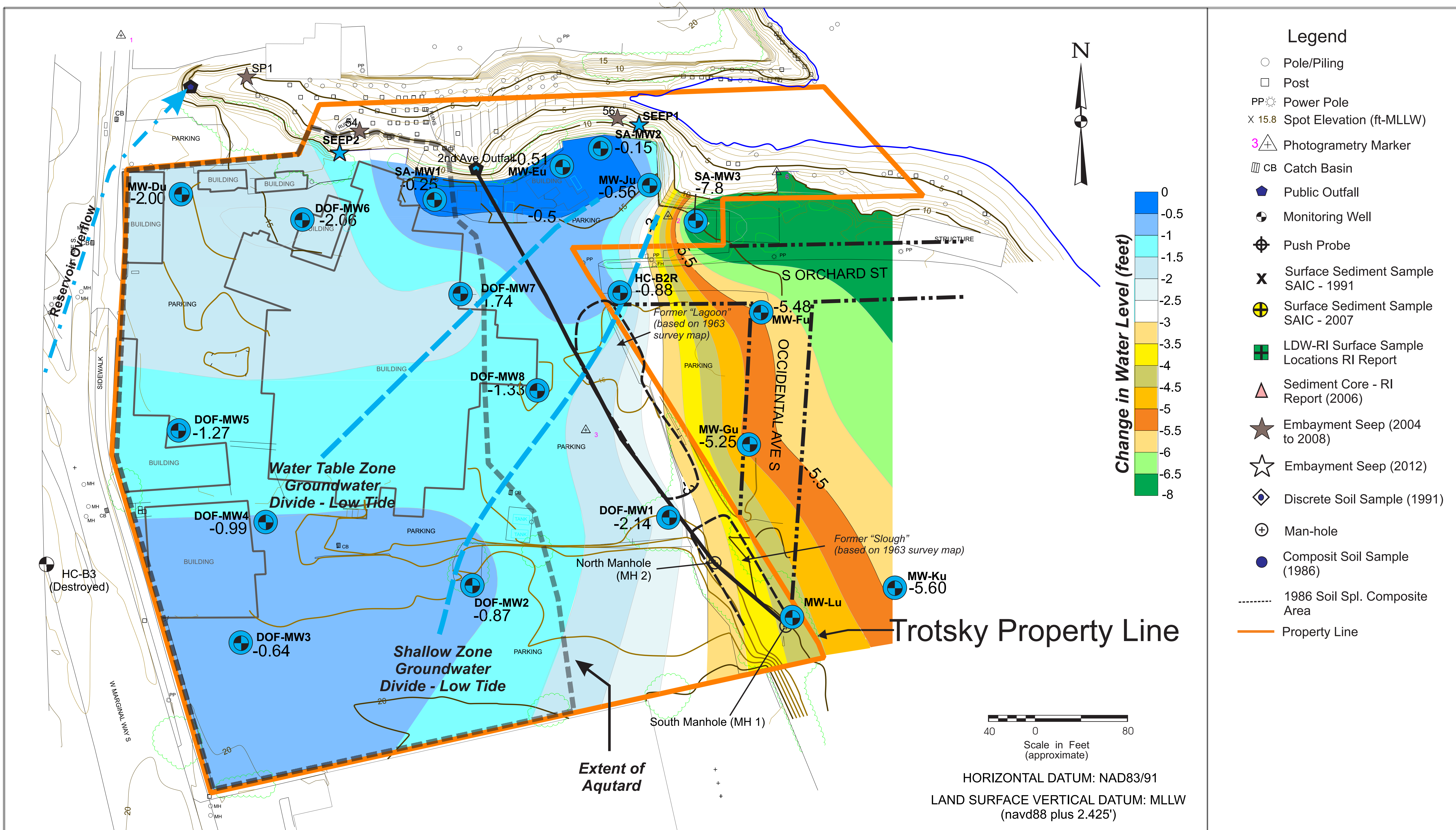
ICS/NW Cooperage Site
Seattle,Washington

Groundwater Flow Directions - ICS Upper Zone
Low Tide (+2.5' MLLW) - February 6, 2018

DOF DALTON OLMSTED FUGLEVAND

FIGURE
4-19b

June 2021



Notes:

1) Upper Zone Includes Water Table and Shallow Zone Wells
2) Wells SA-MW1, SA-MW2 and SA-MW3 are screened in both the Water Table and Shallow Zones.

Ref: GW Flow Directions April 11, 2016Rev.cdr

Monitoring Well

-0.87 ***Change in Water Level - High to Low Tide in Feet***

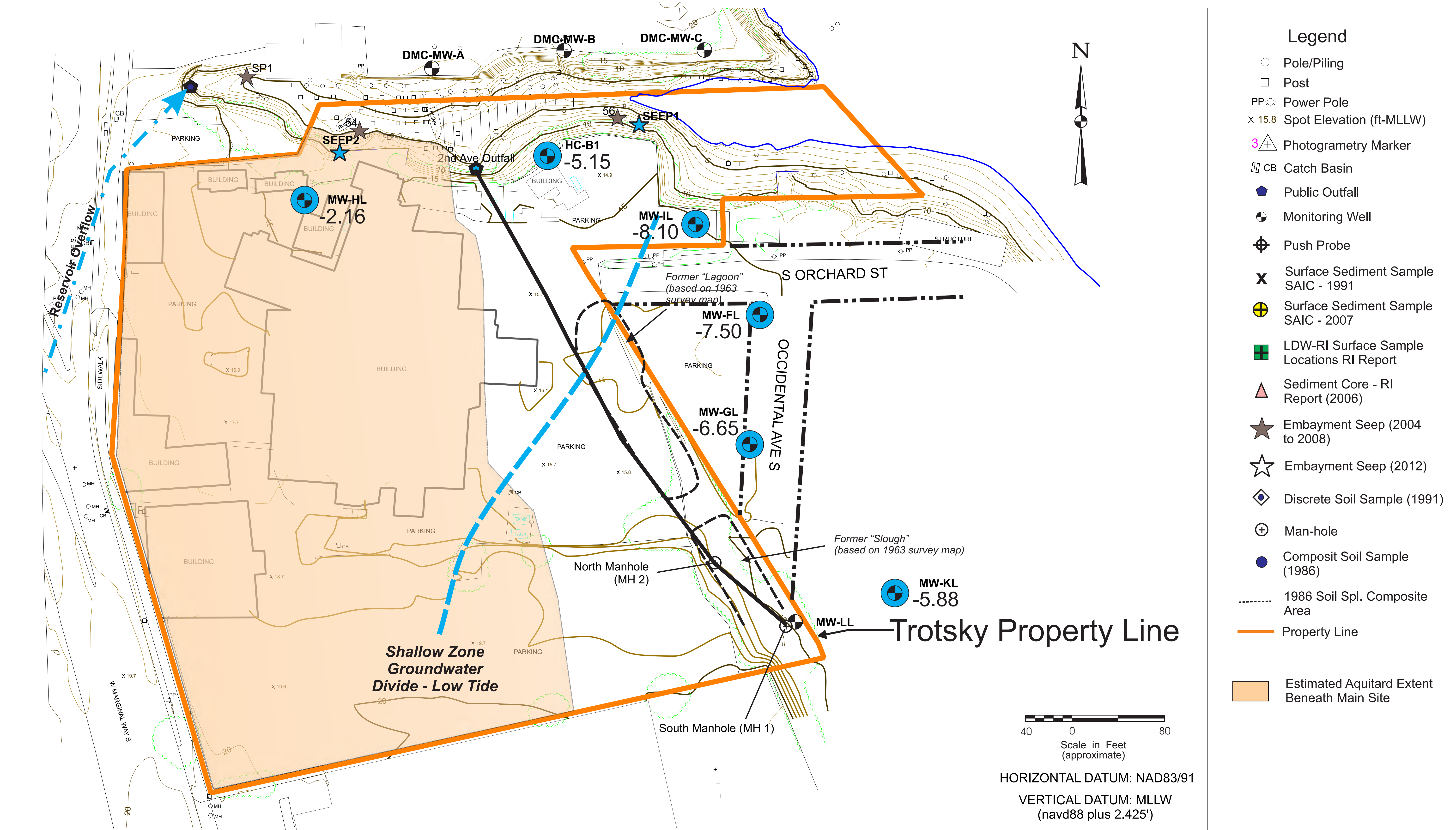
ICS/NW Cooperage Site

Change in Water Levels - Water Table/ Upper Zone High to Low Tide (+10.8' to -1.3' MLLW) - April 11, 2016

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-20a



Notes:
1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

MW-KL — *Lower Zone Monitoring Well*

-0.87 — *Change in Water Level - High to Low Tide in Feet*

ICS/NW Cooperage Site

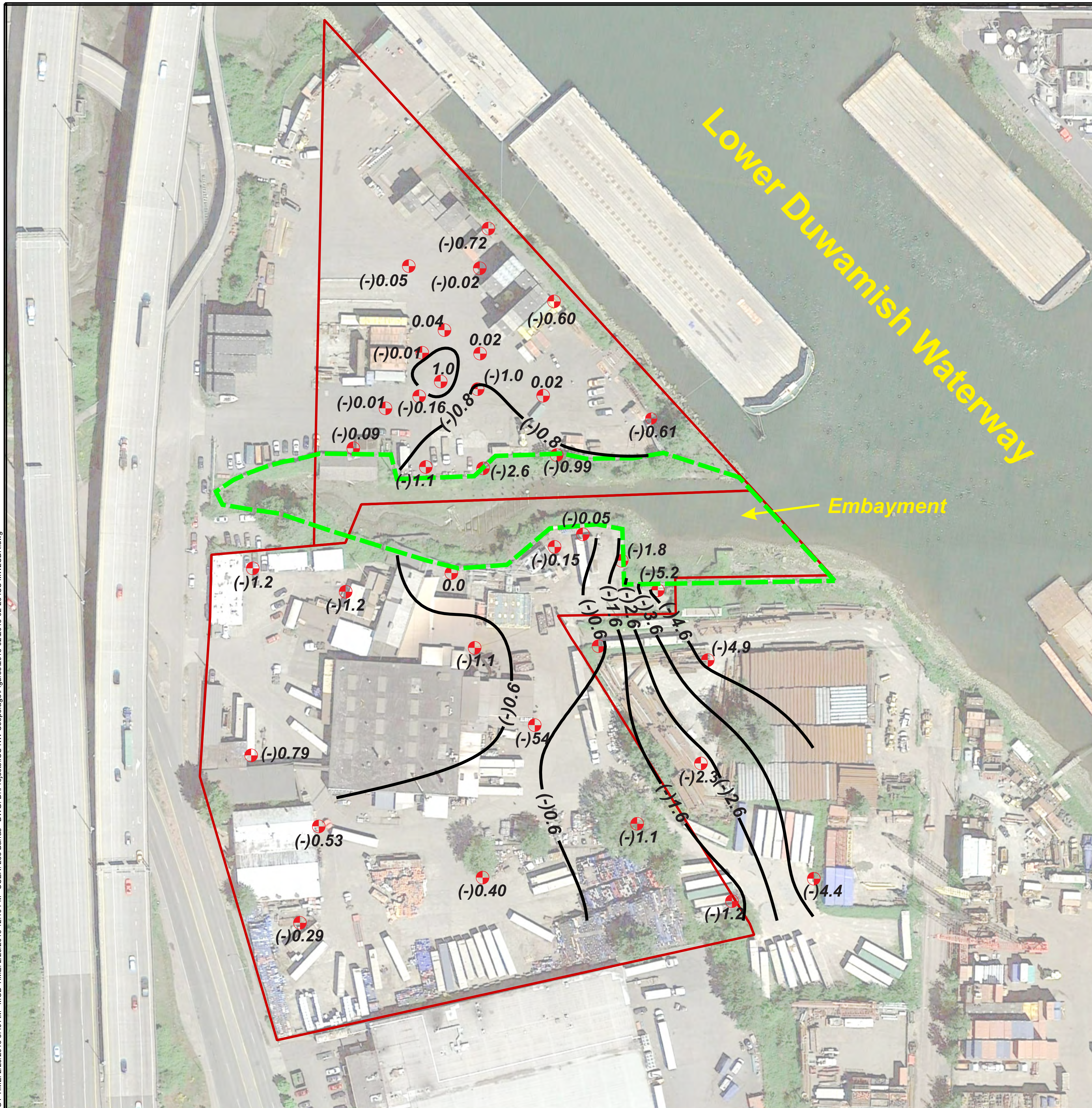
Change in Water Levels - Lower Zone High to Low Tide (10.8' to -1.3' MLLW) April 11, 2016

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-20b

Ref: GW Flow Directions April 11, 2016Rev.cdr



Monitoring Well

(-)4.6 Water Level Change (feet)

(-)0.1 Contour Equal Water Level Change

Property Boundary

Water level measurements were made on February 6, 2018 during predicted tides of +0.1 feet NAVD88 (2.5 feet MLLW) and +9.4 feet NAVD88 (+11.8 feet MLLW).

N

0 120
Scale in Feet

Feb 18 Flow Directions.cdr

PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MW2CDR.dwg

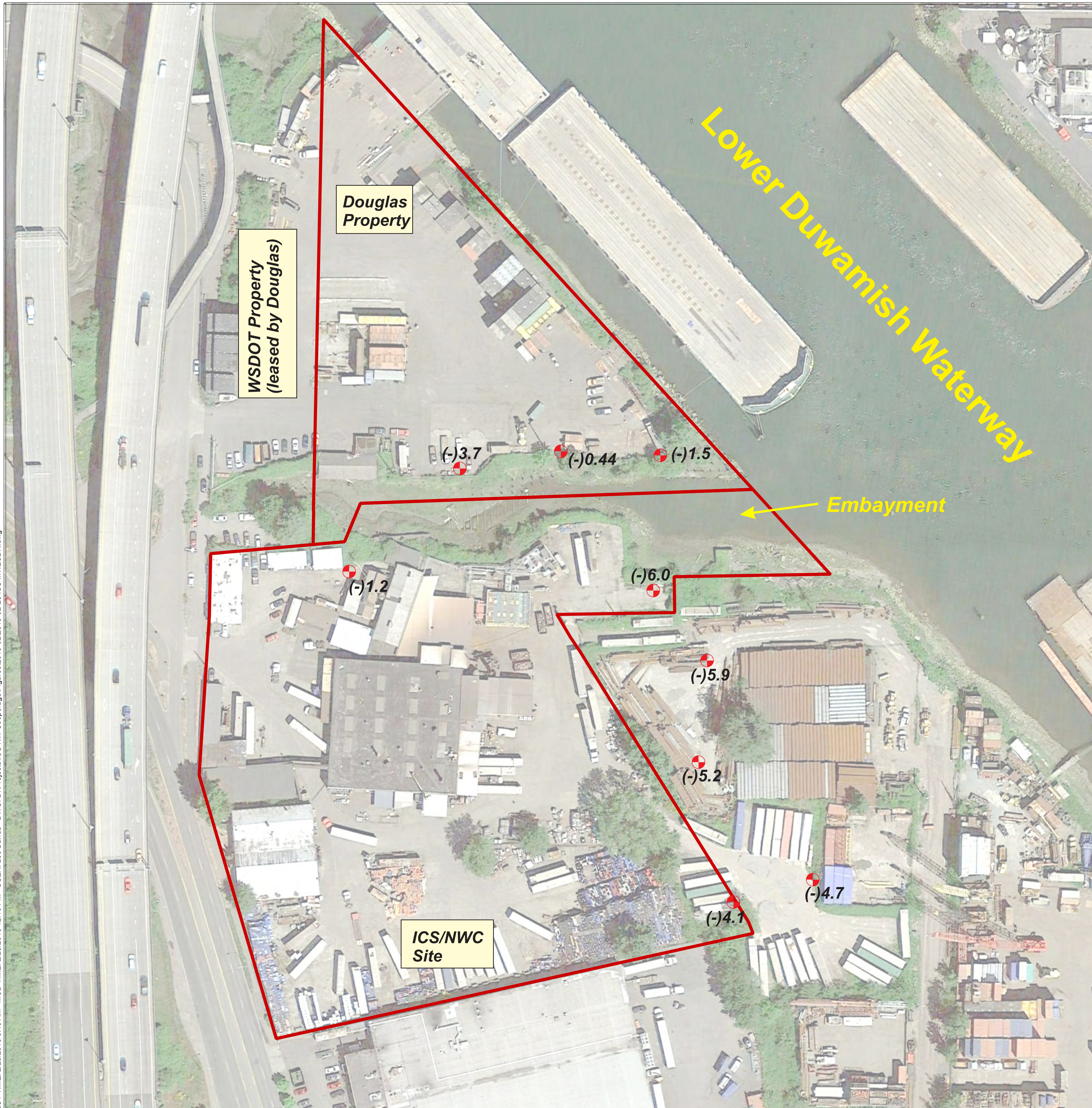
ICS/NW Cooperage Site
Seattle,Washington

DOF DALTON OLMSTED FUGLEVAND

Changes in Well Water Levels
in Water Table/Upper Zone - February 6, 2018

FIGURE
4-21a

March 2018



Monitoring Well

(-)4.6 Water Level Change (feet)

Property Boundary

Water level measurements were made on February 6, 2018 during predicted tides of +0.1 feet NAVD88 (2.5 feet MLLW) and +9.4 feet NAVD88 (+11.8 feet MLLW).

N

0 120
Scale in Feet

Feb 18 Flow Directions.cdr

ICS/NW Cooperage Site
Seattle, Washington

Changes in Well Water Levels
in Lower Zone - February 6, 2018

DOF DALTON OLMSTED FUGLEVAND

FIGURE
4-21b

March 2018

PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MW2CDR.dwg

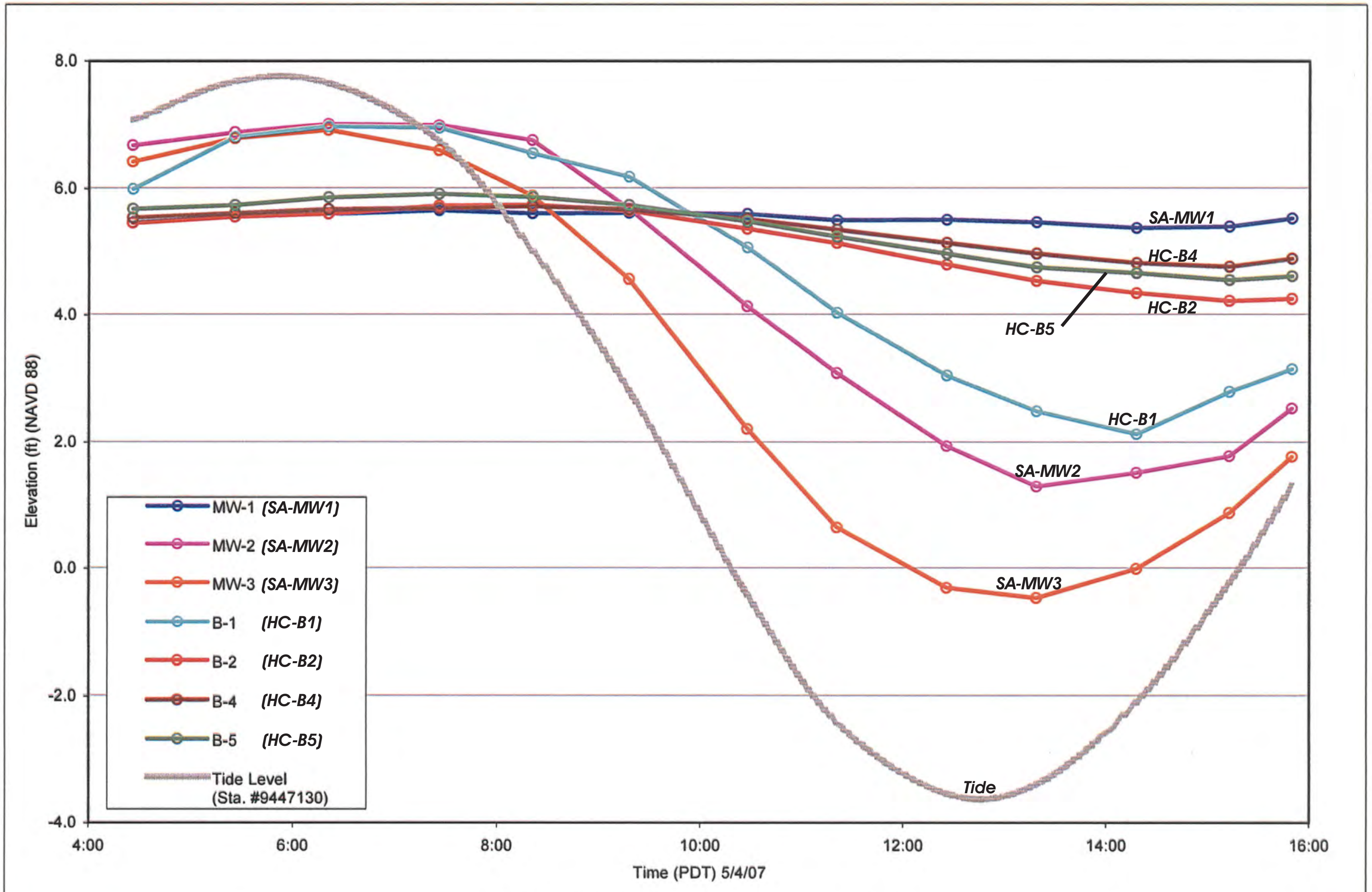


Figure 4. Graph of Water Table and Tide Height Elevations

After Figure 4 (SAIC 2007b)

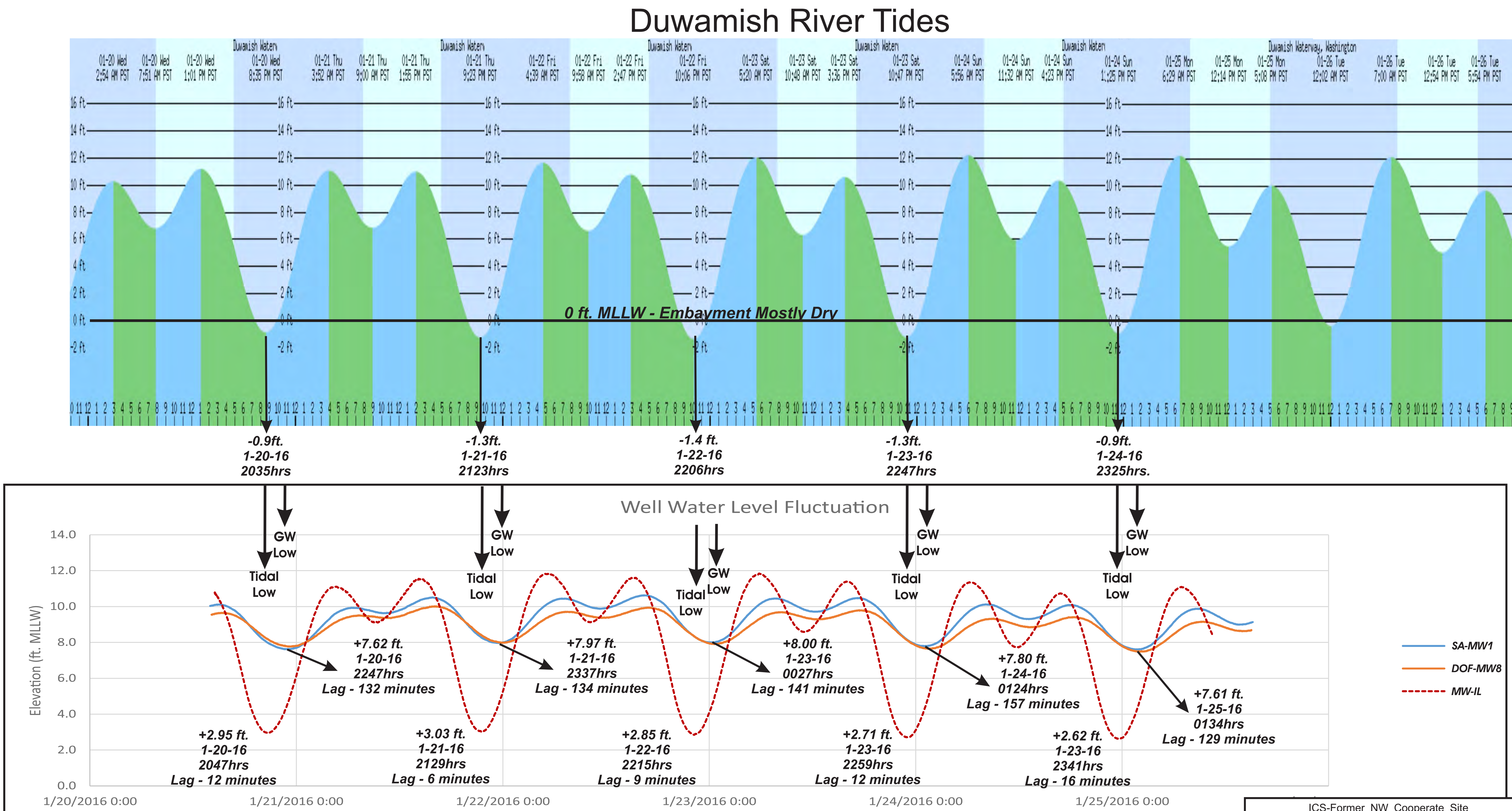
ICS/NW Cooperage Site
Seattle, Washington

Water Level Fluctuations
May 2007

SUM-008-00 **FIGURE 4-22** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: 2007 WL Fluctuations rev.cdr



Ref: Tidal Plots Jan 2016.cdr

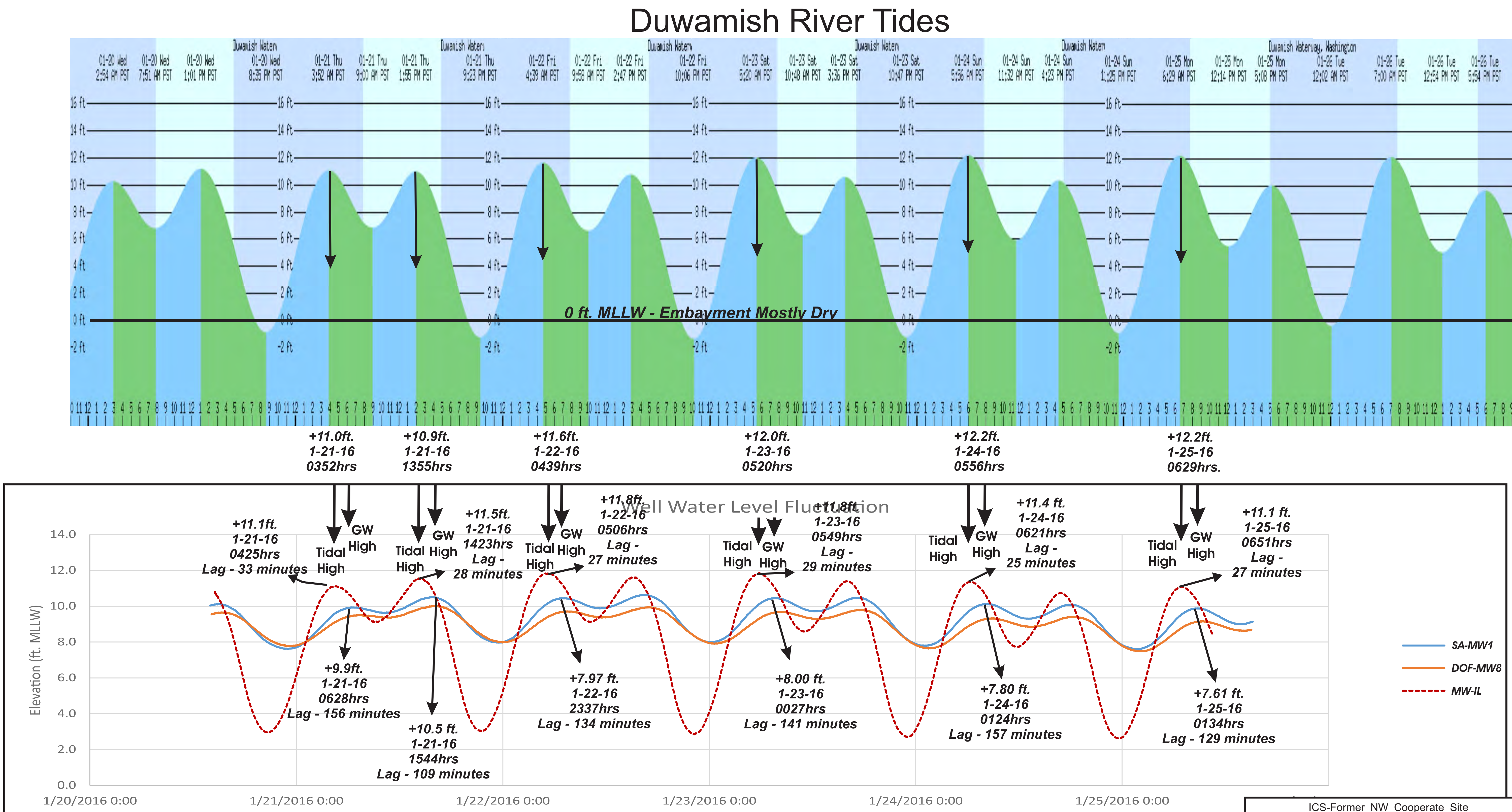
ICS-Former NW Cooperate Site
Seattle, Washington

Comparison Water Level Fluctuations Low Tides

SUM-008-00 **FIGURE 4-23a** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Duwamish River Tides



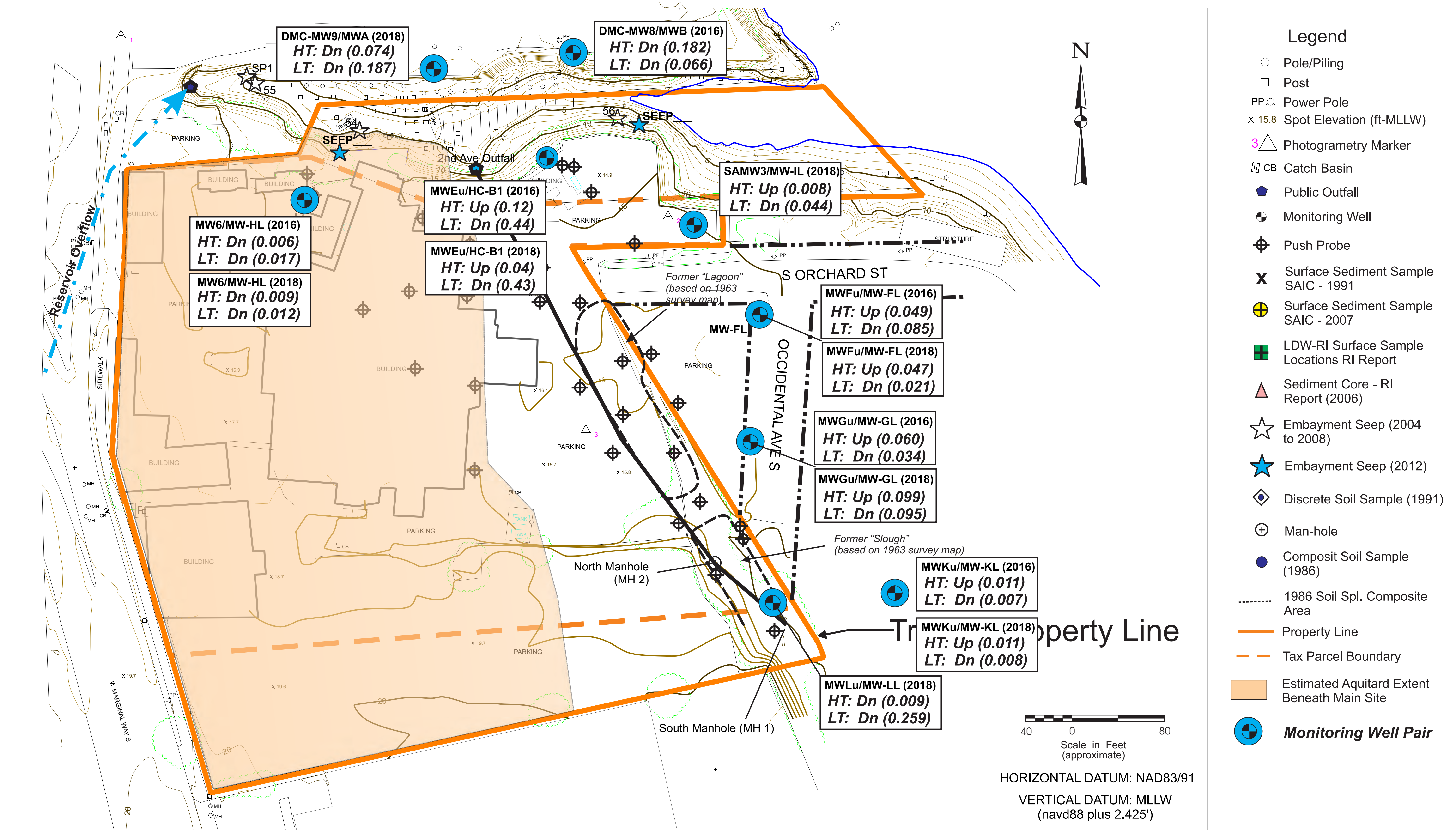
Ref: Tidal Plots Jan 2016.cdr

ICS-Former NW Cooperate Site
Seattle, Washington

Comparison Water Level Fluctuations High Tides

SUM-008-00 **FIGURE 4-23b** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

HT: High Tide (April 2016 +10.8'; February 2018 +11.8' MLLW)
LT: Low Tide (April 2016 -1.3'; February 2018 +2.5' MLLW)
Up: Upward Gradient
Dn: Downward Gradient
(0.010) Gradient Magnitude

Ref: Vertical Gradients rev.cdr

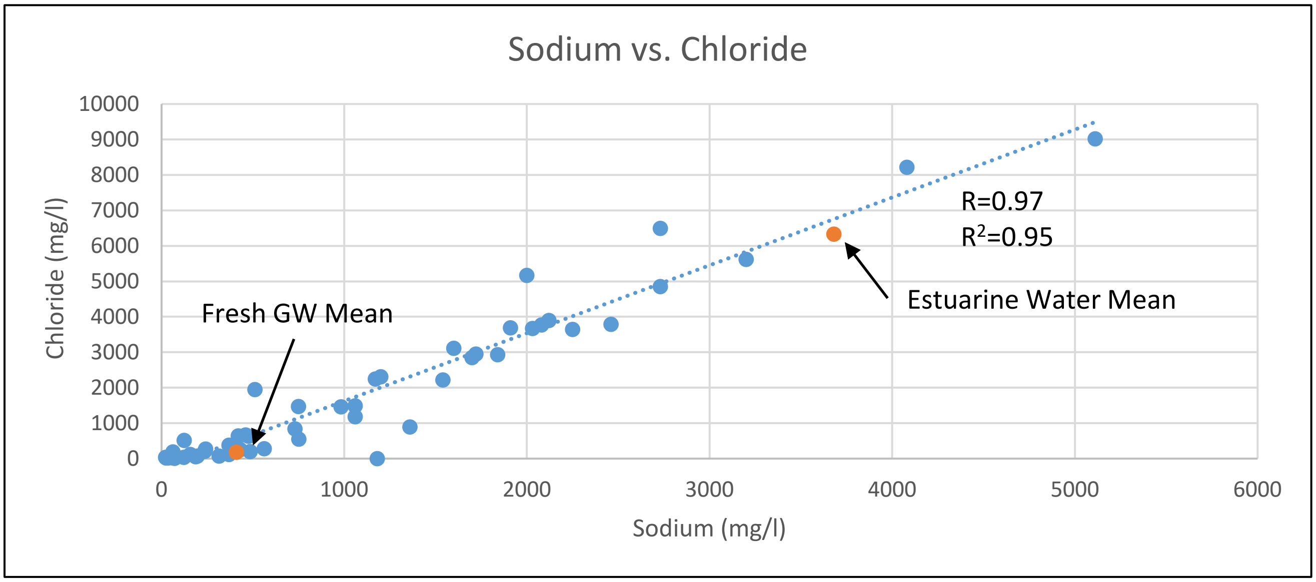
ICS/NW Cooperage Site

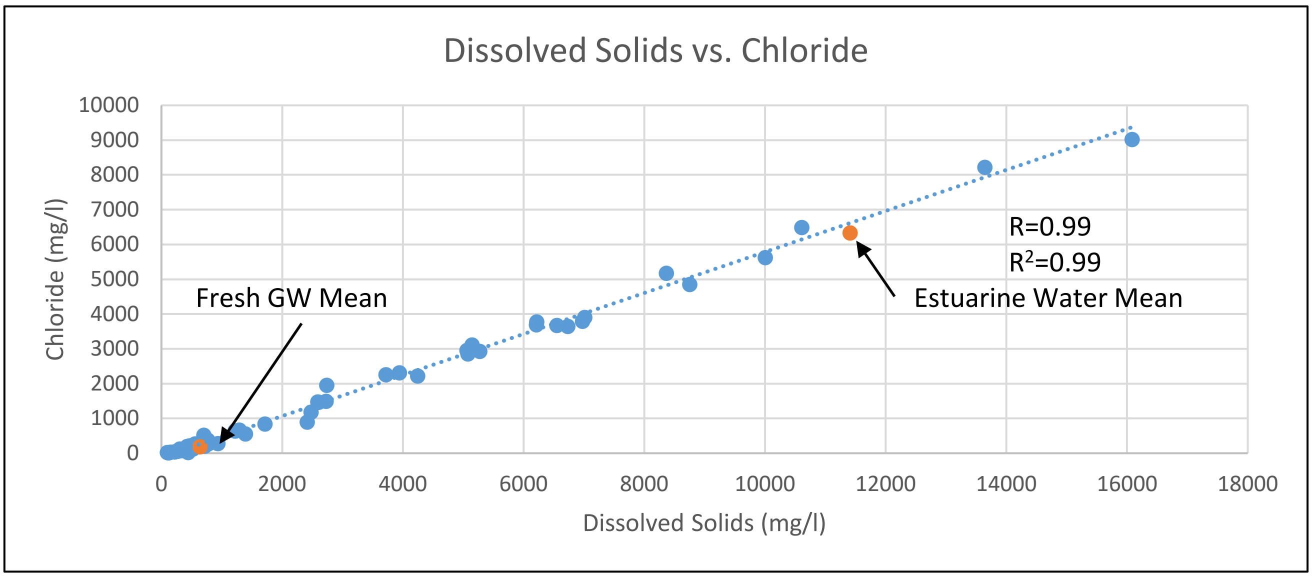
Vertical Gradients

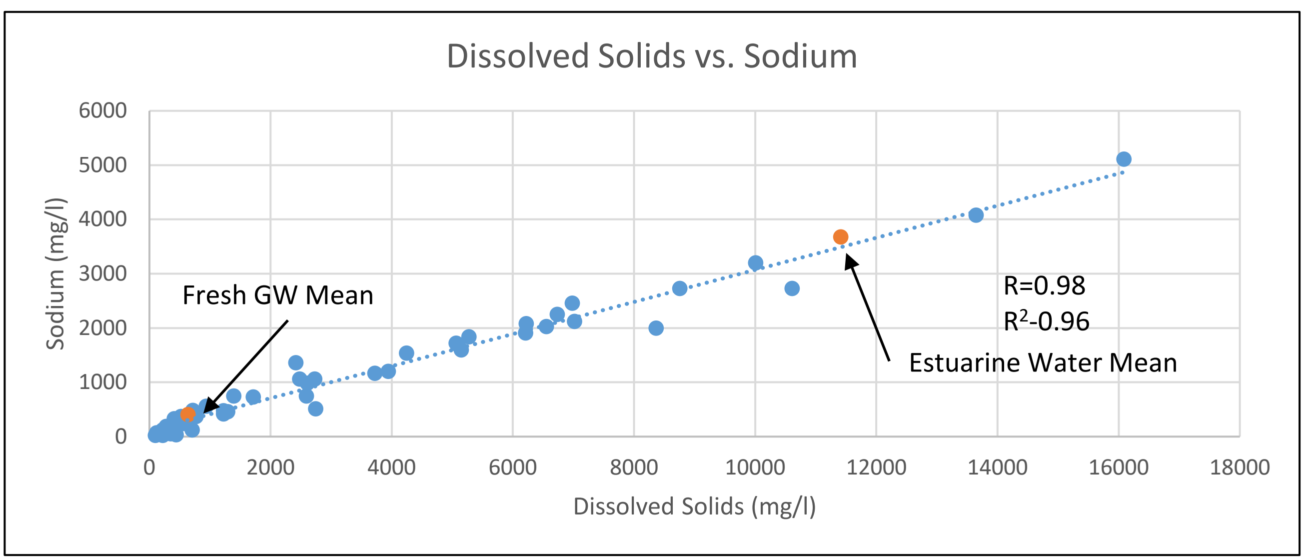
SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-24

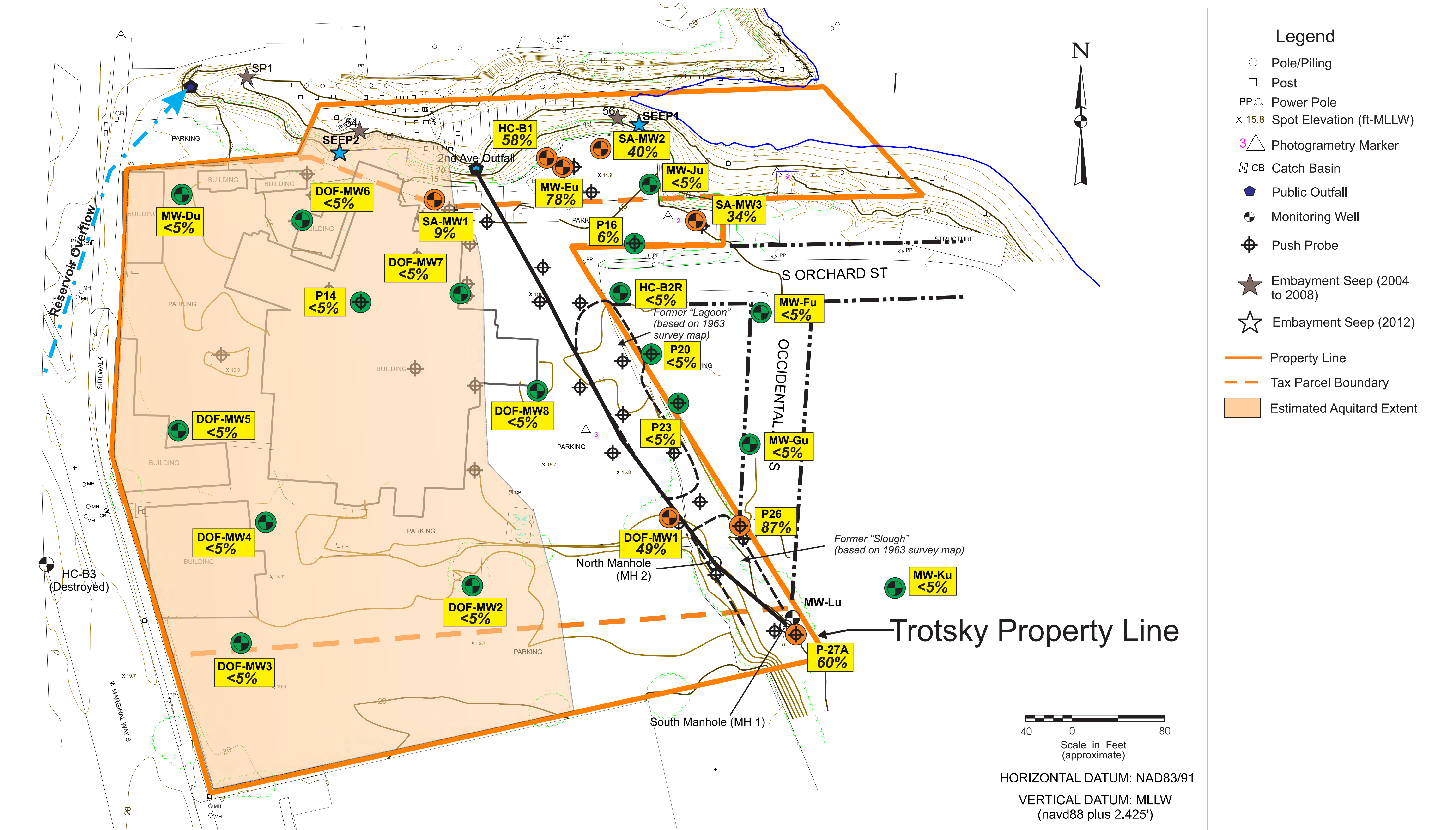






Dalton, Olmsted Fuglevand, Inc.

FIGURE 4-25 - Plots Conventional Parameters



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Estuarine Water Content Less Than 5%

Estuarine Water Content Equal to or Greater Than 5%

Ref: Mixing Ratios rev.cdr

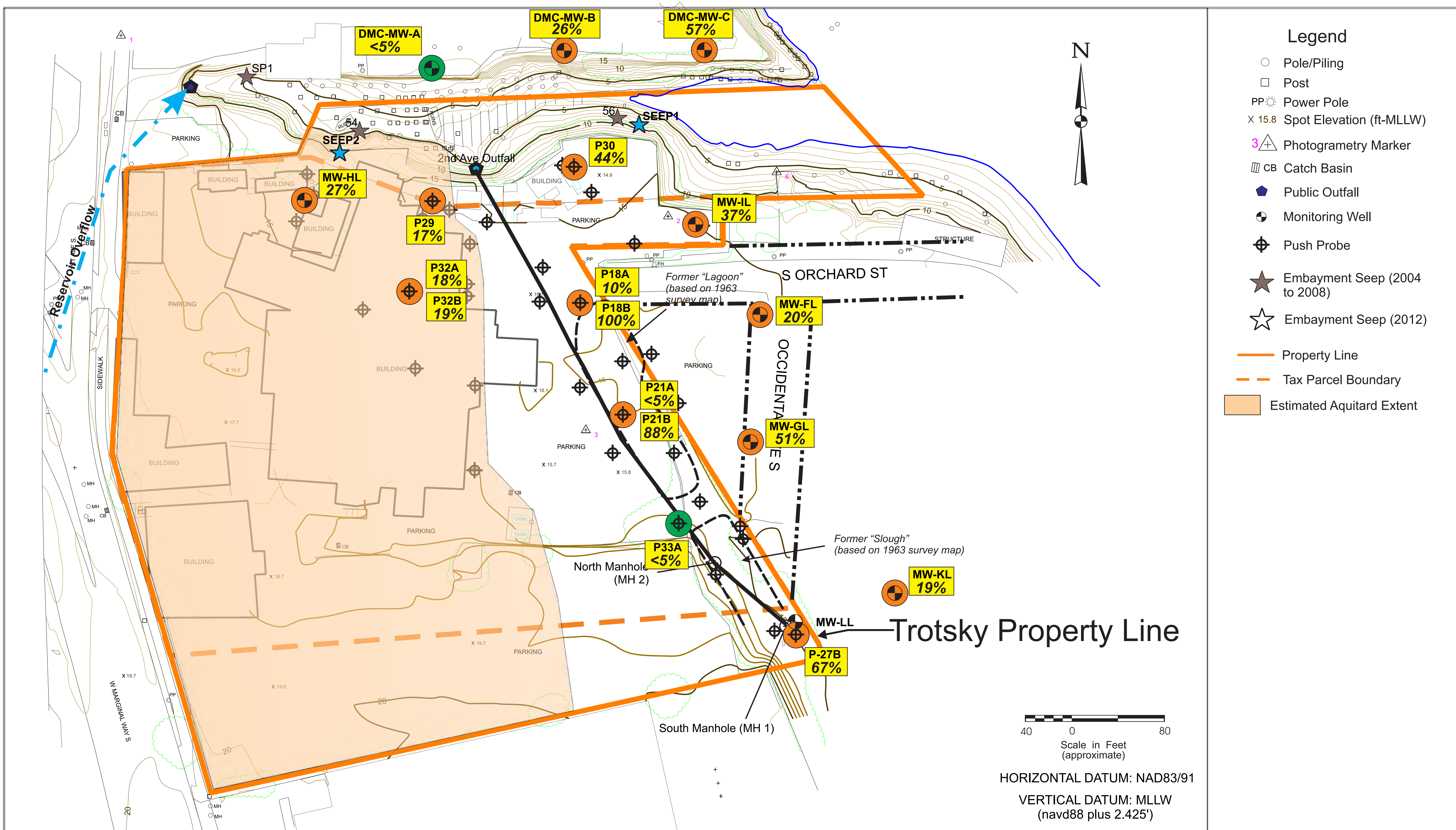
ICS/NW Cooperage Site

Estuarine Water Contents Water Table/Upper Zone Groundwater

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-26a



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Estuarine Water Content Less Than 5%

Estuarine Water Content Equal to or Greater Than 5%

Ref: Mixing Ratios rev.cdr

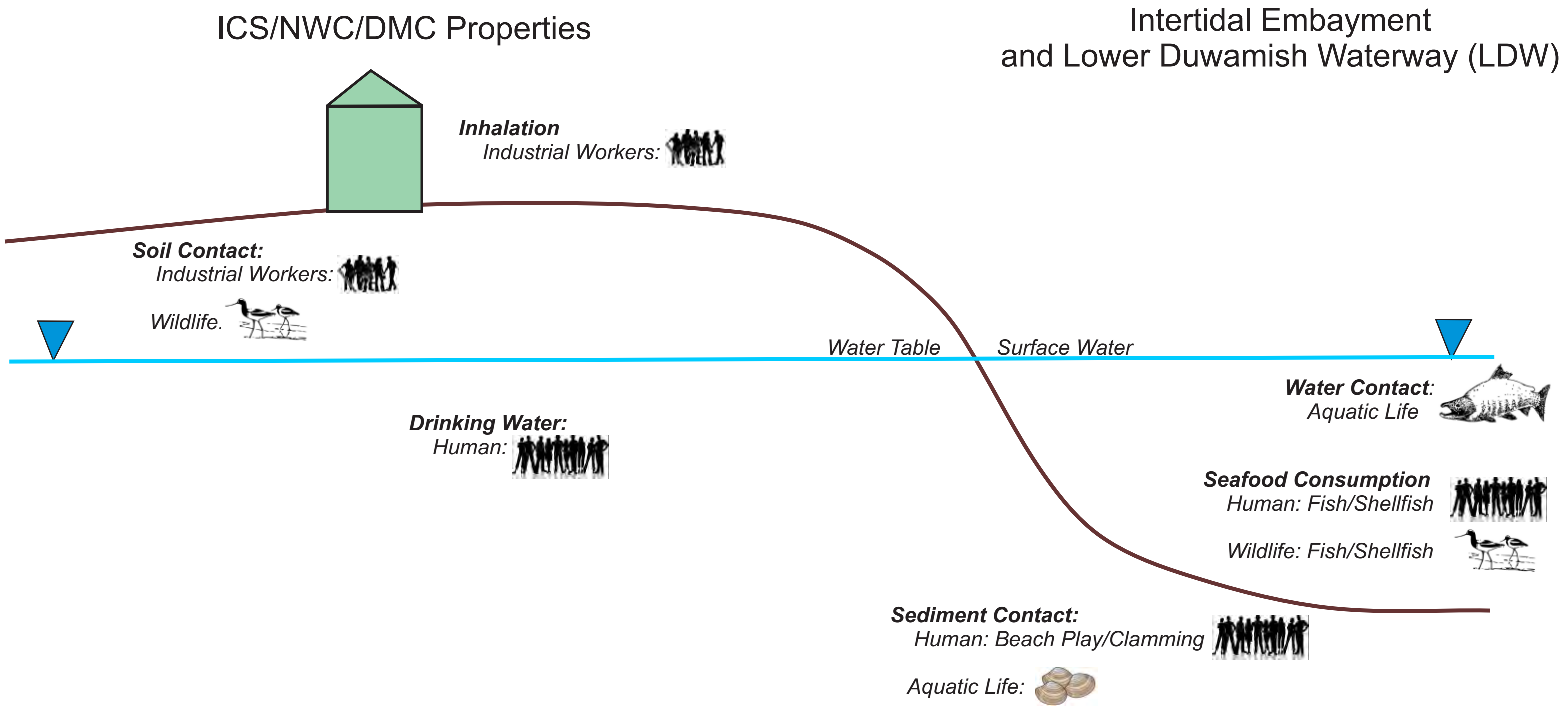
ICS/NW Cooperage Site

Estuarine Water Contents Lower Zone Groundwater

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

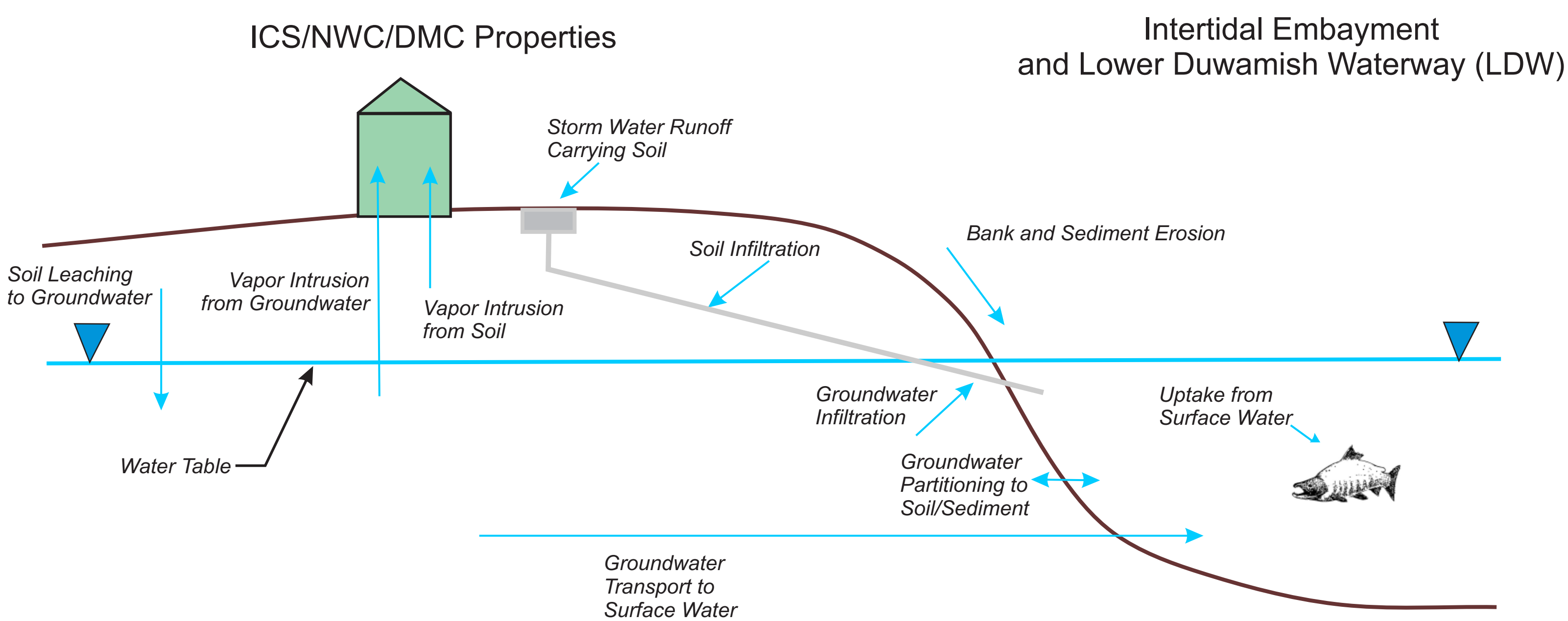
FIGURE 4-26b



ICS/NW Cooperage Site	FIGURE 5-1
Possible Exposure/Receptor Pathways	
SUM-008-00 *Mar. 2018*	
Dalton, Olmsted & Fuglevand, Inc.	

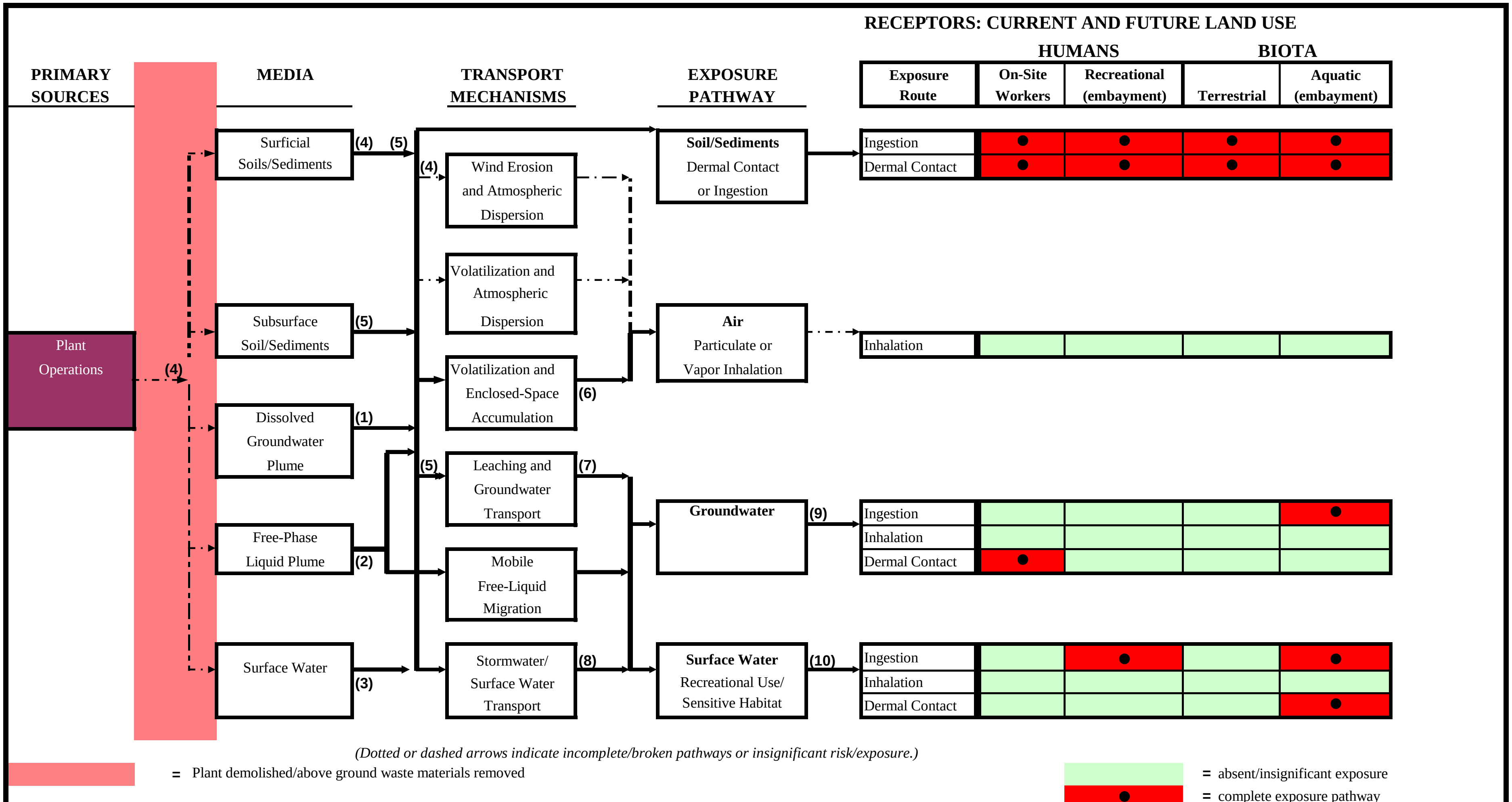
Ref: Exposure Pathways.cdr

Adapted From Figure 2 Ecology (2017)



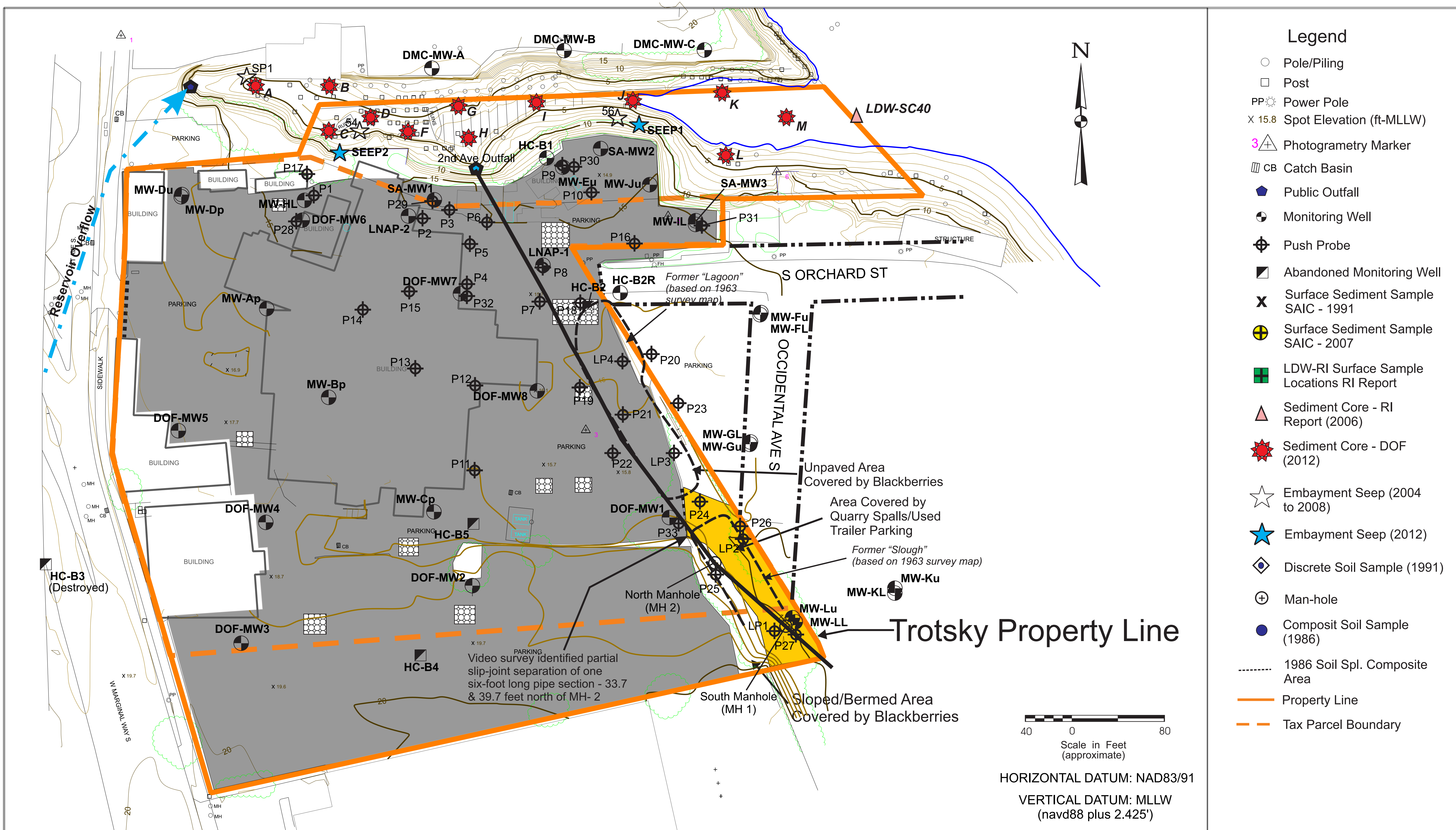
Ref: Conceputal Transport.cdr Adapted From Figure 1 Ecology (2017)

ICS/NW Cooperage Site	FIGURE 5-2
Possible Transport Pathways	
SUM-008-00 ***Mar. 2018***	
Dalton, Olmsted & Fuglevand, Inc.	



(1) = Multiple constituents dissolved in groundwater
(2) = Free-phase hydrocarbons encountered in well SA-MW1.
(3) = Surface water not a source
(4) = Site is 98% coverd with paving and buildings; stormwater is collected, treated and discharged to sanitary sewer; waste materials are disposed off-site; sediments are wet.
(5) = Multiple constituents present in soil and sediment
(6) = Structures on site; VOCs in shallow groundwater small portion of site.
(7) = Groundwater discharge to surface water
(8) = Possible bank and sediment erosion
(9) = Groundwater drinking water use unlikely
(10) = Recreational Harvesting - Fish/Shellfish Ingestion

FIGURE 5-3
Exposure Pathway Analysis



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: TEE Unpaved Areas.cdr

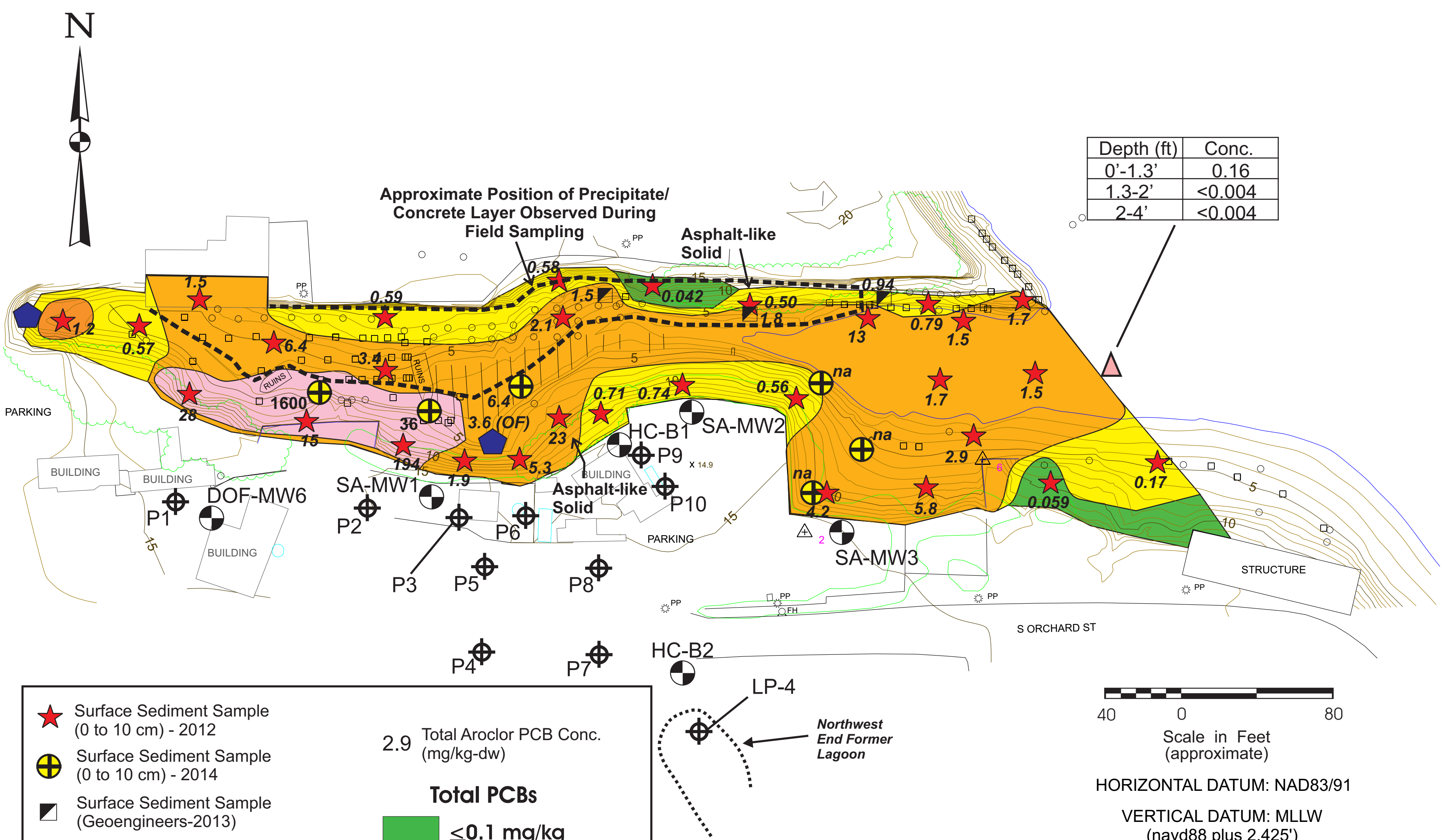
ICS/NW Cooperage Site

Sample Locations in Paved and Unpaved Areas

SUM-008-00 (ICS) ***May 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5.4



Surface Sediment Sample (0 to 10 cm) - 2012

Surface Sediment Sample (0 to 10 cm) - 2014

Surface Sediment Sample (Geoengineers-2013)

Sediment Core - 2006

Push-Probe (2008)

Monitoring Well

Public Outfall (OF sample collected 1-foot from end of pipe)

na Not Analyzed

2.9 Total Aroclor PCB Conc. (mg/kg-dw)

Total PCBs

- ≤0.1 mg/kg
- >0.1 to 1 mg/kg
- >1 to 10 mg/kg
- >10 mg/kg

Embay PCB updated 1brev.cdr

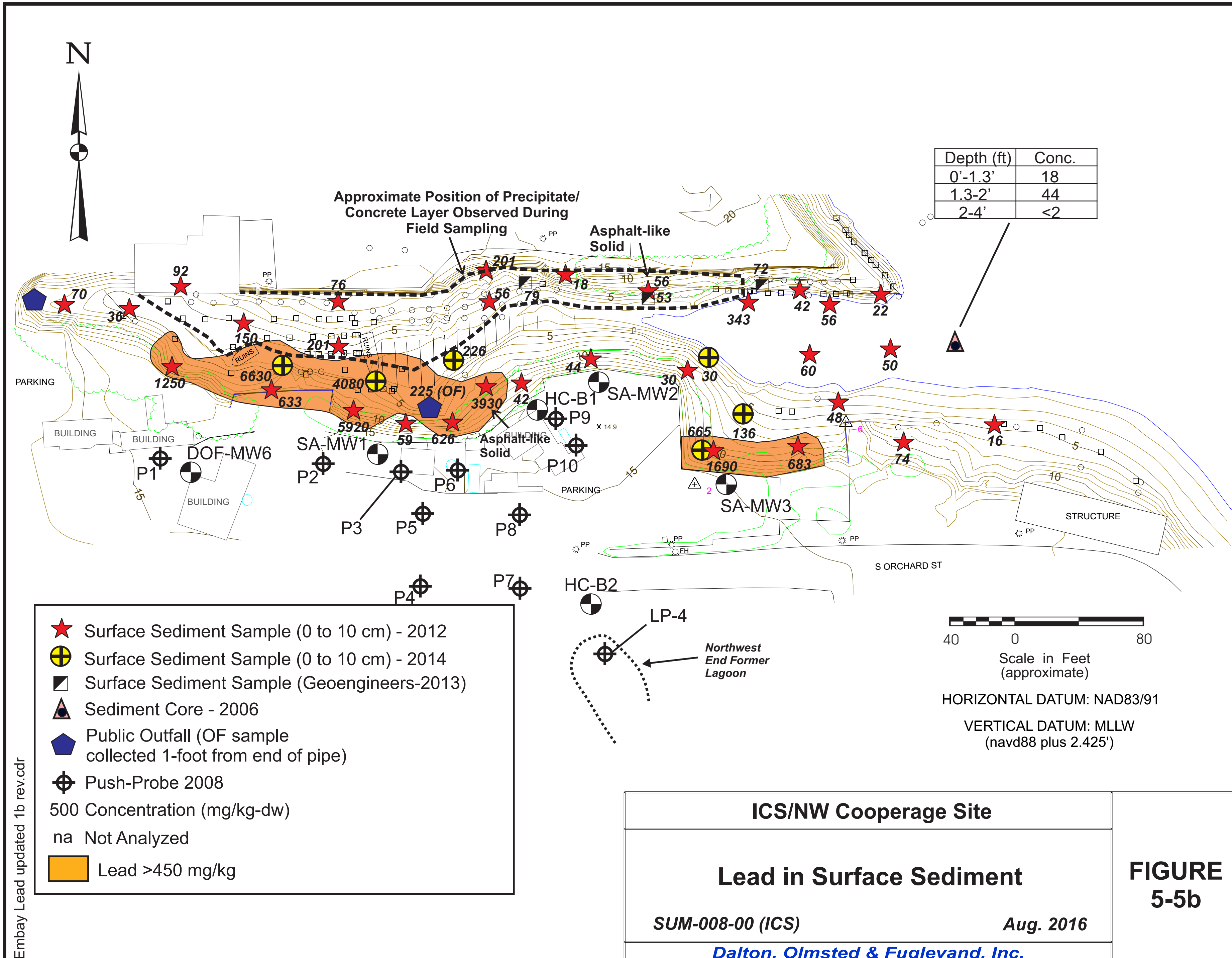
ICS/NW Cooperage Site

PCBs in Surface Sediment

SUM-008-00 (ICS) ***Jan. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-5a



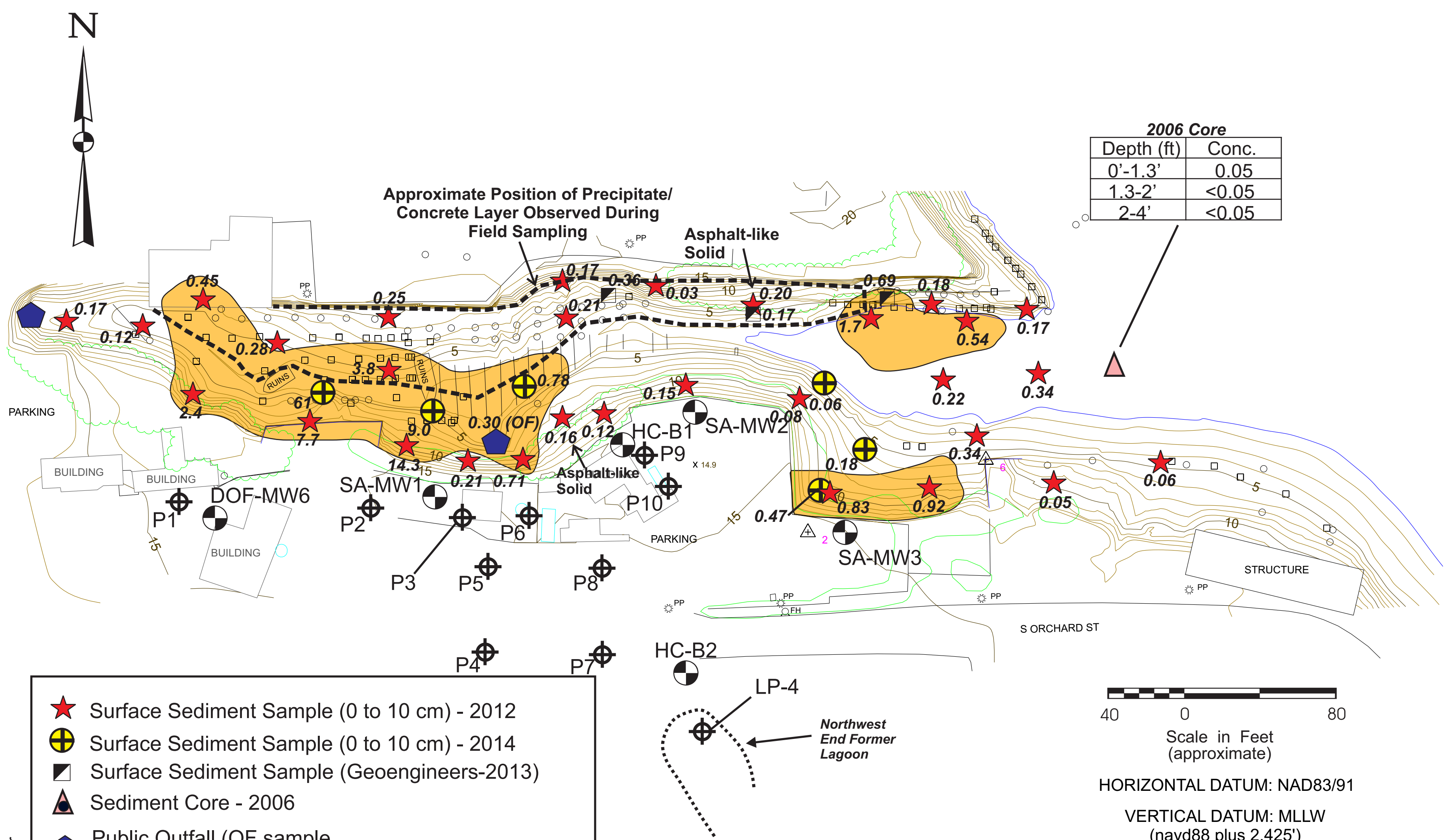
ICS/NW Cooperage Site

Lead in Surface Sediment

SUM-008-00 (ICS) *Aug. 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-5b



Surface Sediment Sample (0 to 10 cm) - 2012
Surface Sediment Sample (0 to 10 cm) - 2014
Surface Sediment Sample (Geoengineers-2013)
Sediment Core - 2006
Public Outfall (OF sample collected 1-foot from end of pipe)
Push-Probe (2008)
0.12 Concentration (mg/kg-dw)
na Not Analyzed
Mercury >0.41 mg/kg

Embay Mercury updated1b rev.cdr

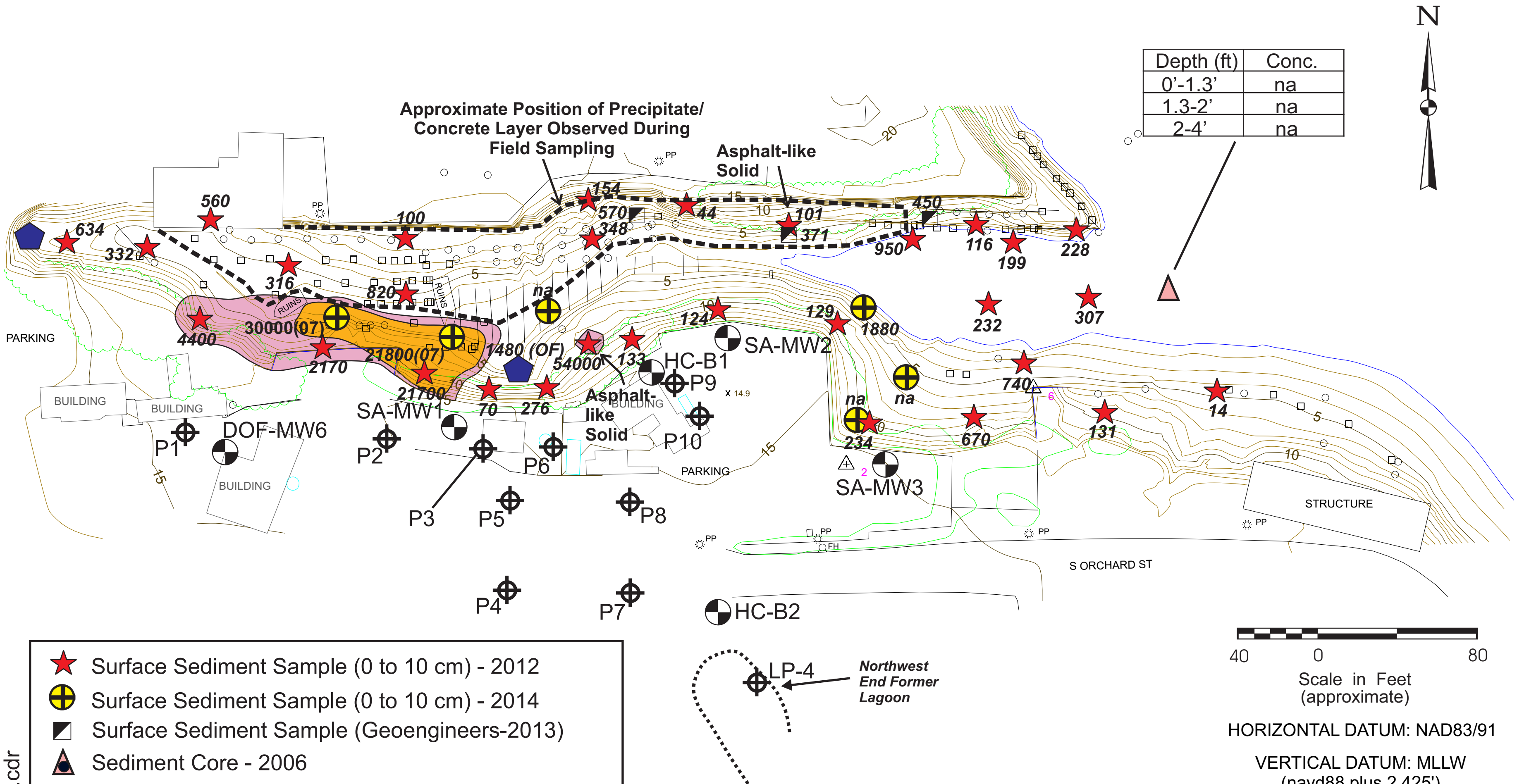
ICS/NW Cooperage Site

Mercury in Surface Sediment

SUM-008-00 (ICS) *Aug. 2016*

FIGURE 5-5c

Dalton, Olmsted & Fuglevand, Inc.



- ★ Surface Sediment Sample (0 to 10 cm) - 2012
- ⊕ Surface Sediment Sample (0 to 10 cm) - 2014
- ◪ Surface Sediment Sample (Geoengineers-2013)
- ▲ Sediment Core - 2006
- ⬟ Public Outfall (OF sample collected 1-foot from end of pipe)
- 500 Petroleum Hydrocarbon Concentration Diesel + Motor-oil Hydrocarbons (mg/kg-dw)
- na Not Analyzed
- TPH >2,000 mg/kg
- TPH >10,000 mg/kg

40 0 80
Scale in Feet (approximate)

HORIZONTAL DATUM: NAD83/91

VERTICAL DATUM: MLLW (navd88 plus 2.425')

ICS/NW Cooperage Site

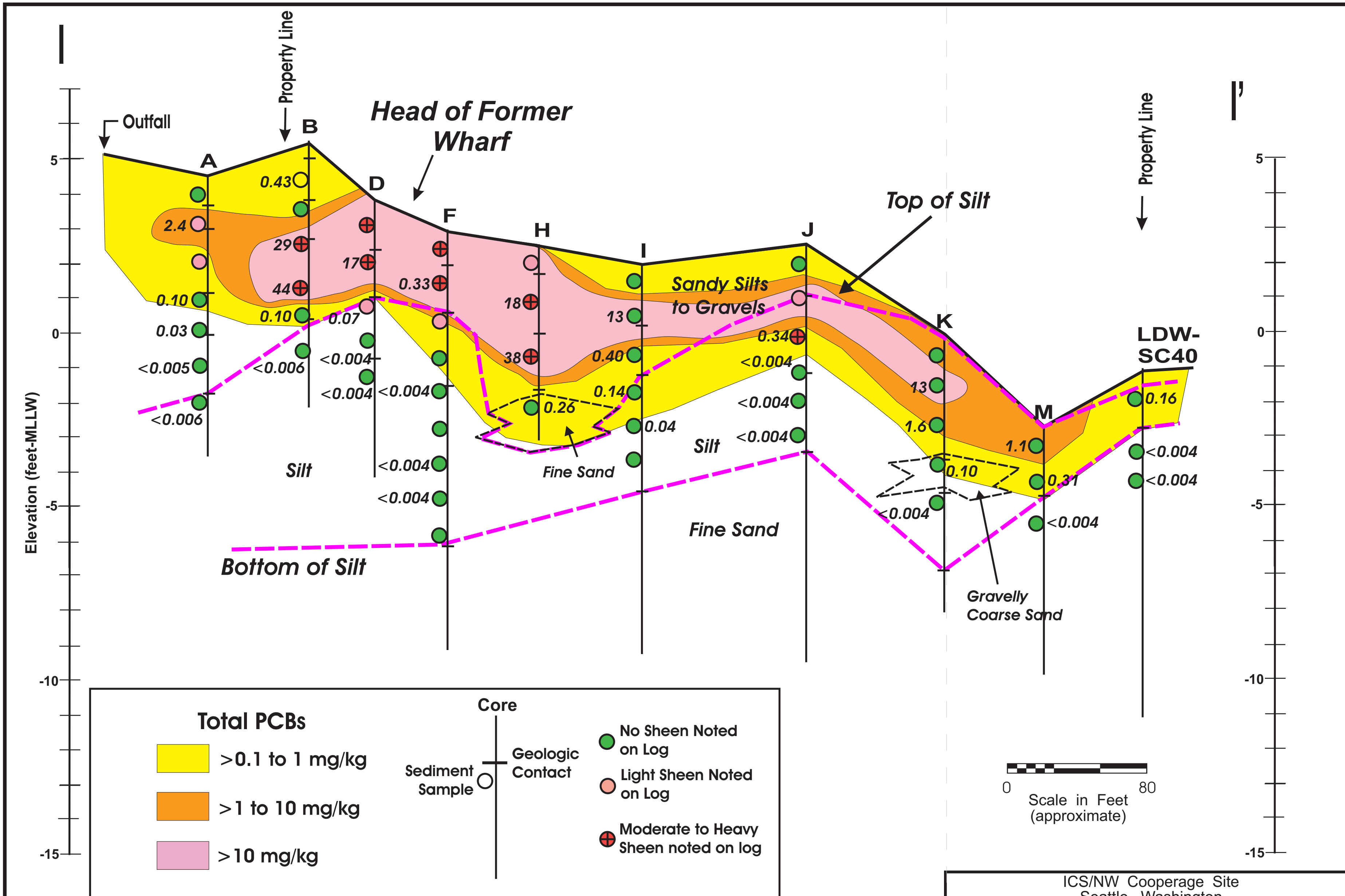
Petroleum Hydrocarbons in Surface Sediment

SUM-008-00 (ICS) *Aug. 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-5d

Embay TPH updated 1b rev.cdr



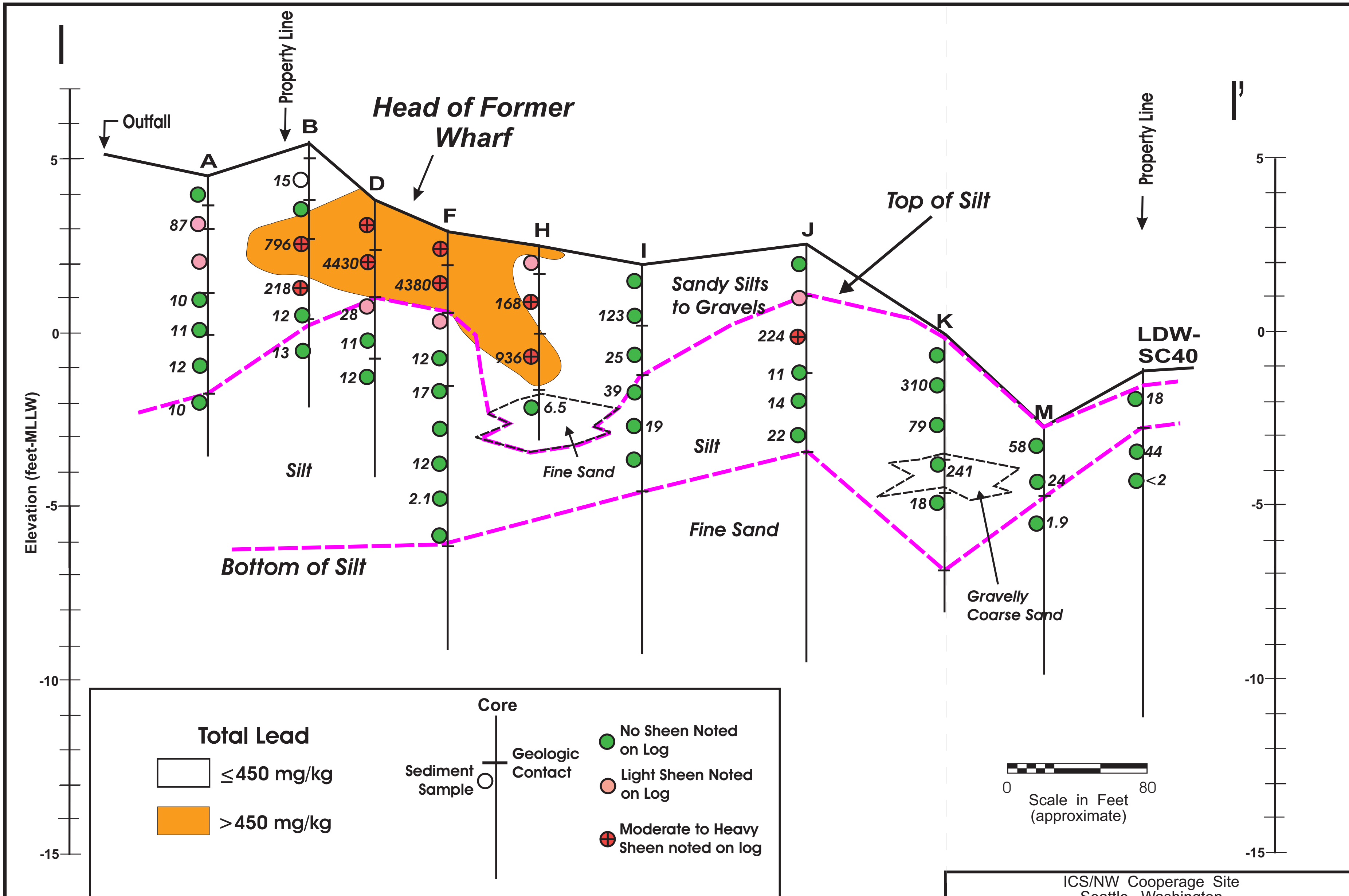
ICS/NW Cooperage Site
Seattle, Washington

PCBs in Subsurface Sediment

SUM-008-00 **FIGURE 5-6a** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section I-I' Conc rev rpt.cdr



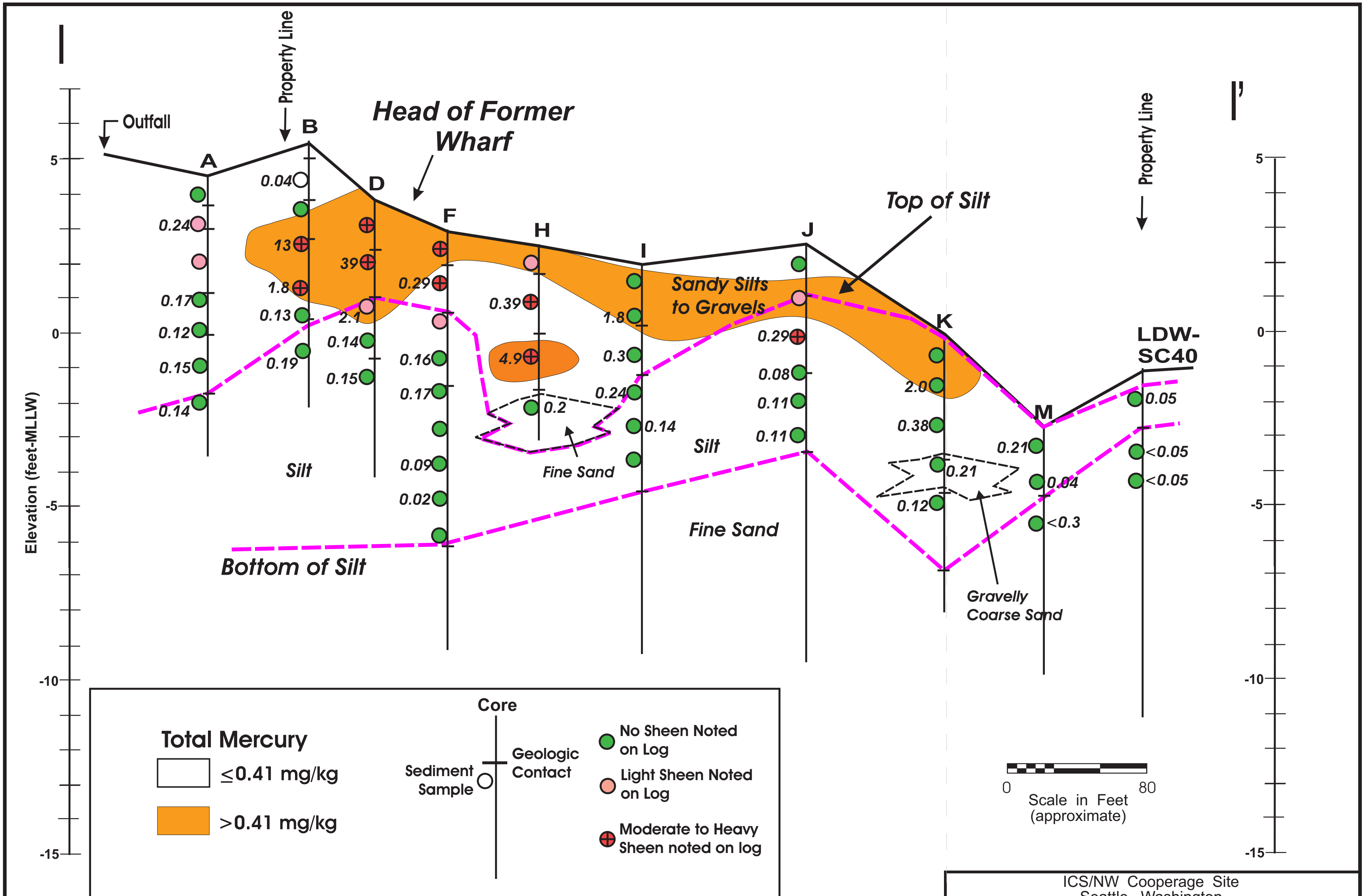
ICS/NW Cooperage Site
Seattle, Washington

Lead in Subsurface Sediment

SUM-008-00 **FIGURE 5-6b** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section I-I' Conc rev rpt.cdr



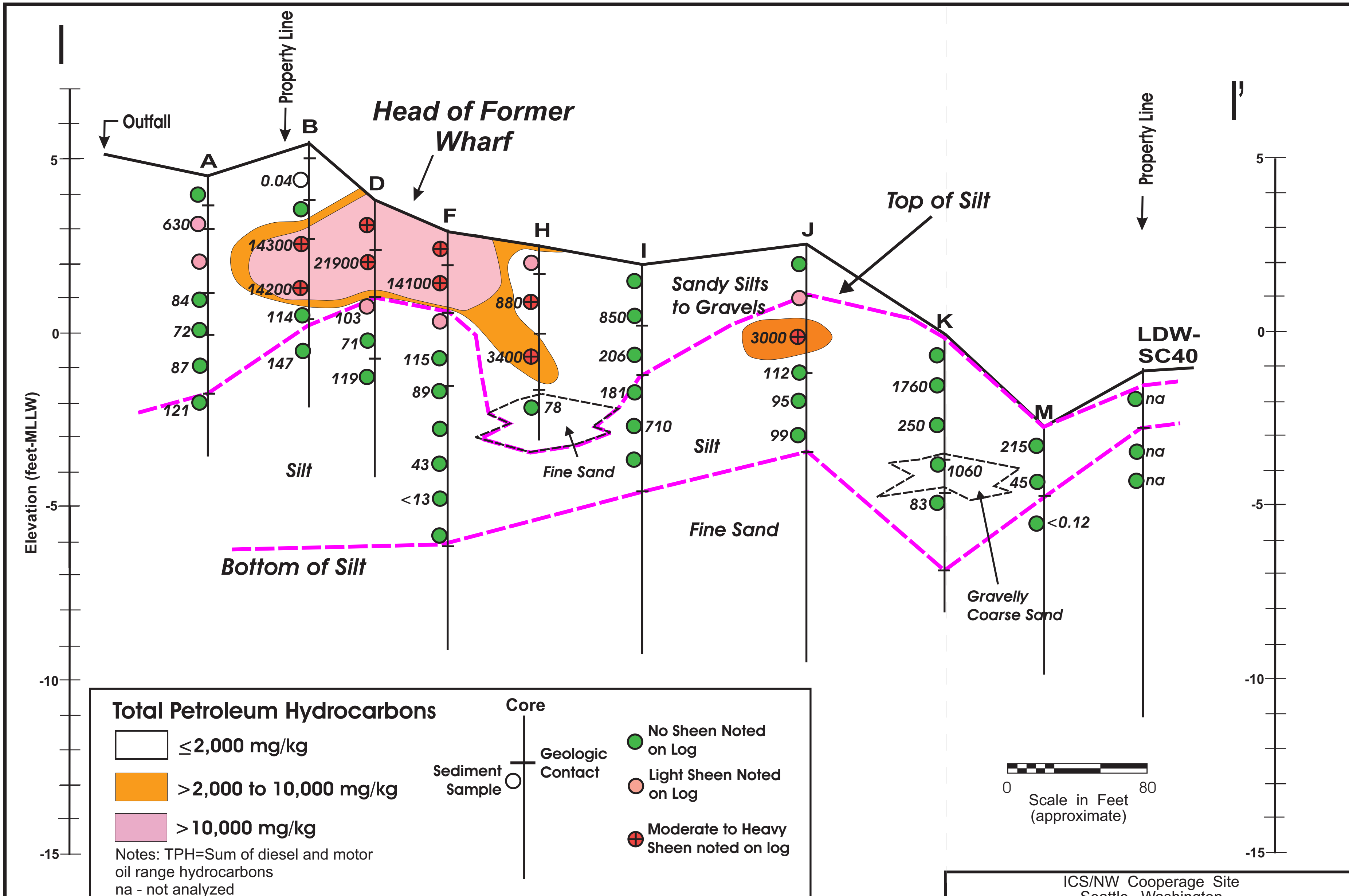
ICS/NW Cooperage Site
Seattle, Washington

Mercury in Subsurface Sediment

SUM-008-00 **FIGURE 5-6c** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section I-I' Conc rev rpt.cdr



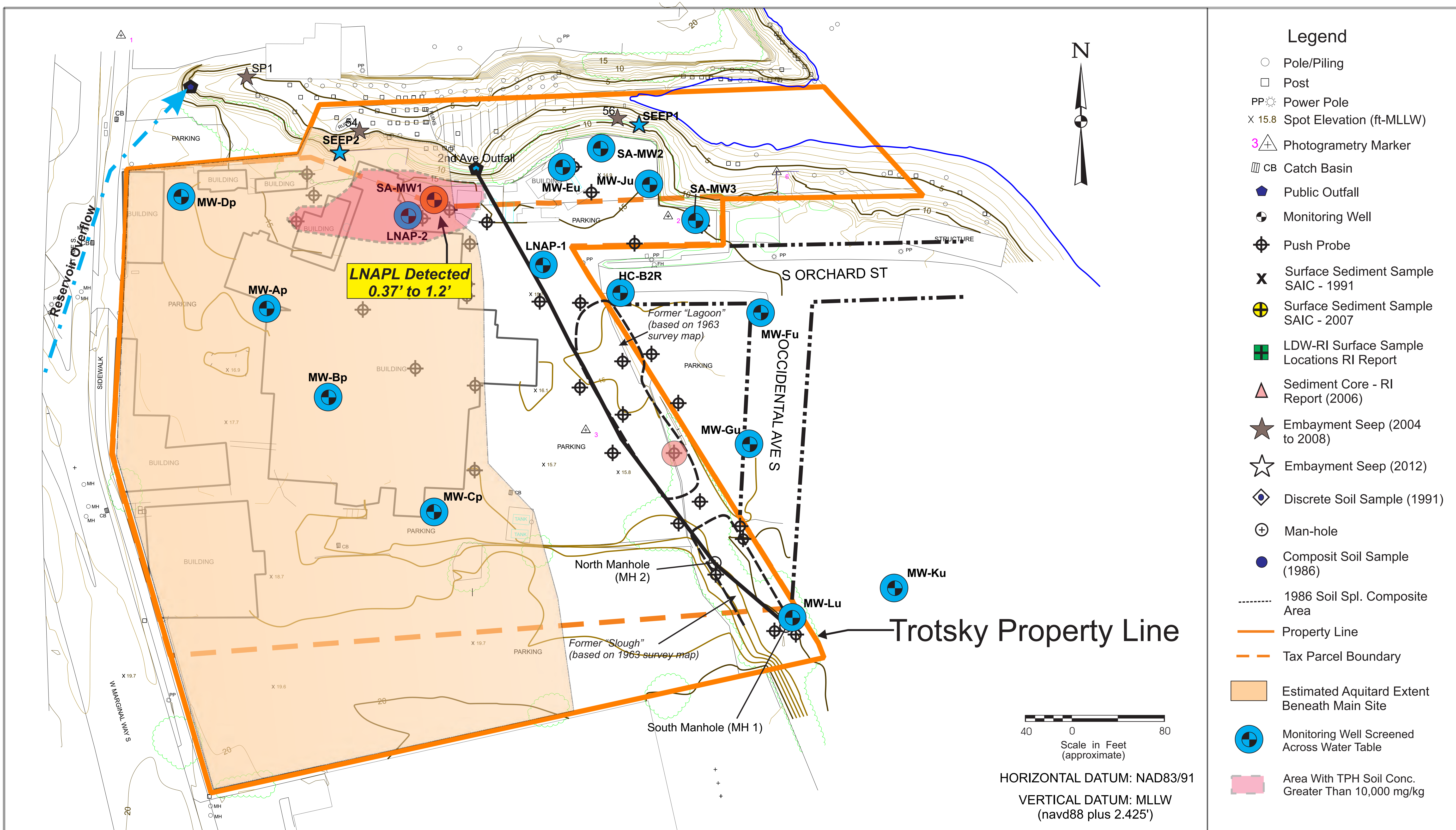
ICS/NW Cooperage Site
Seattle, Washington

Petroleum Hydrocarbons in Subsurface Sediment

SUM-008-00 **FIGURE 5-6d** Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section I-I' Conc rev rpt.cdr



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: NAPL Well Networkrev.cdr

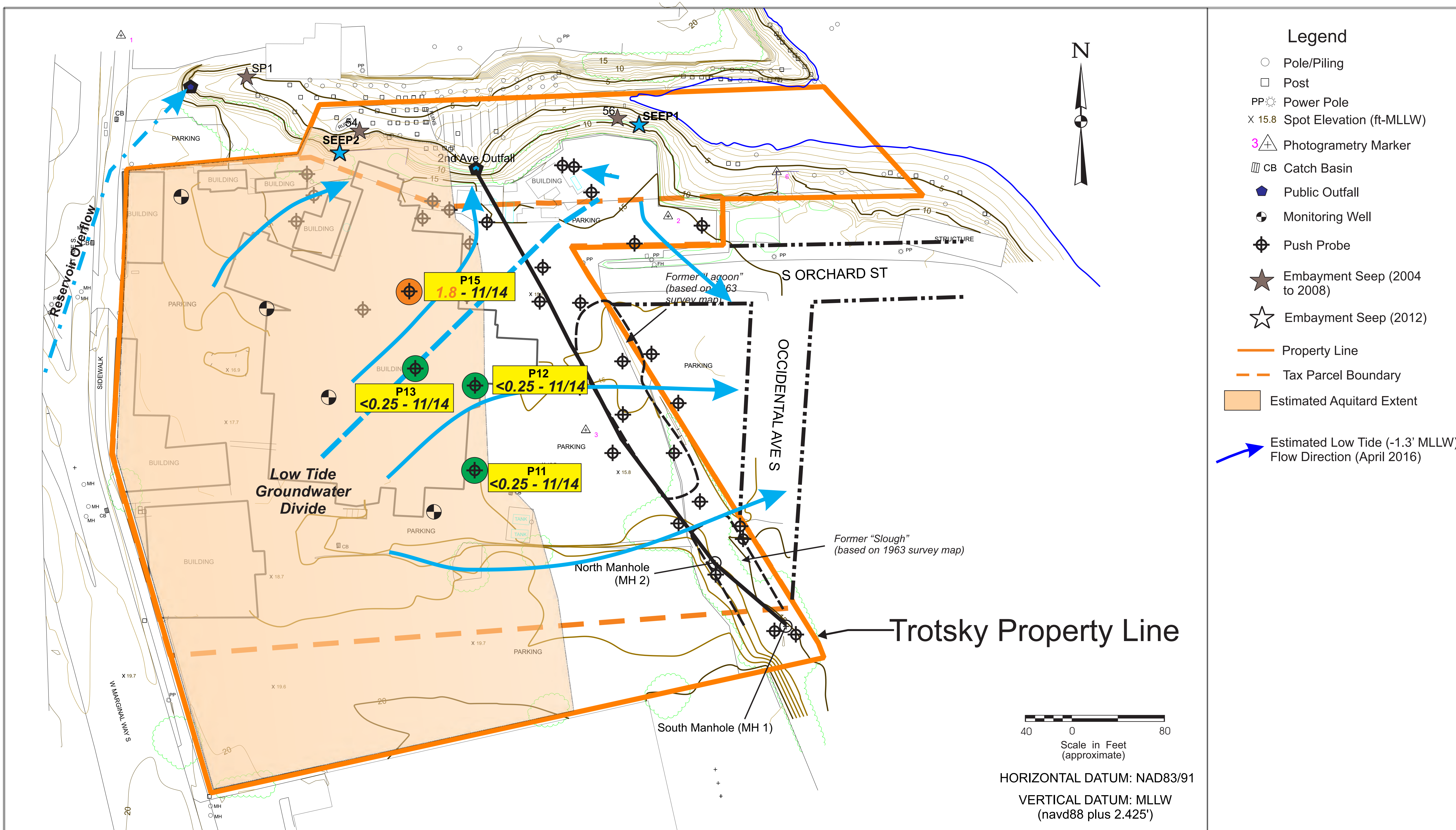
ICS/NW Cooperage Site

Wells Screened Across Water Table To Monitor for LNAPL

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-7



Concentration ≤ Screening Level (SL= 0.8* mg/l)

Concentration > Screening Level (SL= 0.8* mg/l)

2.0/5.3/6.0/2.0 Sum Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Groundwater Method A

Ref: TPHG GW Plot R1-R3rev.cdr

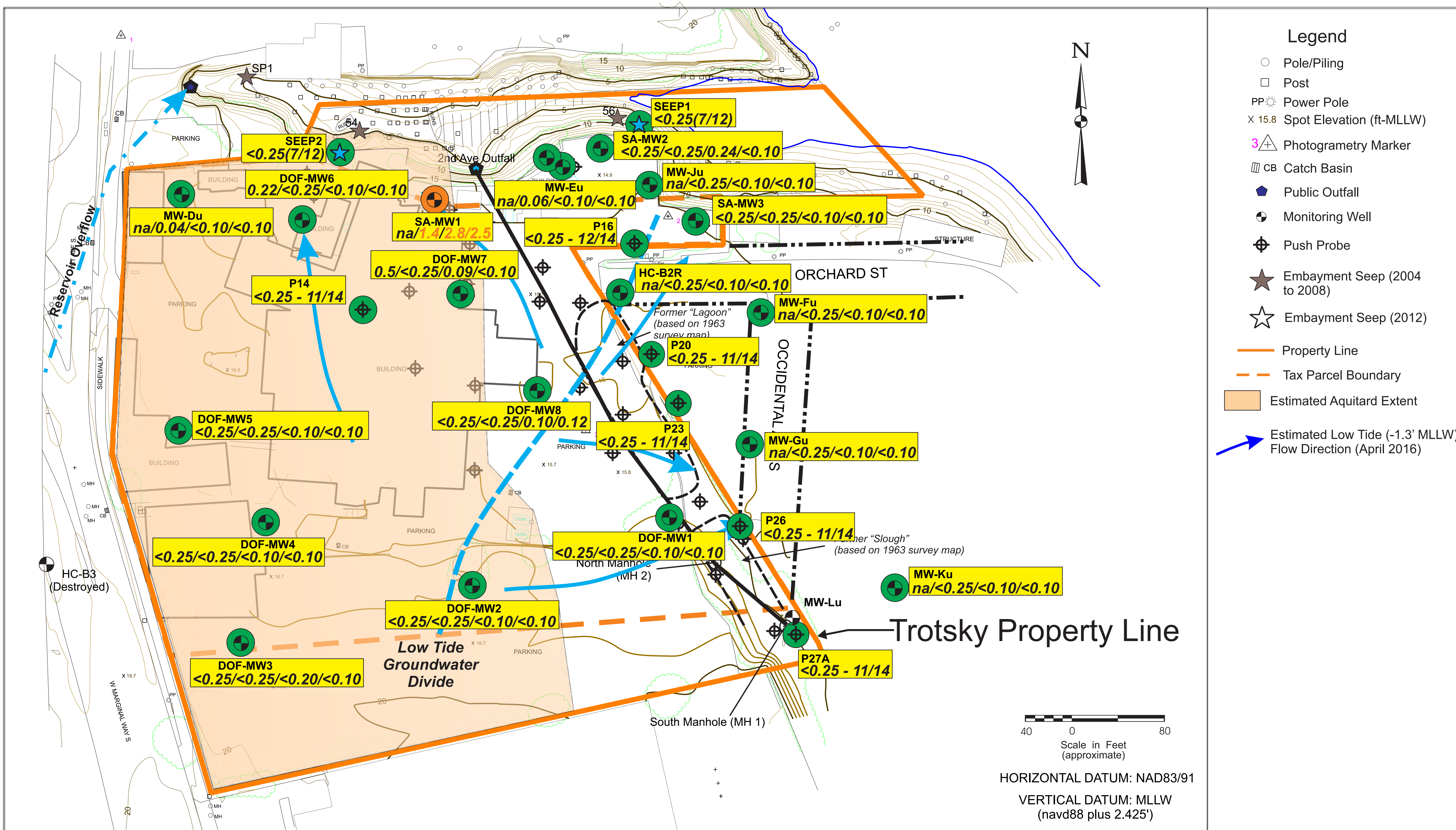
ICS/NW Cooperage Site

Gasoline Range Organics Concentrations - Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-8a



Concentration ≤ Screening Level (SL= 0.8* mg/l)

Concentration > Screening Level (SL= 0.8* mg/l)

2.0/5.3/6.0/2.0 Sum Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Groundwater Method A

Ref: TPHG GW Plot R1-R3rev.cdr

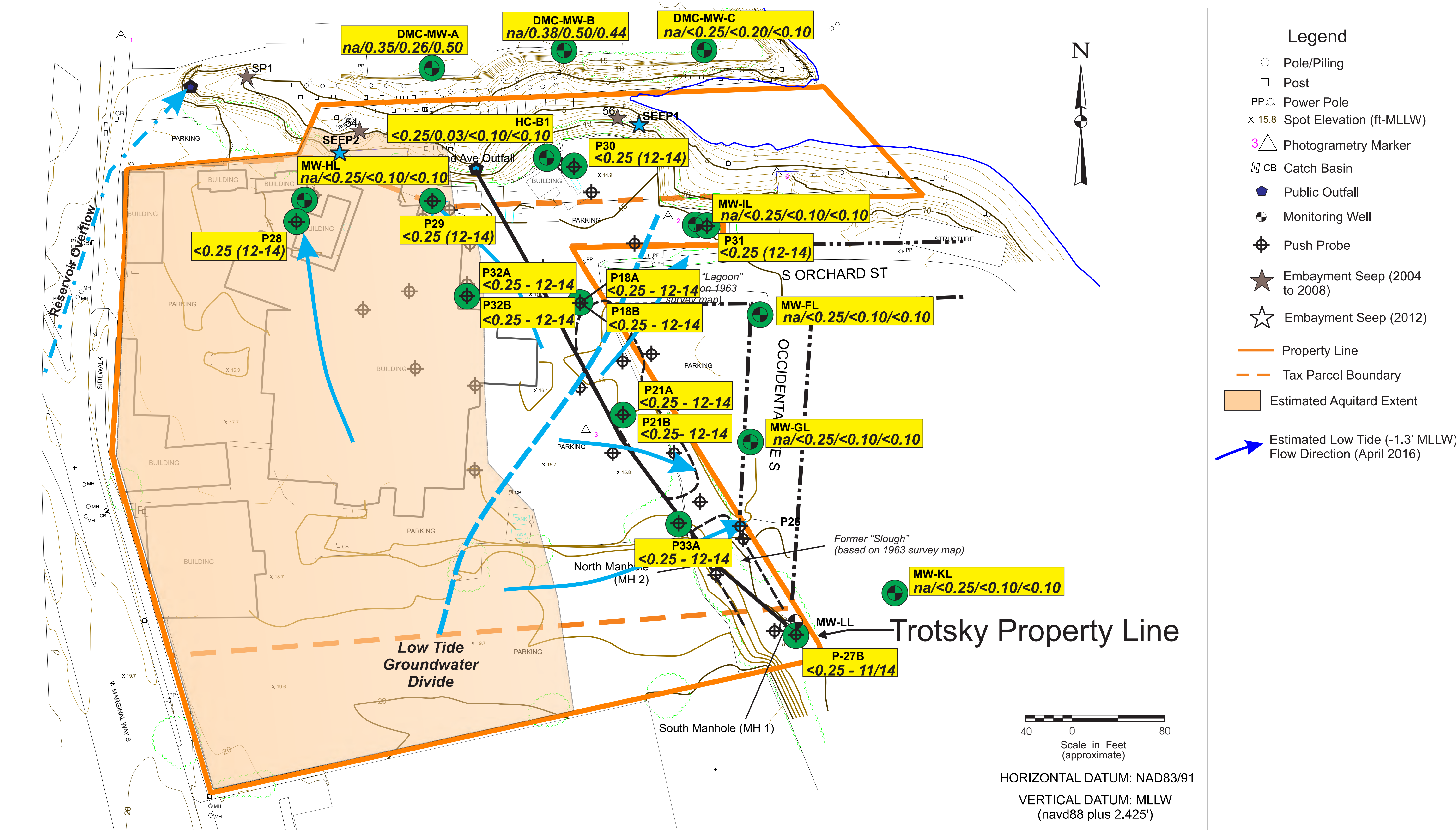
ICS/NW Cooperage Site

Gasoline Range Organics Concentrations - Upper Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-8b



Concentration ≤ Screening Level (SL= 0.8* mg/l)

Concentration > Screening Level (SL= 0.8* mg/l)

2.0/5.3/6.0/2.0 Sum Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Groundwater Method A

Ref: TPHG GW Plot R1-R3rev.cdr

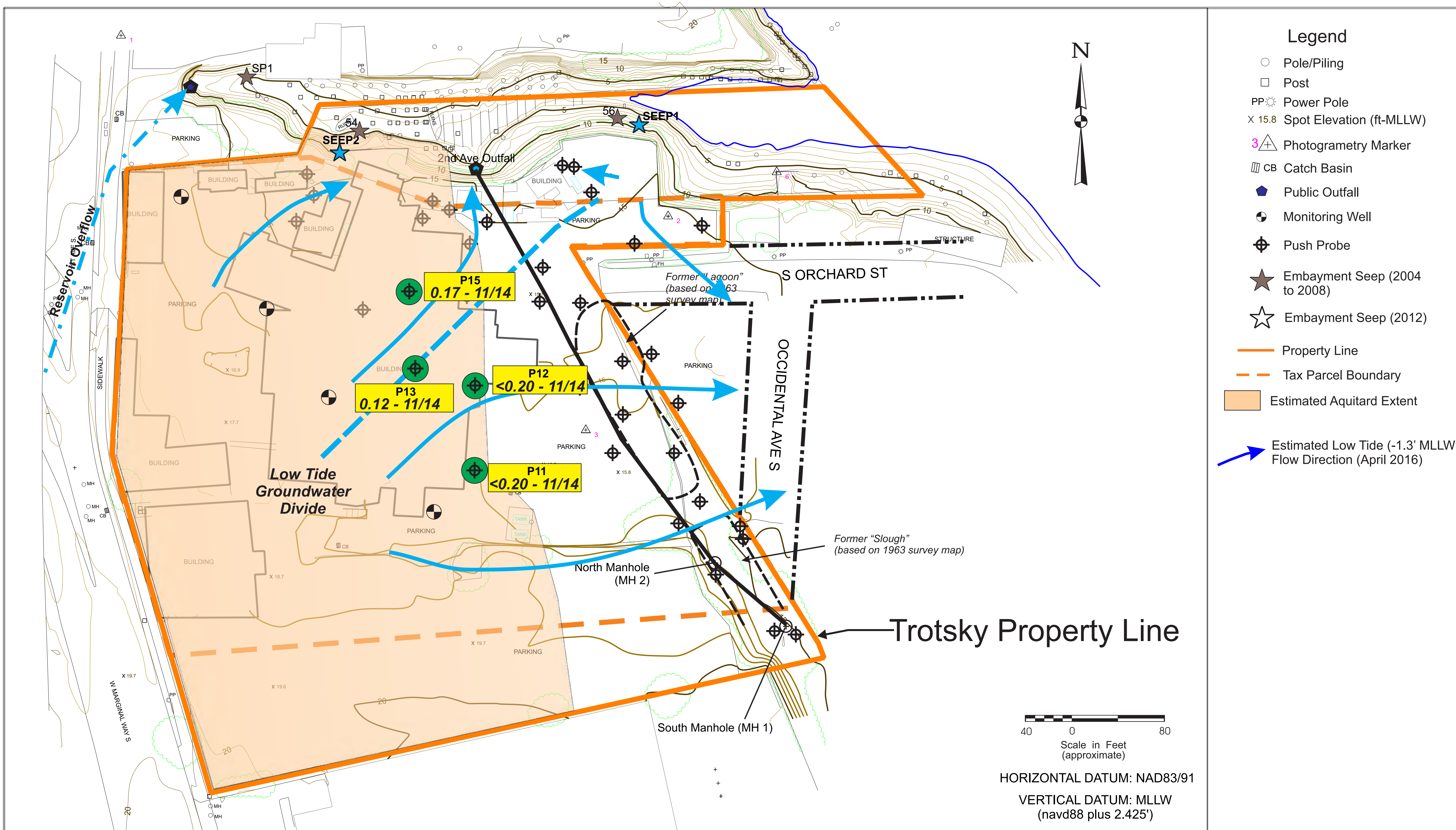
ICS/NW Cooperage Site

Gasoline Range Organics Concentrations - Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-8c



Concentration ≤ Screening Level (SL= 0.5* mg/l)

Concentration > Screening Level (SL= 0.5* mg/l)

2.0/5.3/6.0/2.0 Sum Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Groundwater Method A

Ref: TPH-Dx GW Plot R1-R3rev.cdr

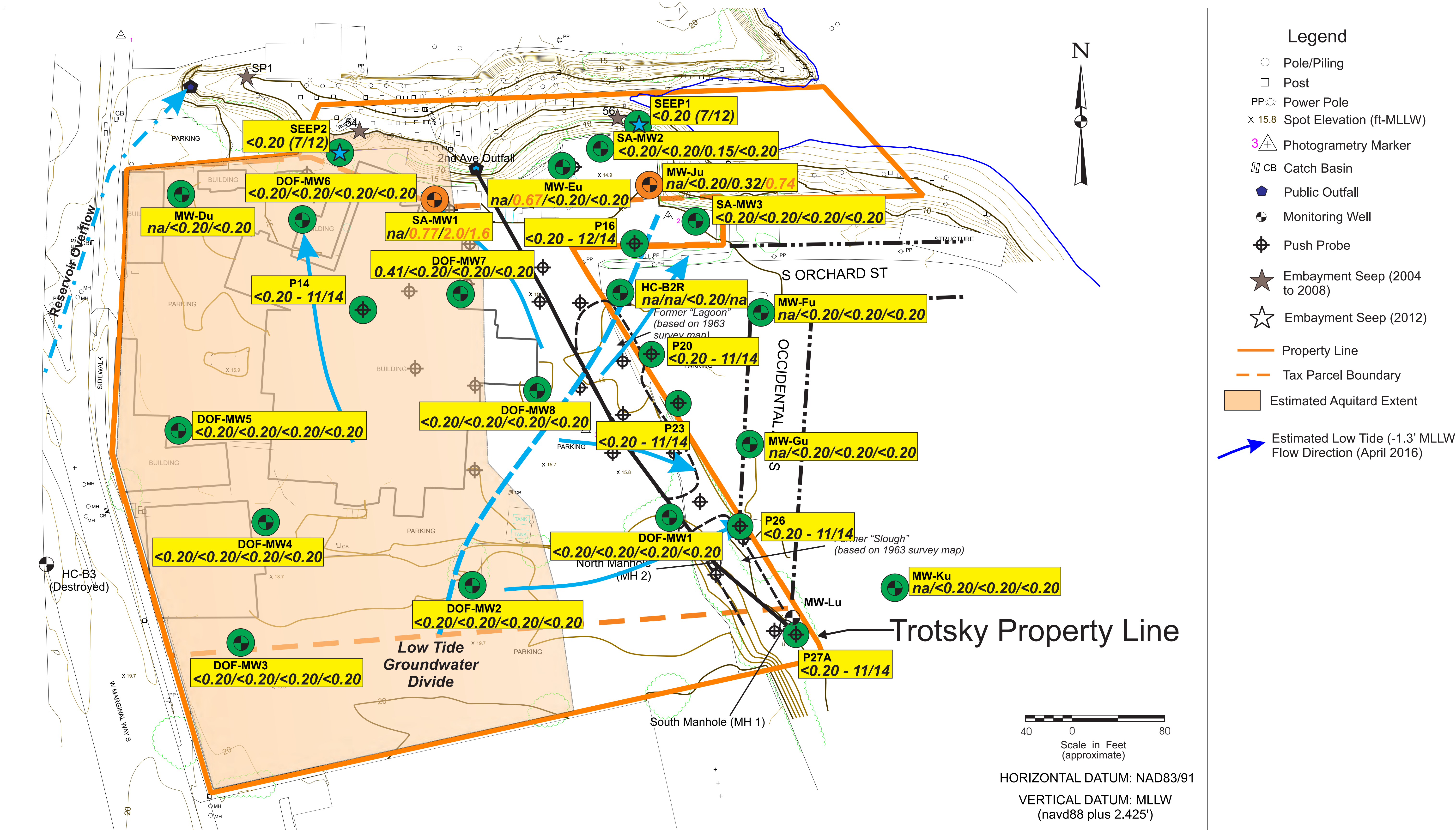
ICS/NW Cooperage Site

Diesel/Heavy-Oil Range Organics Concentrations - Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-9a



Concentration ≤ Screening Level (SL= 0.5* mg/l)

Concentration > Screening Level (SL= 0.5* mg/l)

2.0/5.3/6.0/2.0 Sum Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Groundwater Method A

Ref: TPH-Dx GW Plot R1-R3rev.cdr

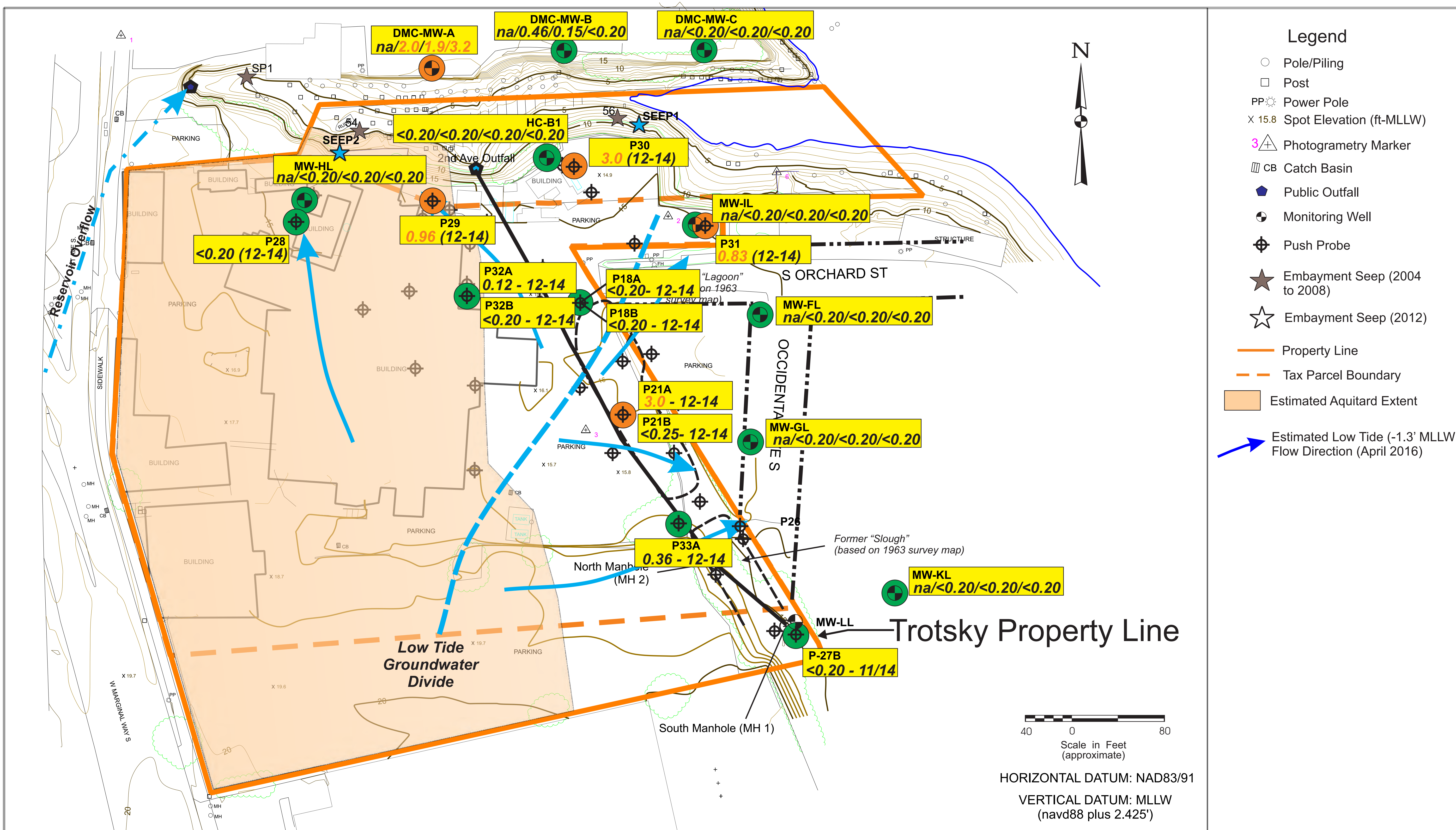
ICS/NW Cooperage Site

Diesel/Heavy-Oil Range Organics Concentrations - Upper Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-9b



Concentration ≤ Screening Level (SL= 0.5* mg/l)

Concentration > Screening Level (SL= 0.5* mg/l)

2.0/5.3/6.0/2.0 Sum Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Groundwater Method A

Ref: TPHG GW Plot R1-R3rev.cdr

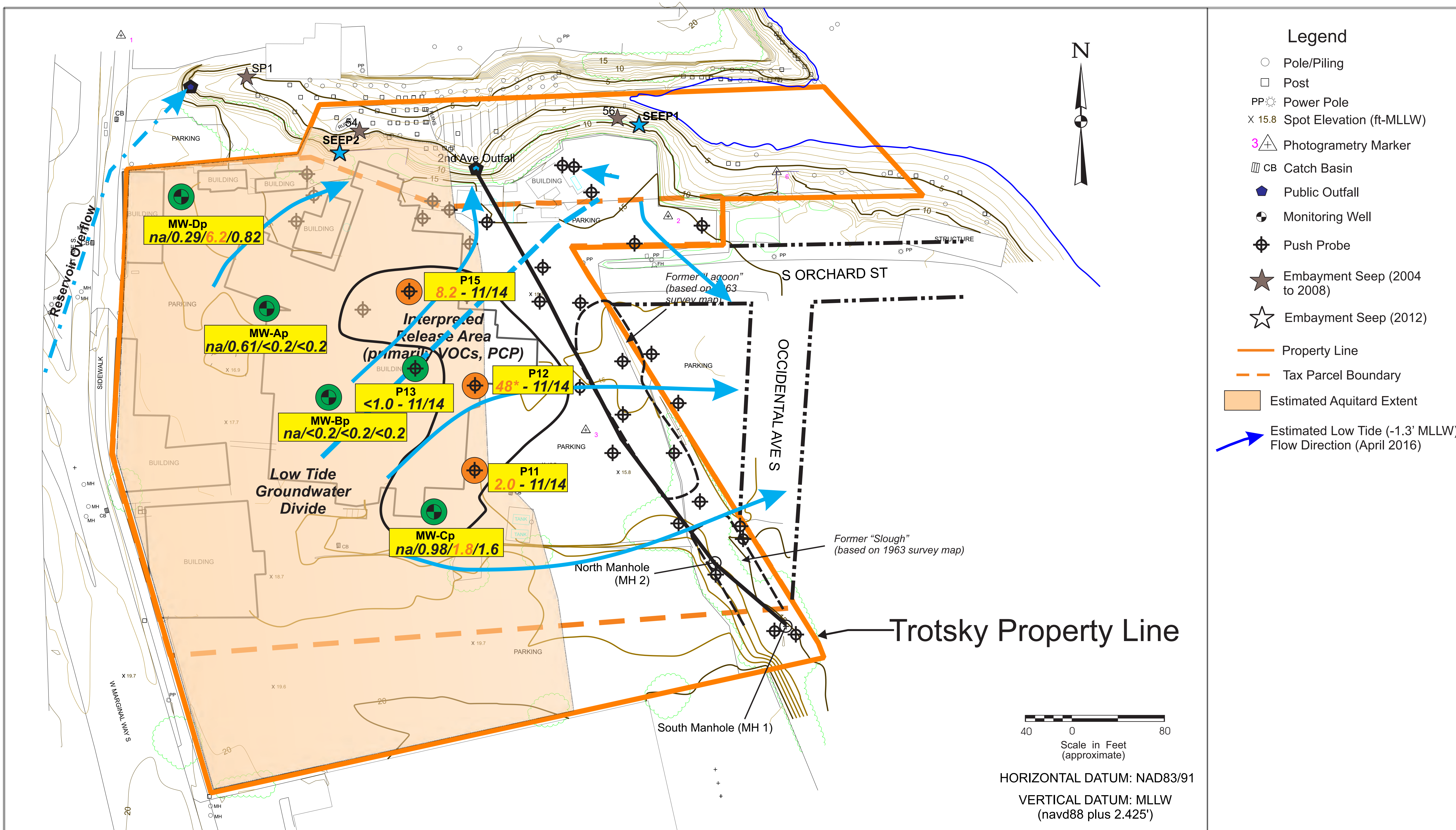
ICS/NW Cooperage Site

Diesel/Heavy-Oil Range Organics Concentrations - Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-9c



Concentration ≤ Screening Level (SL= 1.6* ug/l)

Concentration > Screening Level (SL= 1.6* ug/l)

2.0/5.3/6.0/0.61 Concentration - ug/l (11-2012/11-2015/3-2016/10-2016)

na - Not Available; * Surface Water

Ref: Benzene GW Plot R1-R3rev.cdr

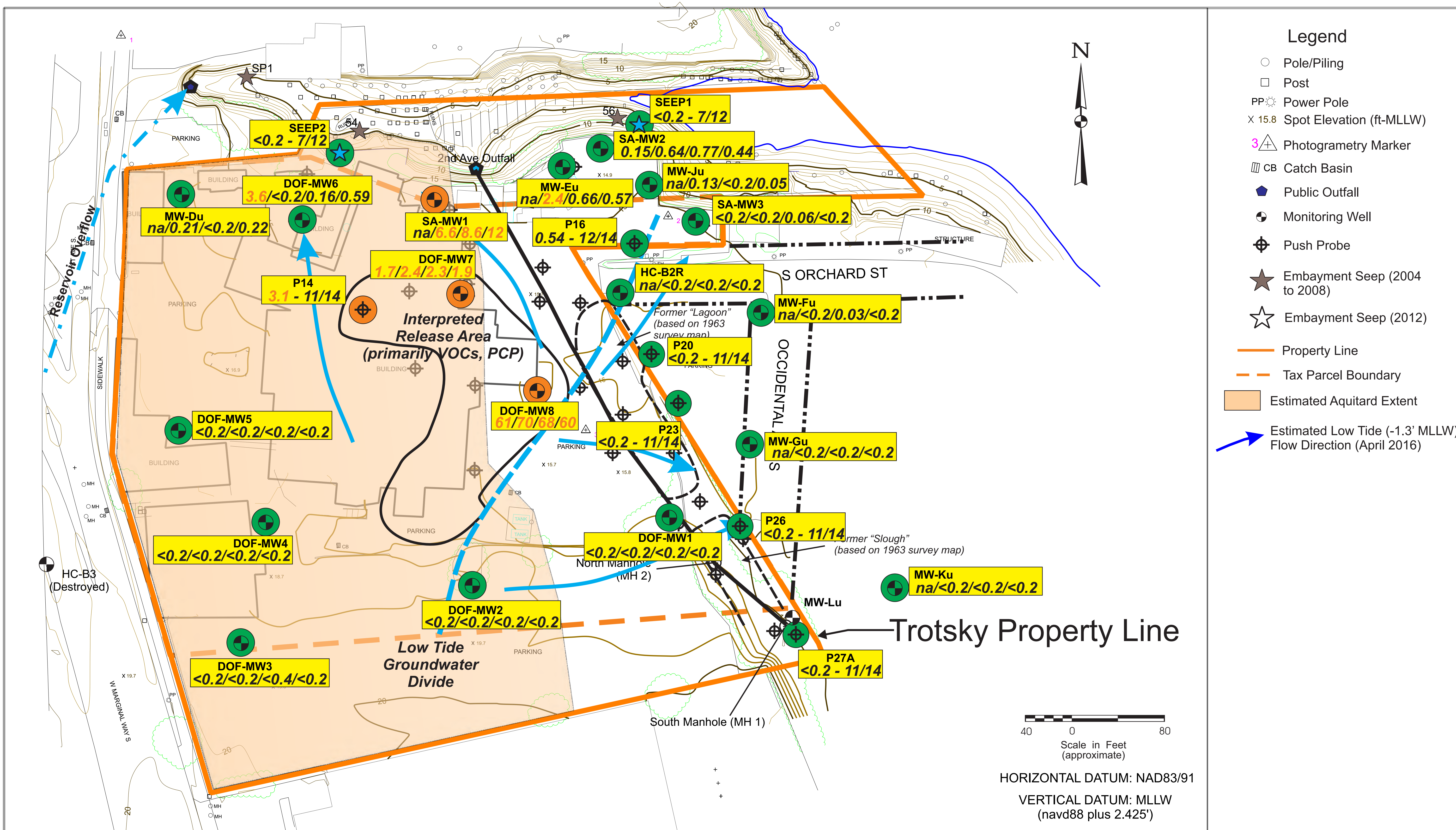
ICS/NW Cooperage Site

Benzene Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-10a



Concentration ≤ Screening Level (SL= 1.6* ug/l)

Concentration > Screening Level (SL= 1.6* ug/l)

2.0/5.3/6.0/0.61 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

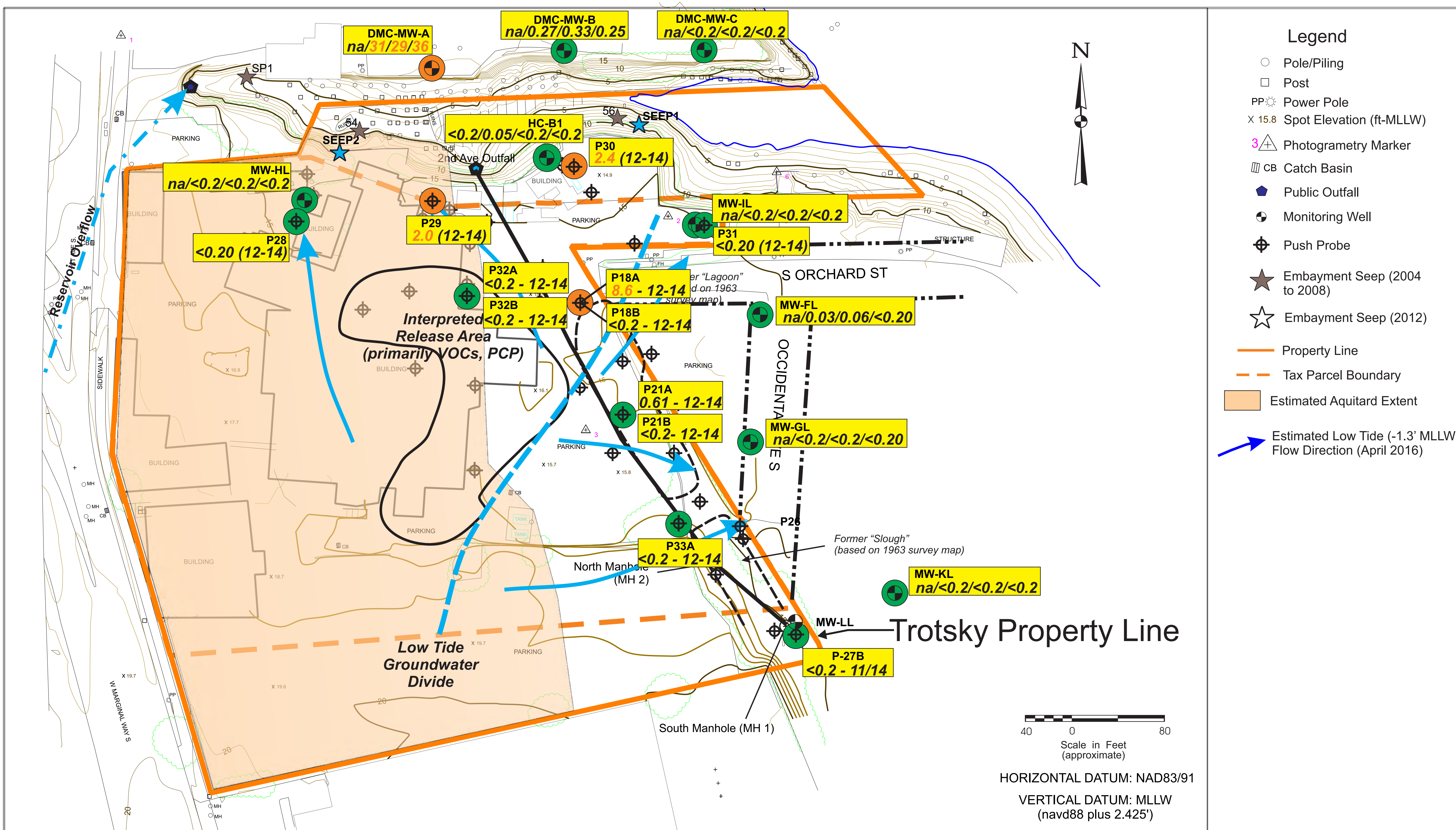
ICS/NW Cooperage Site

Benzene Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-10b



Concentration ≤ Screening Level (SL= 1.6* ug/l)

Concentration > Screening Level (SL= 1.6* ug/l)

2.0/5.3/6.0/0.61 Concentration - ug/l (11-2012/11-2015/3-2016/10-2016)

na - Not Available; * Surface Water

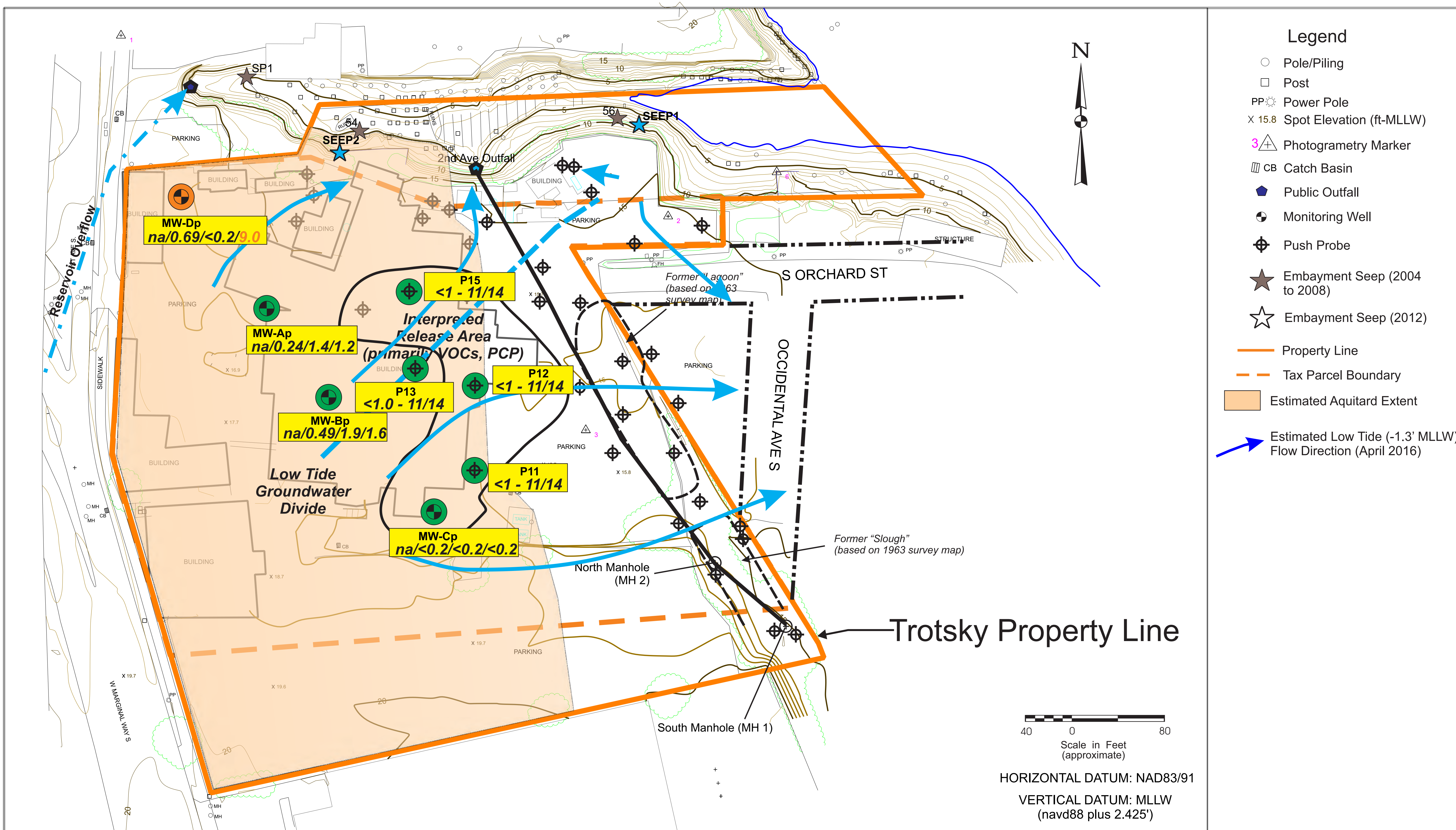
ICS/NW Cooperage Site

Benzene Concentrations Lower Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-10c



Concentration ≤ Screening Level (SL=2.9*ug/l)

Concentration > Screening Level (SL= 2.9* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

Ref: PCE GW Plot R1-R3rev.cdr

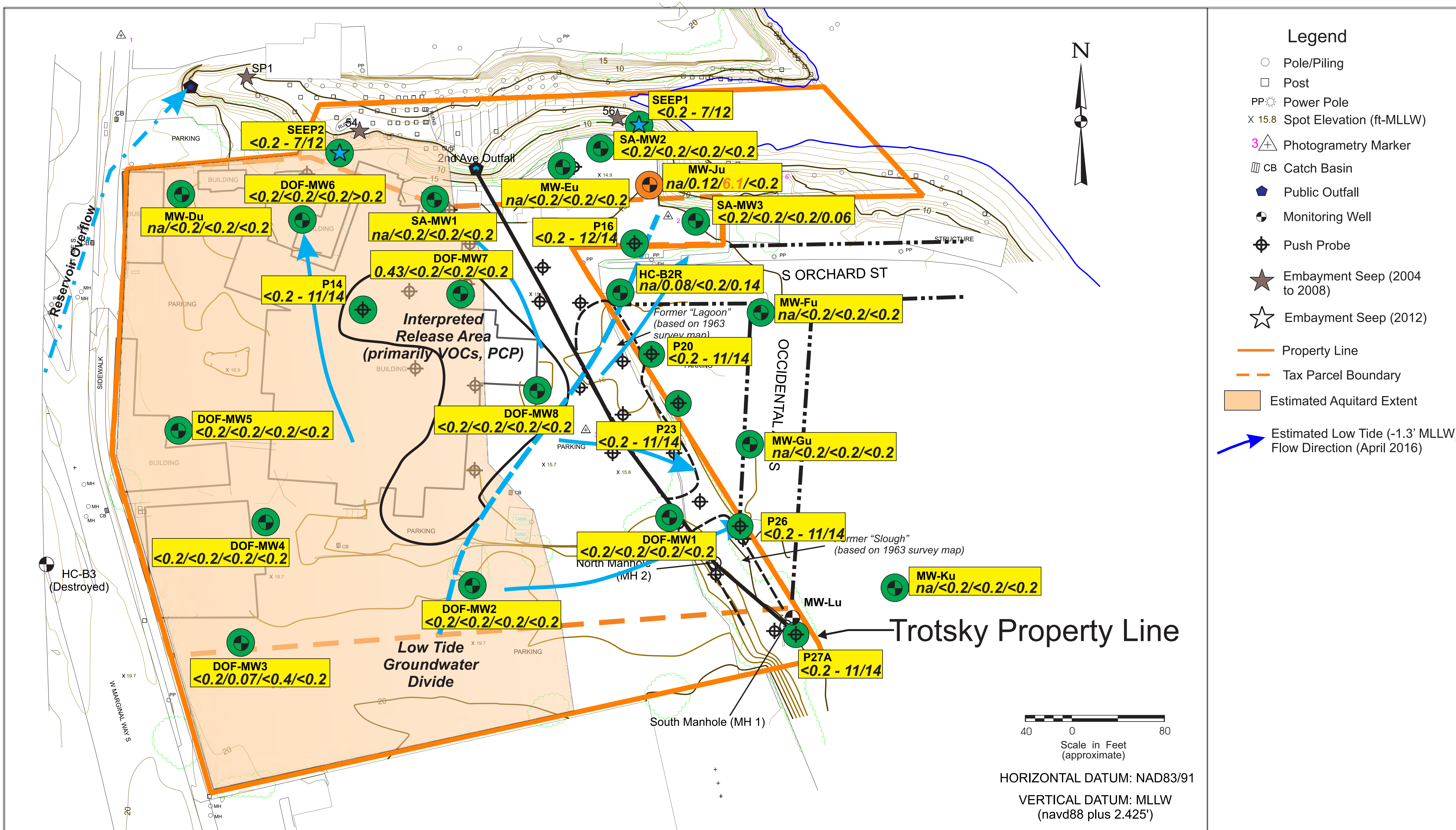
ICS/NW Cooperage Site

Tetrachloroethene Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-11a



Concentration ≤ Screening Level (SL=2.9*ug/l) 2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

Concentration > Screening Level (SL= 2.9* ug/l) *na* - Not Available; * Surface Water

Ref: PCE GW Plot R1-R3rev.cdr

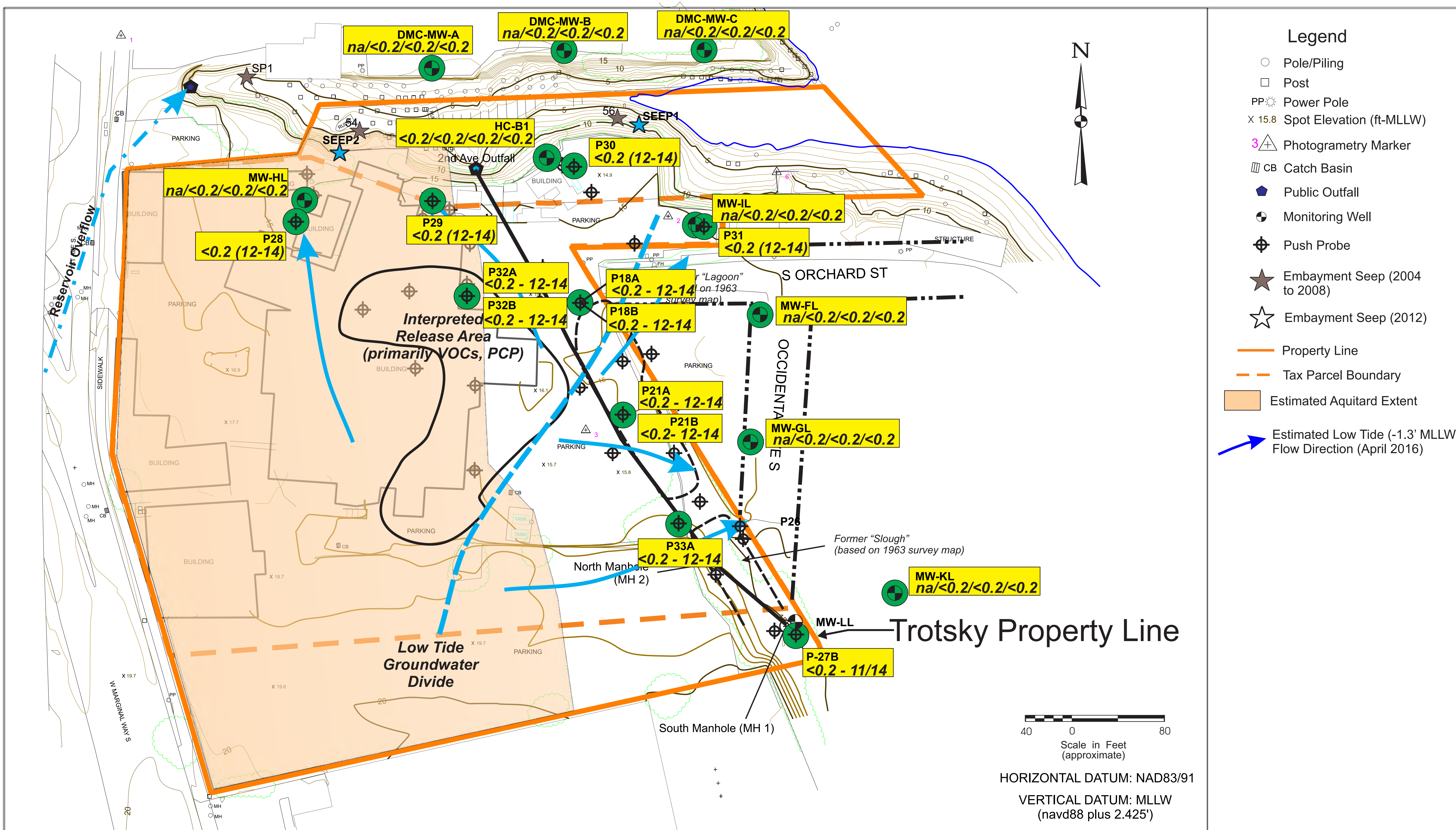
ICS/NW Cooperage Site

Tetrachloroethene Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-11b



Concentration ≤ Screening Level (SL=2.9*ug/l)

Concentration > Screening Level (SL= 2.9* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

Ref:PCE GW Plot R1-R3rev.cdr

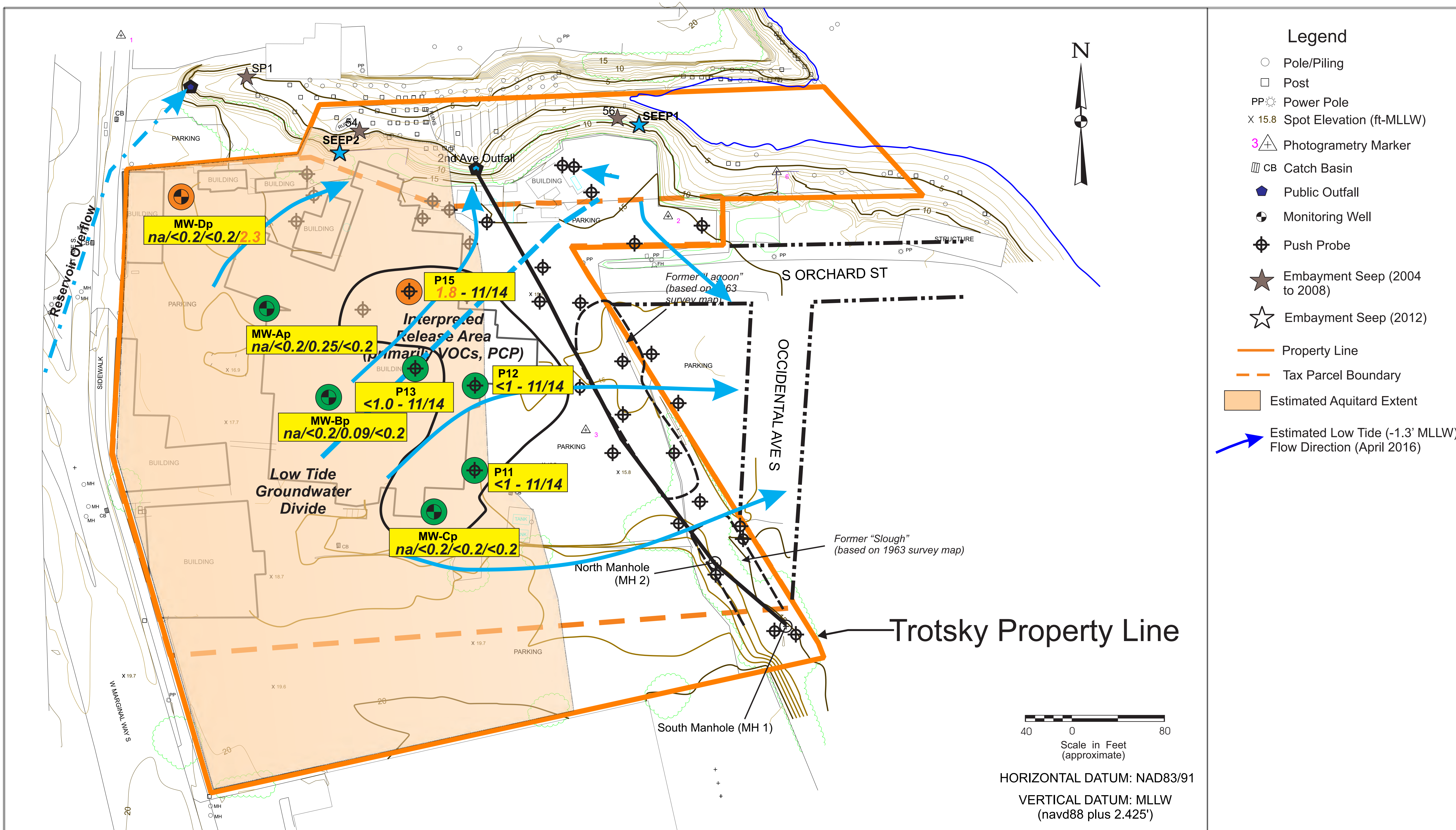
ICS/NW Cooperage Site

Tetrachloroethene Concentrations Lower Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-11c



Concentration ≤ Screening Level (SL= 0.7* ug/l)

Concentration > Screening Level (SL= 0.7* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

Ref: TCE GW Plot R1-R3rev.cdr

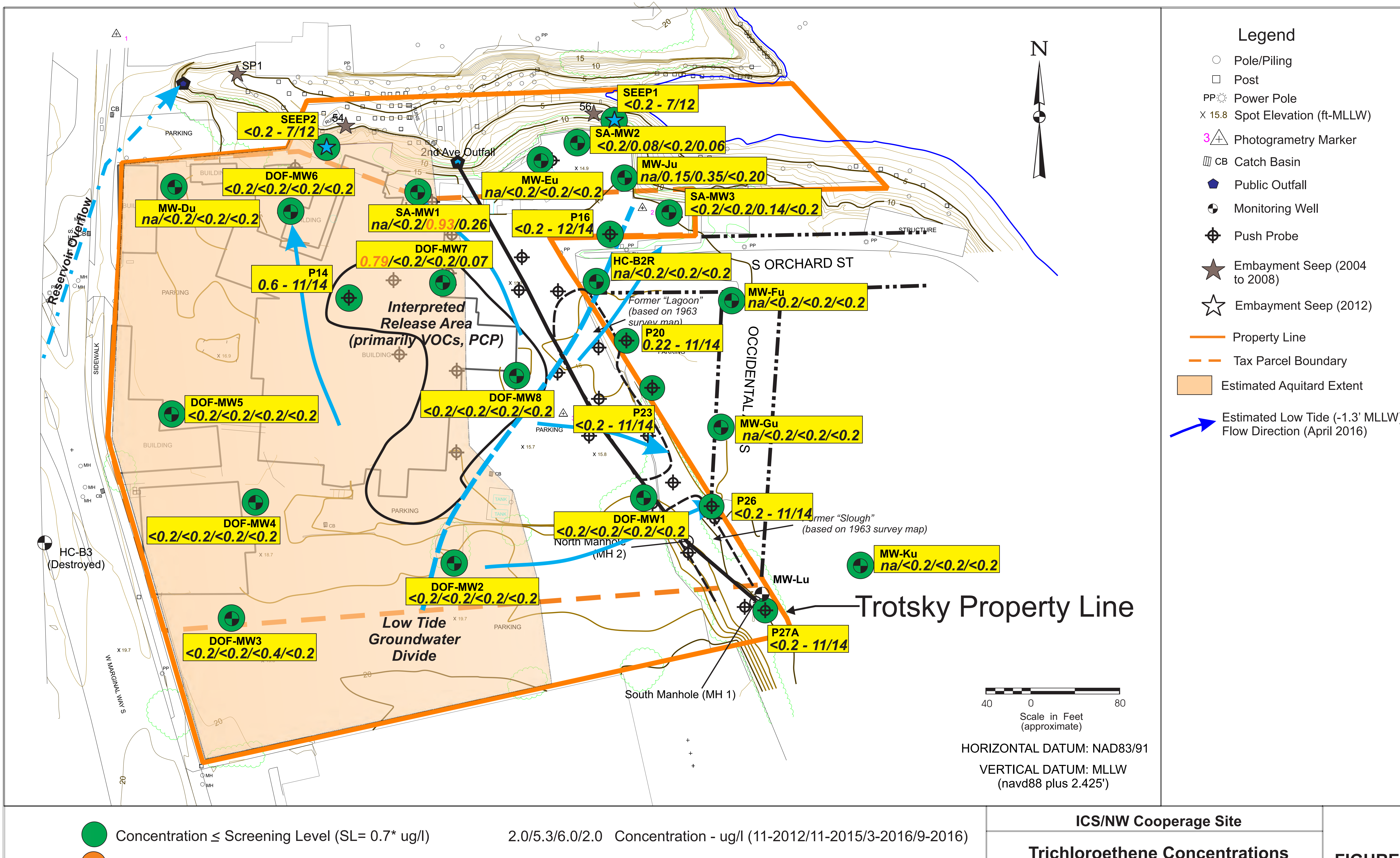
ICS/NW Cooperage Site

Trichloroethene Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-12a



ICS/NW Cooperage Site

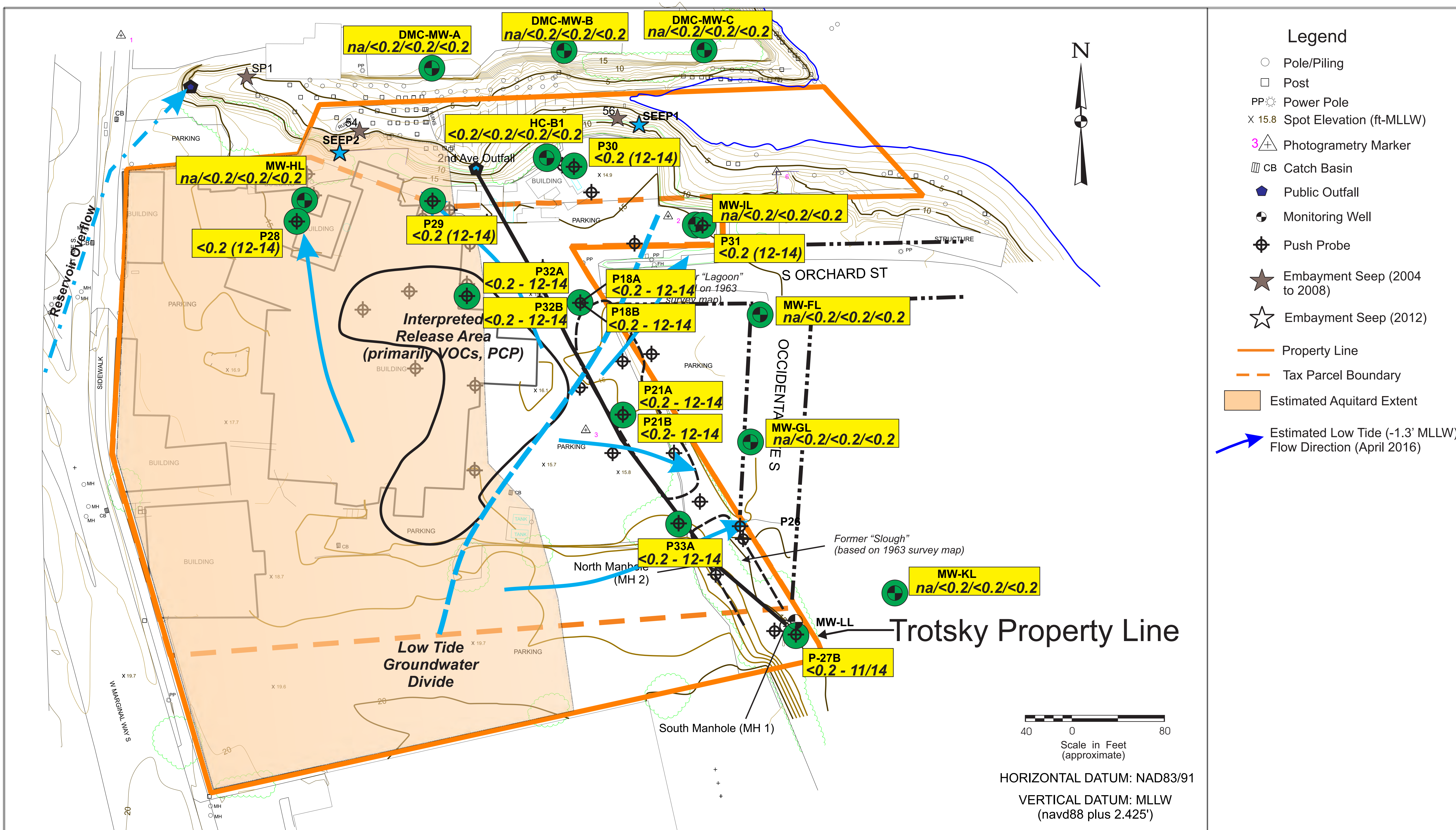
Trichloroethene Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-12b

Ref: TCE GW Plot R1-R3rev.cdr



Concentration ≤ Screening Level (SL= 0.7* ug/l)

Concentration > Screening Level (SL= 0.7* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

Ref:TCE GW Plot R1-R3rev.cdr

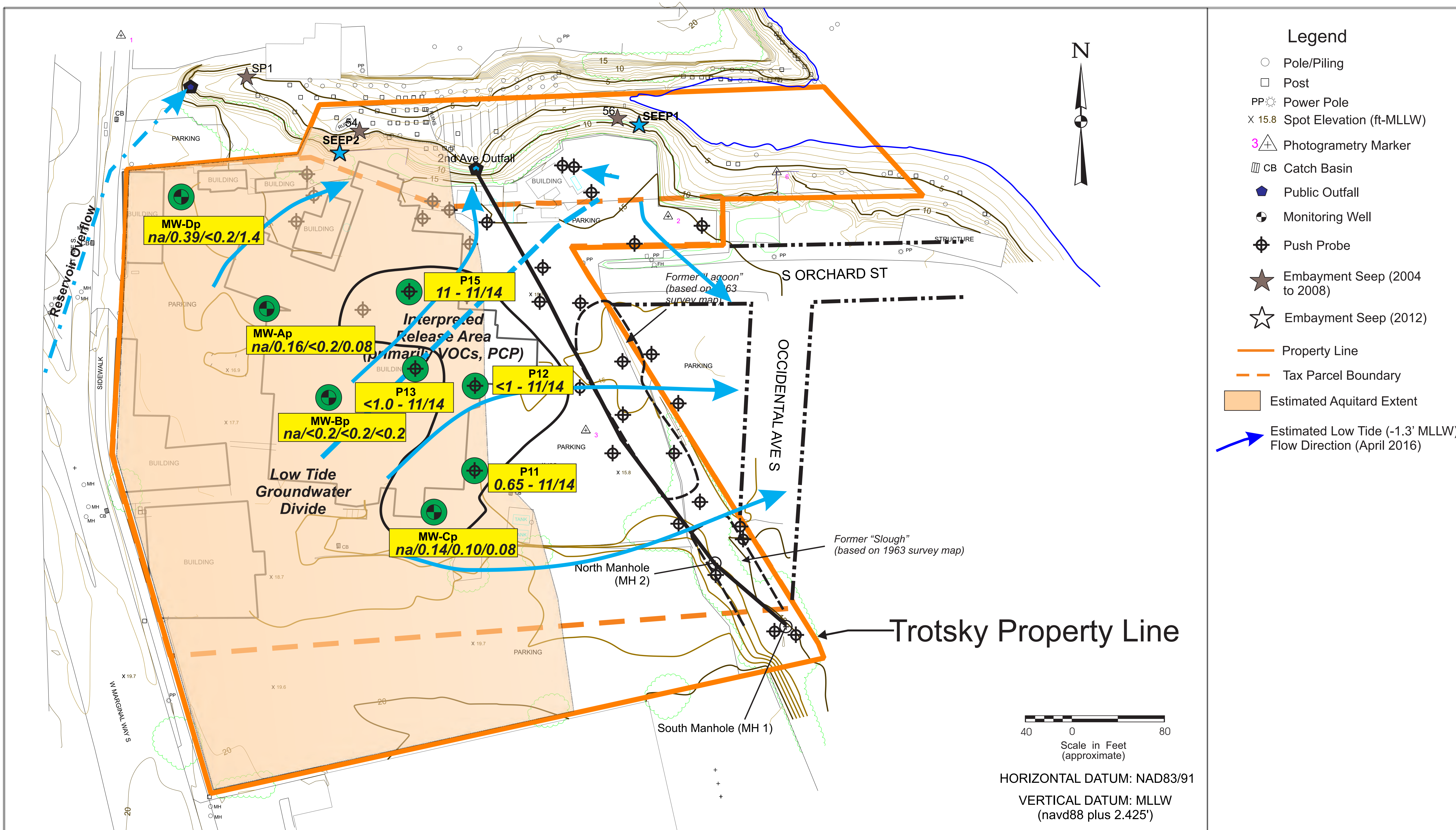
ICS/NW Cooperage Site

Trichloroethene Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-12c



Concentration ≤ Screening Level (SL= na*/16** ug/l)

Concentration > Screening Level (SL= na*/16** ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water; ** Groundwater - MTCA Method B

Ref: cis12DCE GW Plot R1-R3rev.cdr

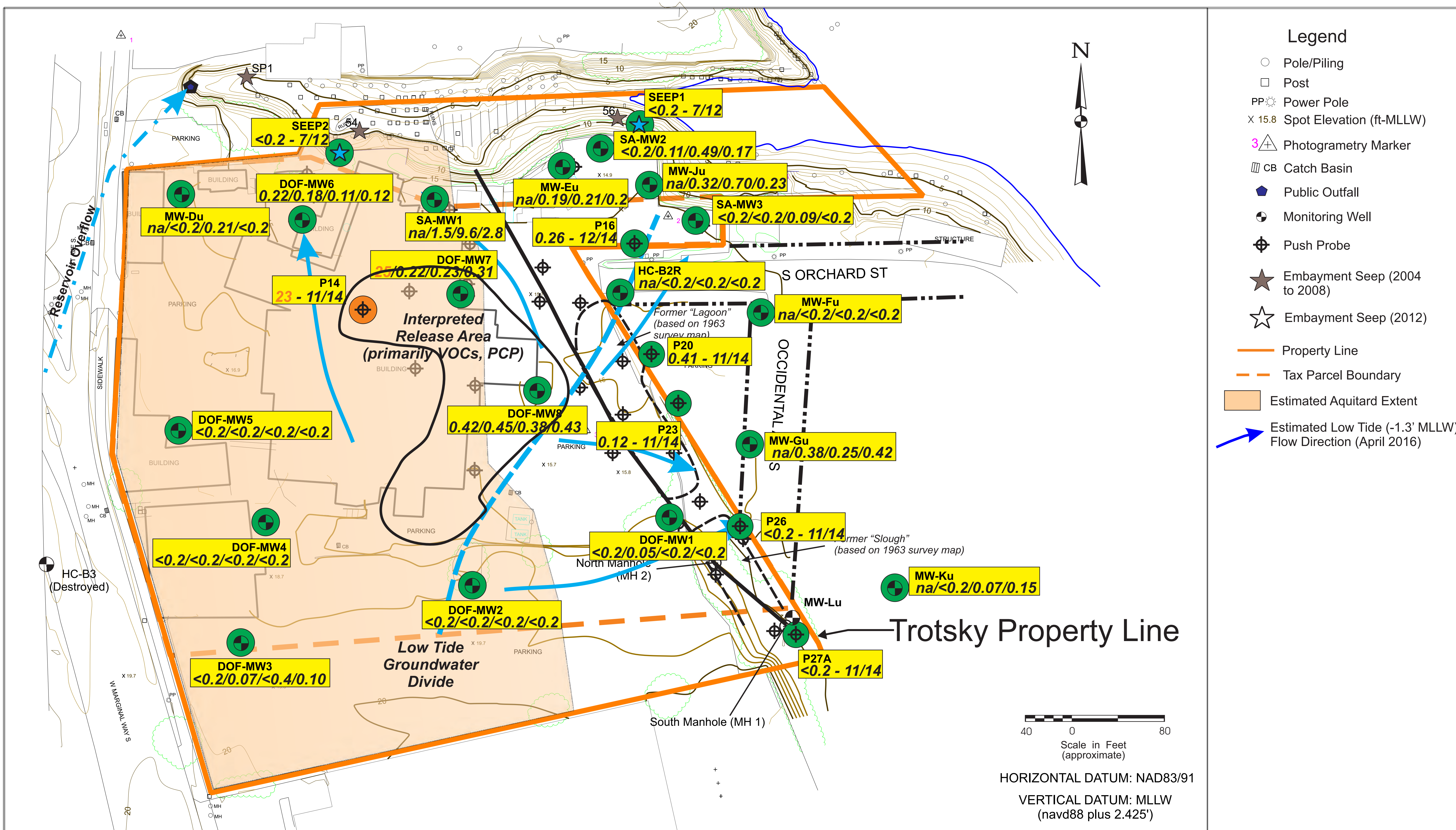
ICS/NW Cooperage Site

cis-1,2-Dichloroethene Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-13a



Concentration ≤ Screening Level (SL= na*/16** ug/l)

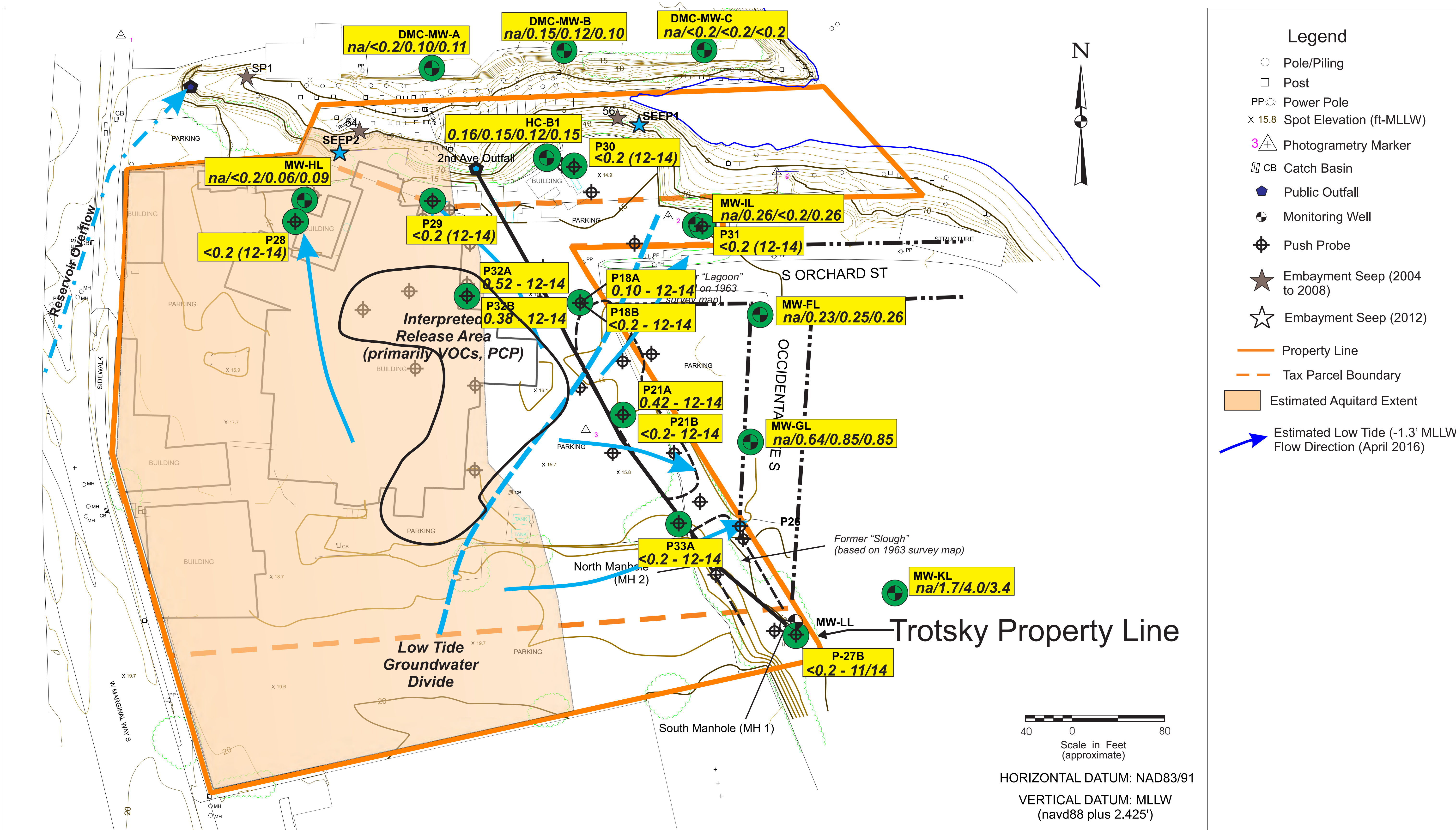
Concentration > Screening Level (SL= na*/16** ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water; ** Groundwater - MTCA Method B

Ref: cis12DCE GW Plot R1-R3rev.cdr

ICS/NW Cooperage Site	
cis-1,2-Dichloroethene Concentrations Upper Zone	**FIGURE 5-13b**
SUM-008-00 (ICS) *Mar. 2018*	
Dalton, Olmsted & Fuglevand, Inc.	



Concentration ≤ Screening Level (SL= na*/16** ug/l)

Concentration > Screening Level (SL= na*/16** ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water; ** Groundwater - MTCA Method B

Ref:Cis12DCE GW Plot R1-R3rev.cdr

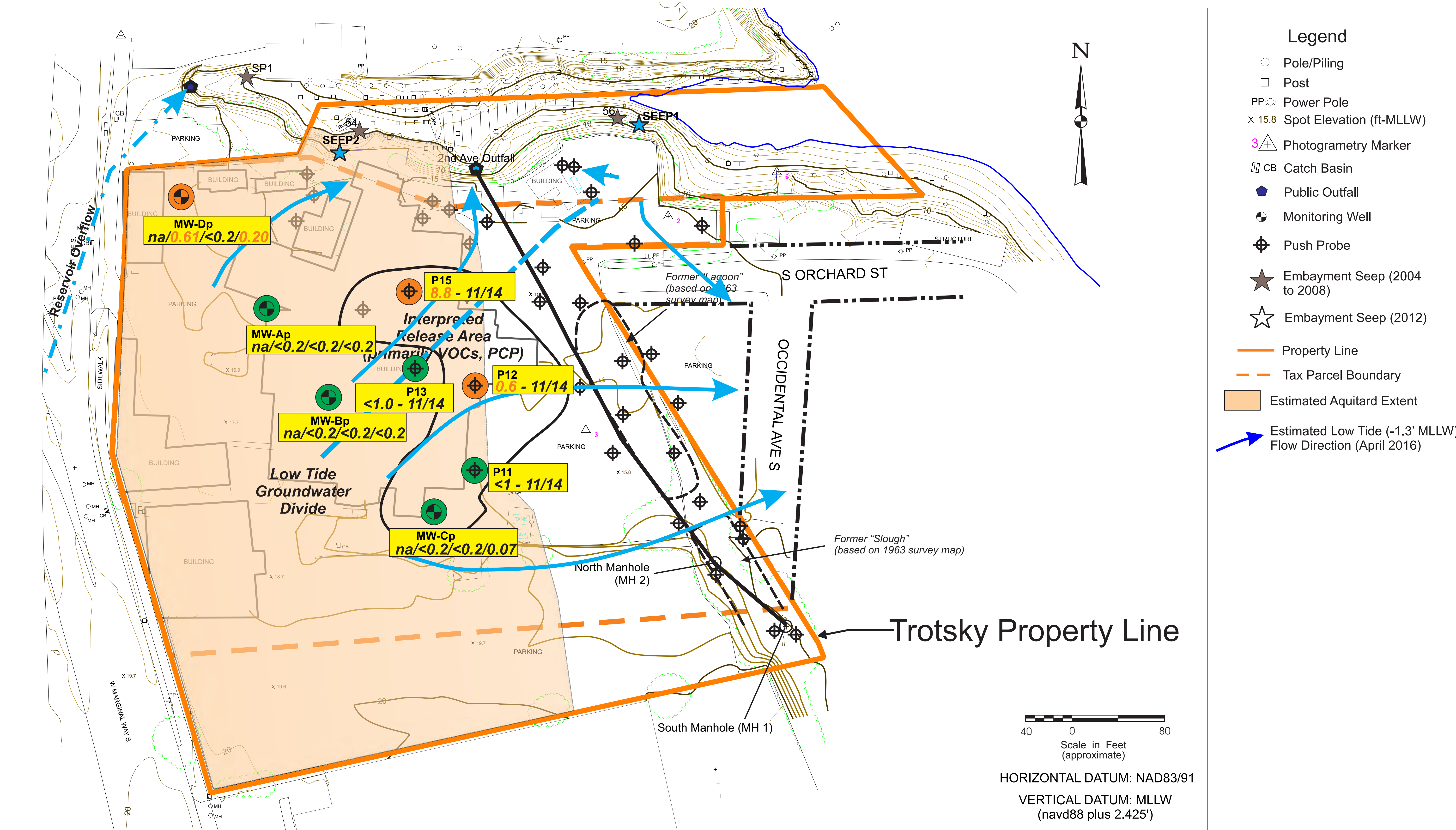
ICS/NW Cooperage Site

cis-1,2-Dichloroethene Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-13c



Concentration ≤ Screening Level (SL = 0.18* ug/l)

Concentration > Screening Level (SL= 0.18* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

Ref: VC GW Plot R1-R3rev.cdr

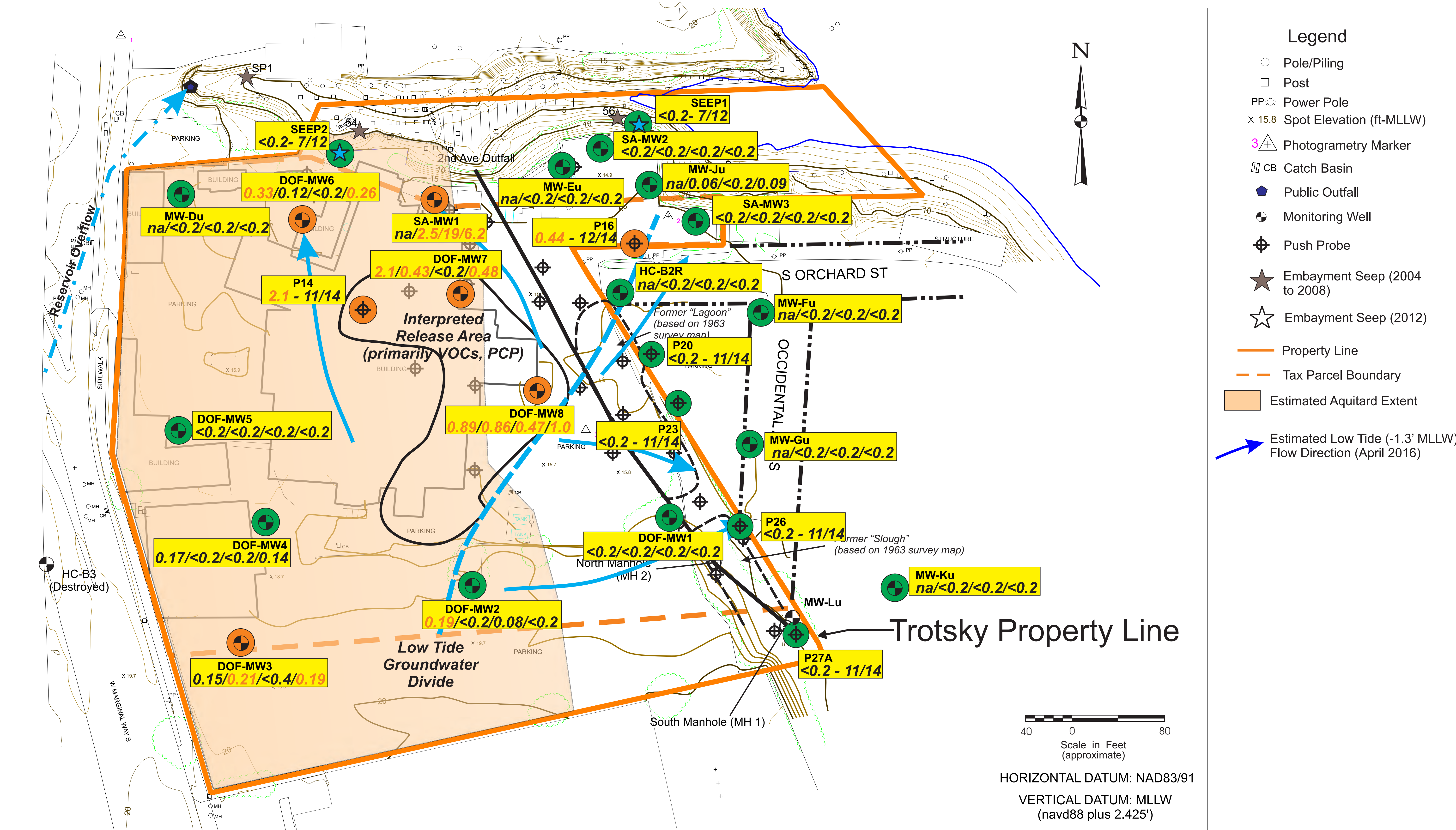
ICS/NW Cooperage Site

Vinyl Chloride Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-14a



Ref: VC GW Plot R1-R3rev.cdr

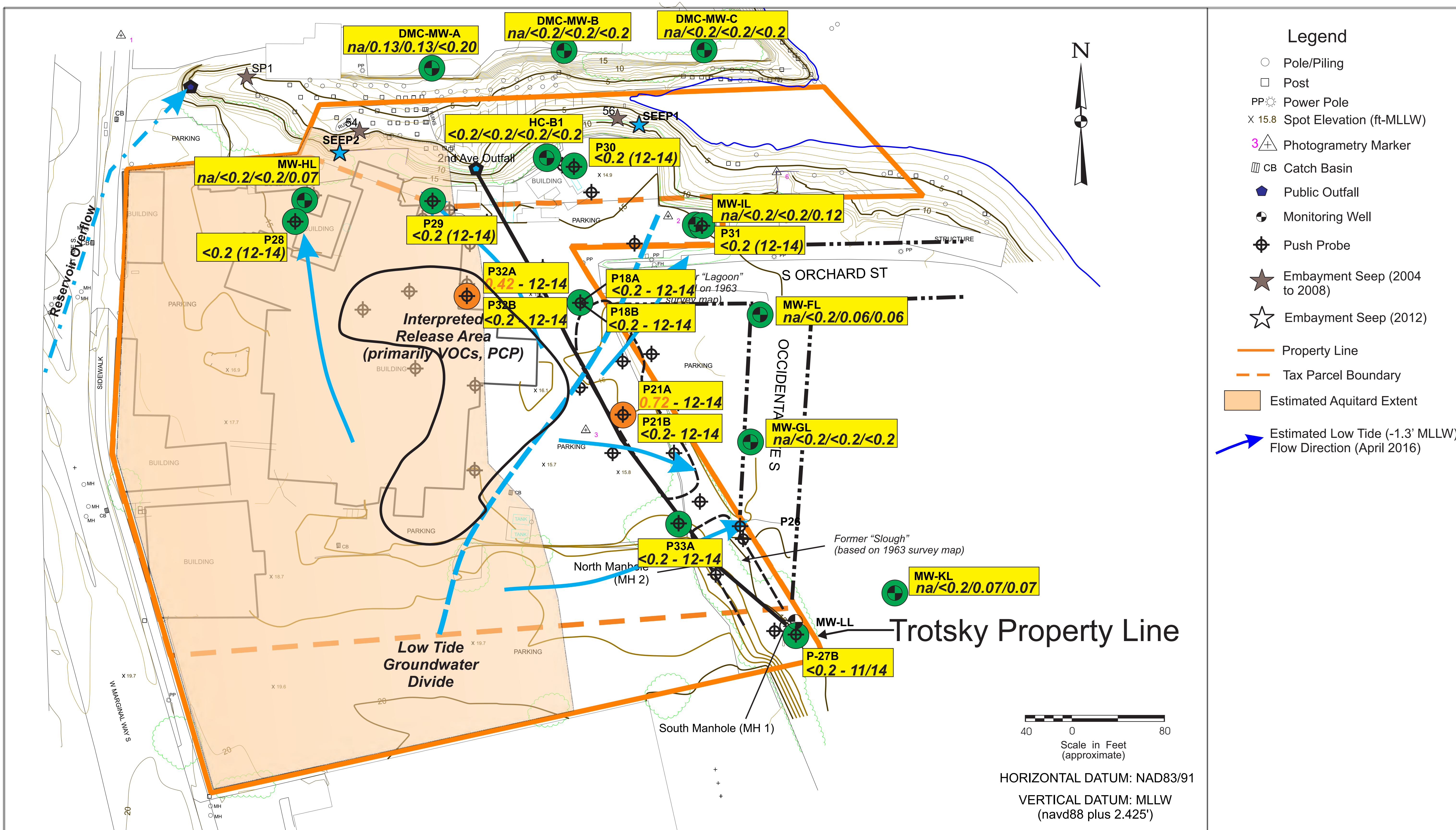
ICS/NW Cooperage Site

Vinyl Chloride Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-14b



Concentration ≤ Screening Level (SL = 0.18* ug/l)

Concentration > Screening Level (SL= 0.18* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Surface Water

Ref: VC GW Plot R1-R3rev.cdr

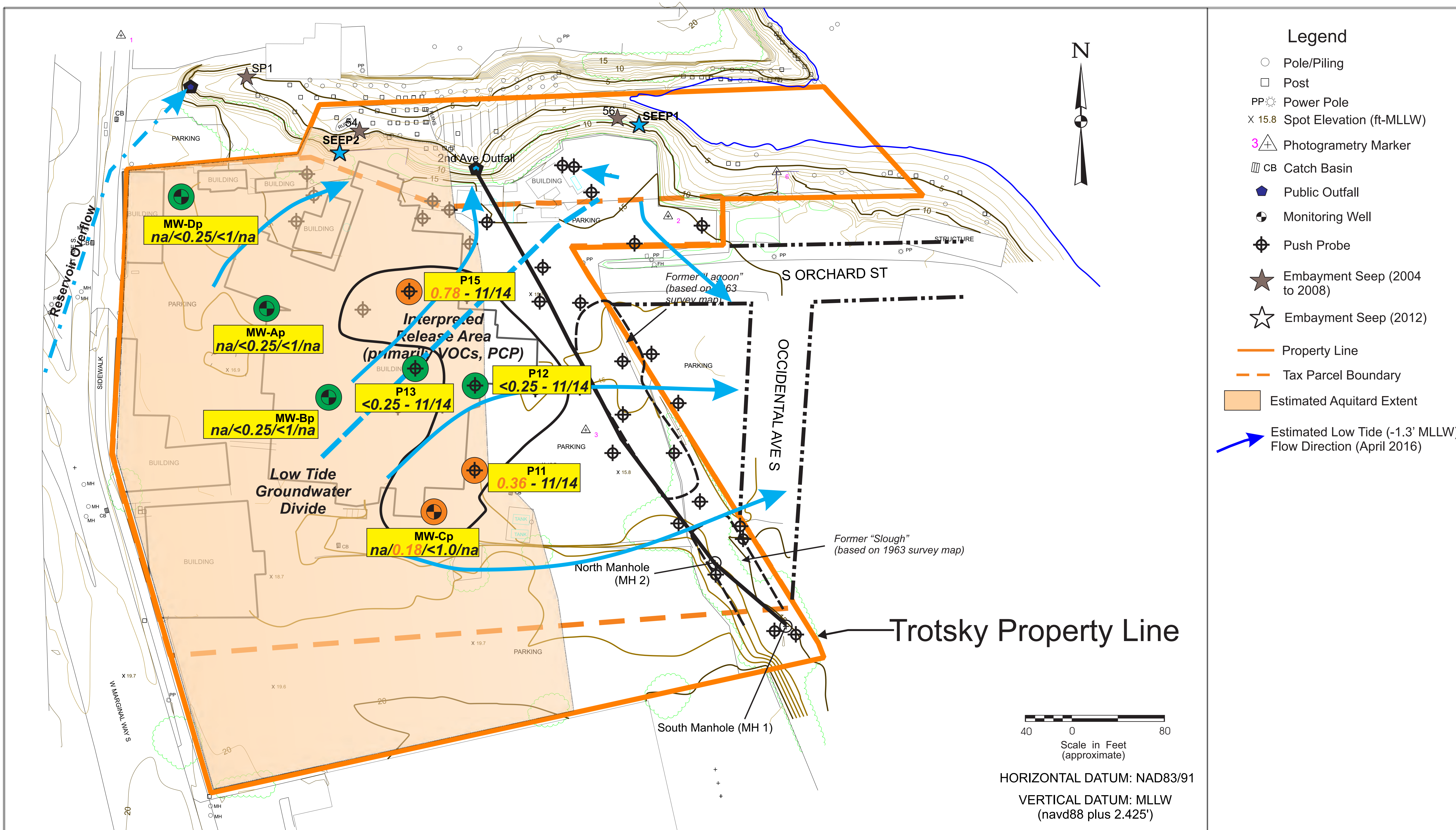
ICS/NW Cooperage Site

Vinyl Chloride Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-14c



Concentration ≤ Screening Level (SL= 0.002 ug/l - PQL=0.025 ug/l) 2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

Concentration > Screening Level (SL= 0.002 ug/l- PQL=0.025 ug/l) *na* - Not Available

Ref: PCP GW Plot R1-R3rev.cdr

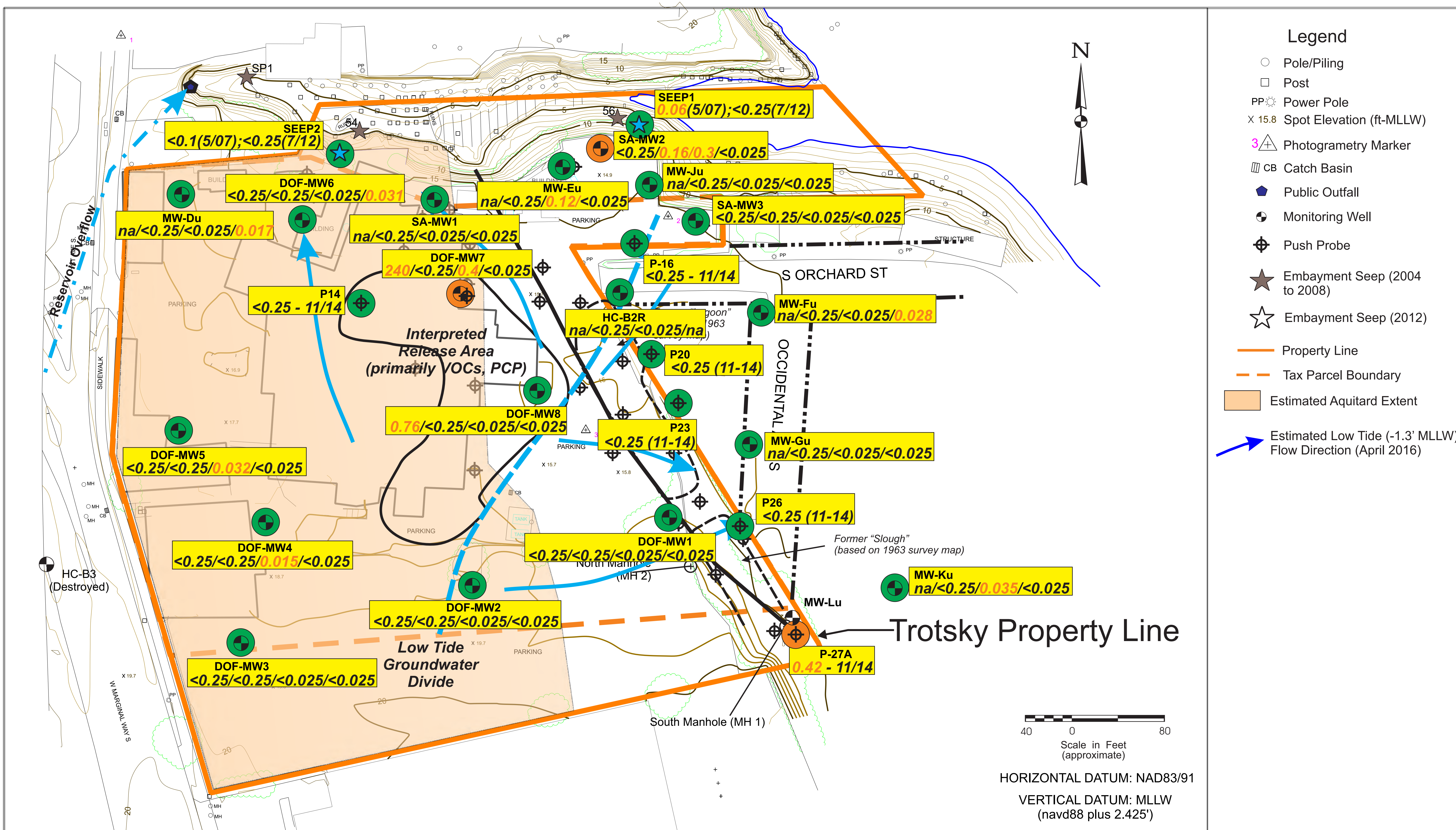
ICS/NW Cooperage Site

Pentachlorophenol Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-15a



Concentration ≤ Screening Level (SL= 0.002 ug/l - PQL=0.025 ug/l)

Concentration > Screening Level (SL= 0.002 ug/l- PQL=0.025 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: PCP GW Plot R1-R3rev.cdr

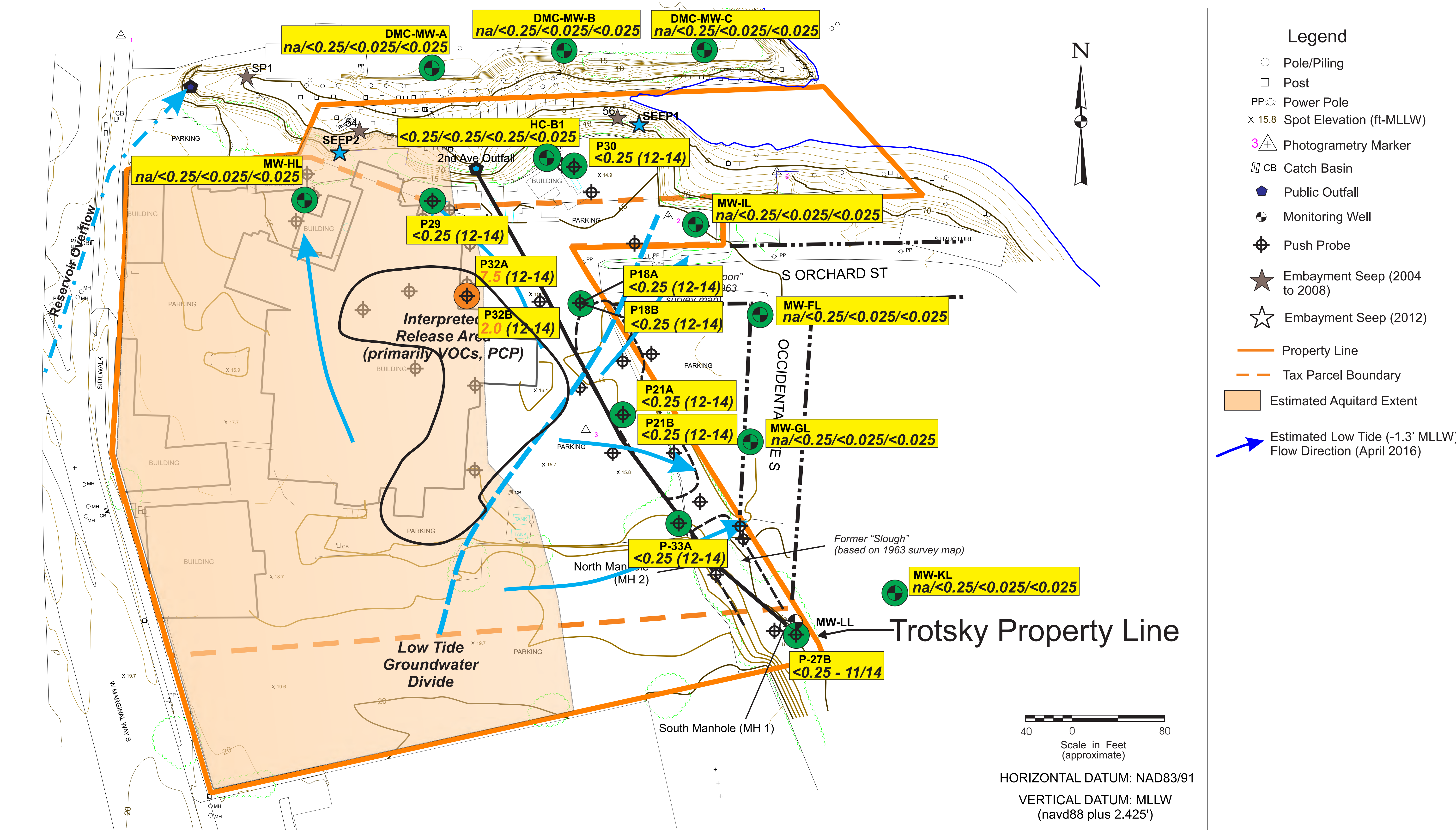
ICS/NW Cooperage Site

Pentachlorophenol Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-15b



Concentration ≤ Screening Level (SL= 0.002 ug/l - PQL=0.025 ug/l) 2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

Concentration > Screening Level (SL= 0.002 ug/l- PQL=0.025 ug/l) *na* - Not Available

Ref: PCP GW Plot R1-R3rev.cdr

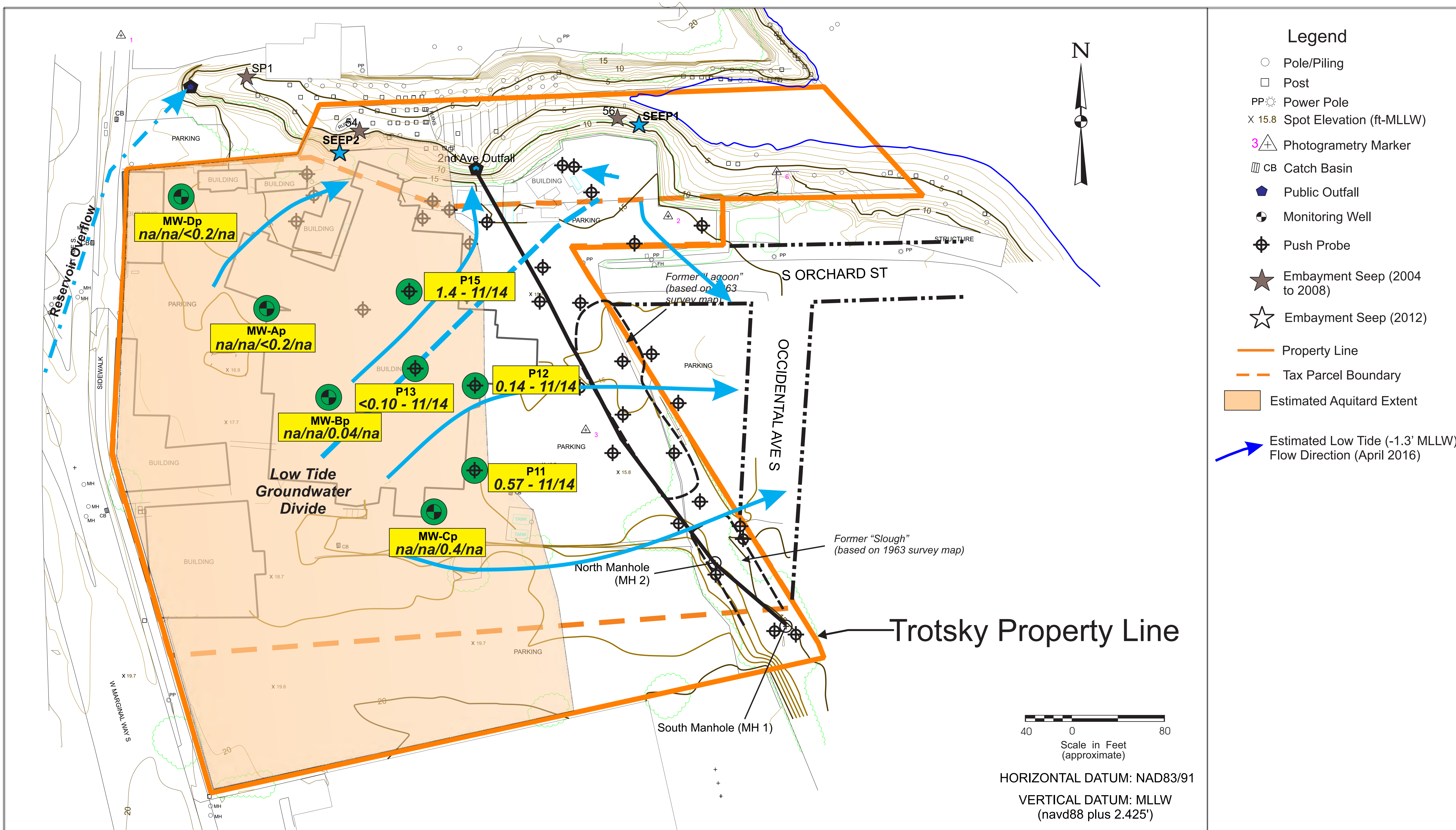
ICS/NW Cooperage Site

Pentachlorophenol Concentrations Lower Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-15c



Concentration ≤ Screening Level (SL= 1.4* ug/l)

Concentration > Screening Level (SL= 1.4* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016)

na - Not Available; * Surface Water

Ref: Naph GW Plot R1-R3rev.cdr

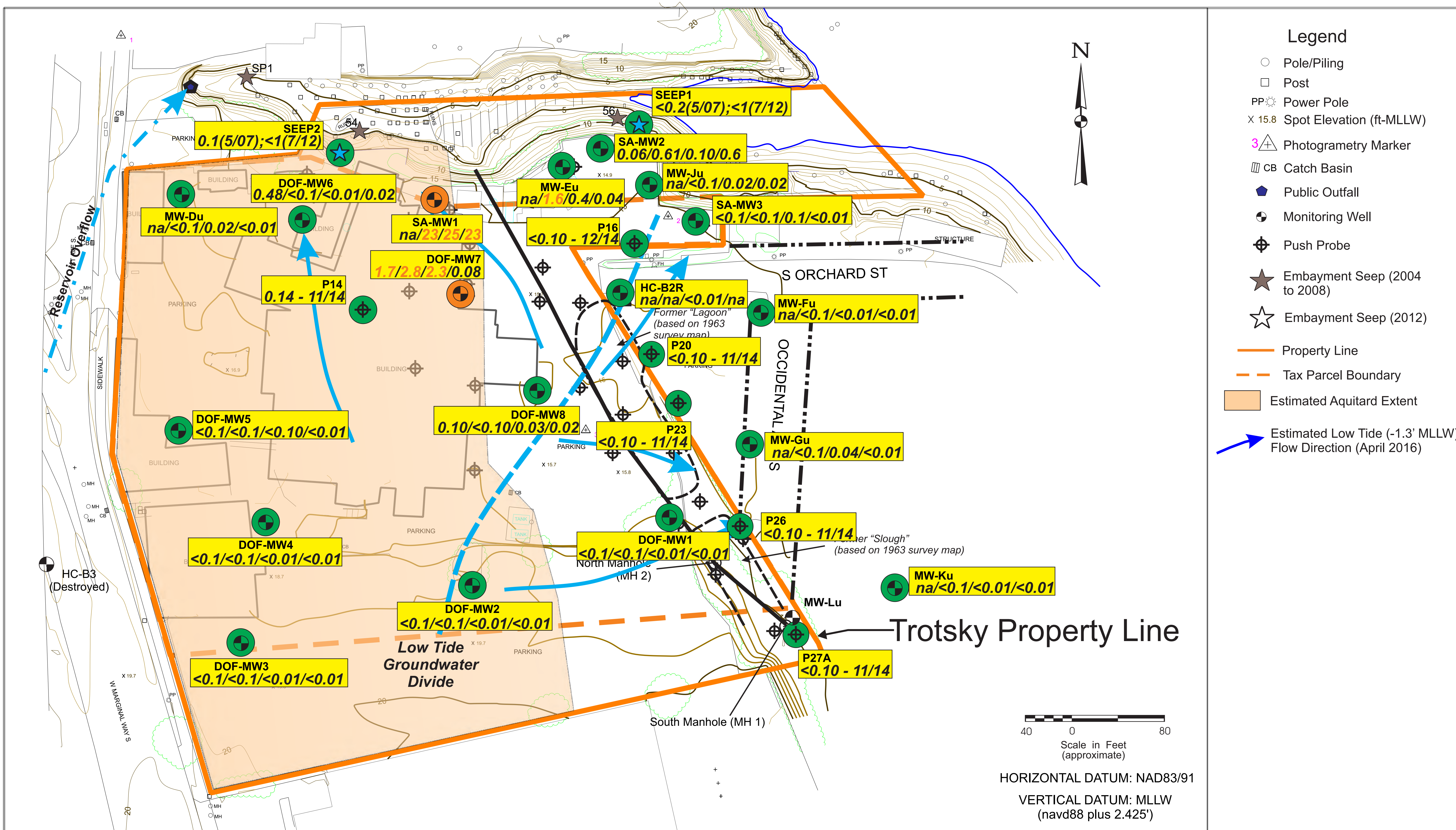
ICS/NW Cooperage Site

Naphthalene Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-16a



Concentration ≤ Screening Level (SL= 1.4* ug/l)

Concentration > Screening Level (SL= 1.4* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016)

na - Not Available; * Surface Water

Ref: Naph GW Plot R1-R3rev.cdr

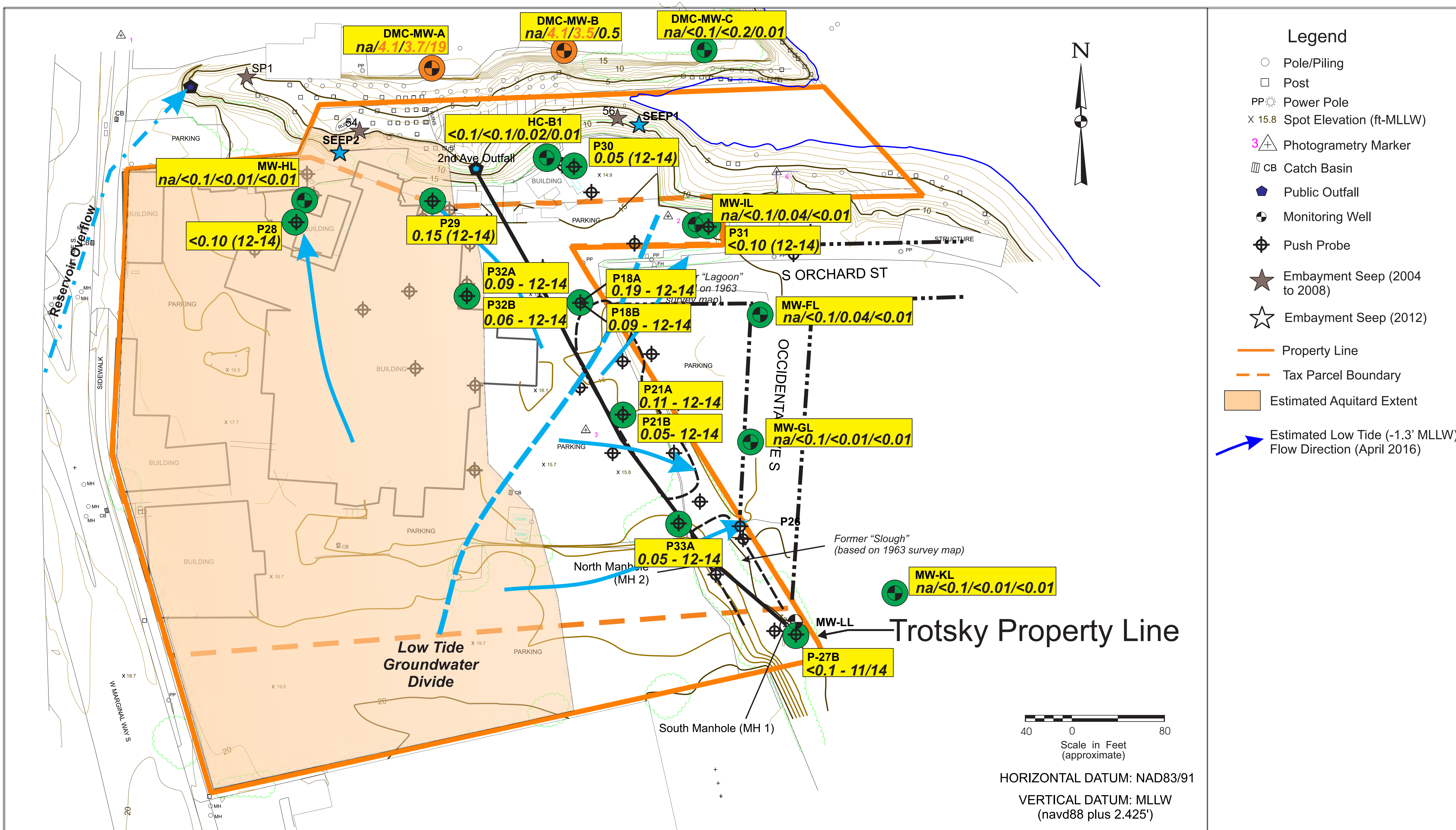
ICS/NW Cooperage Site

Naphthalene Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-16b



Concentration ≤ Screening Level (SL= 1.4* ug/l)

Concentration > Screening Level (SL= 1.4* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016)

na - Not Available; * Surface Water

Ref: Naph GW Plot R1-R3rev.cdr

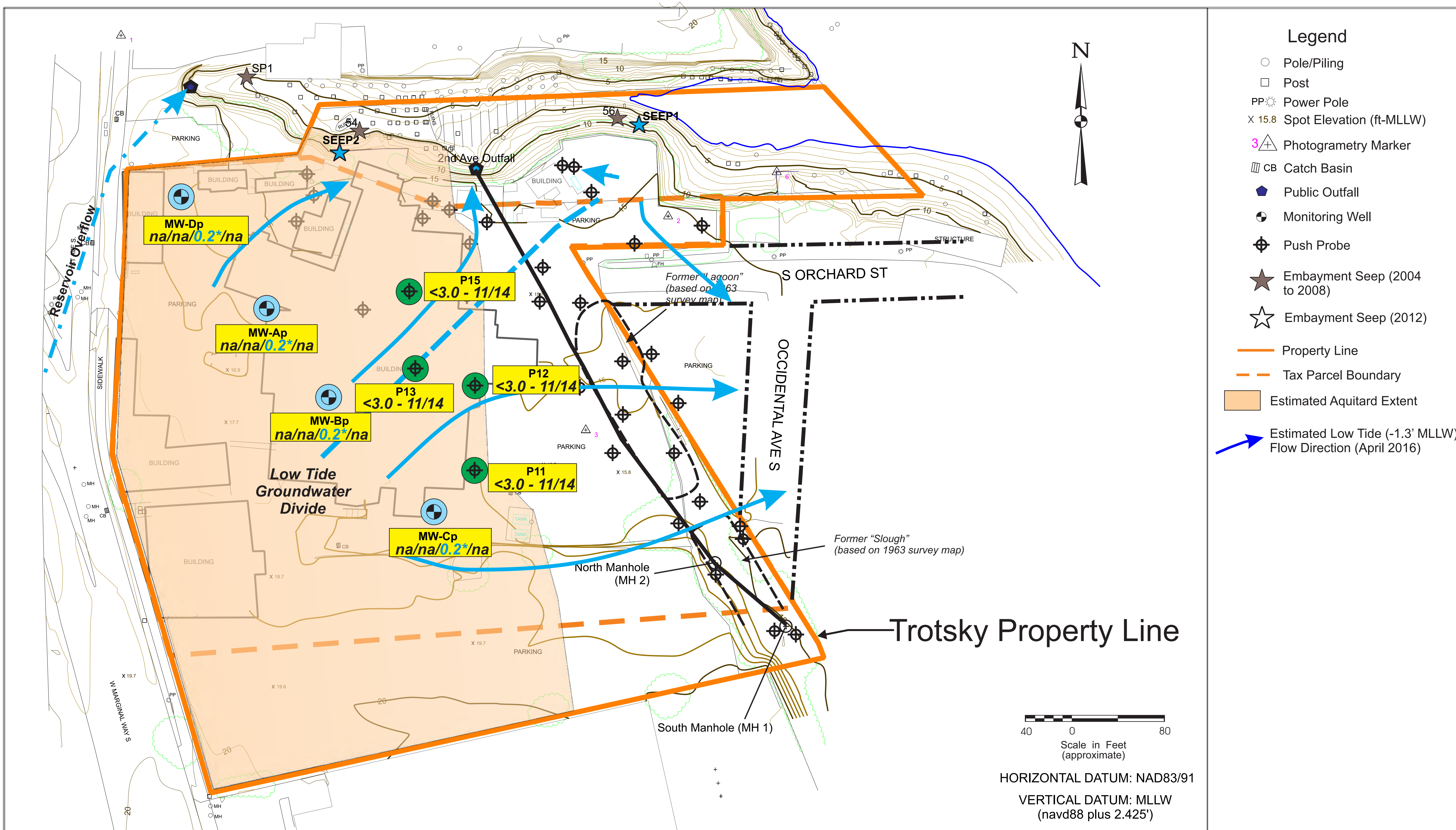
ICS/NW Cooperage Site

Naphthalene Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-16c



Concentration ≤ Screening Level (SL= 0.046 ug/l; PQL =0.2 ug/l)

Concentration > Screening Level (SL= 0.046 ug/l; PQL =0.2 ug/l)

Detection at or below PQL

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

* May be the result of laboratory contamination

Ref: BEHP GW Plot R1-R3rev.cdr

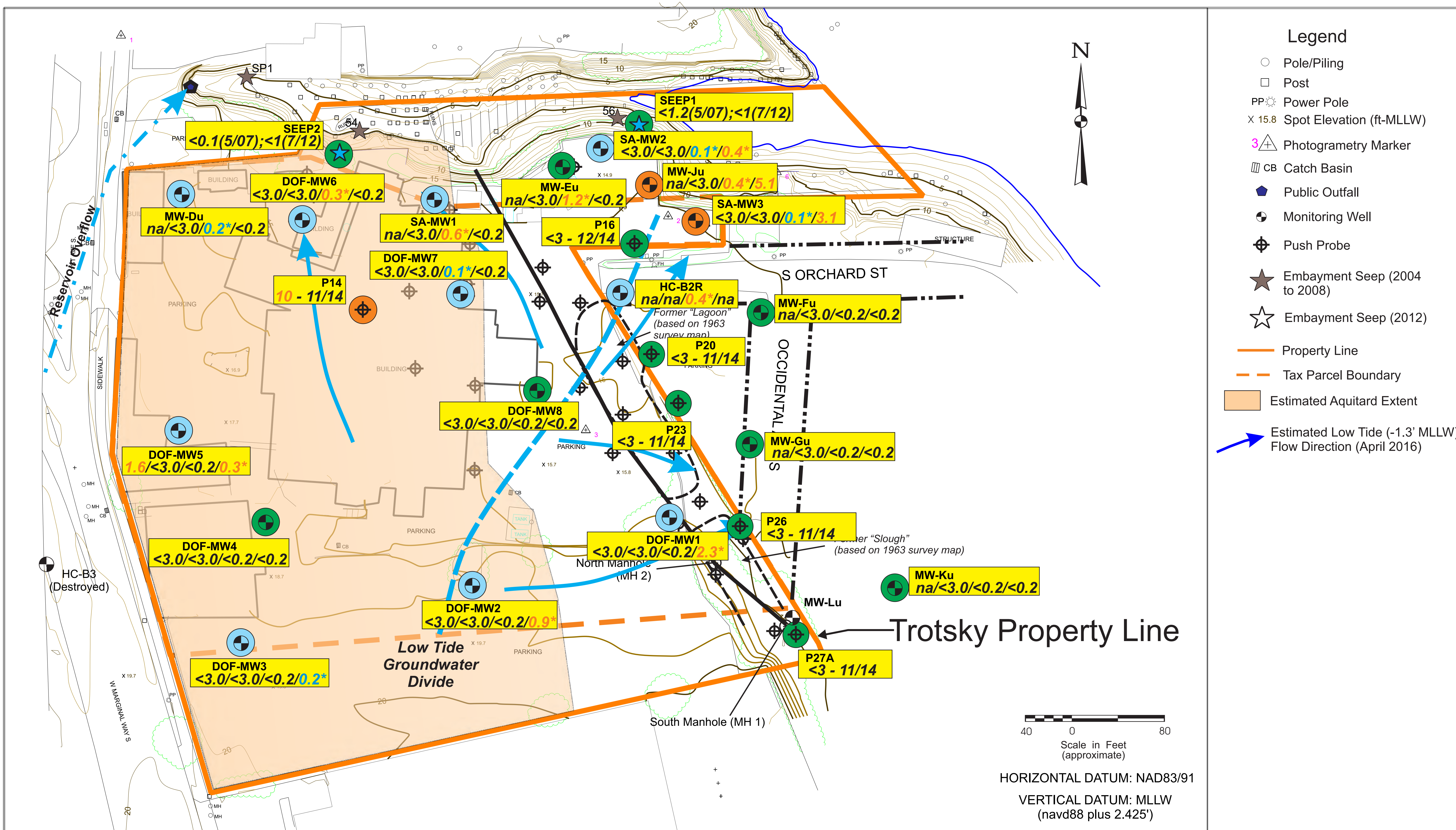
ICS/NW Cooperage Site

bis(2-Ethylhexyl)phthalate Concentrations - Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

FIGURE 5-17a

Dalton, Olmsted & Fuglevand, Inc.



Concentration ≤ Screening Level (SL= 0.046 ug/l; PQL =0.2 ug/l)

Concentration > Screening Level (SL= 0.046 ug/l; PQL =0.2 ug/l)

Detection at or below PQL

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

* May be the result of laboratory contamination

Ref: BEHP GW Plot R1-R3rev.cdr

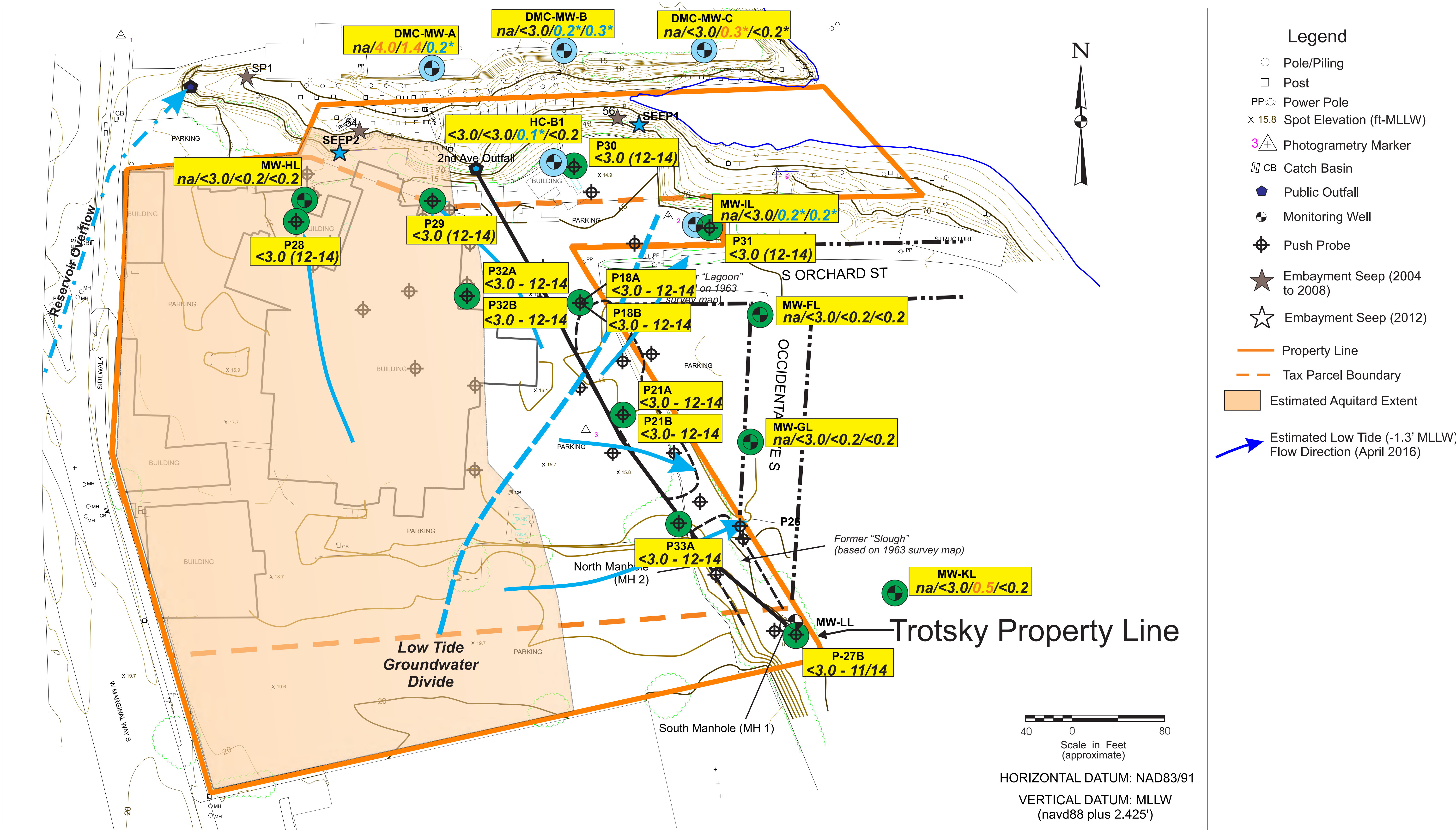
ICS/NW Cooperage Site

bis(2-Ethylhexyl)phthalate Concentrations - Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-17b



Concentration ≤ Screening Level (SL= 0.046 ug/l; PQL =0.2 ug/l)

Concentration > Screening Level (SL= 0.046 ug/l; PQL =0.2 ug/l)

Detection at or below PQL

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

* May be the result of laboratory contamination

Ref: BEHP GW Plot R1-R3rev.cdr

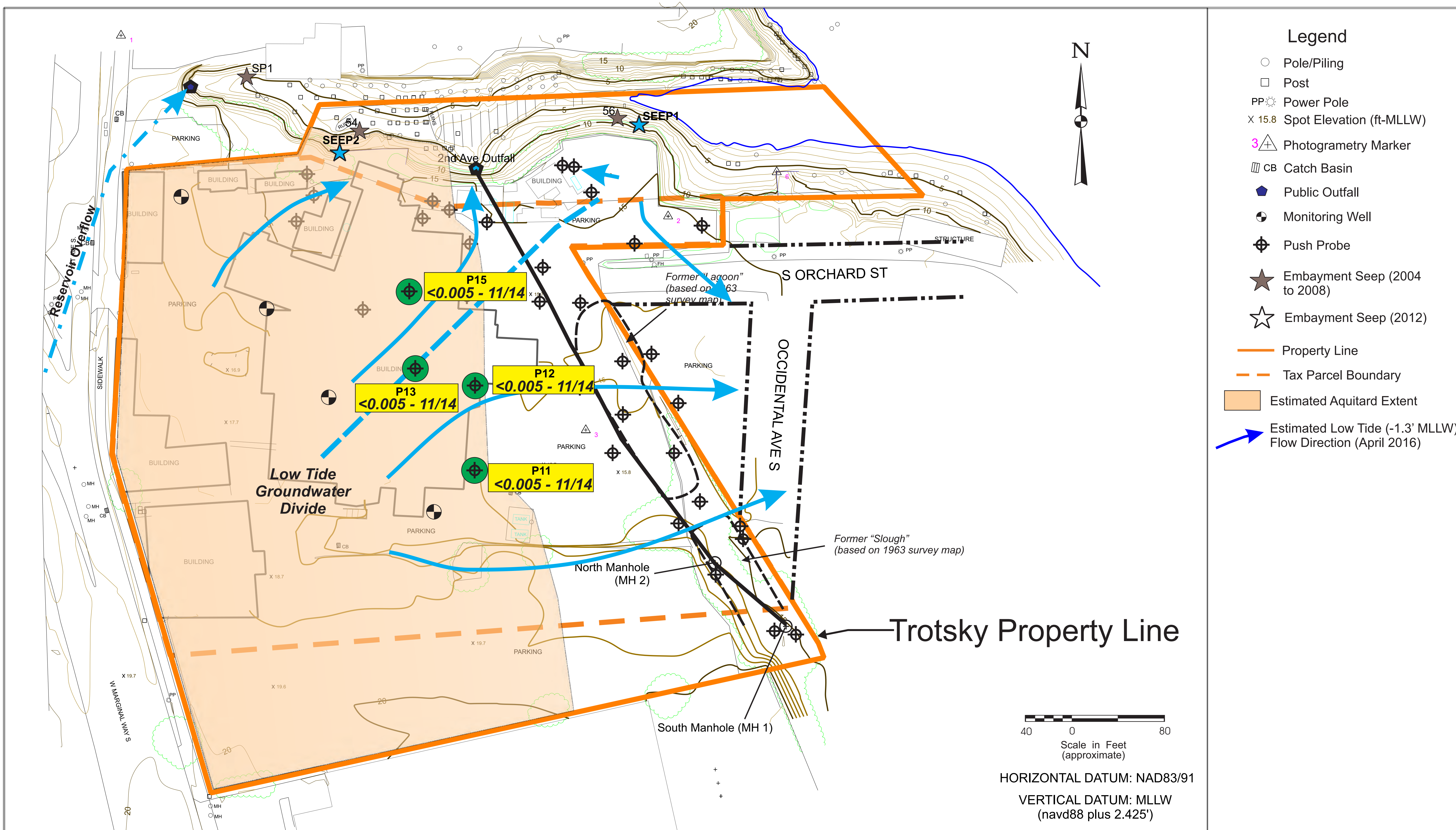
ICS/NW Cooperage Site

bis(2-Ethylhexyl)phtnalate Concentrations - Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-17c



Concentration ≤ Screening Level (SL= 7.9E-6 ug/l; PQL*= 0.0013 ug/l)

Concentration > Screening Level (SL= 7.9E-6 ug/l; PQL*= 0.0013 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Screening based on PQL

Ref: DDD GW Plot R1-R3rev.cdr

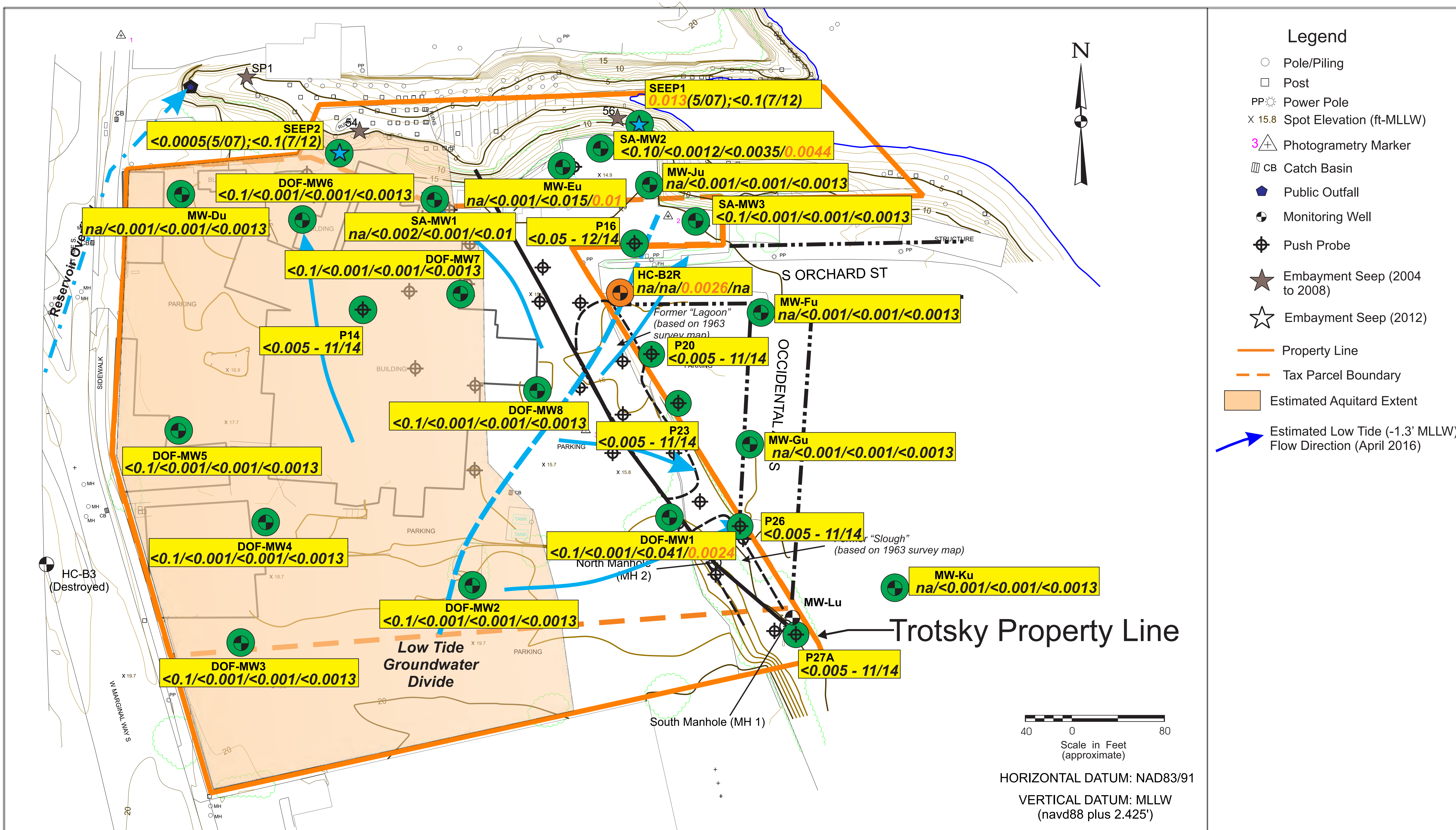
ICS/NW Cooperage Site

4,4'-DDD Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-18a



Concentration ≤ Screening Level (SL= 7.9E-6 ug/l; PQL*= 0.0013 ug/l)

Concentration > Screening Level (SL= 7.9E-6 ug/l; PQL*= 0.0013 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Screening based on PQL

Ref: DDD GW Plot R1-R3rev.cdr

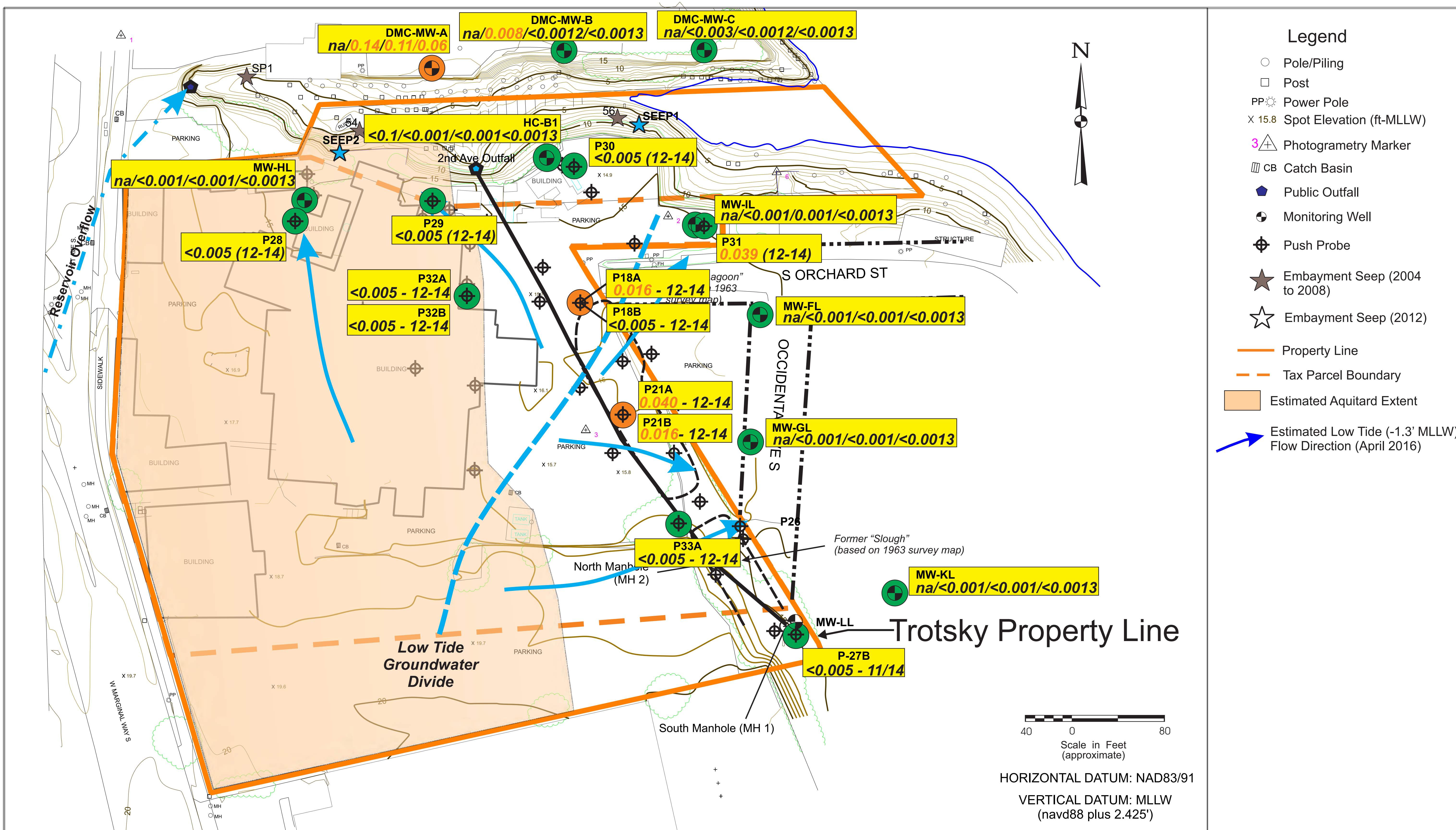
ICS/NW Cooperage Site

4,4'-DDD Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-18b



Concentration ≤ Screening Level (SL= 7.9E-6 ug/l; PQL*= 0.0013 ug/l)

Concentration > Screening Level (SL= 7.9E-6 ug/l; PQL*= 0.0013 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * Screening based on PQL

Ref: DDD GW Plot R1-R3rev.cdr

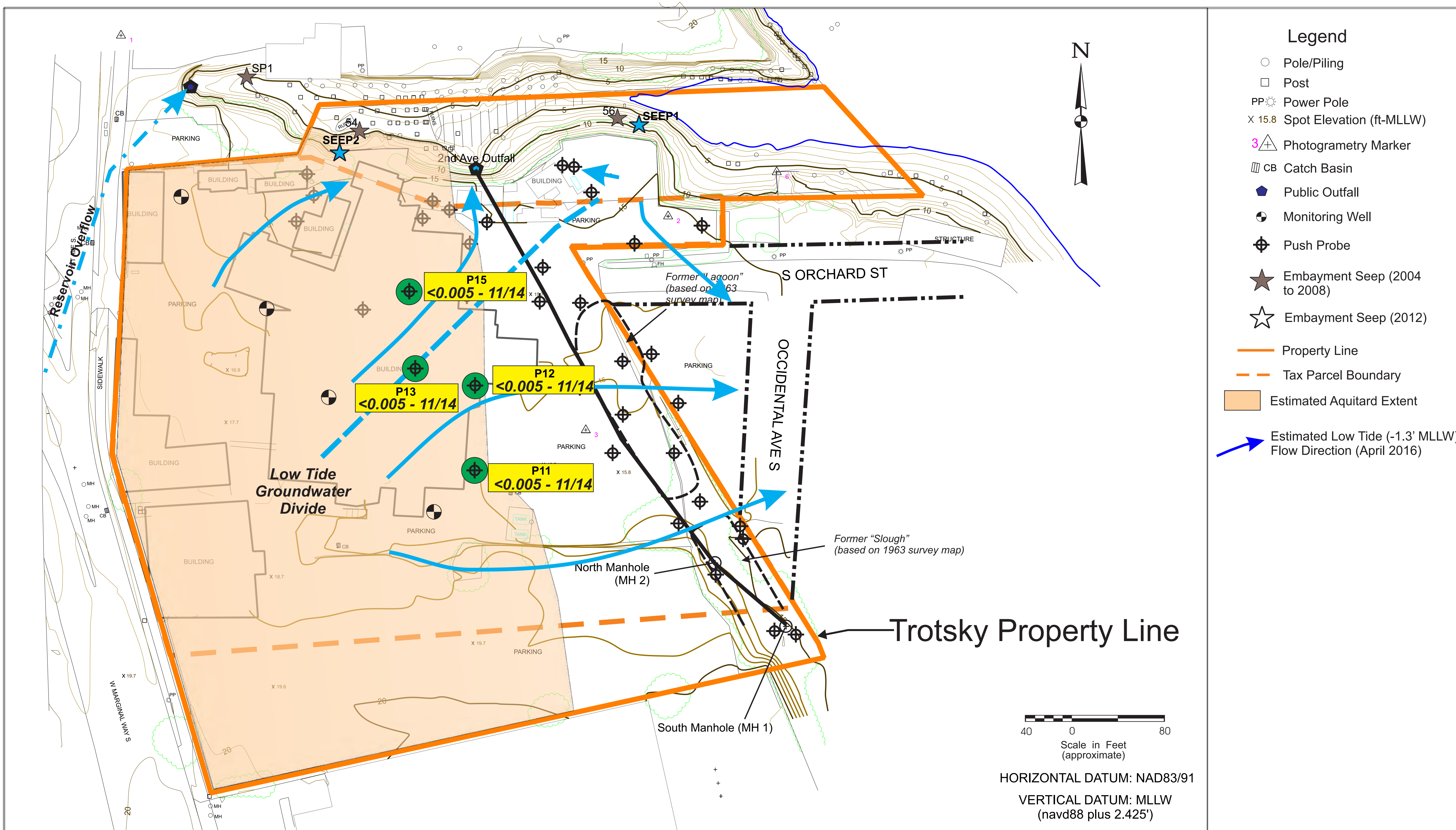
ICS/NW Cooperage Site

4,4'-DDD Concentrations Lower Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-18c



Concentration ≤ Screening Level (SL= 8.8E-7; PQL=0.0013* ug/l)

Concentration > Screening Level (SL= 8.8E-7; PQL=0.0013* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: DDE GW Plot R1-R3rev.cdr

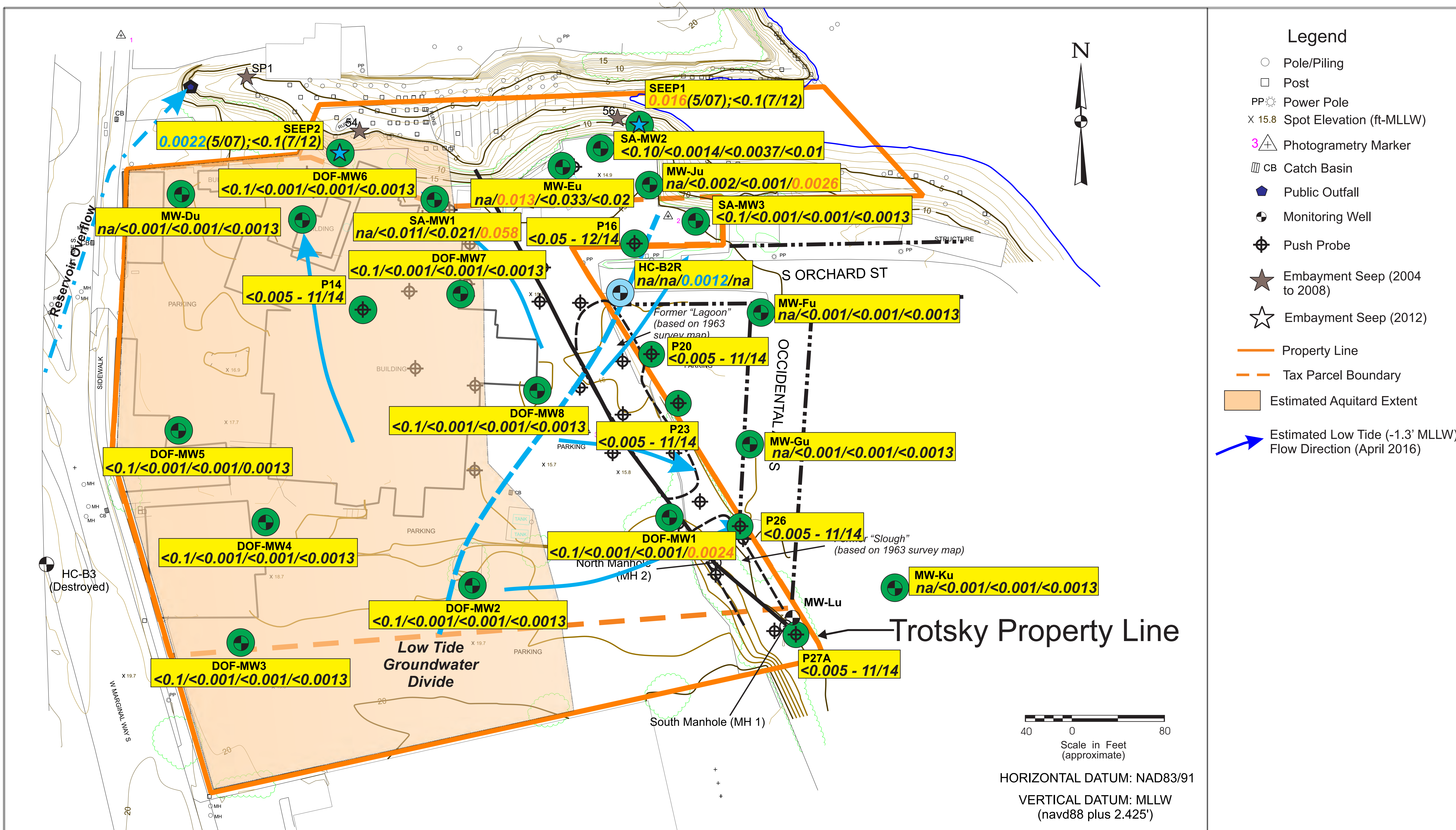
ICS/NW Cooperage Site

4,4'-DDE Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-19a



Concentration ≤ Screening Level (SL= 8.8E-7; PQL=0.0013* ug/l) 2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

Concentration > Screening Level (SL= 8.8E-7; PQL=0.0013* ug/l) *na* - Not Available; * SL Based on PQL

Detection at or below PQL

Ref: DDE GW Plot R1-R3rev.cdr

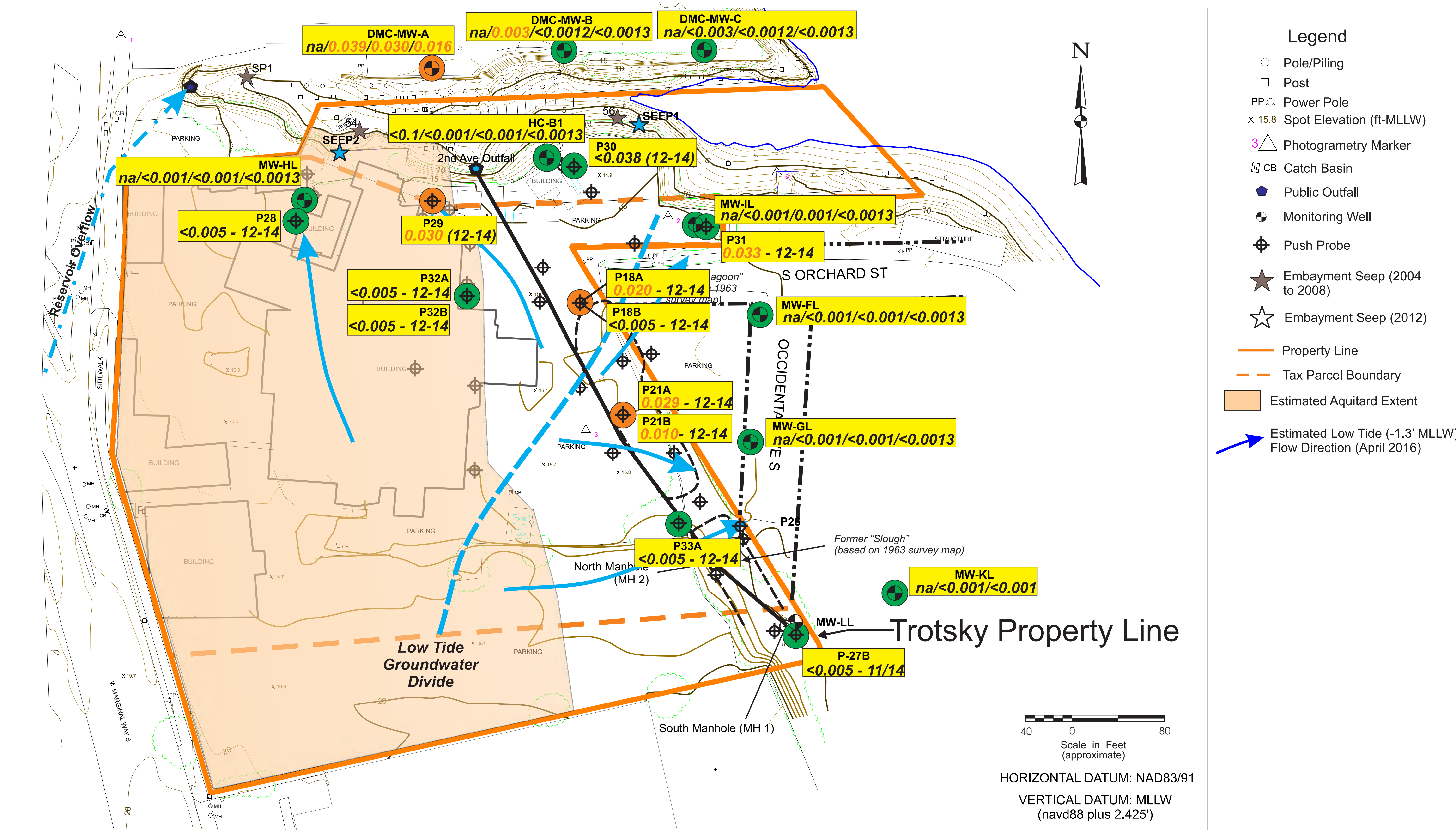
ICS/NW Cooperage Site

4,4'-DDE Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-19b



Concentration ≤ Screening Level (SL= 8.8E-7; PQL=0.0013* ug/l)

Concentration > Screening Level (SL= 8.8E-7; PQL=0.0013* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: DDE GW Plot R1-R3rev.cdr

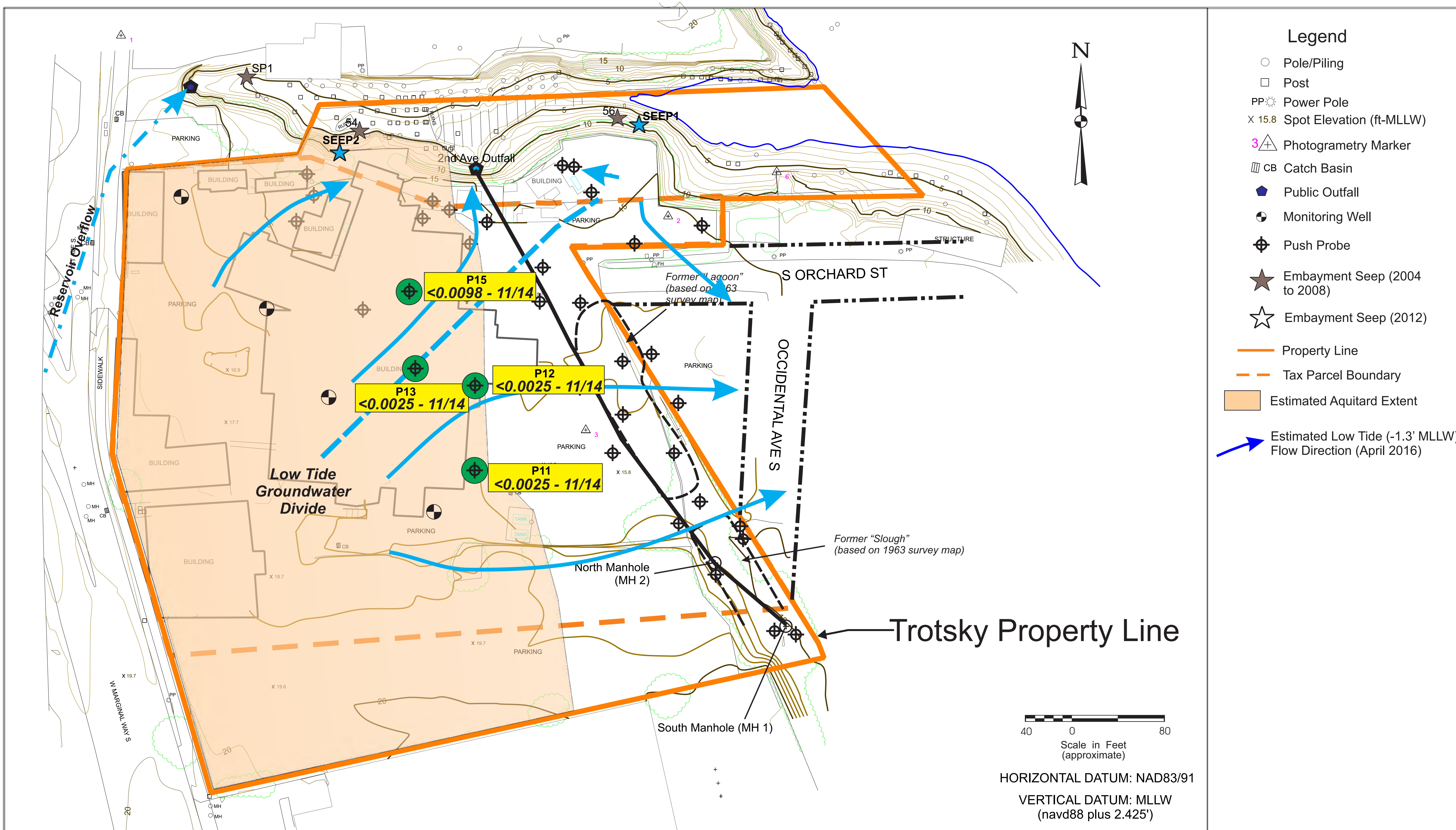
ICS/NW Cooperage Site

4,4'-DDE Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-19c



Concentration ≤ Screening Level (SL= 3.6E-04; PQL=0.00063* ug/l)

Concentration > Screening Level (SL= 3.6E-04; PQL=0.00063* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: TchlordaneGW Plot R1-R3rev.cdr

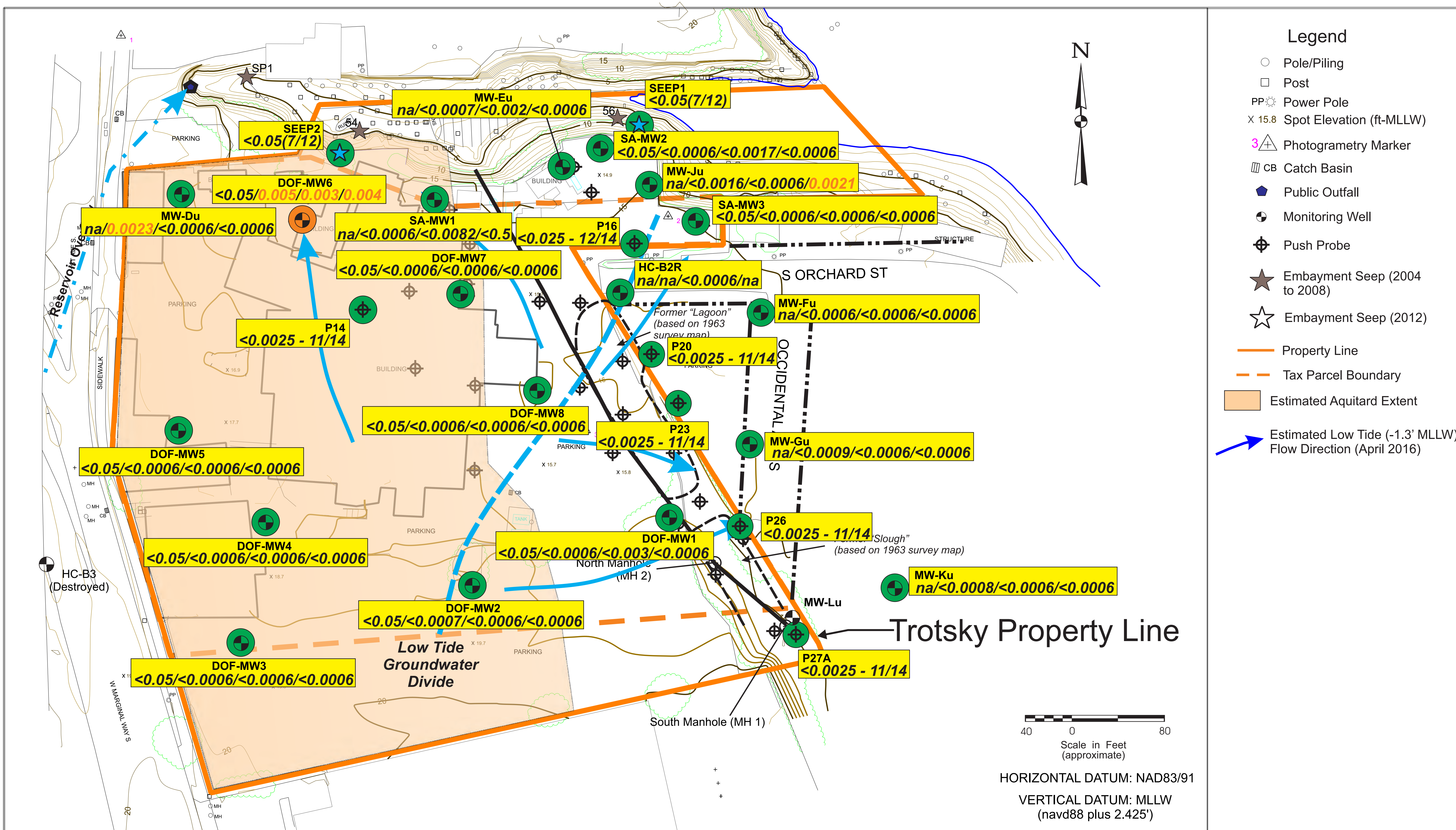
ICS/NW Cooperage Site

Trans-Chlordane Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-20a



Concentration ≤ Screening Level (SL= 8.8E-7; PQL=0.00063* ug/l)

Concentration > Screening Level (SL= 8.8E-7; PQL=0.00063* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: TChlordaneGW Plot R1-R3rev.cdr

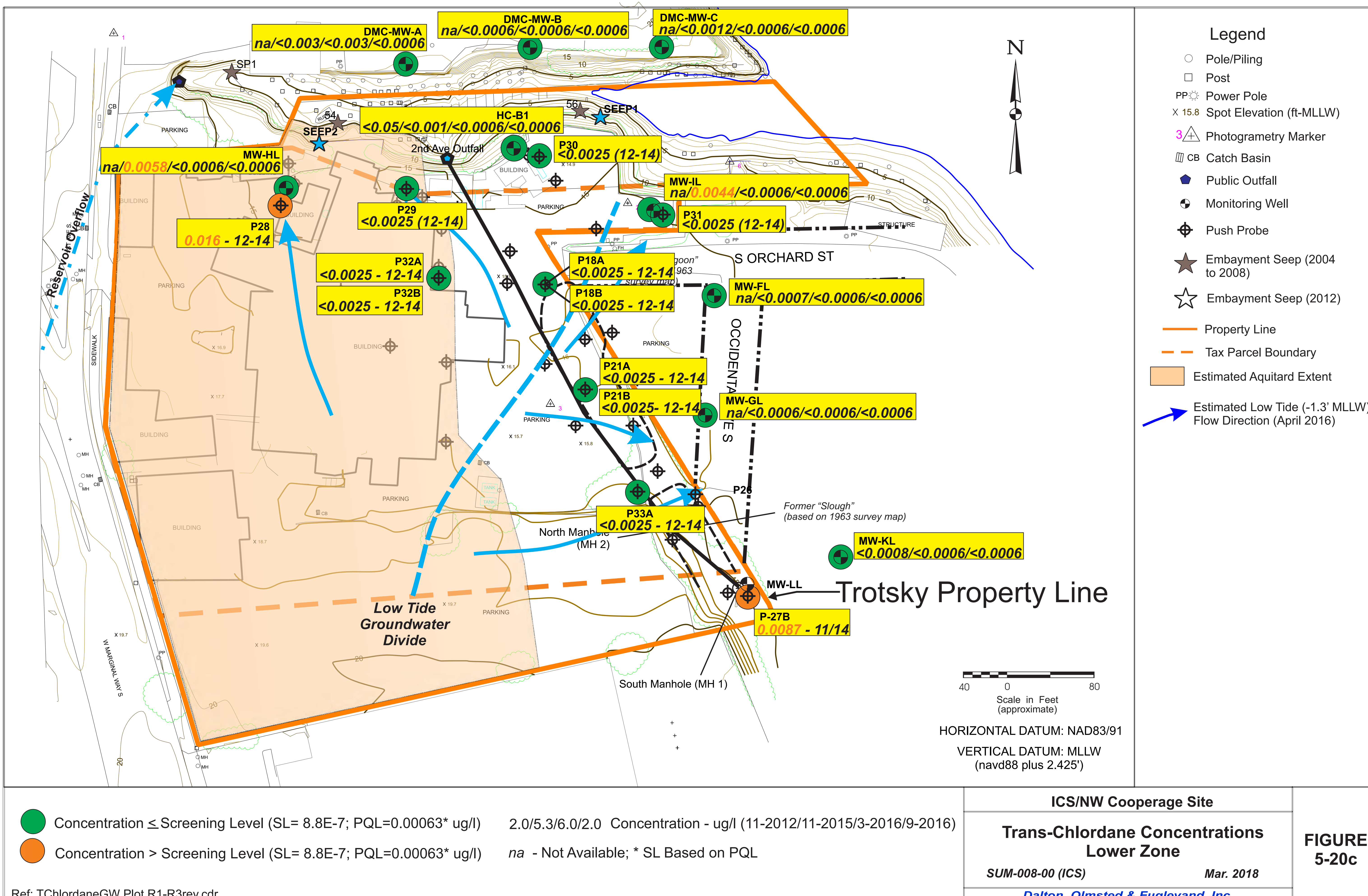
ICS/NW Cooperage Site

Trans-Chlordane Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-20b



ICS/NW Cooperage Site

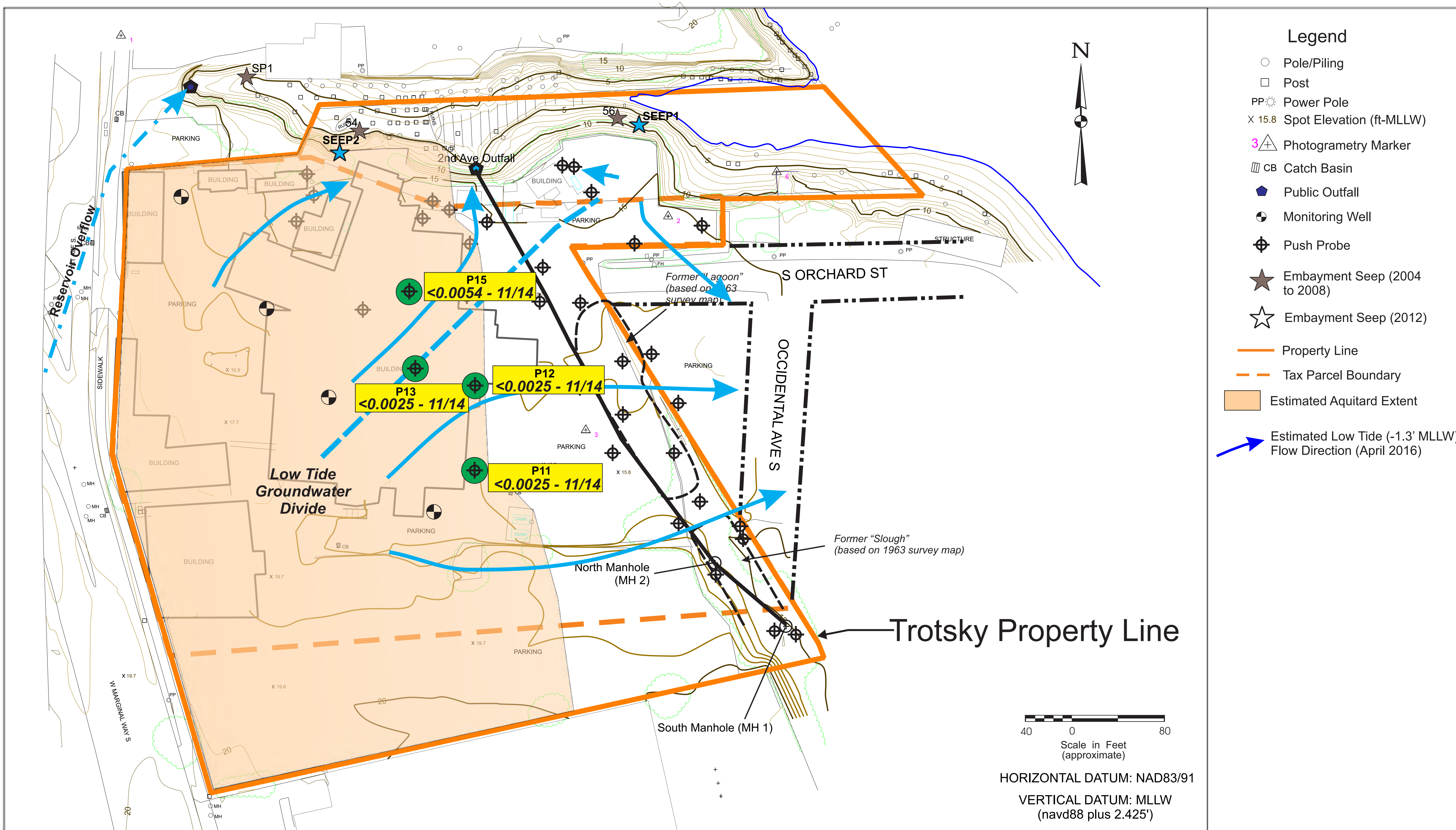
Trans-Chlordane Concentrations Lower Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-20c

Ref: TChlordaneGW Plot R1-R3rev.cdr



Concentration ≤ Screening Level (SL= 3.6E-04; PQL=0.00063* ug/l)

Concentration > Screening Level (SL= 3.6E-04; PQL=0.00063* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: cis-chlordaneGW Plot R1-R3rev.cdr

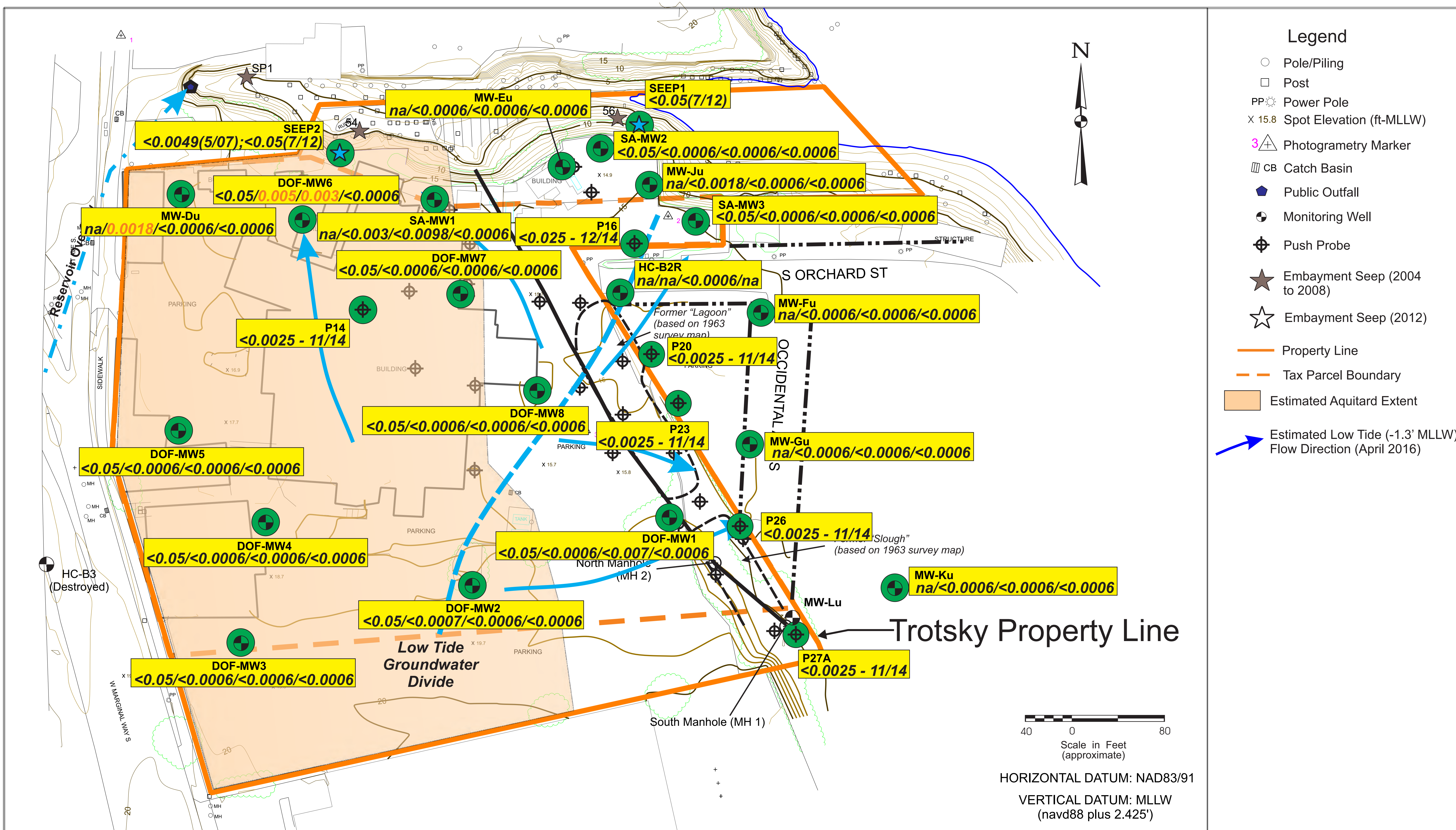
ICS/NW Cooperage Site

cis-Chlordane Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-21a



Concentration ≤ Screening Level (SL= 8.8E-7; PQL=0.00063* ug/l)

Concentration > Screening Level (SL= 8.8E-7; PQL=0.00063* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: cis-ChlordaneGW Plot R1-R3rev.cdr

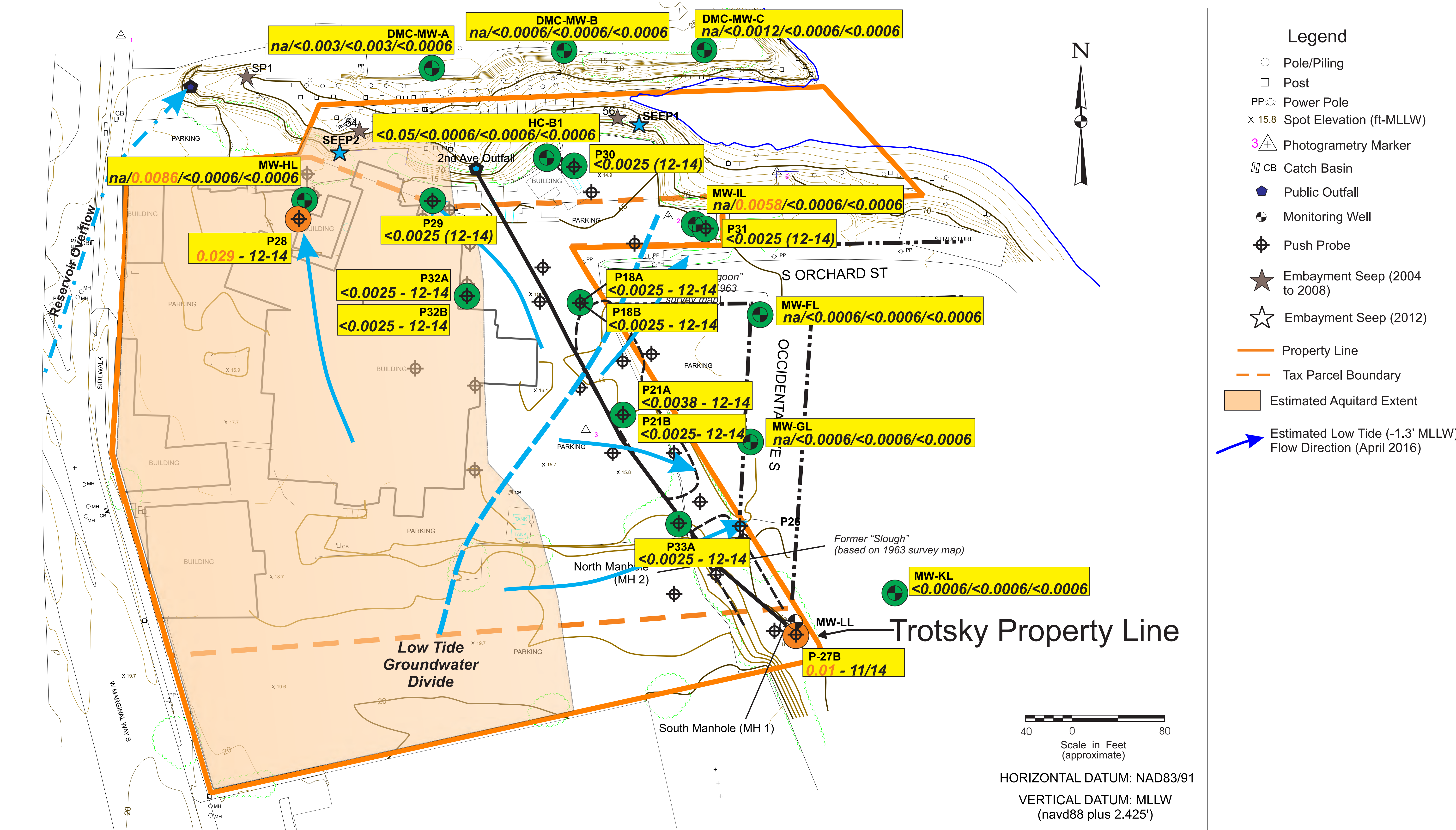
ICS/NW Cooperage Site

cis-Chlordane Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-21b



Concentration ≤ Screening Level (SL= 8.8E-7; PQL=0.00063* ug/l)

Concentration > Screening Level (SL= 8.8E-7; PQL=0.00063* ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: cis-ChlordaneGW Plot R1-R3rev.cdr

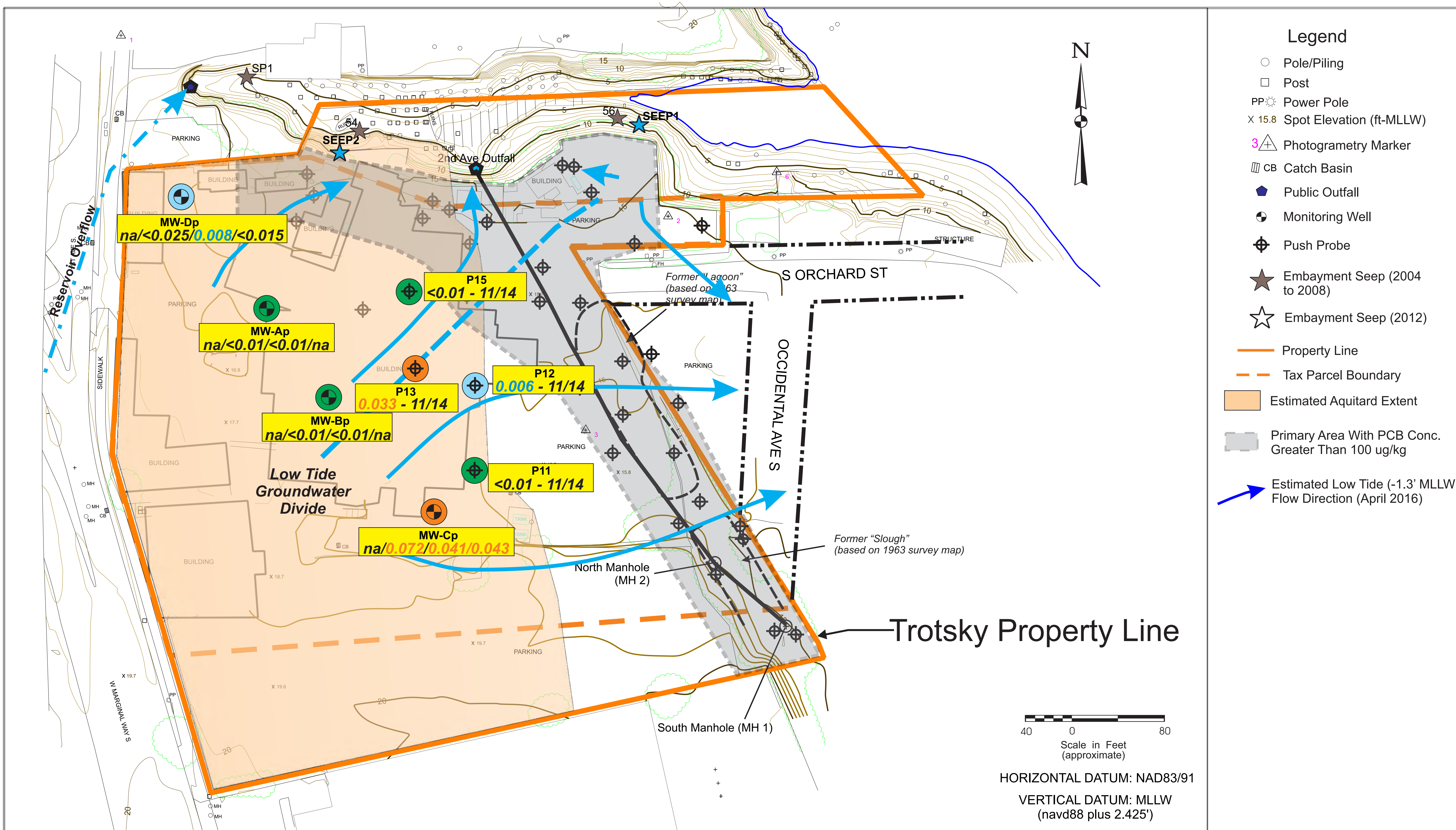
ICS/NW Cooperage Site

cis-Chlordane Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-21c



Concentration ≤ Screening Level (SL= 7.0E-06*; PQL=0.01 ug/l)

Concentration > Screening Level (SL= 7.0/E-06*; PQL=0.01 ug/l)

Detection at or below PQL

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: TPCBs GW Plot R1-R3rev.cdr

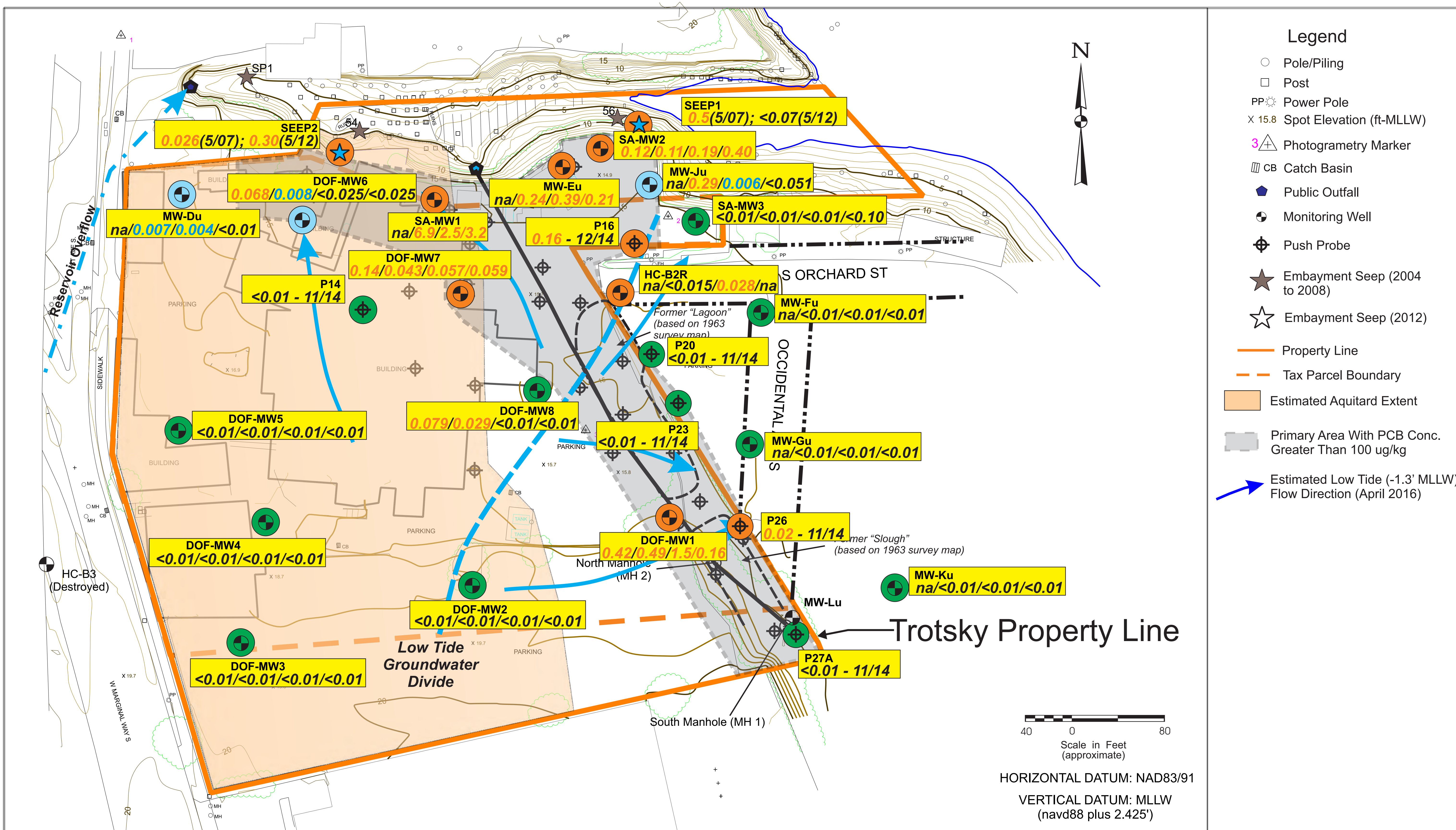
ICS/NW Cooperage Site

Total PCB Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-22a



Concentration ≤ Screening Level (SL= 7.0E-06*; PQL=0.01 ug/l)

Concentration > Screening Level (SL= 7.0/E-06*; PQL=0.01 ug/l)

Detection at or below PQL

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: TPCBs GW Plot R1-R3rev.cdr

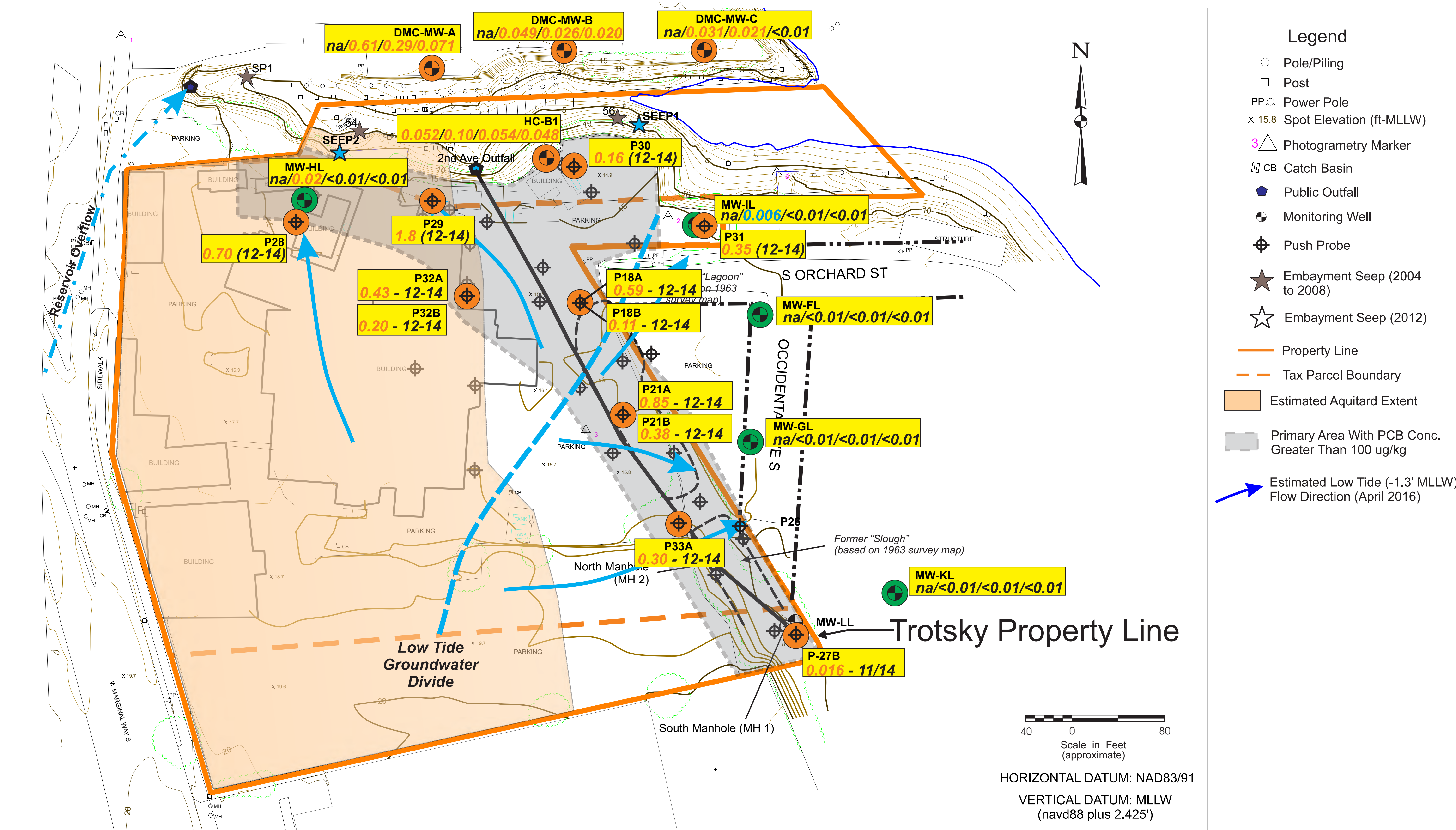
ICS/NW Cooperage Site

Total PCB Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-22b



Concentration ≤ Screening Level (SL= 7.0E-06*; PQL=0.01 ug/l)

Concentration > Screening Level (SL= 7.0/E-06*; PQL=0.01 ug/l)

Detection at or below PQL

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available; * SL Based on PQL

Ref: TPCBs GW Plot R1-R3rev.cdr

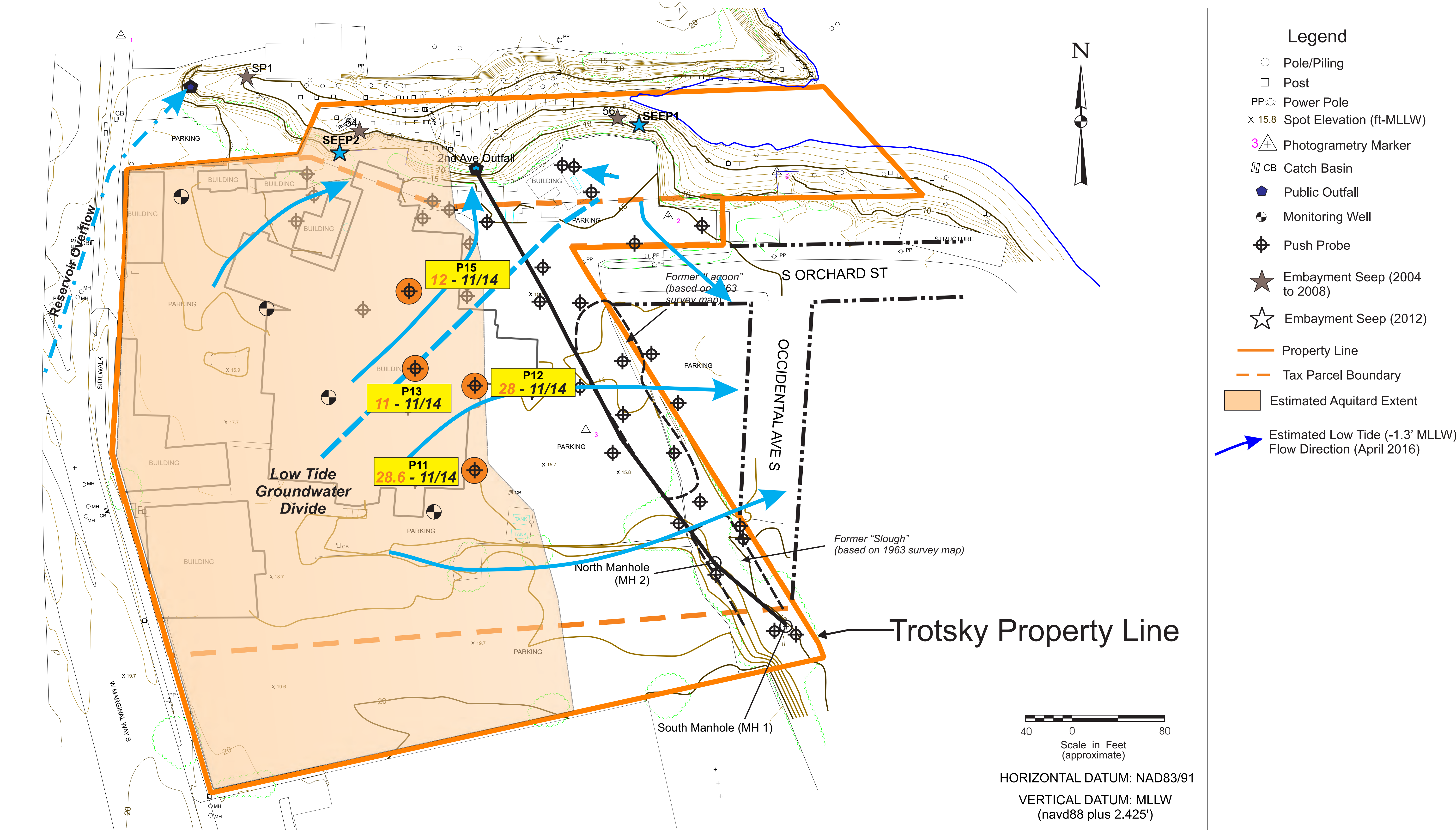
ICS/NW Cooperage Site

Total PCB Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-22c



Concentration ≤ Screening Level (SL=5.0 ug/l)

Concentration > Screening Level (SL=5.0 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DAs GW Plot R1-R3rev.cdr

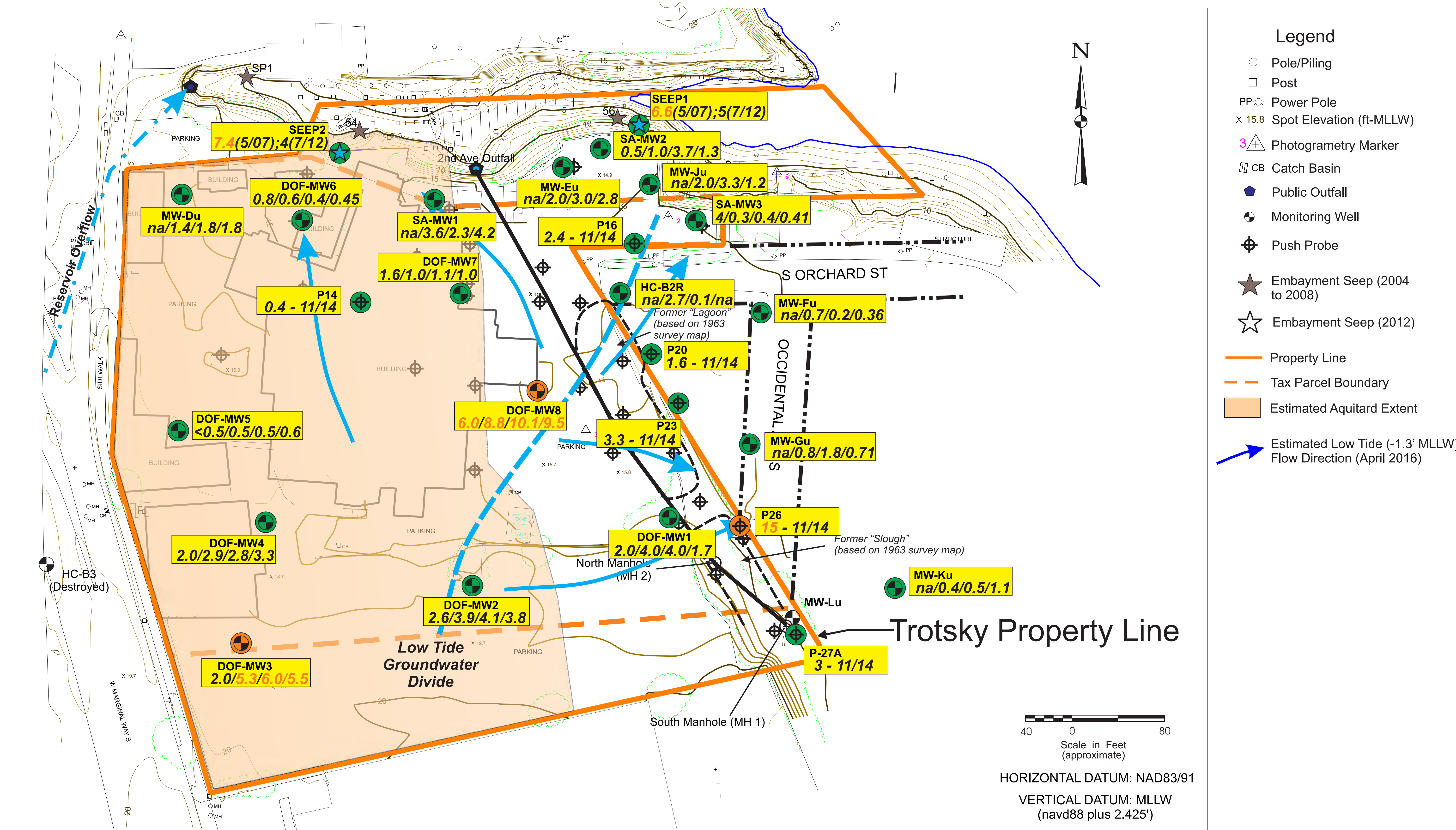
ICS/NW Cooperage Site

Dissolved Arsenic Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-23a



Concentration ≤ Screening Level (SL=5.0 ug/l)

Concentration > Screening Level (SL=5.0 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DAs GW Plot R1-R3rev.cdr

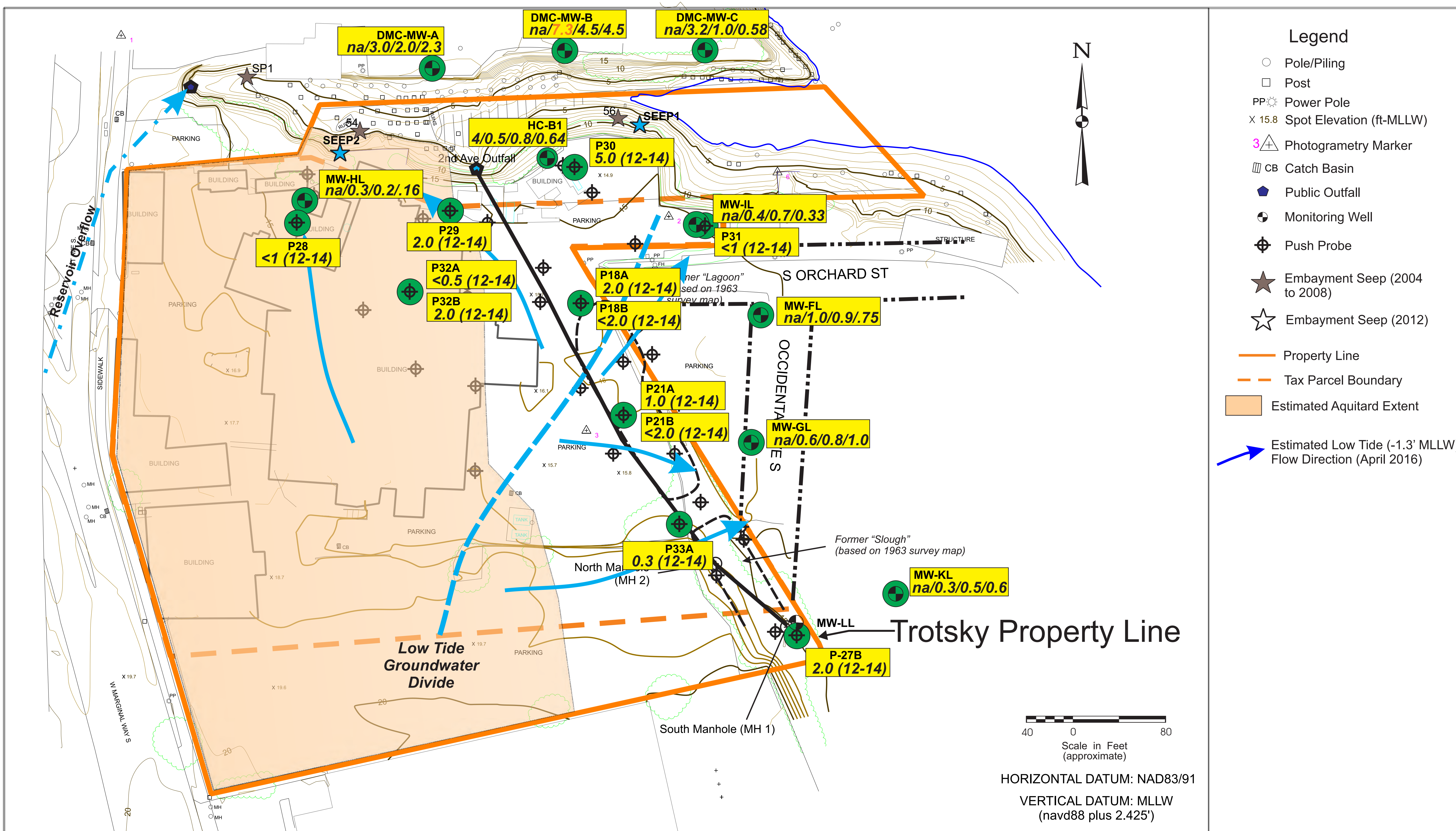
ICS/NW Cooperage Site

Dissolved Arsenic Concentrations Upper Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-23b



● Concentration ≤ Screening Level (SL=5.0 ug/l)

● Concentration > Screening Level (SL=5.0 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: D As GW Plot R1-R3rev.cdr

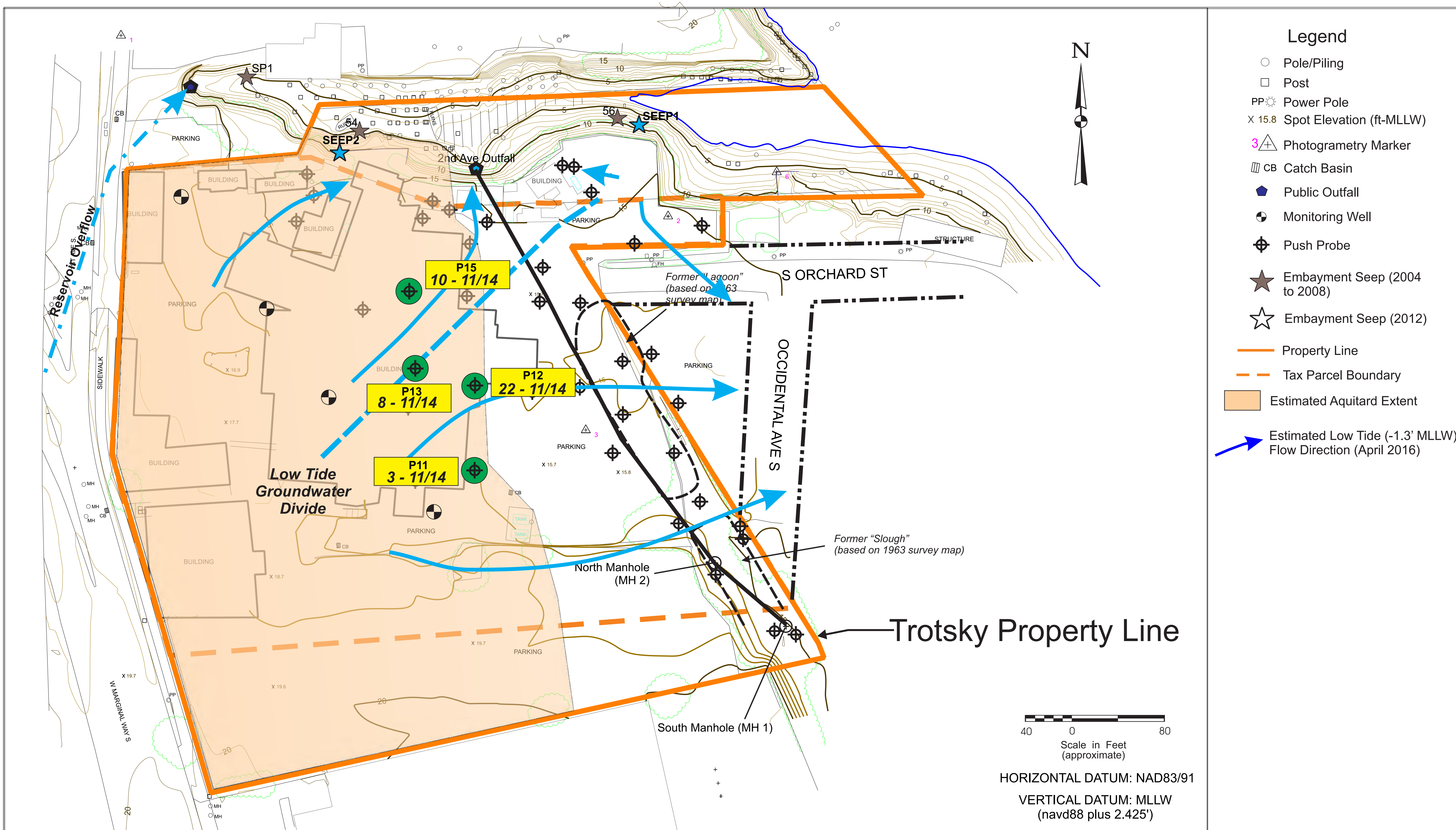
ICS/NW Cooperage Site

Dissolved Arsenic Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-23c



Concentration ≤ Screening Level (SL=27 ug/l)

Concentration > Screening Level (SL=27 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DTCr GW Plot R1-R3rev.cdr

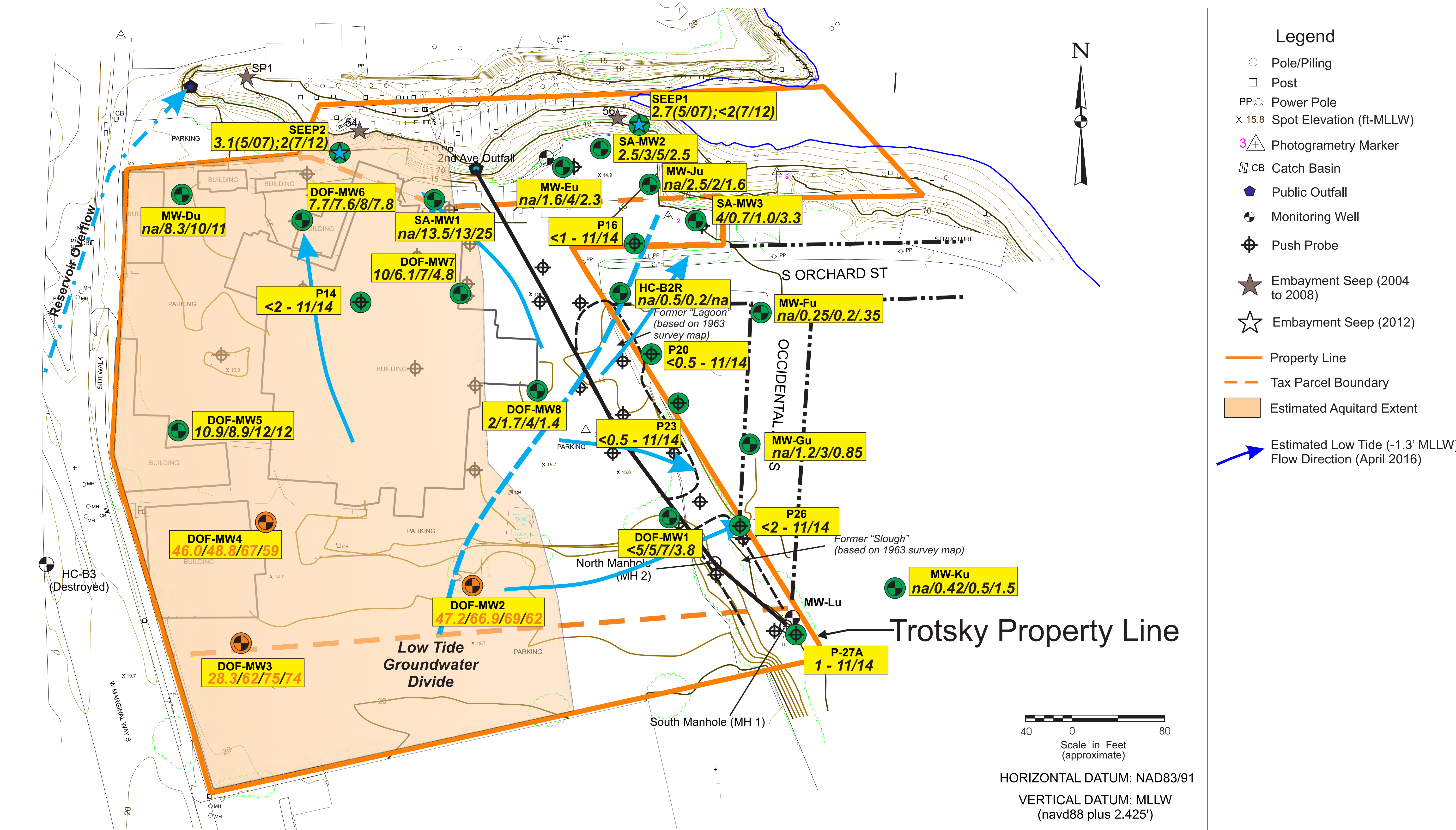
ICS/NW Cooperage Site

Dissolved Total Chromium Concentrations - Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-24a



Concentration ≤ Screening Level (SL=27 ug/l)

Concentration > Screening Level (SL=27 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: D TCr GW Plot R1-R3rev.cdr

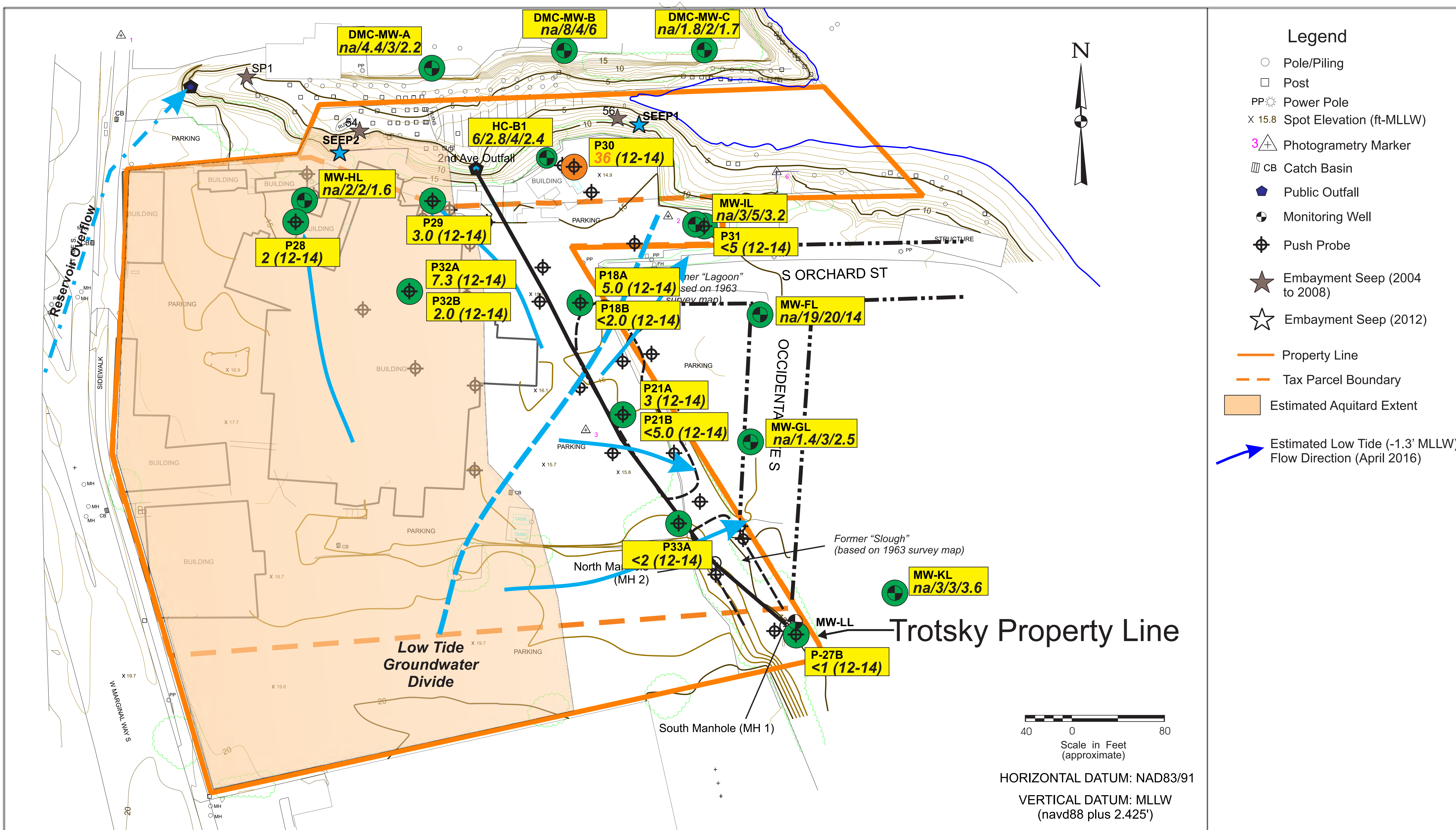
ICS/NW Cooperage Site

Dissolved Total Chromium Concentrations - Upper Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-24b



Concentration ≤ Screening Level (SL=27 ug/l)

Concentration > Screening Level (SL=27 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: D TCr GW Plot R1-R3rev.cdr

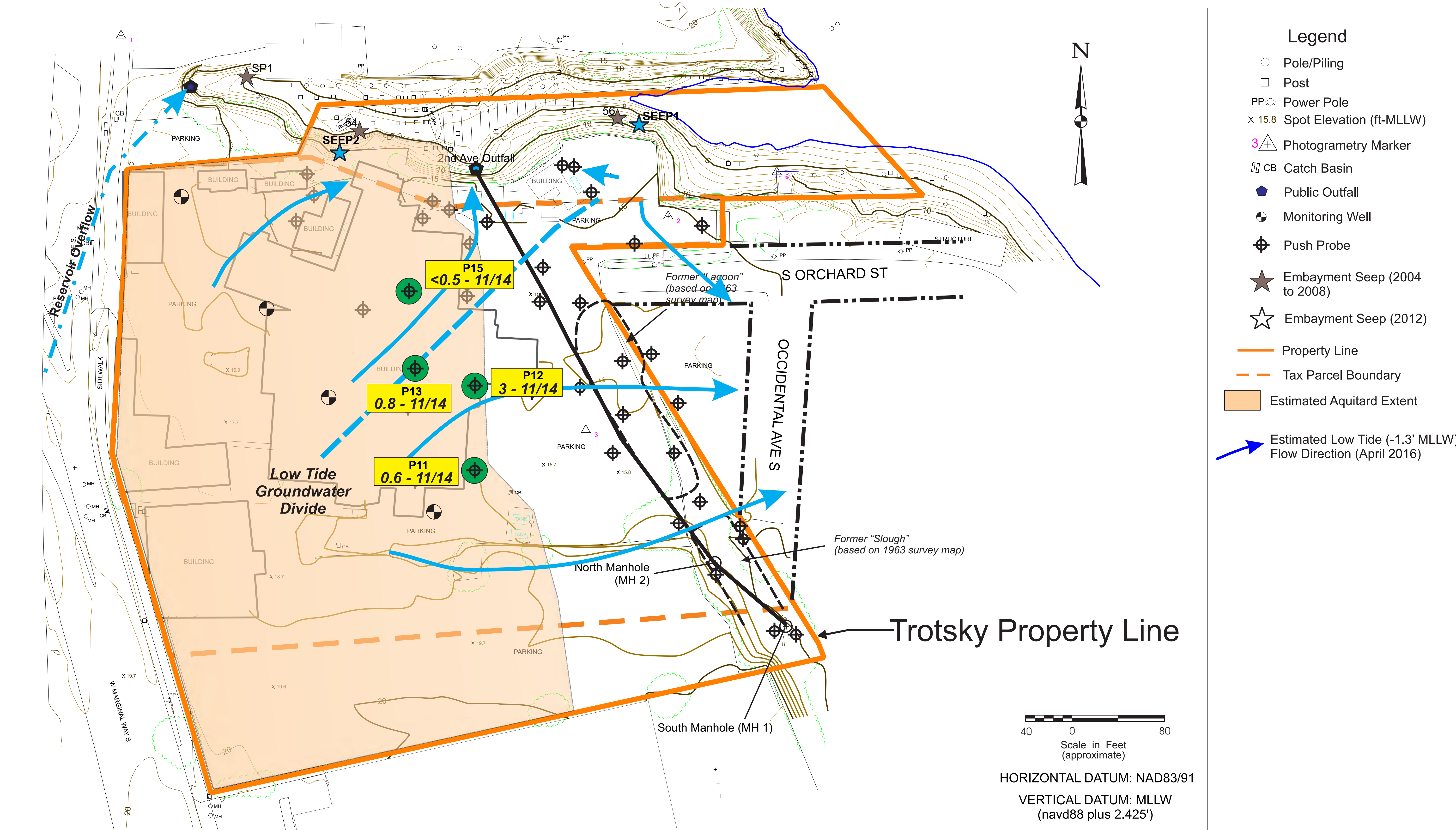
ICS/NW Cooperage Site

Dissolved Total Chromium Concentrations - Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-24c



Concentration ≤ Screening Level (SL=3.1 ug/l)

Concentration > Screening Level (SL=3.1 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DCu GW Plot R1-R3rev.cdr

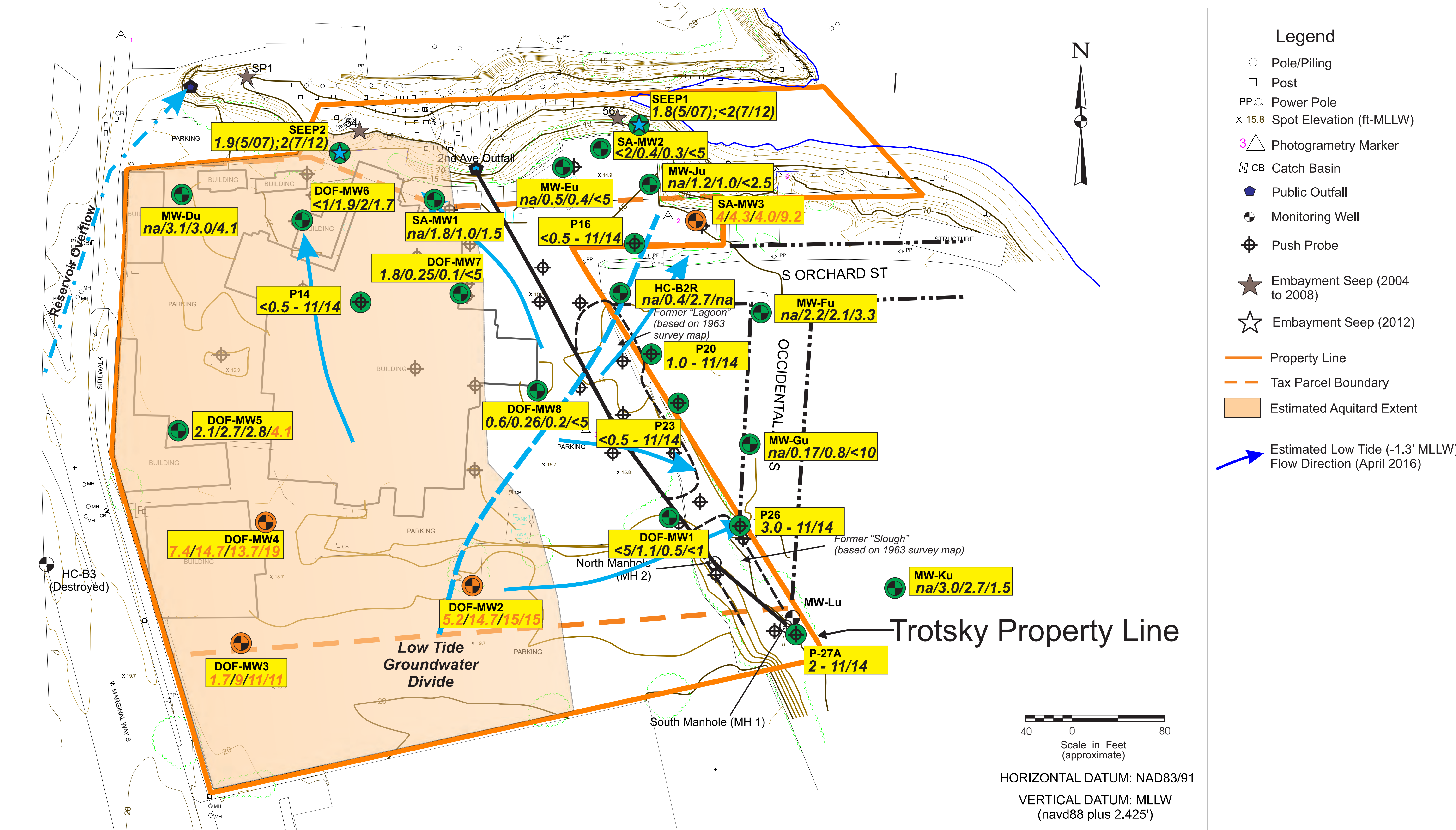
ICS/NW Cooperage Site

Dissolved Copper Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-25a



Concentration ≤ Screening Level (SL=3.1 ug/l)

Concentration > Screening Level (SL=3.1 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DCu GW Plot R1-R3rev.cdr

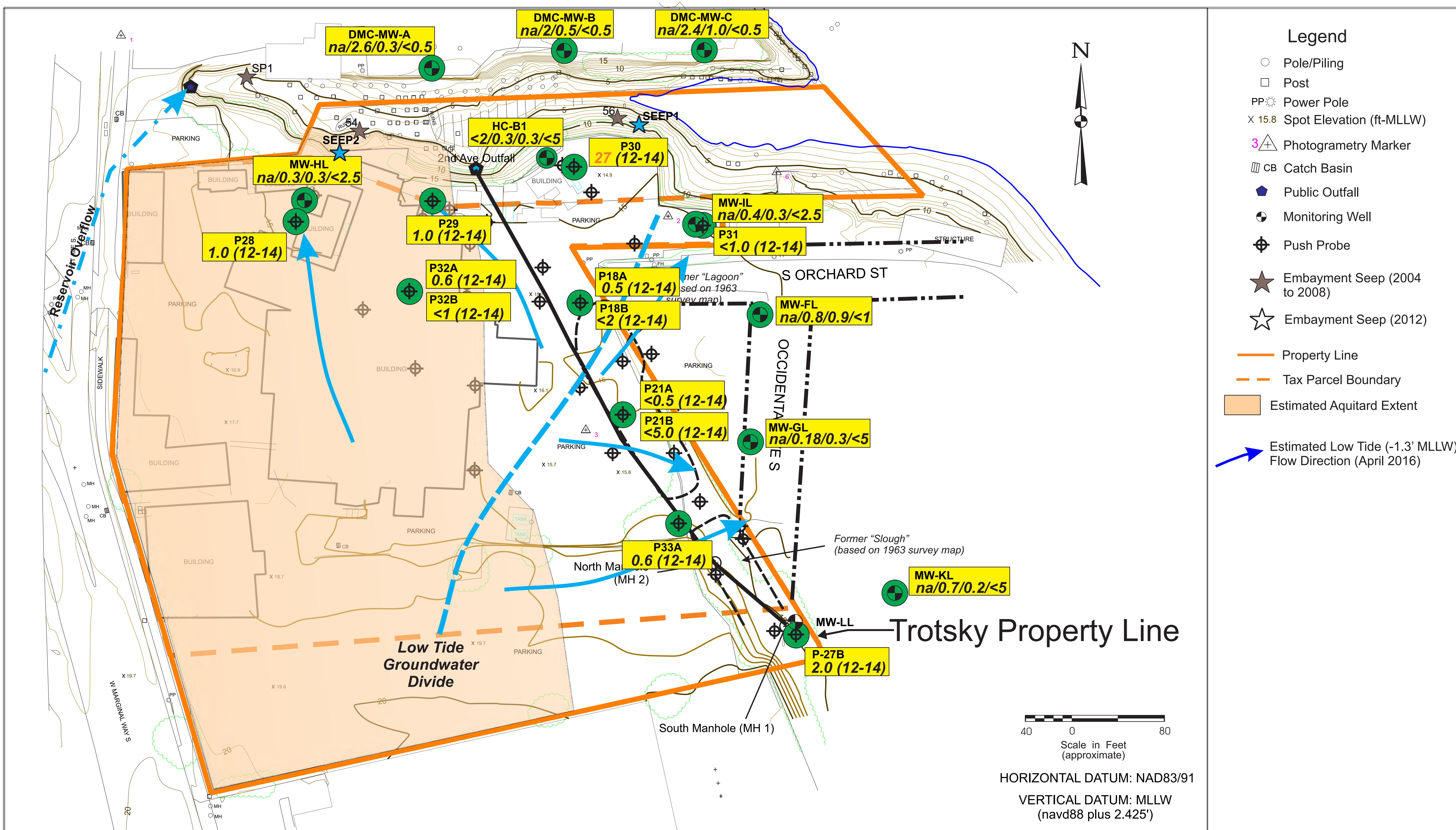
ICS/NW Cooperage Site

Dissolved Copper Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-25b



Concentration ≤ Screening Level (SL=3.1 ug/l)

Concentration > Screening Level (SL=3.1 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: D Cu GW Plot R1-R3rev.cdr

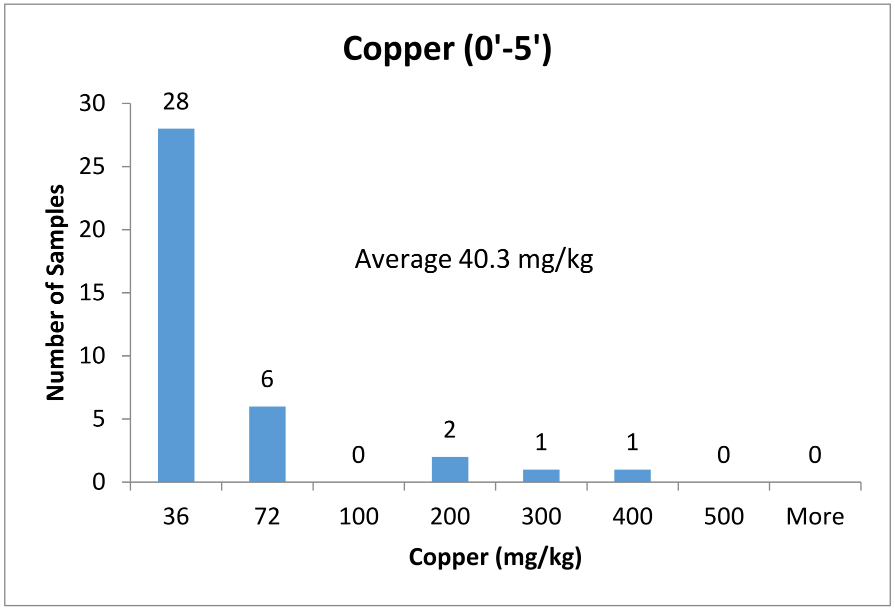
ICS/NW Cooperage Site

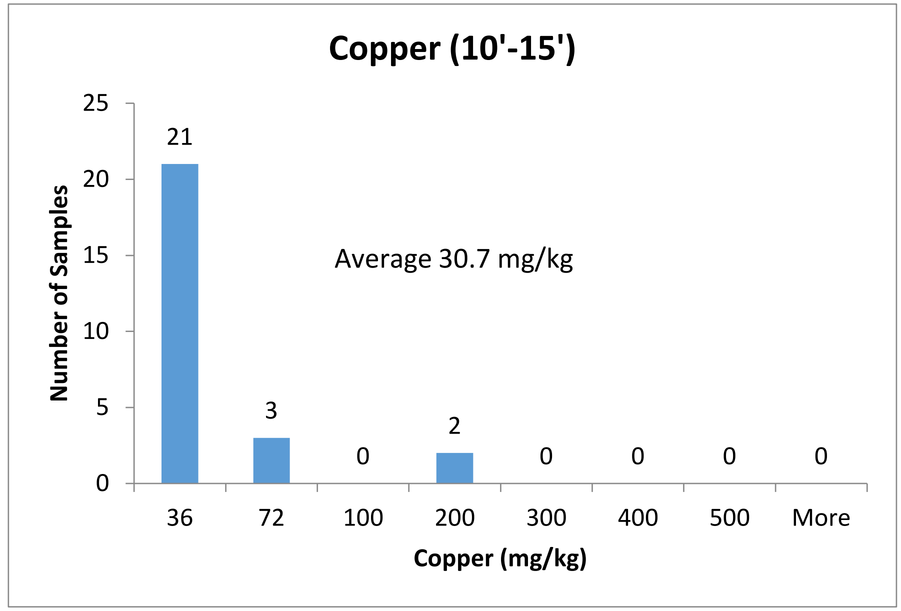
Dissolved Copper Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-25c





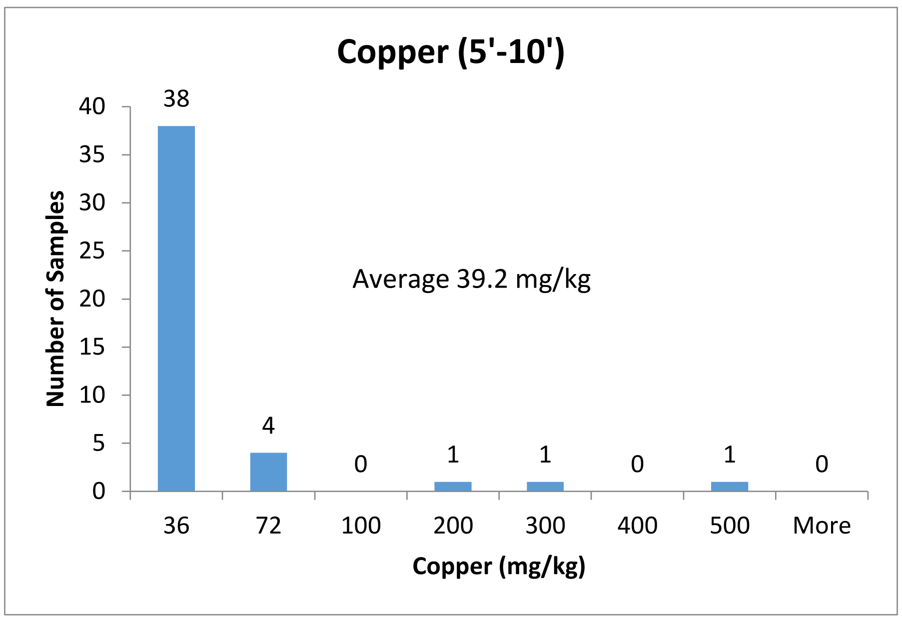
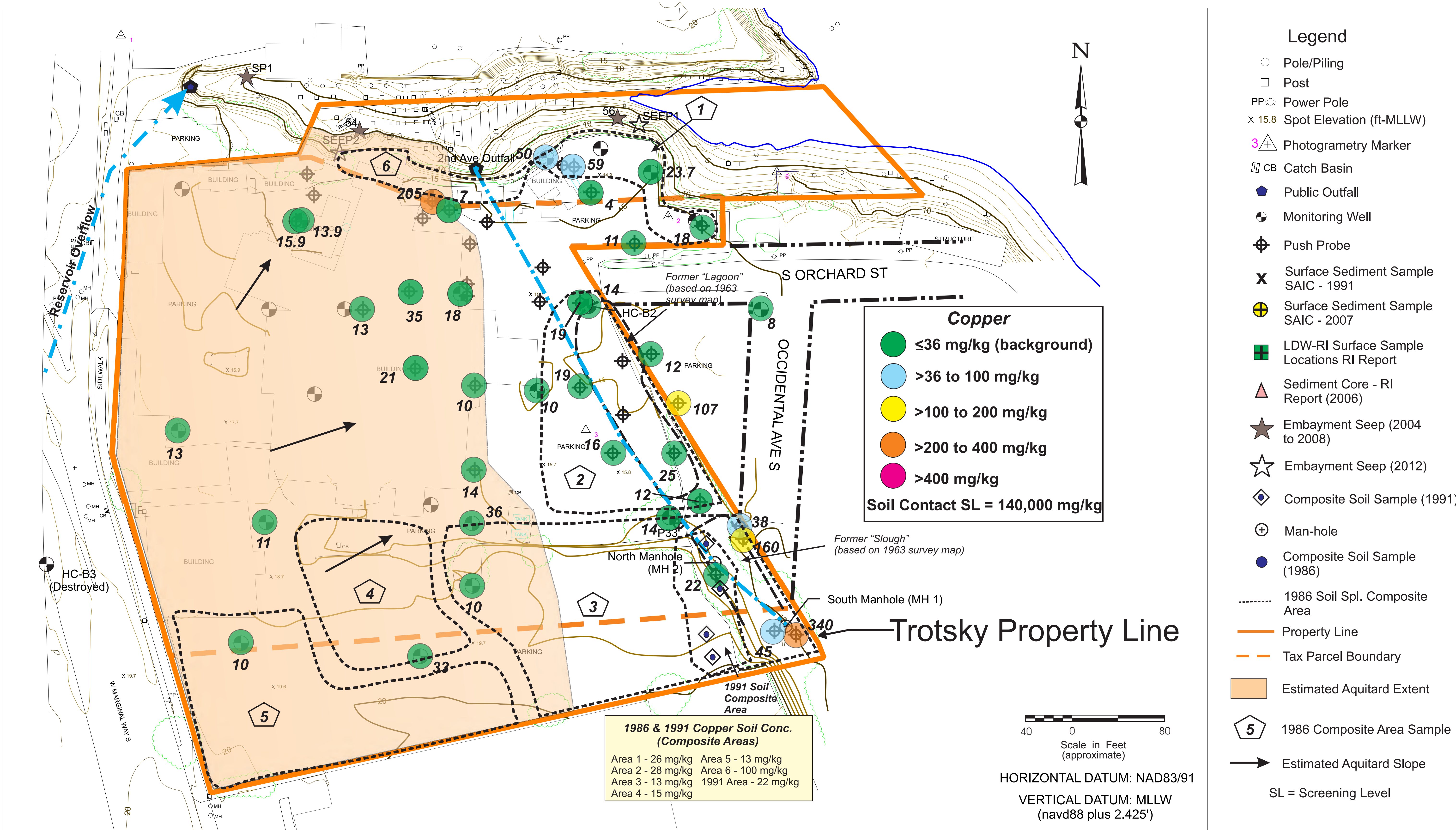


FIGURE 5-26 - Copper In Soil Histograms



Notes:

Ref: Upland Phase2a copper.cdr

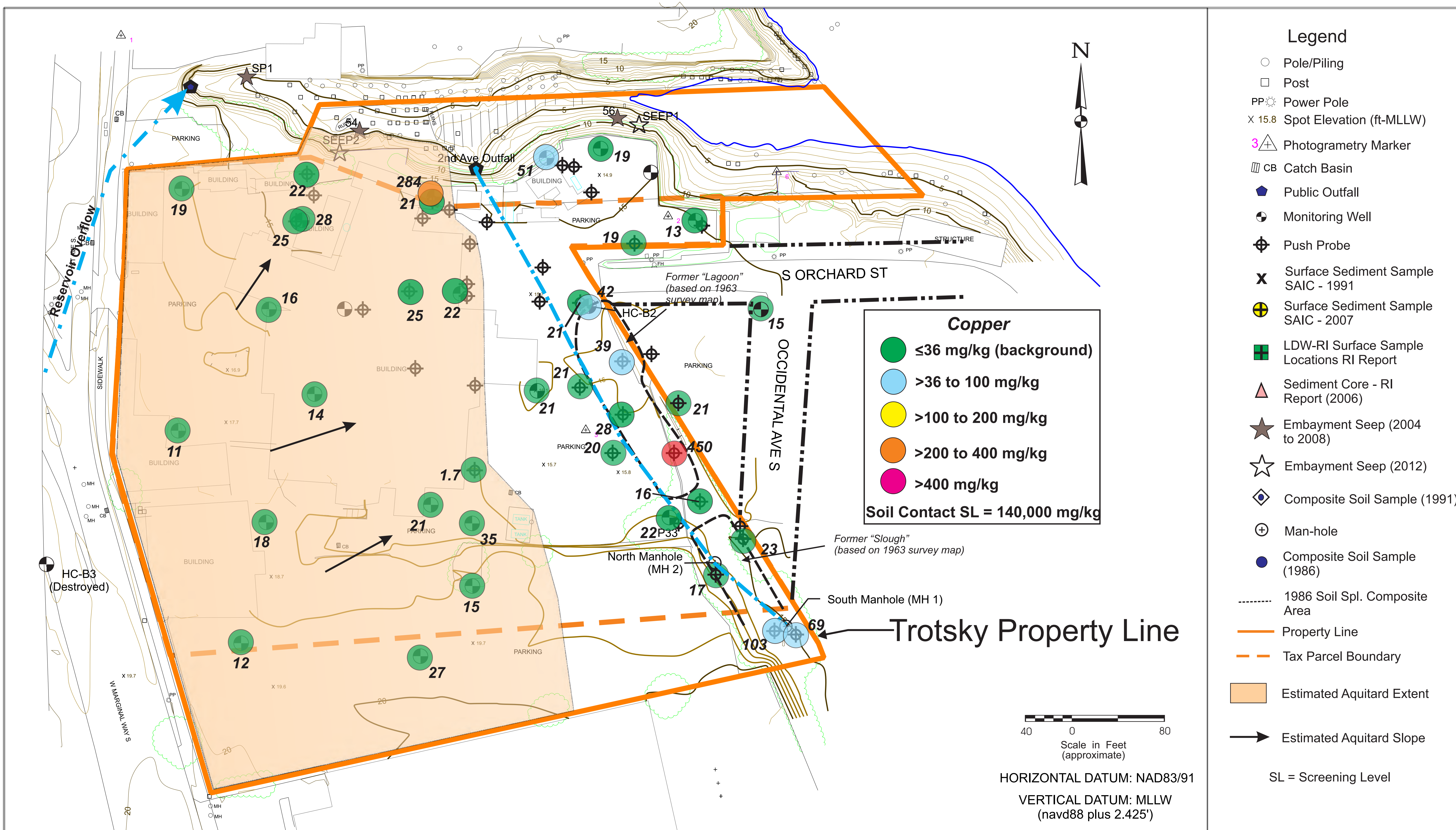
ICS/NW Cooperage Site

Extent of Copper in Soil Less than 5-feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-27a



Notes:

Ref: Upland Phase2a copper.cdr

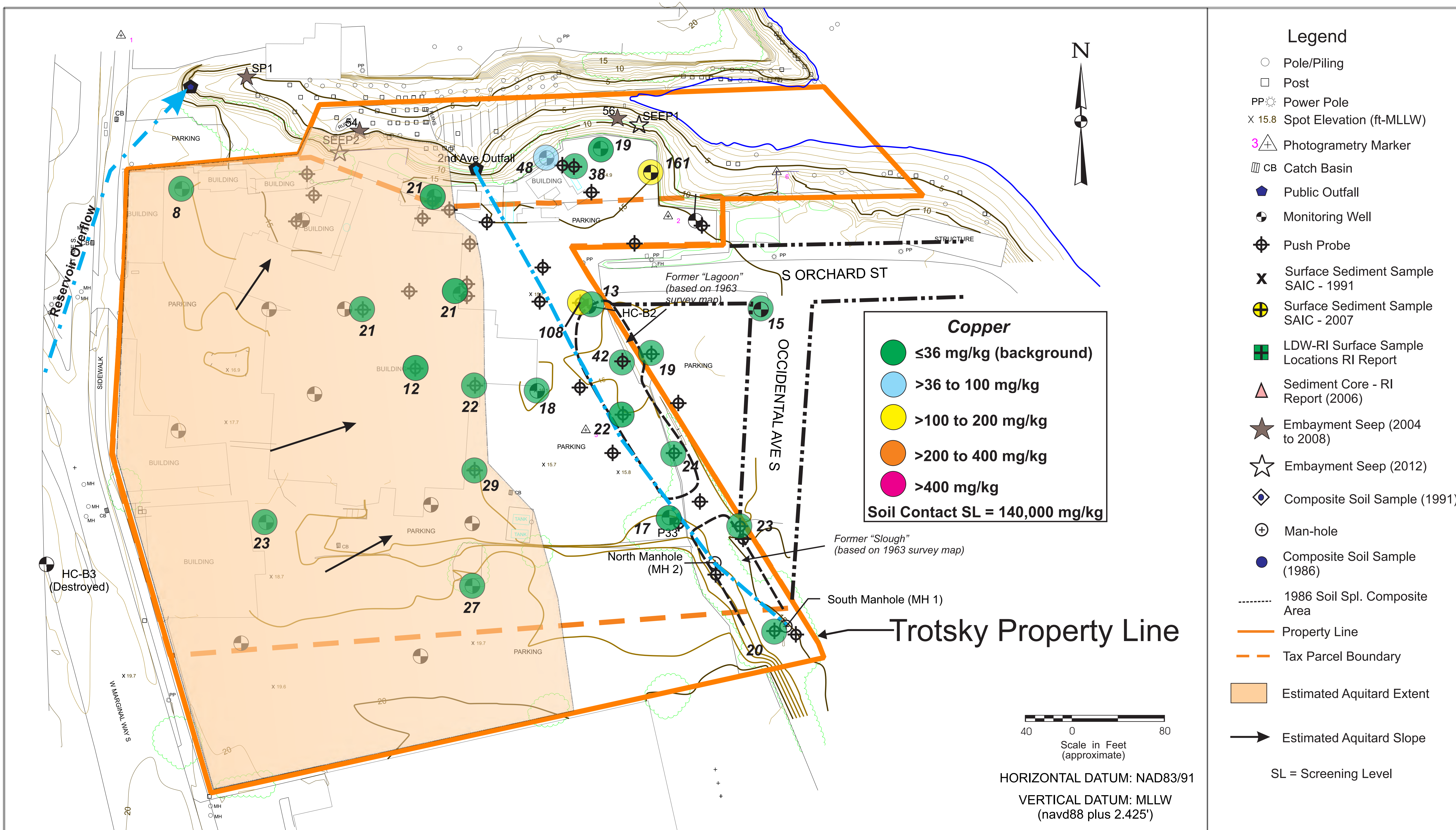
ICS/NW Cooperage Site

Extent of Copper in Soil Five to Ten Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-27b



ICS/NW Cooperage Site

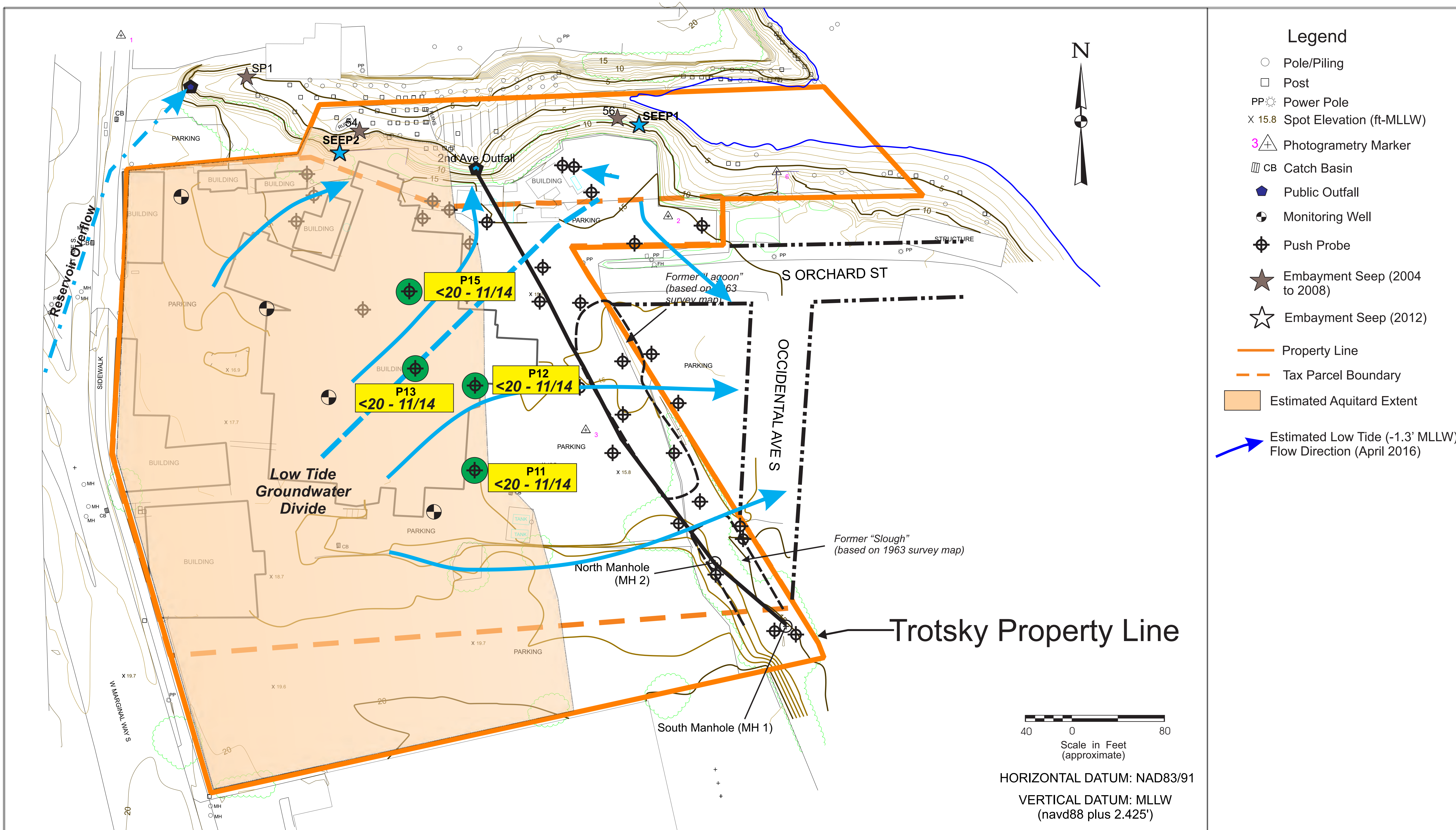
Extent of Copper in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-27c

Ref: Upland Phase2a copper.cdr



Concentration ≤ Screening Level (SL= 25 ng/l)

Concentration > Screening Level (SL= 25 ng/l)

2.0/5.3/6.0/2.0 Concentration - ng/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: Mercury GW Plot R1-R3rev.cdr

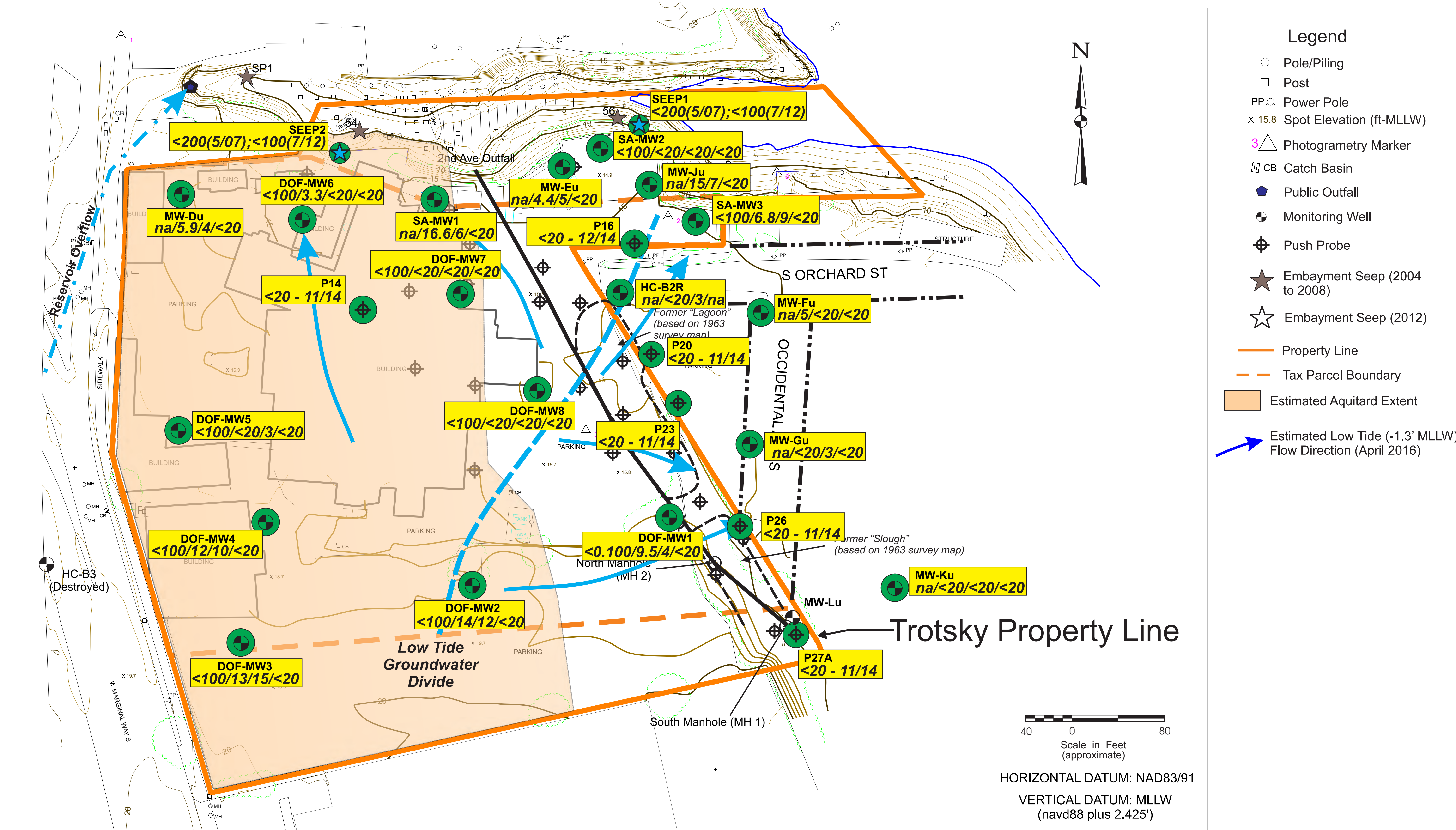
ICS/NW Cooperage Site

Dissolved Mercury Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-28a



Concentration ≤ Screening Level (SL= 25 ng/l)

Concentration > Screening Level (SL= 25 ng/l)

2.0/5.3/6.0/2.0 Concentration - ng/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: Mercury GW Plot R1-R3rev.cdr

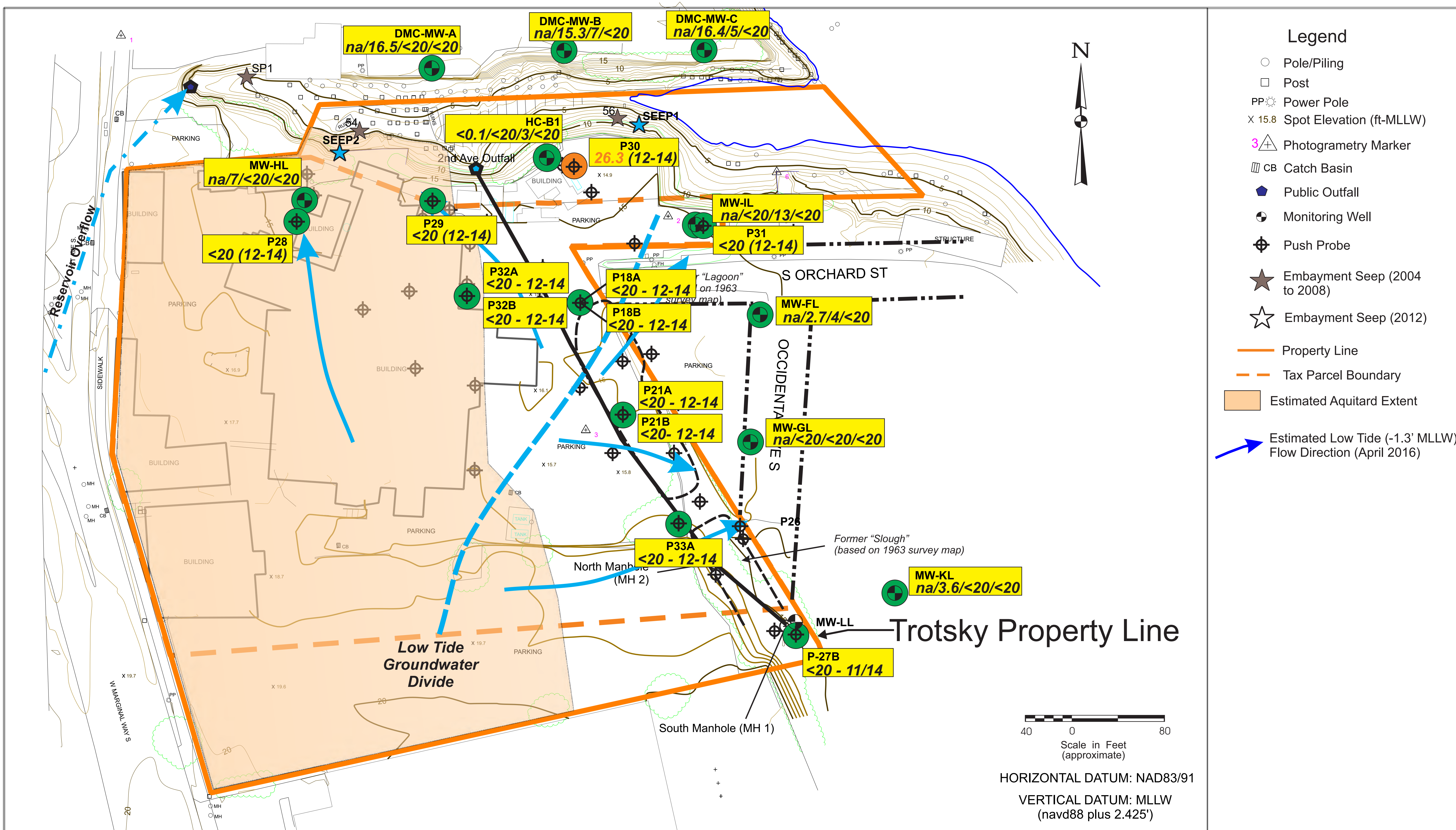
ICS/NW Cooperage Site

Dissolved Mercury Concentrations Upper Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-28b



Concentration ≤ Screening Level (SL= 25 ng/l)

Concentration > Screening Level (SL= 25 ng/l)

2.0/5.3/6.0/2.0 Concentration - ng/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: Mercury GW Plot R1-R3rev.cdr

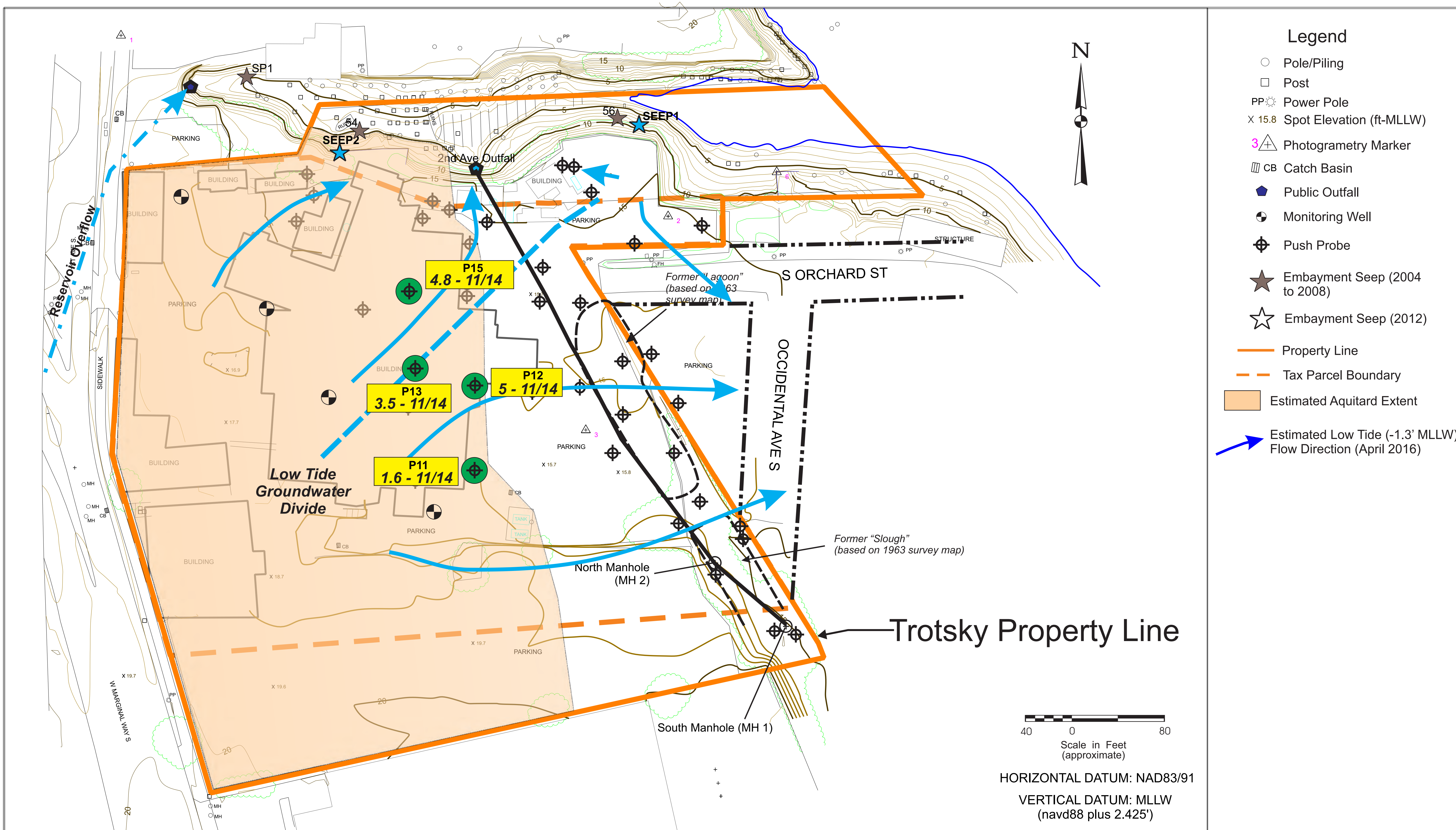
ICS/NW Cooperage Site

Dissolved Mercury Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-28c



Concentration ≤ Screening Level (SL=8.2 ug/l)

Concentration > Screening Level (SL=8.2 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DNi GW Plot R1-R3rev.cdr

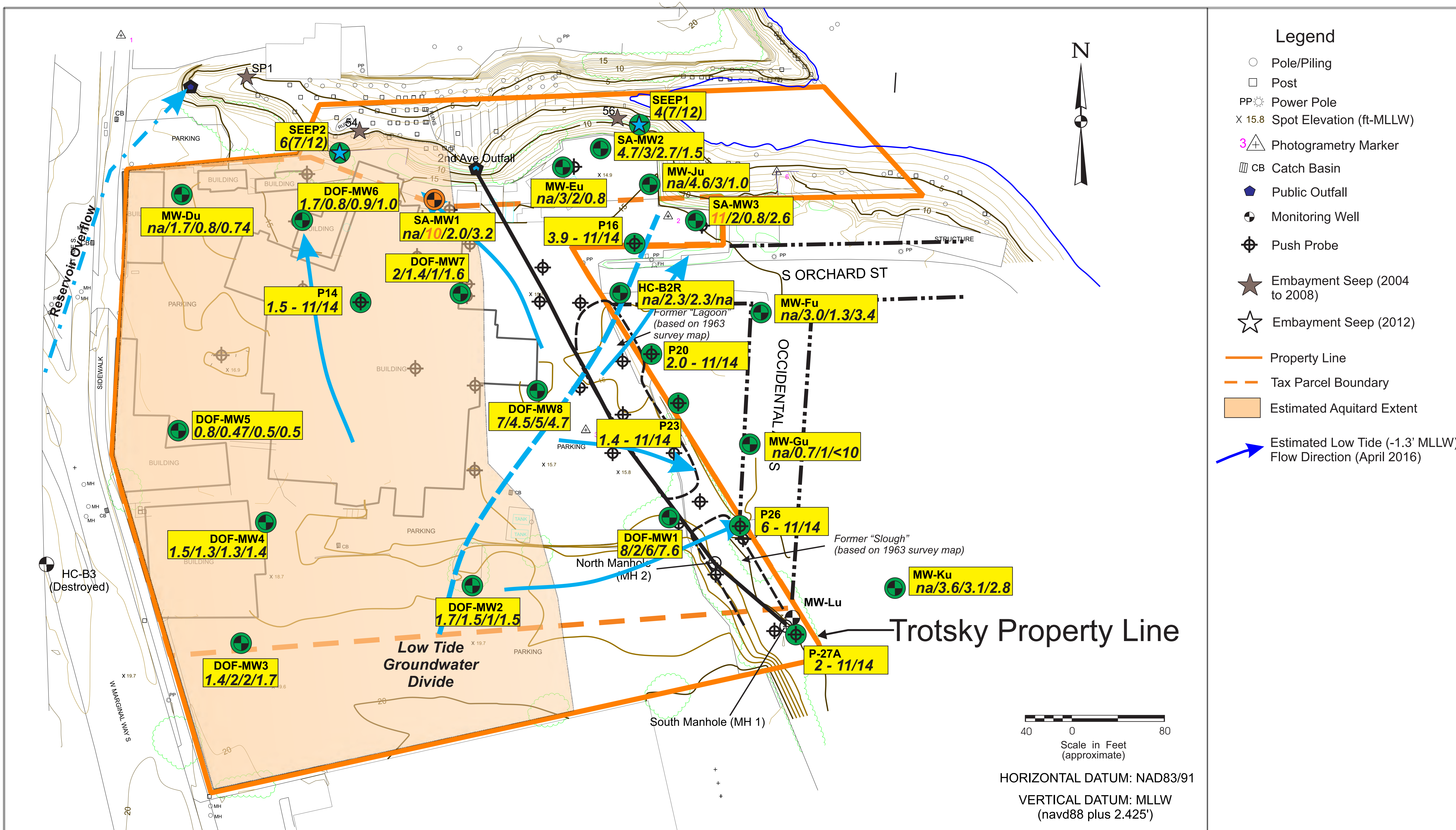
ICS/NW Cooperage Site

Dissolved Nickel Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-29a



Concentration ≤ Screening Level (SL=8.2 ug/l)

Concentration > Screening Level (SL=8.2 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DNi GW Plot R1-R3rev.cdr

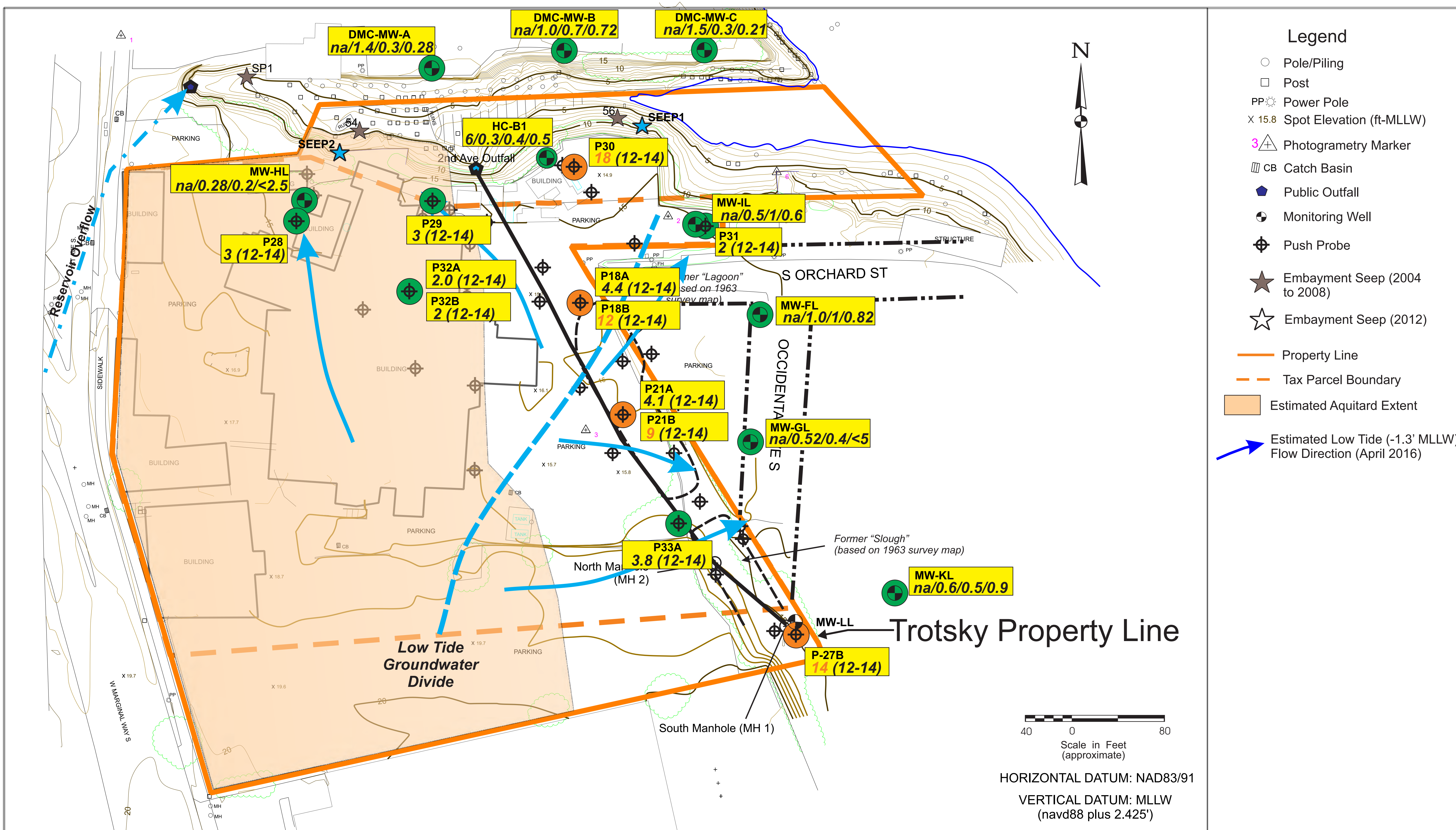
ICS/NW Cooperage Site

Dissolved Nickel Concentrations Upper Zone

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-29b



Concentration ≤ Screening Level (SL=8.2 ug/l)

Concentration > Screening Level (SL=8.2 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: D Ni GW Plot R1-R3rev.cdr

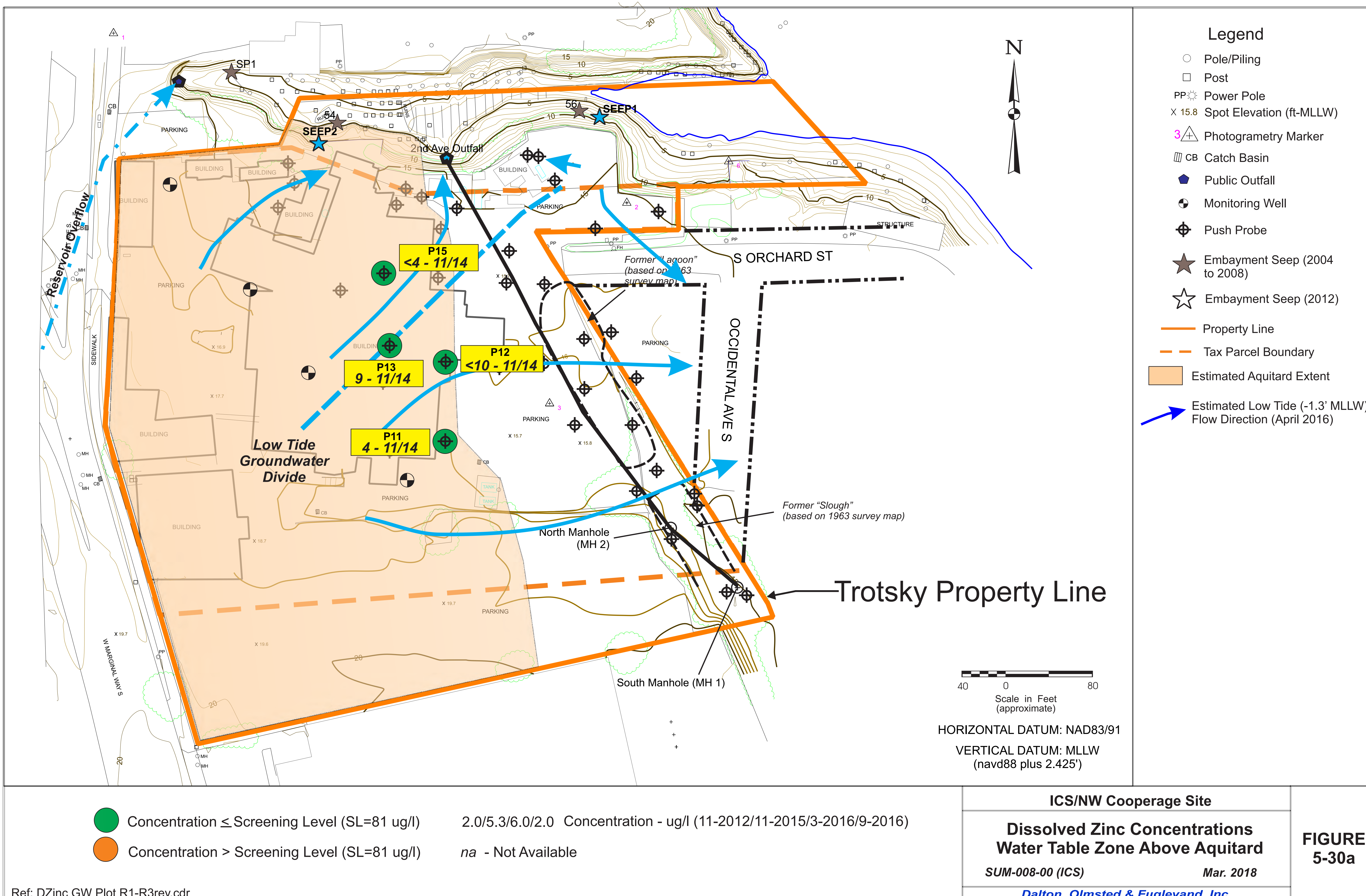
ICS/NW Cooperage Site

Dissolved Nickel Concentrations Lower Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-29c



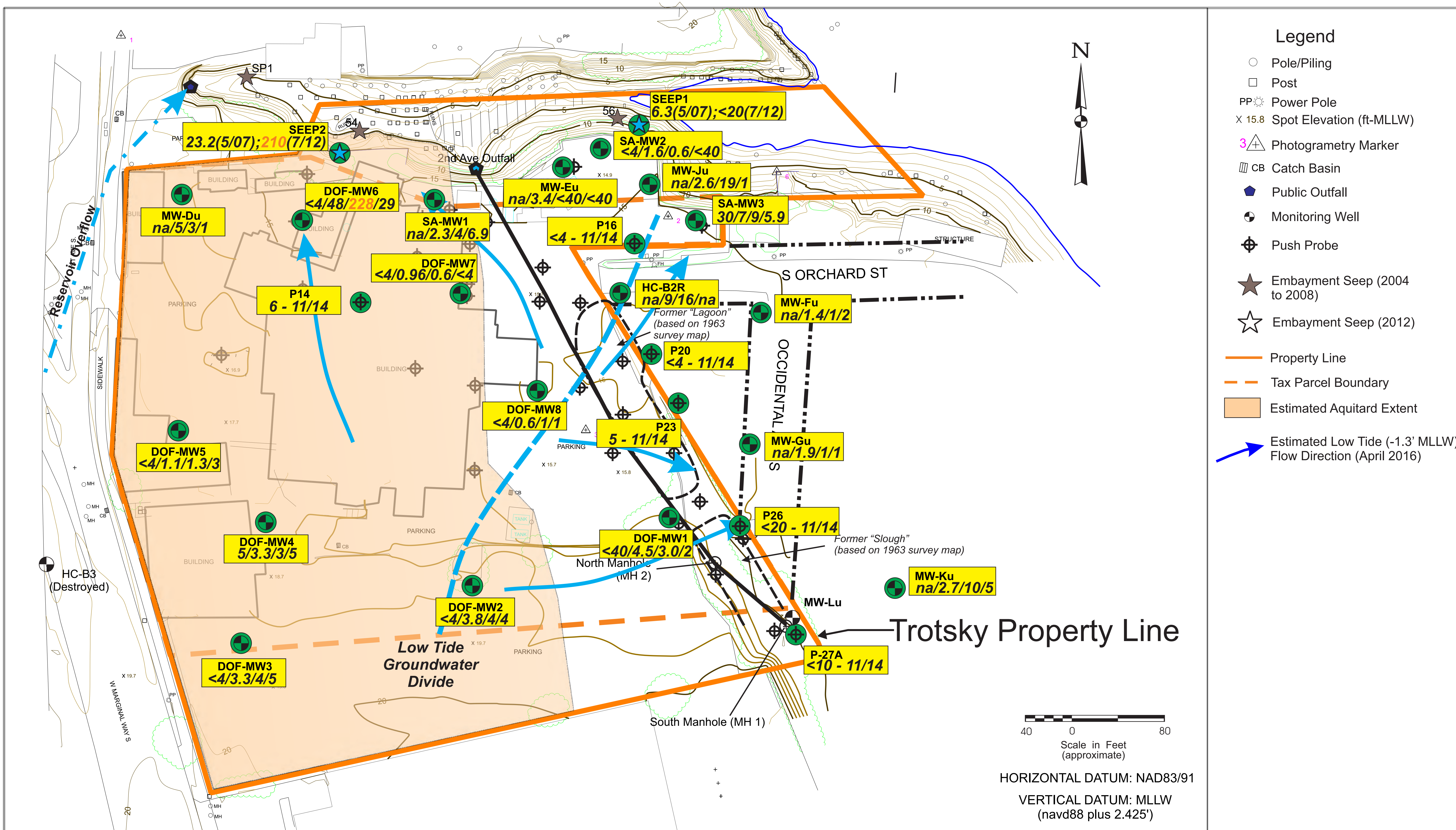
ICS/NW Cooperage Site

Dissolved Zinc Concentrations Water Table Zone Above Aquitard

SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-30a



Concentration ≤ Screening Level (SL=81 ug/l)

Concentration > Screening Level (SL=81 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DZinc GW Plot R1-R3rev.cdr

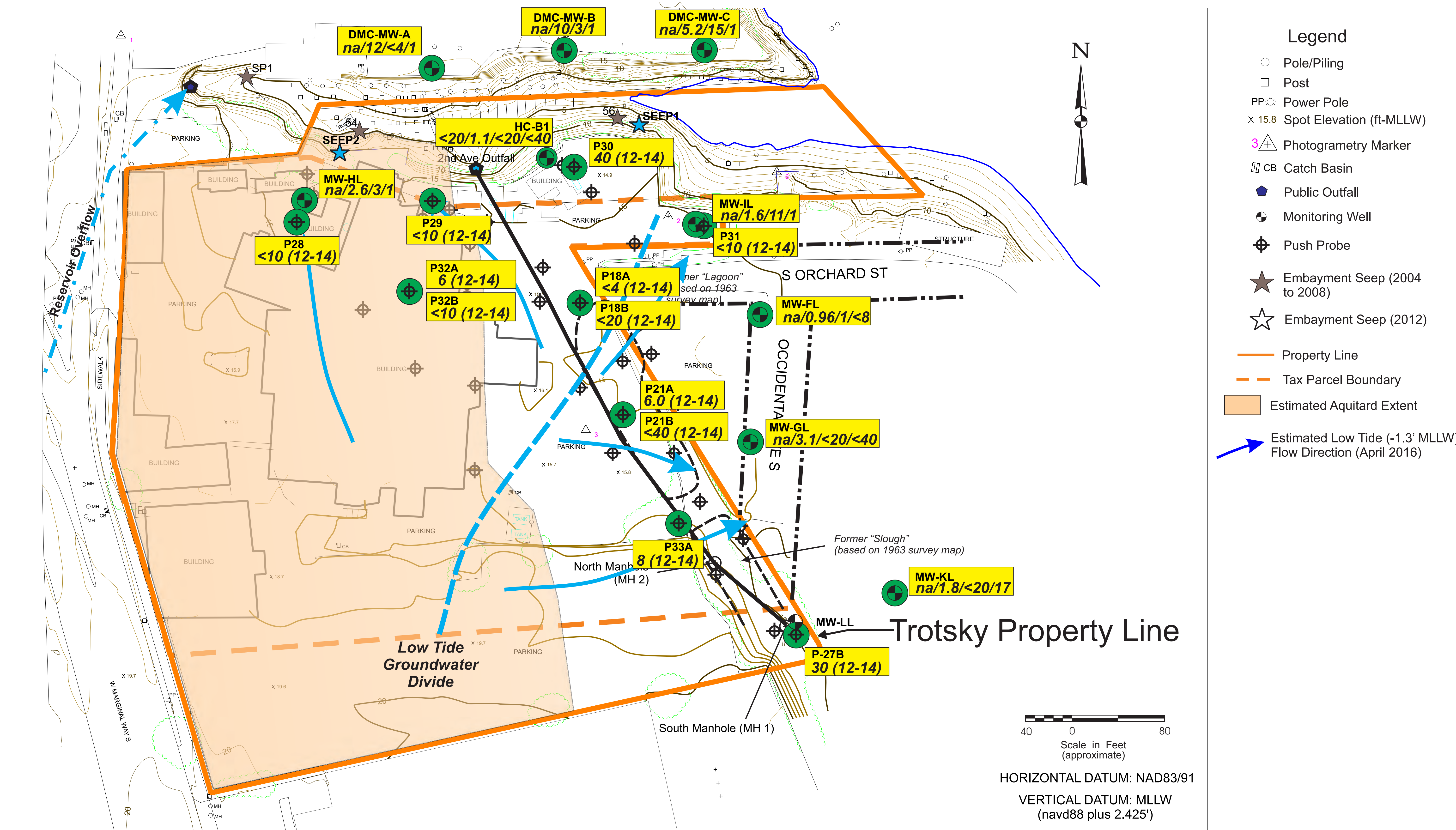
ICS/NW Cooperage Site

Dissolved Zinc Concentrations Upper Zone

SUM-008-00 (ICS) ***Mar. 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-30b



Concentration ≤ Screening Level (SL=81 ug/l)

Concentration > Screening Level (SL=81 ug/l)

2.0/5.3/6.0/2.0 Concentration - ug/l (11-2012/11-2015/3-2016/9-2016)

na - Not Available

Ref: DZinc GW Plot R1-R3rev.cdr

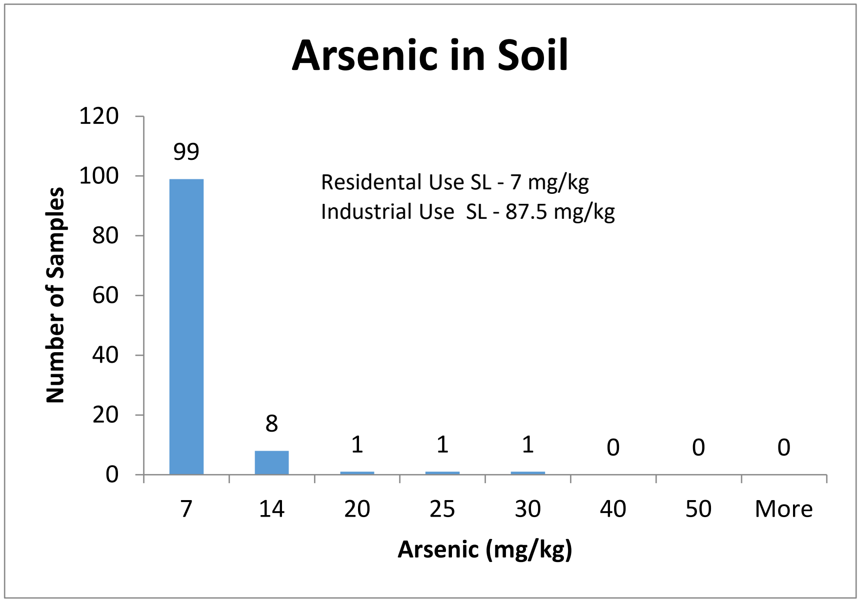
ICS/NW Cooperage Site

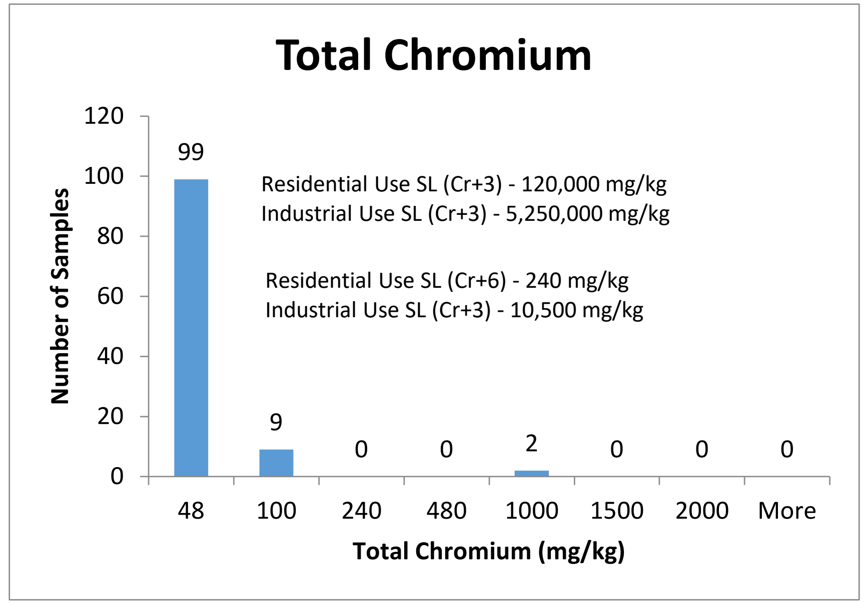
Dissolved Zinc Concentrations Lower Zone

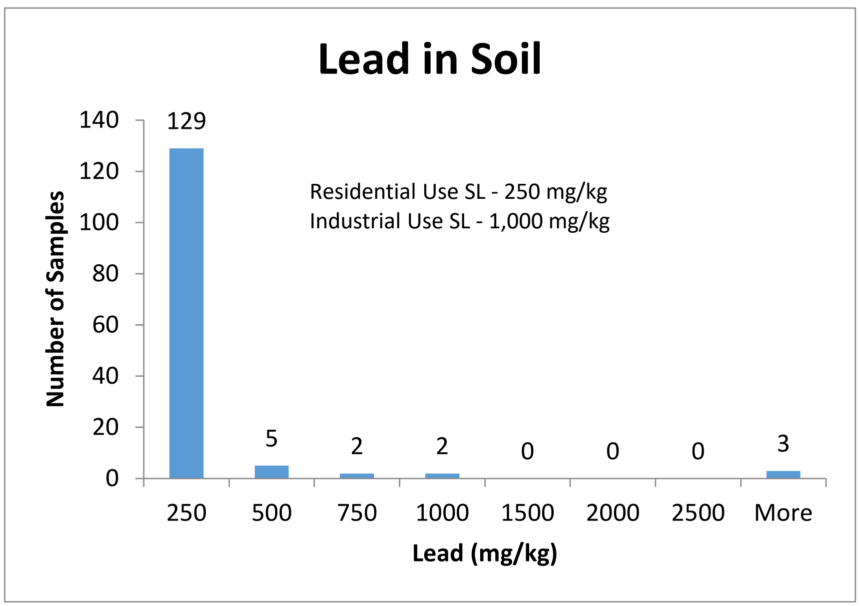
SUM-008-00 (ICS) *Mar. 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 5-30c







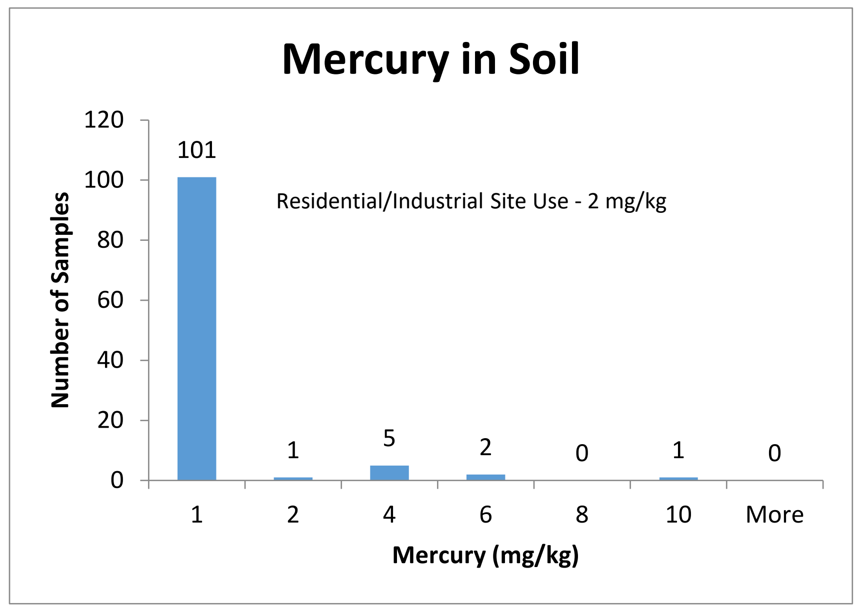
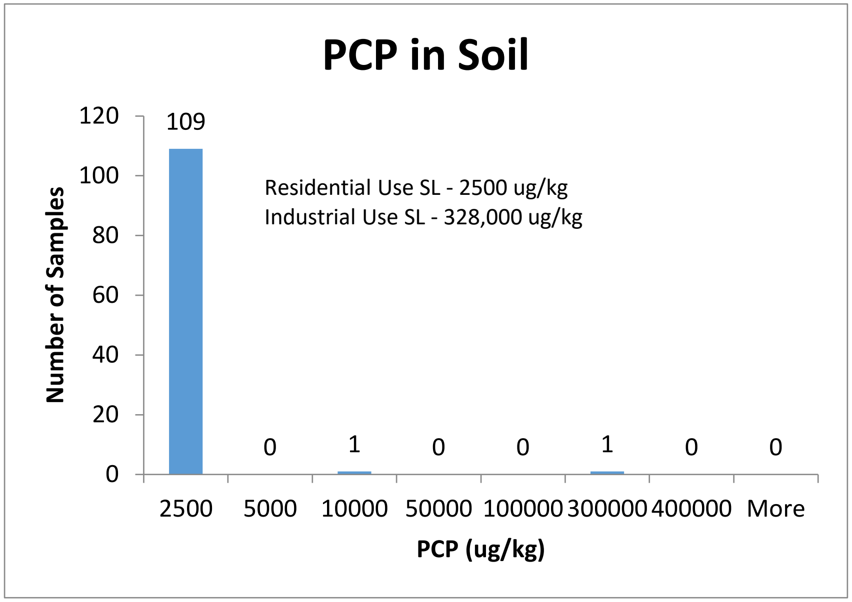
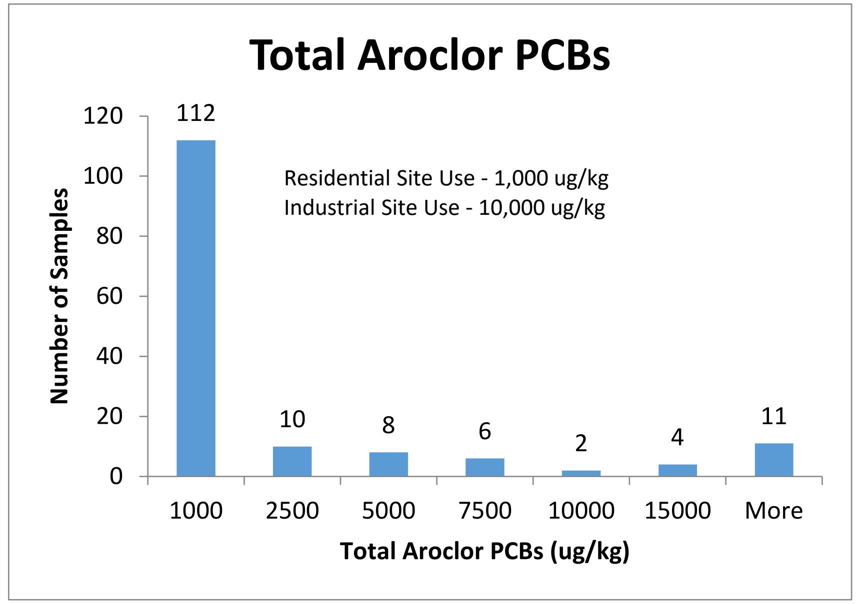
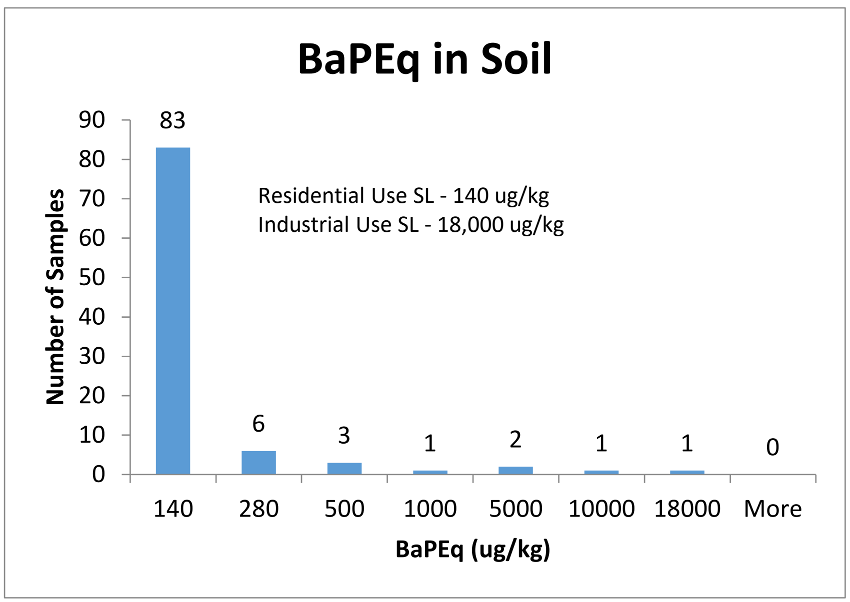


FIGURE 5-31 - Soil Concentration Histograms - Less Than 15' Deep







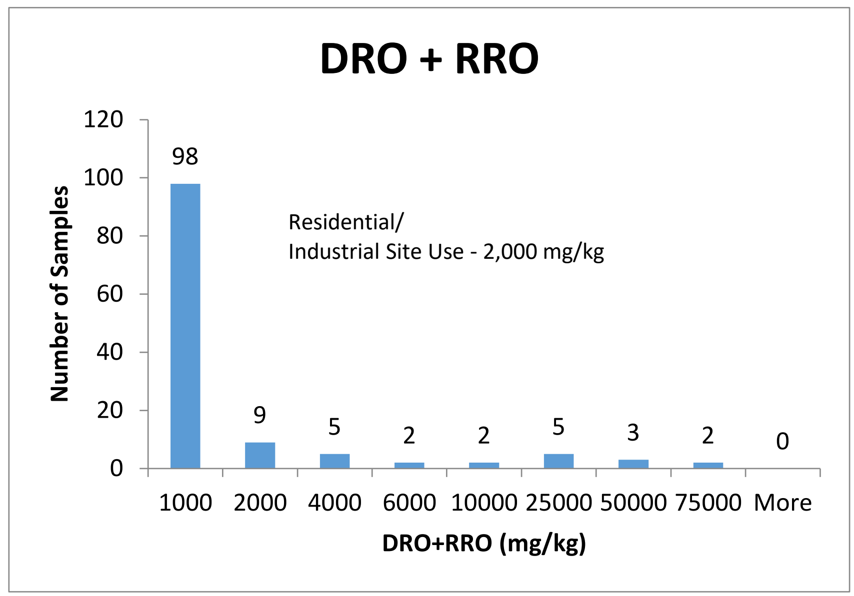


FIGURE 5-31 - Soil Concentration Histograms - Less Than 15' Deep

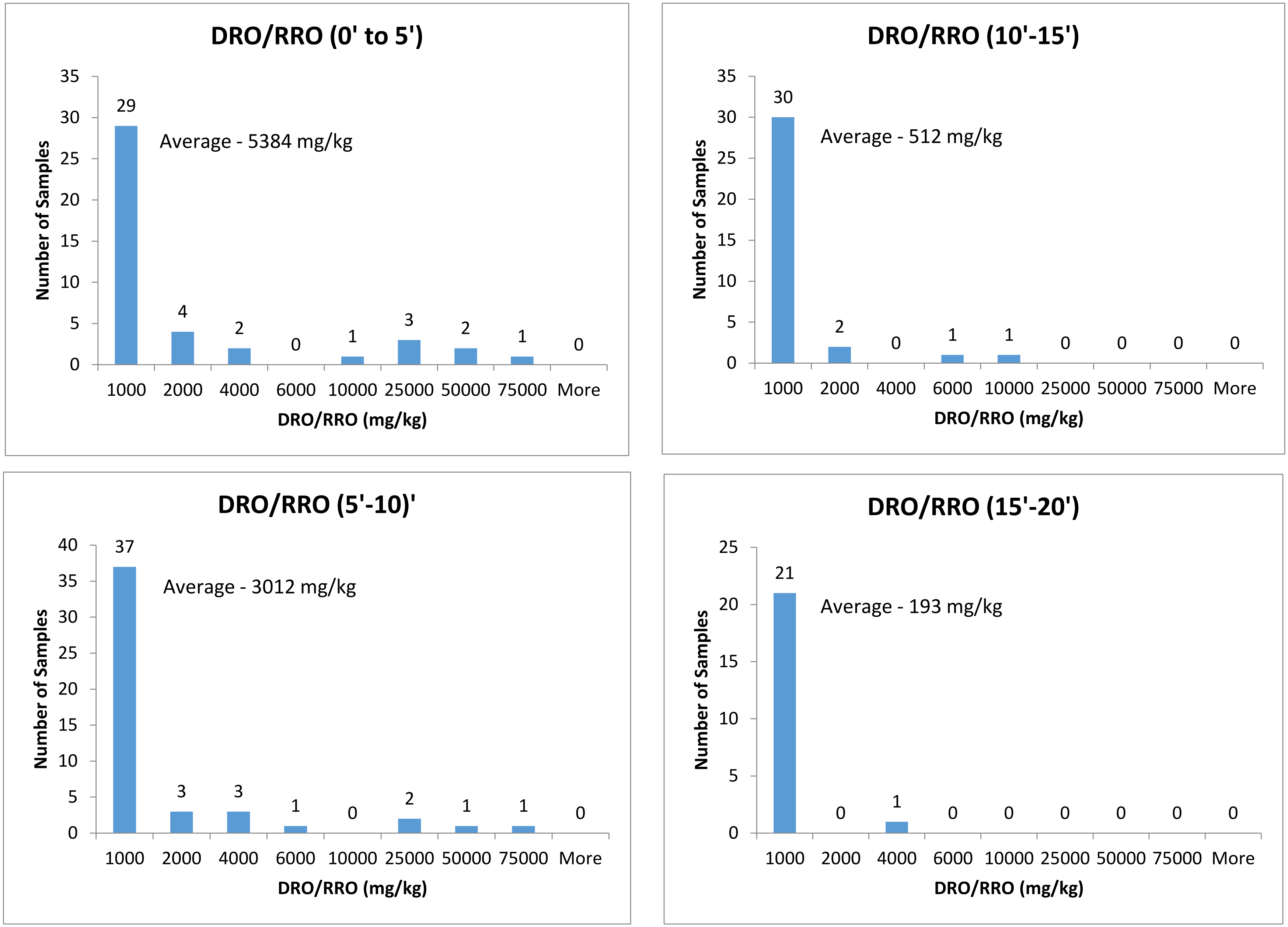
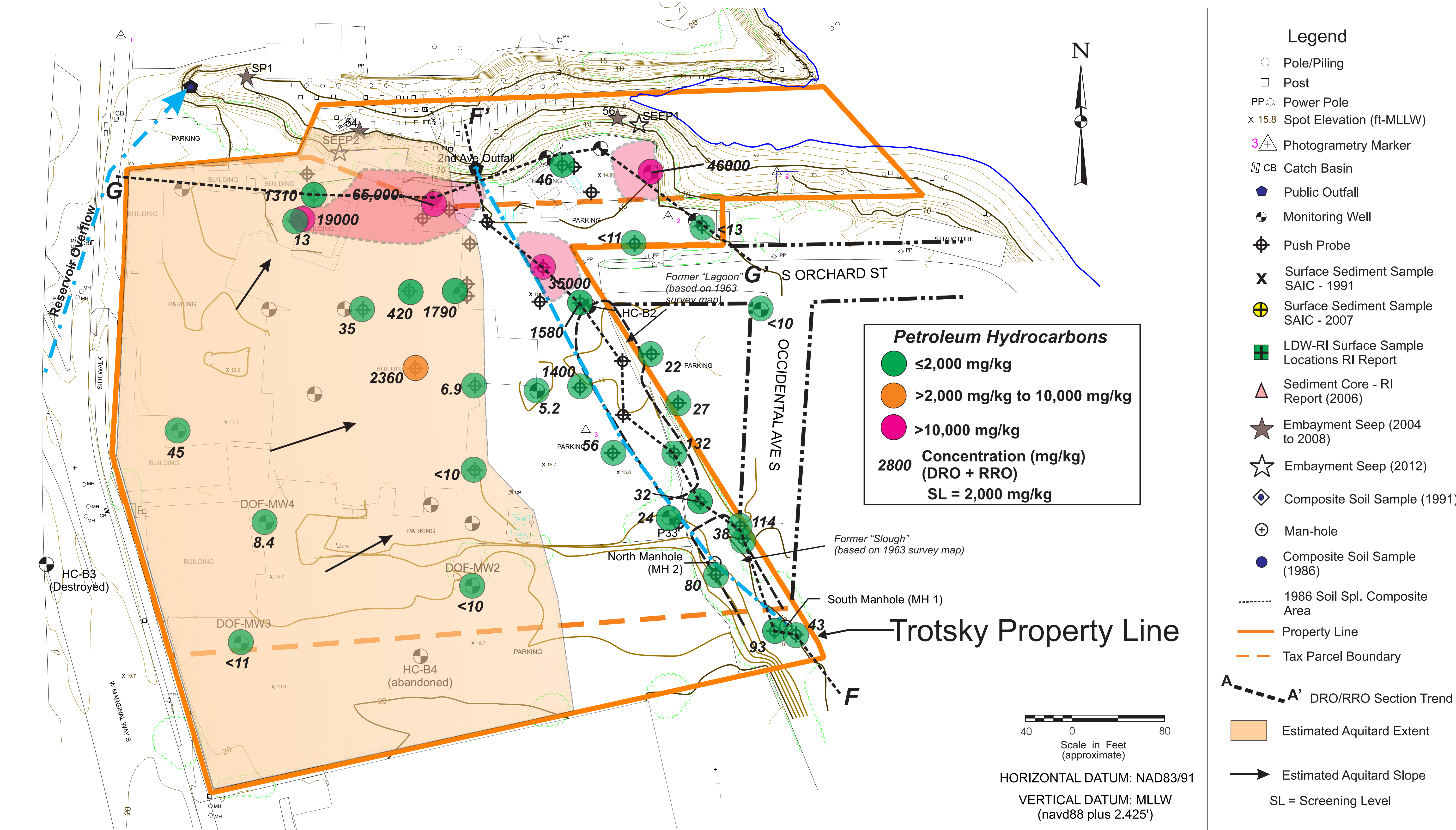


FIGURE 6-1 - DRO/RRO In Soil Histograms



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of TPH contamination during sampling.

Ref: Upland Phase2a TPHrev.cdr

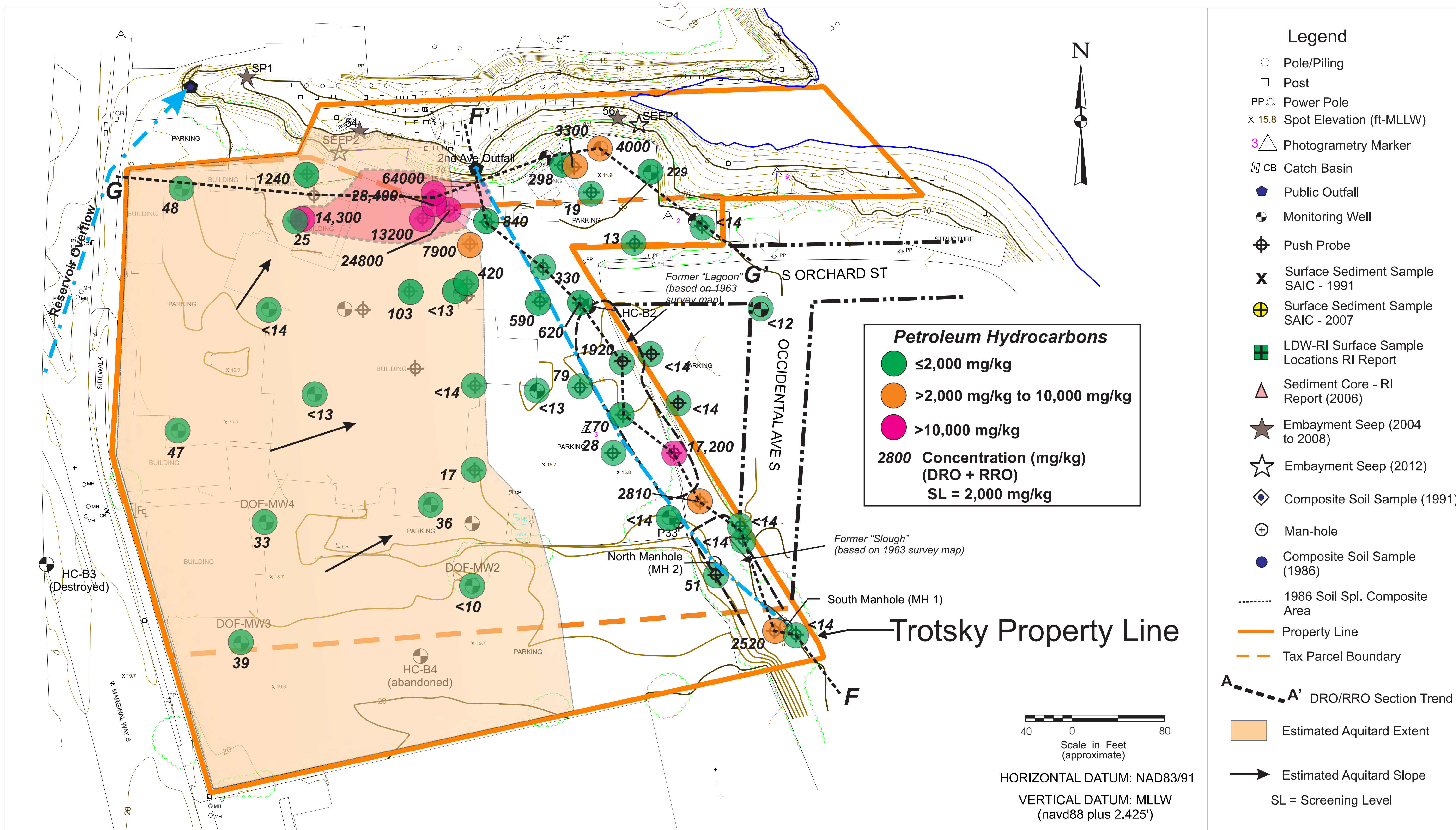
ICS/NW Cooperage Site

Extent of DRO/RRO in Soil Less than Five Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-2a



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of TPH contamination during sampling.

Ref: Upland Phase2a TPHrev.cdr

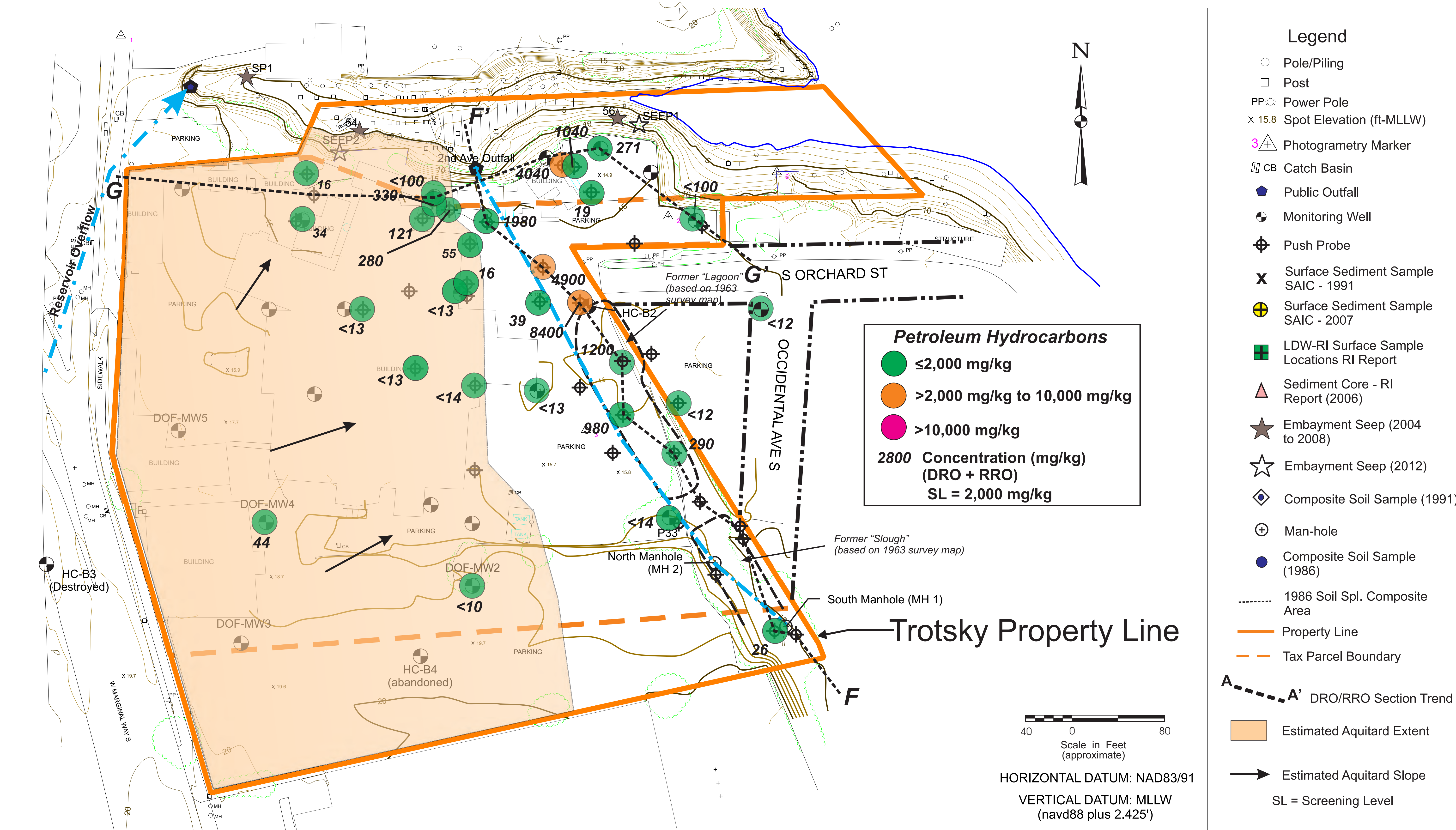
ICS/NW Cooperage Site

Extent of DRO/RRO in Soil Five to Ten Feet Deep

SUM-008-00 (ICS) ***March 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-2b



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of TPH contamination during sampling.

Ref: Upland Phase2a TPHrev.cdr

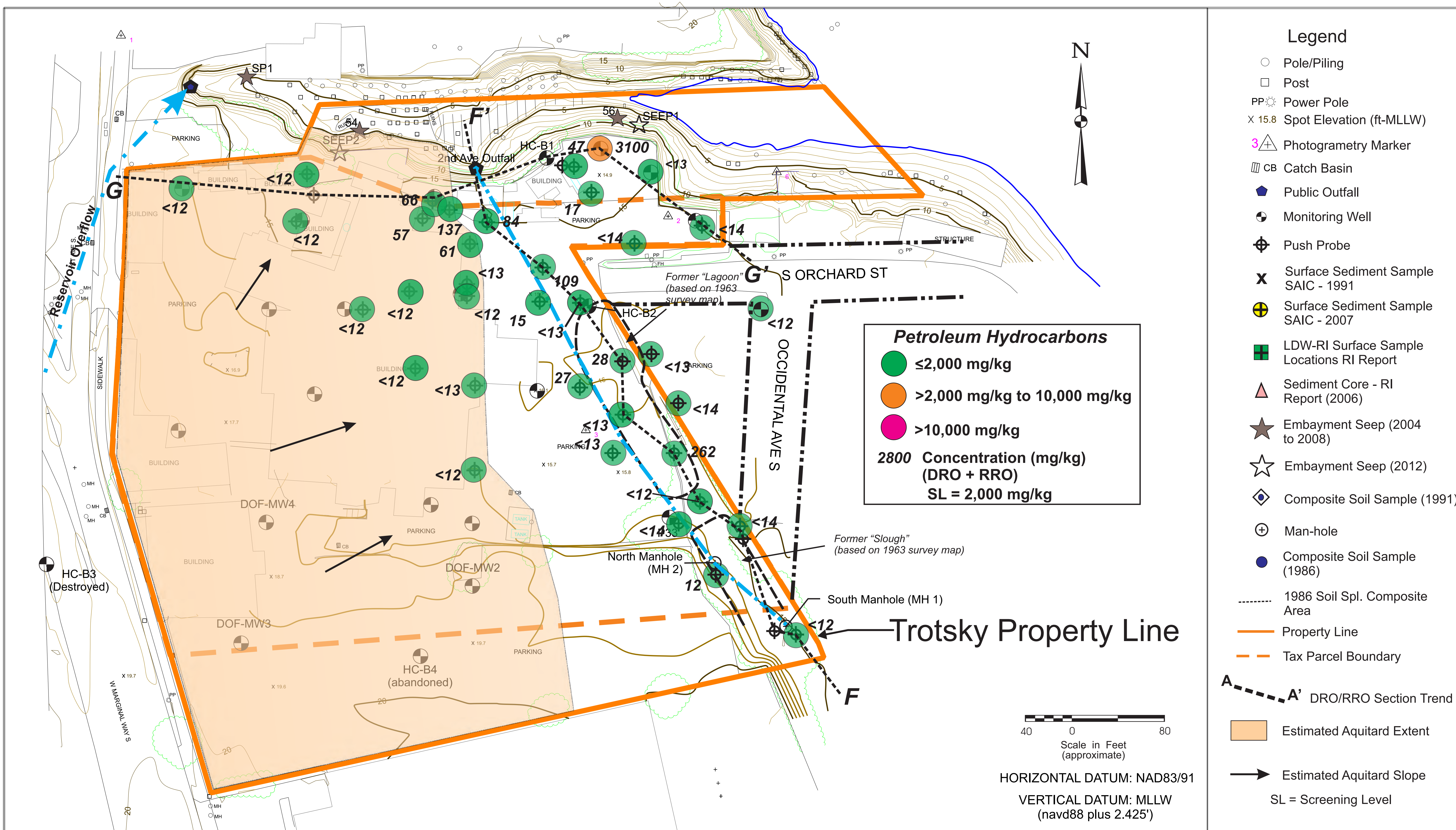
ICS/NW Cooperage Site

Extent of DRO/RRO in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) ***March 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-2c



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of TPH contamination during sampling.

Ref: Upland Phase2a TPHrev.cdr

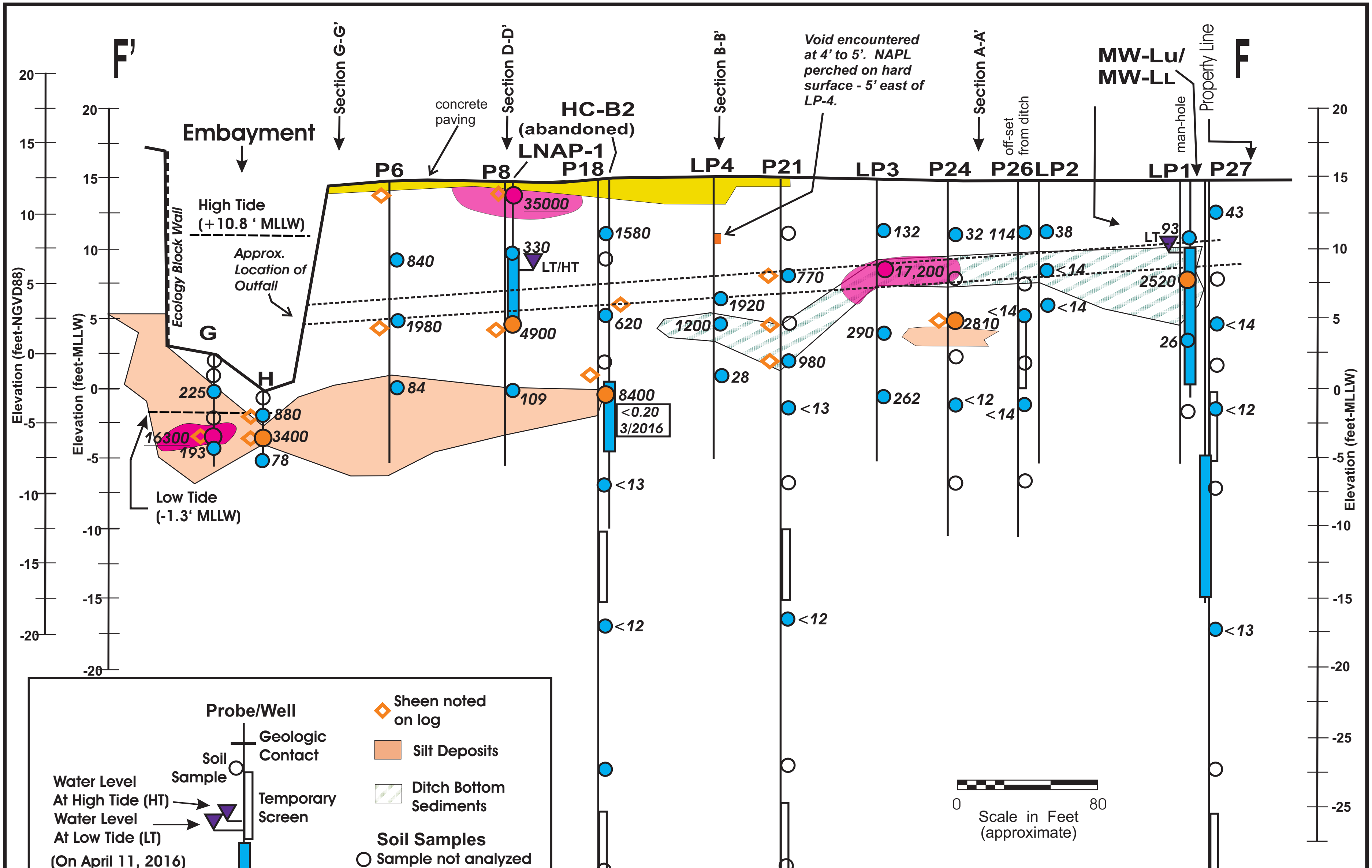
ICS/NW Cooperage Site

Extent of DRO/RRO in Soil Fifteen to Twenty Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-2d



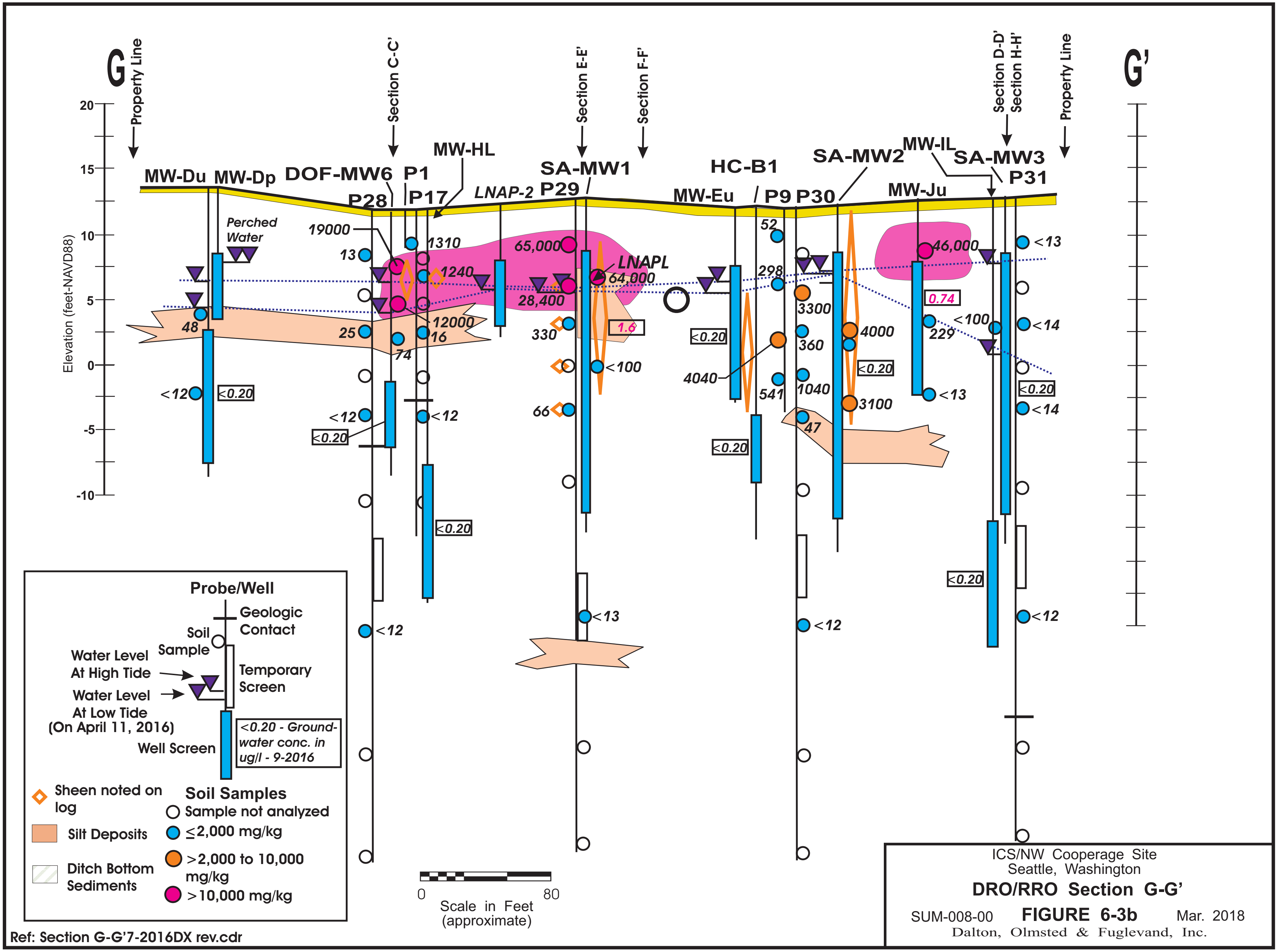
ICS/NW Cooperage Site
Seattle, Washington

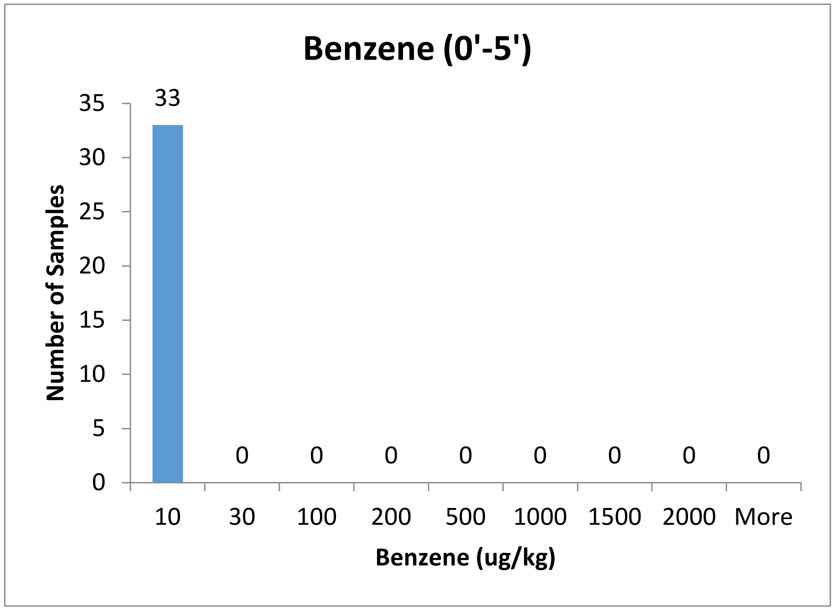
DRO/RRO - Section F-F'

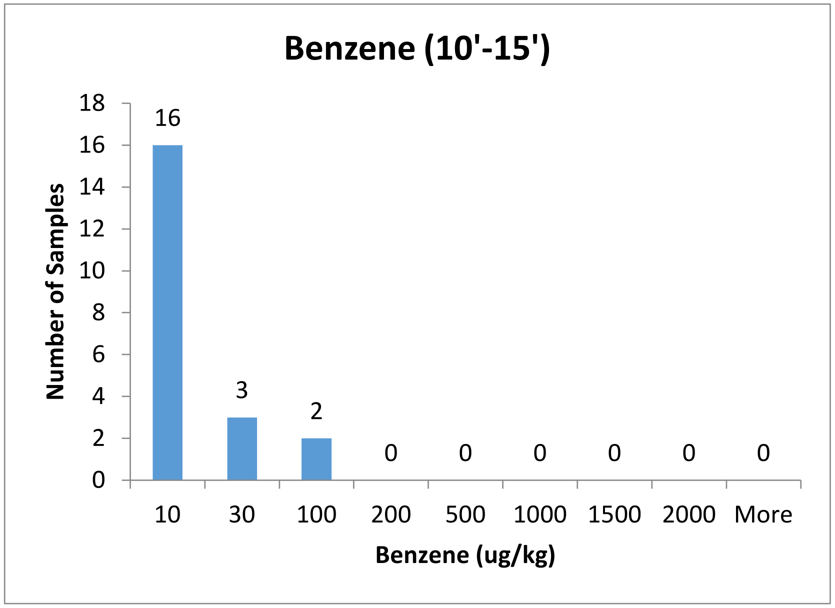
SUM-008-00 **FIGURE 6-3a** Mar. 2018

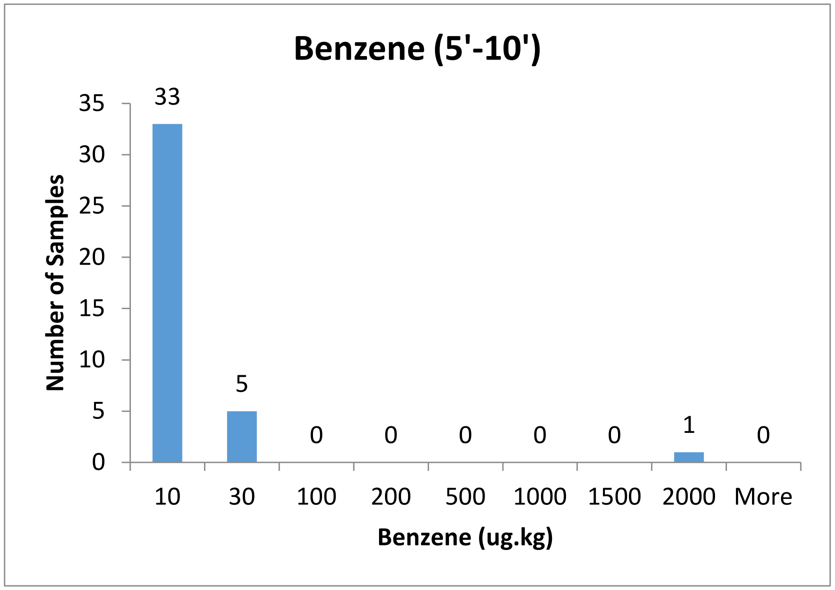
Dalton, Olmsted & Fuglevand, Inc.

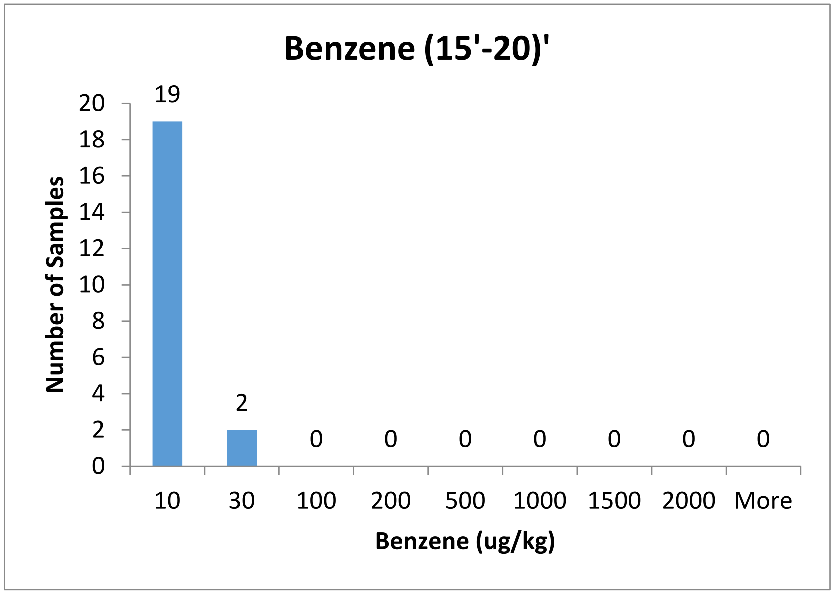
Ref: Section F-F'aDx rev.cdr

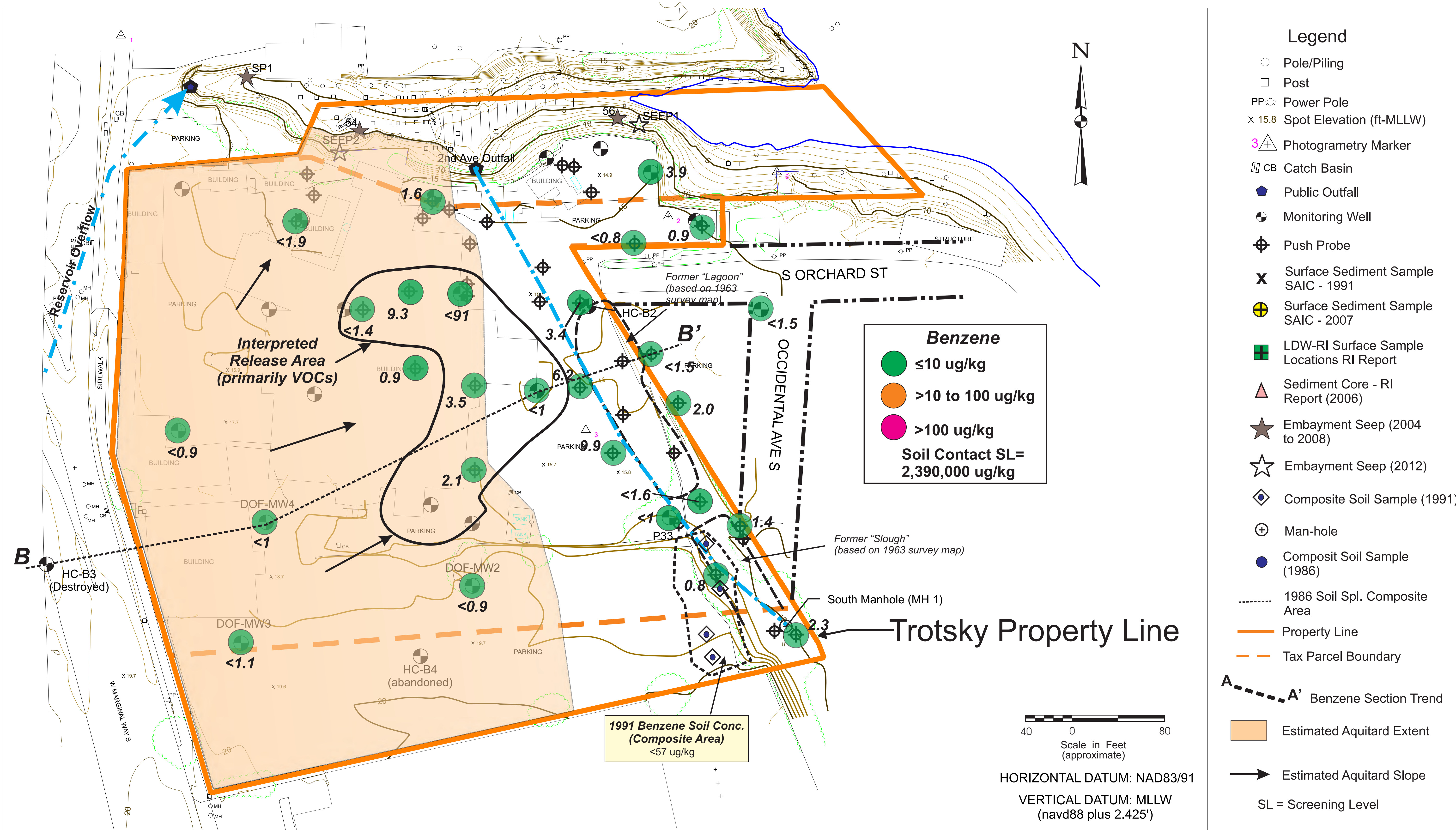

G
G'
Property Line
Section C-C'
Section E-E'
Section F-F'
Section D-D'
Section H-H'
Property Line
Elevation (feet-NAVD88)
20
15
10
5
0
-5
-10
MW-Du
MW-Dp
DOF-MW6
P1
MW-HL
P28
P17
LNAP-2
SA-MW1
P29
HC-B1
MW-Eu
P9
P30
SA-MW2
MW-IL
SA-MW3
P31
MW-Ju
Perched Water
19000
1310
13
1240
65,000
LNAPL
64,000
28,400
12000
16
25
74
48
330
1.6
<100
66
<12
<0.20
<12
<0.20
<12
<0.20
<13
<12
52
298
3300
360
4040
541
1040
47
<0.20
<0.20
4000
<0.20
3100
46,000
0.74
<100
229
<13
<13
<14
<0.20
<14
<0.20
<12
<12
Probe/Well
Geologic Contact
Soil Sample
Water Level At High Tide
Water Level At Low Tide (On April 11, 2016)
Temporary Screen
Well Screen
<0.20 - Ground-water conc. in ug/l - 9-2016
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample not analyzed
≤2,000 mg/kg
>2,000 to 10,000 mg/kg
>10,000 mg/kg
0
80
Scale in Feet (approximate)
Ref: Section G-G'7-2016DX rev.cdr
ICS/NW Cooperage Site
Seattle, Washington
DRO/RRO Section G-G'
SUM-008-00
FIGURE 6-3b
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.


Benzene (0'-5')
Number of Samples
35
30
25
20
15
10
5
0
33
0
0
0
0
0
0
0
0
10
30
100
200
500
1000
1500
2000
More
Benzene (ug/kg)


Benzene (10'-15')
Number of Samples
18
16
14
12
10
8
6
4
2
0
16
3
2
0
0
0
0
0
0
10
30
100
200
500
1000
1500
2000
More
Benzene (ug/kg)


Benzene (5'-10')
Number of Samples
35
30
25
20
15
10
5
0
33
5
0
0
0
0
0
1
0
10
30
100
200
500
1000
1500
2000
More
Benzene (ug.kg)


Benzene (15'-20')'
Number of Samples
20
18
16
14
12
10
8
6
4
2
0
19
2
0
0
0
0
0
0
0
10
30
100
200
500
1000
1500
2000
More
Benzene (ug/kg)



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of benzene contamination during sampling.
2) Data from the HC borings (HC-B1 to HC-B5) not plotted; benzene concentrations were not detected in soil samples from these locations.

Ref: Upland Phase2a Benrev.cdr

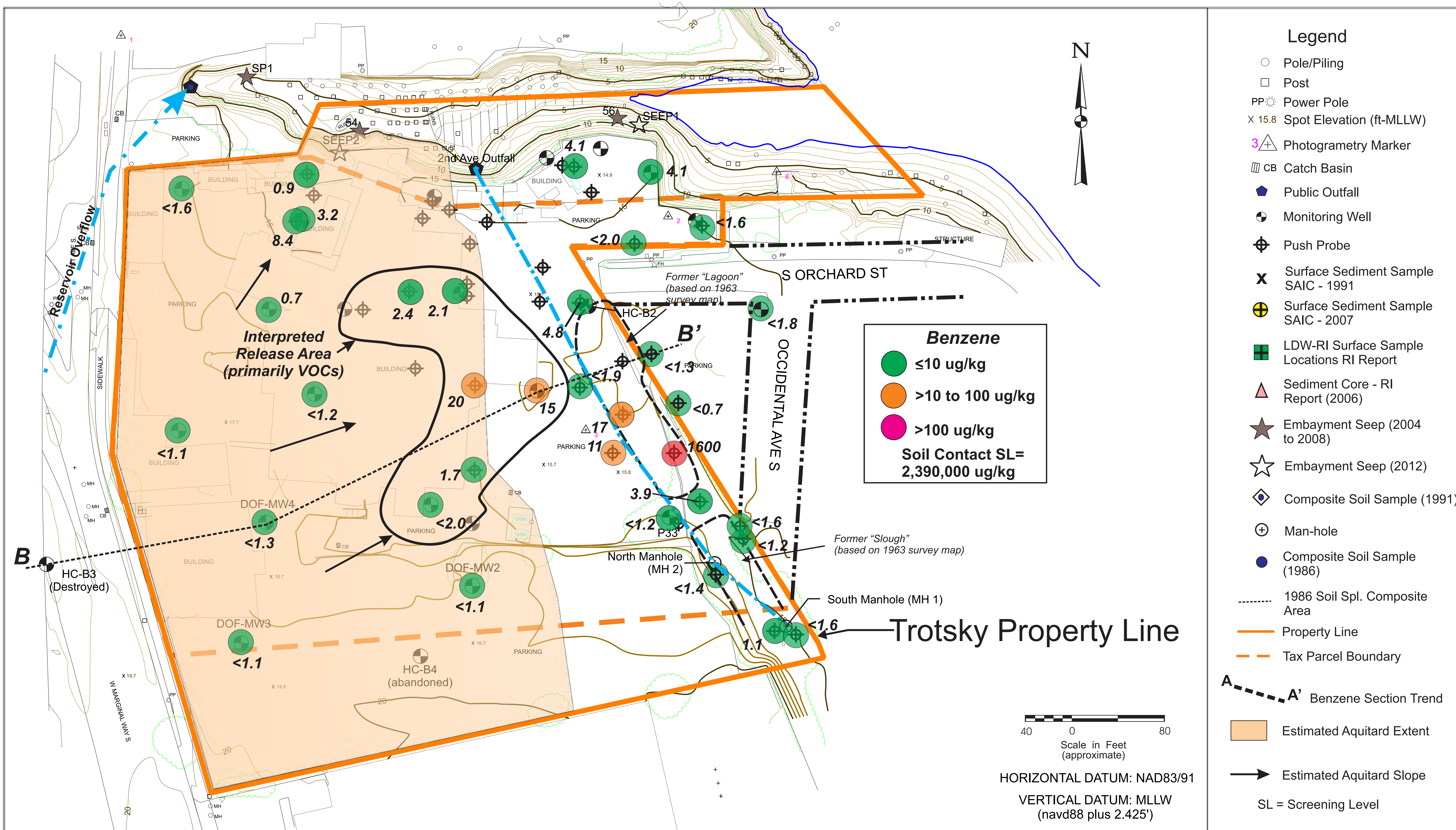
ICS/NW Cooperage Site

Extent of Benzene in Soil Less than Five Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-5a



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of benzene contamination during sampling.

2) Data from the HC borings (HC-B1 to HC-B5) not plotted; benzene concentrations were not detected in soil samples from these locations.

Ref: Upland Phase2a Benrev.cdr

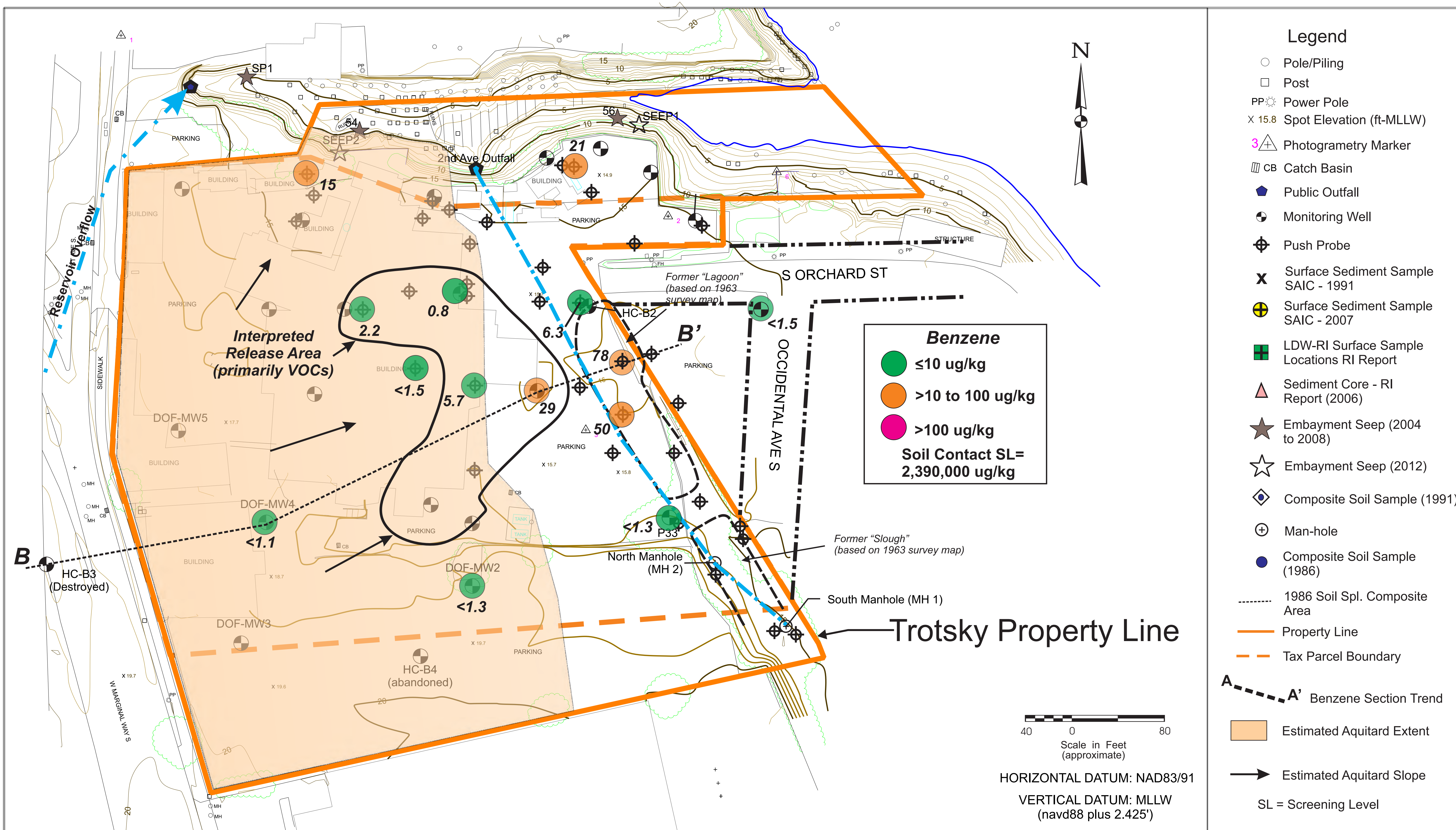
ICS/NW Cooperage Site

Extent of Benzene in Soil Five to Ten Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-5b



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of benzene contamination during sampling.

2) Data from the HC borings (HC-B1 to HC-B5) not plotted; benzene concentrations were not detected in soil samples from these locations.

Ref: Upland Phase2a Benrev.cdr

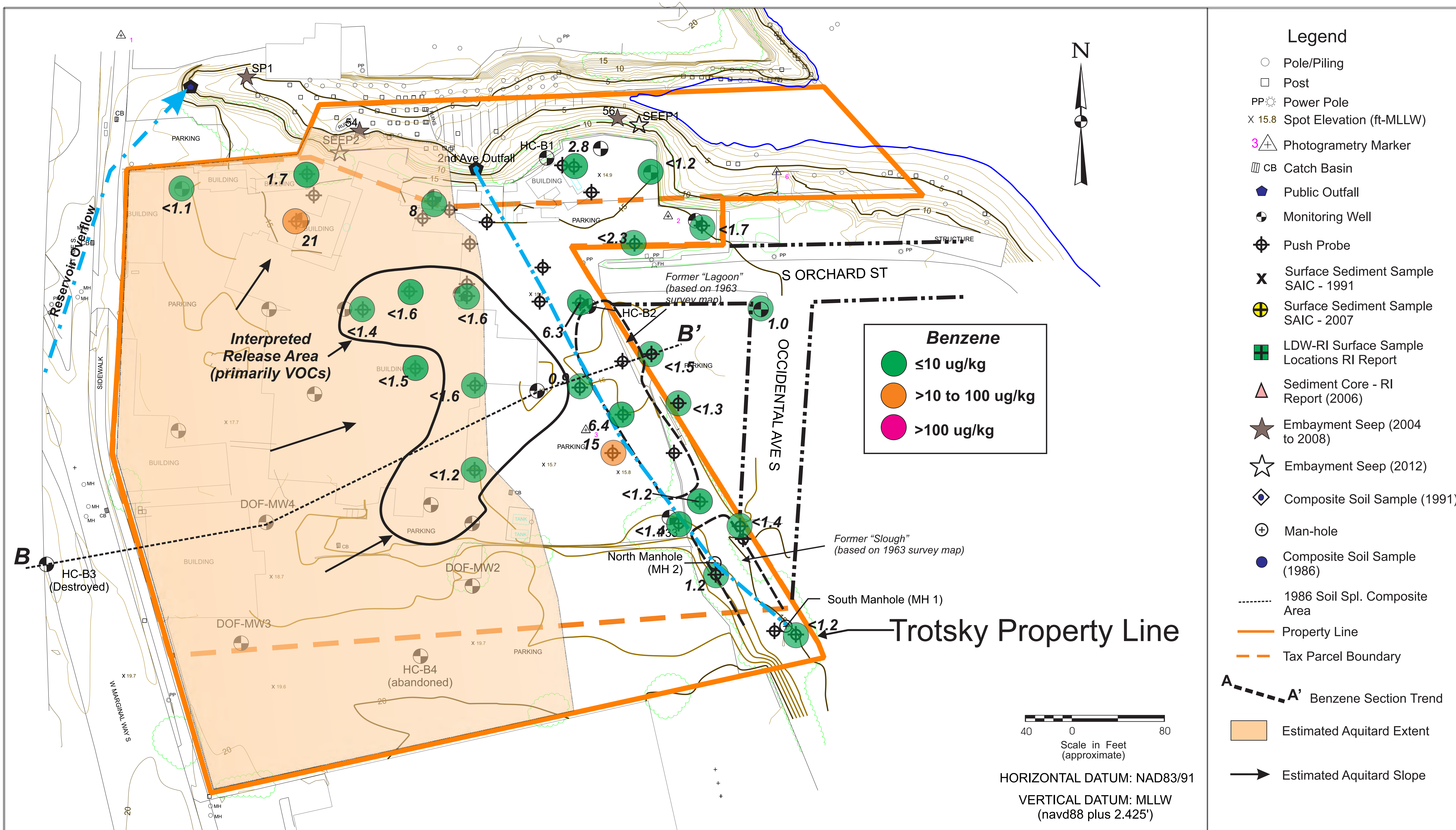
ICS/NW Cooperage Site

Extent of Benzene in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-5c



Notes:

1) Locations with no analytical data displayed no significant field evidence (sheen or elevated PID vapor concentrations) of benzene contamination during sampling.

2) Data from the HC borings (HC-B1 to HC-B5) not plotted; benzene concentrations were not detected in soil samples from these locations.

Ref: Upland Phase2a Benrev.cdr

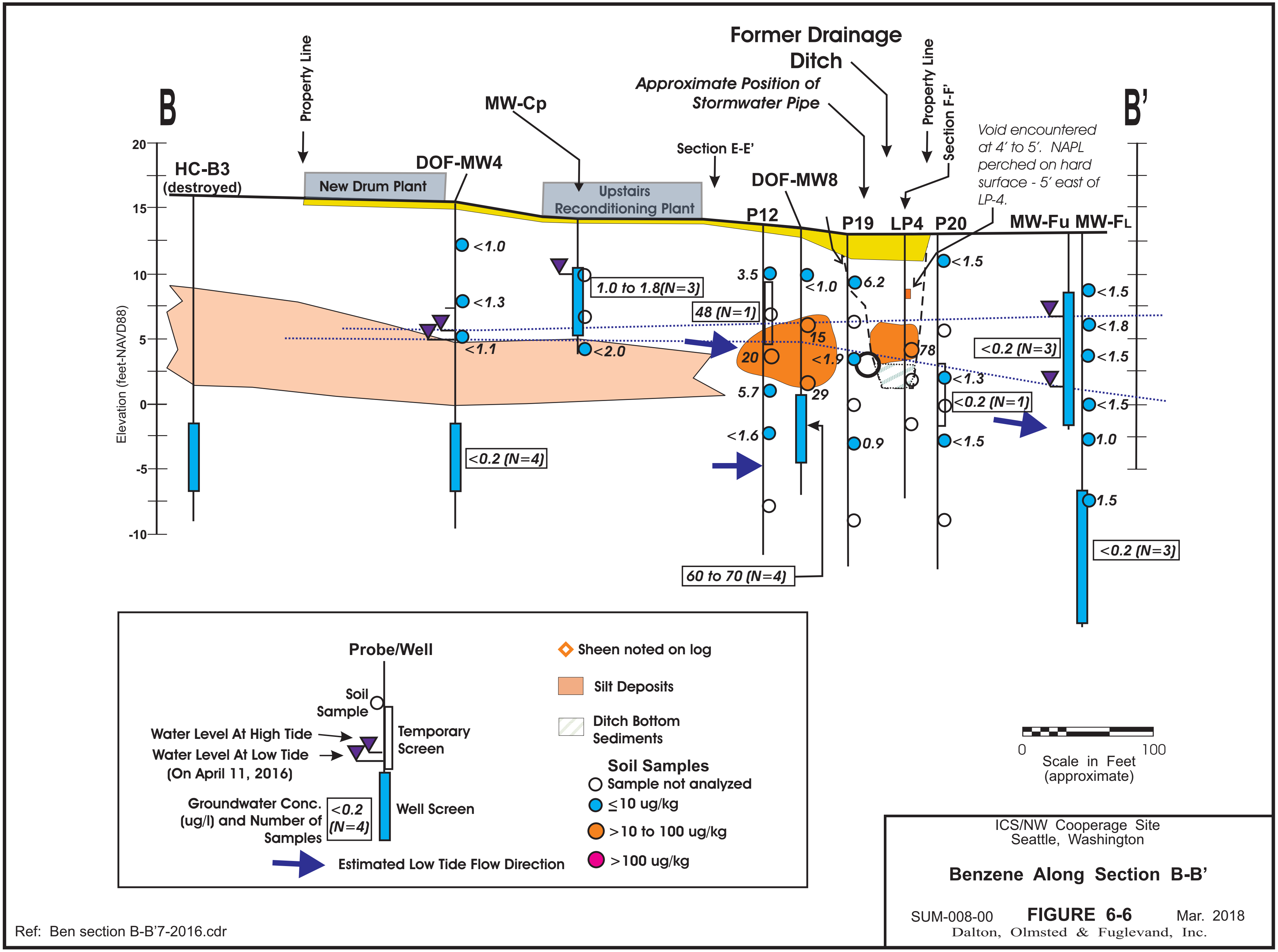
ICS/NW Cooperage Site

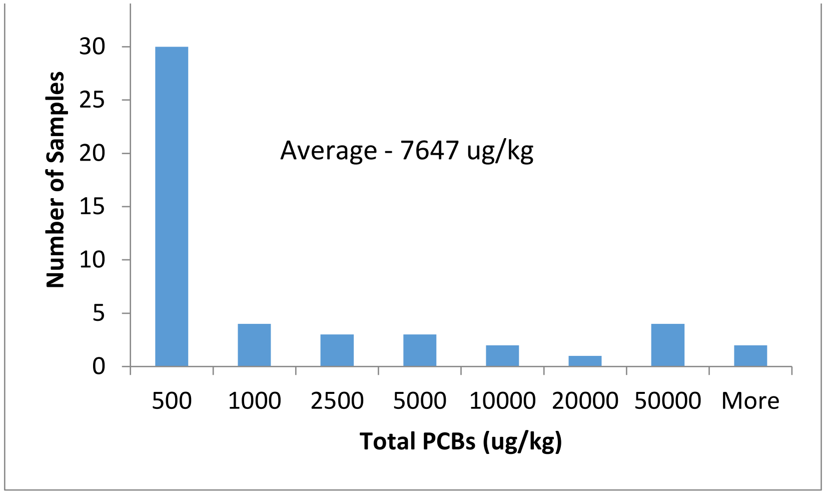
Extent of Benzene in Soil Fifteen to Twenty Feet Deep

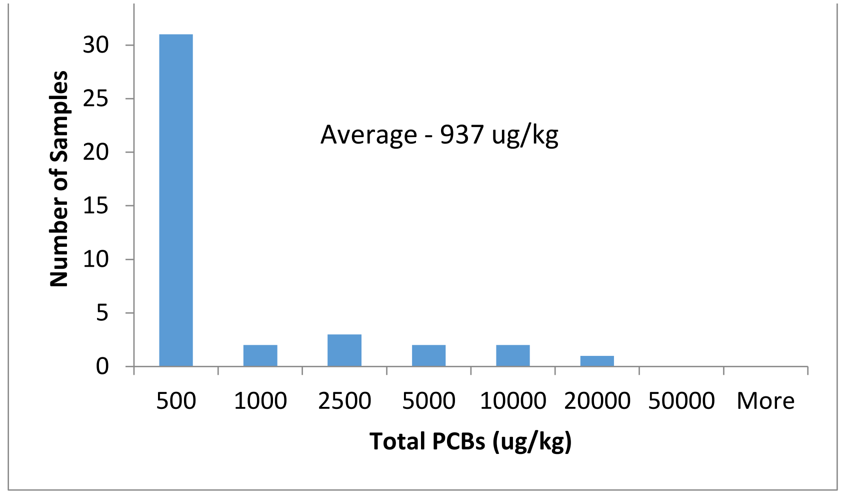
SUM-008-00 (ICS) *March 2018*

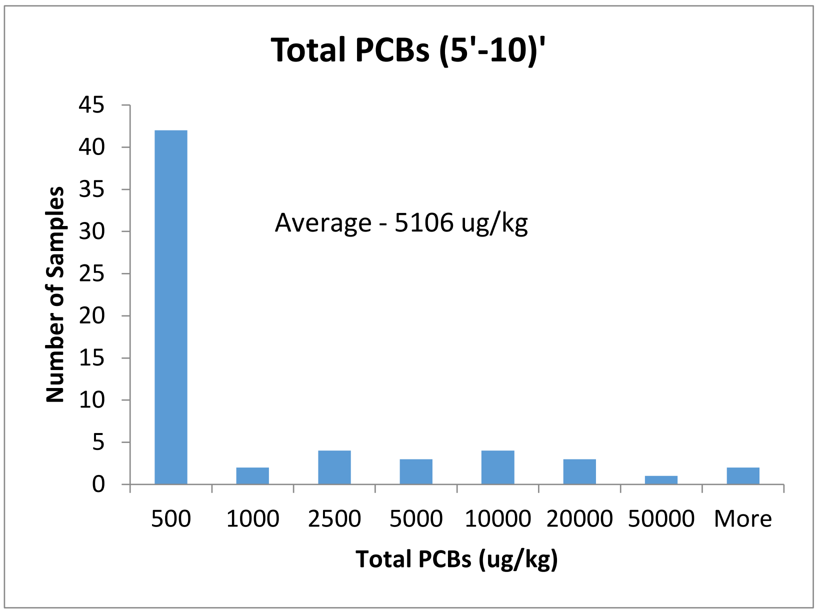
Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-5d


B
B'
Property Line
MW-Cp
Former Drainage Ditch
Approximate Position of Stormwater Pipe
Property Line
Section F-F'
Section E-E'
HC-B3 (destroyed)
New Drum Plant
DOF-MW4
Upstairs Reconditioning Plant
DOF-MW8
P12
P19
LP4
P20
MW-Fu MW-FL
Void encountered at 4' to 5'. NAPL perched on hard surface - 5' east of LP-4.
Elevation (feet-NAVD88)
20
15
10
5
0
-5
-10
<1.0
<1.3
<1.1
1.0 to 1.8(N=3)
<2.0
<0.2 (N=4)
48 (N=1)
3.5
20
5.7
<1.6
<1.0
15
<1.9
29
60 to 70 (N=4)
6.2
0.9
78
<1.5
<1.3
<0.2 (N=1)
<1.5
<0.2 (N=3)
<1.5
<1.8
<1.5
<1.5
1.0
1.5
<0.2 (N=3)
Probe/Well
Soil Sample
Water Level At High Tide
Water Level At Low Tide
(On April 11, 2016)
Temporary Screen
Groundwater Conc. (ug/l) and Number of Samples
<0.2 (N=4)
Well Screen
Estimated Low Tide Flow Direction
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample not analyzed
≤10 ug/kg
>10 to 100 ug/kg
>100 ug/kg
0
100
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
Benzene Along Section B-B'
SUM-008-00
FIGURE 6-6
Mar. 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Ben section B-B'7-2016.cdr







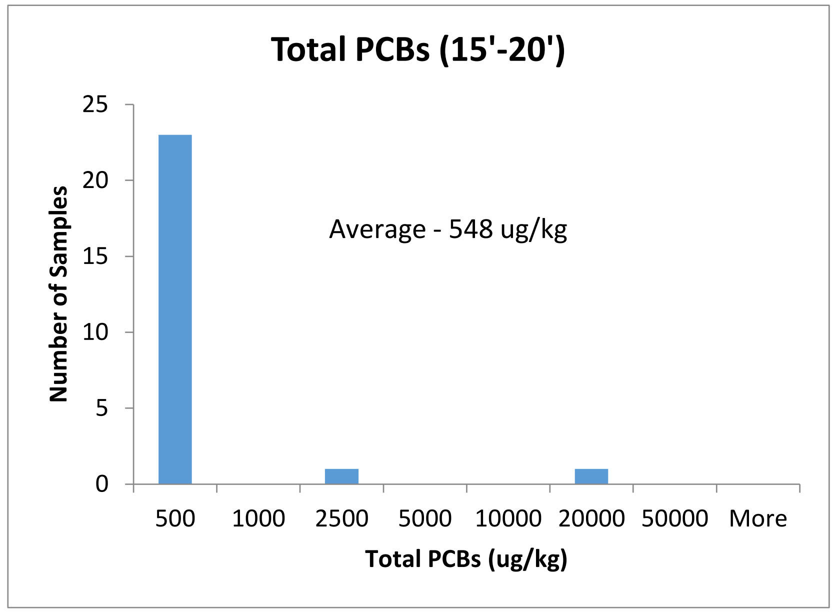
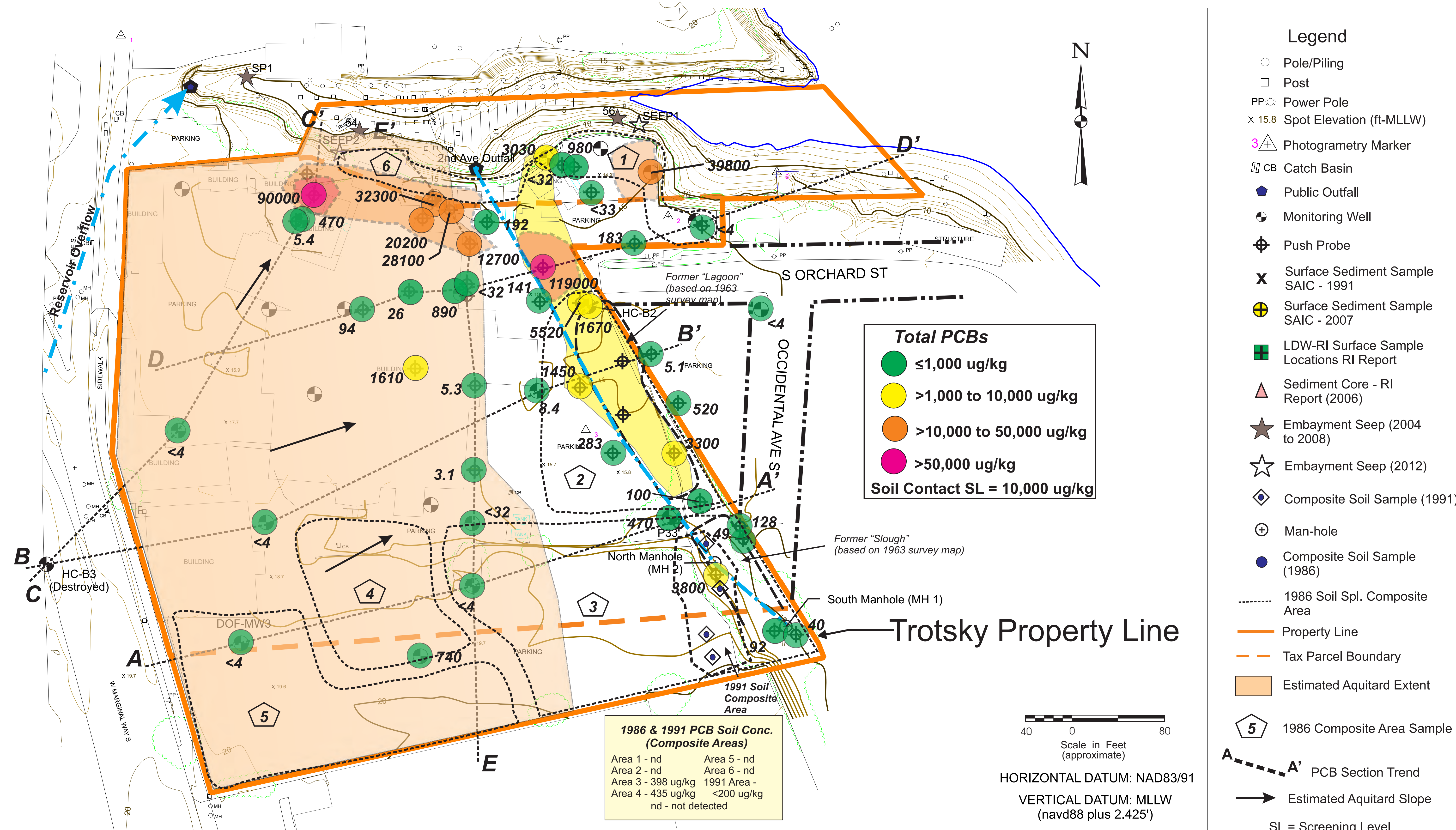


FIGURE 6-7 - Total PCBs In Soil Histograms

Dalton, Olmsted Fuglevand, Inc.

(Upland Soil Histograms.xlsx-PCBs)



ICS/NW Cooperage Site

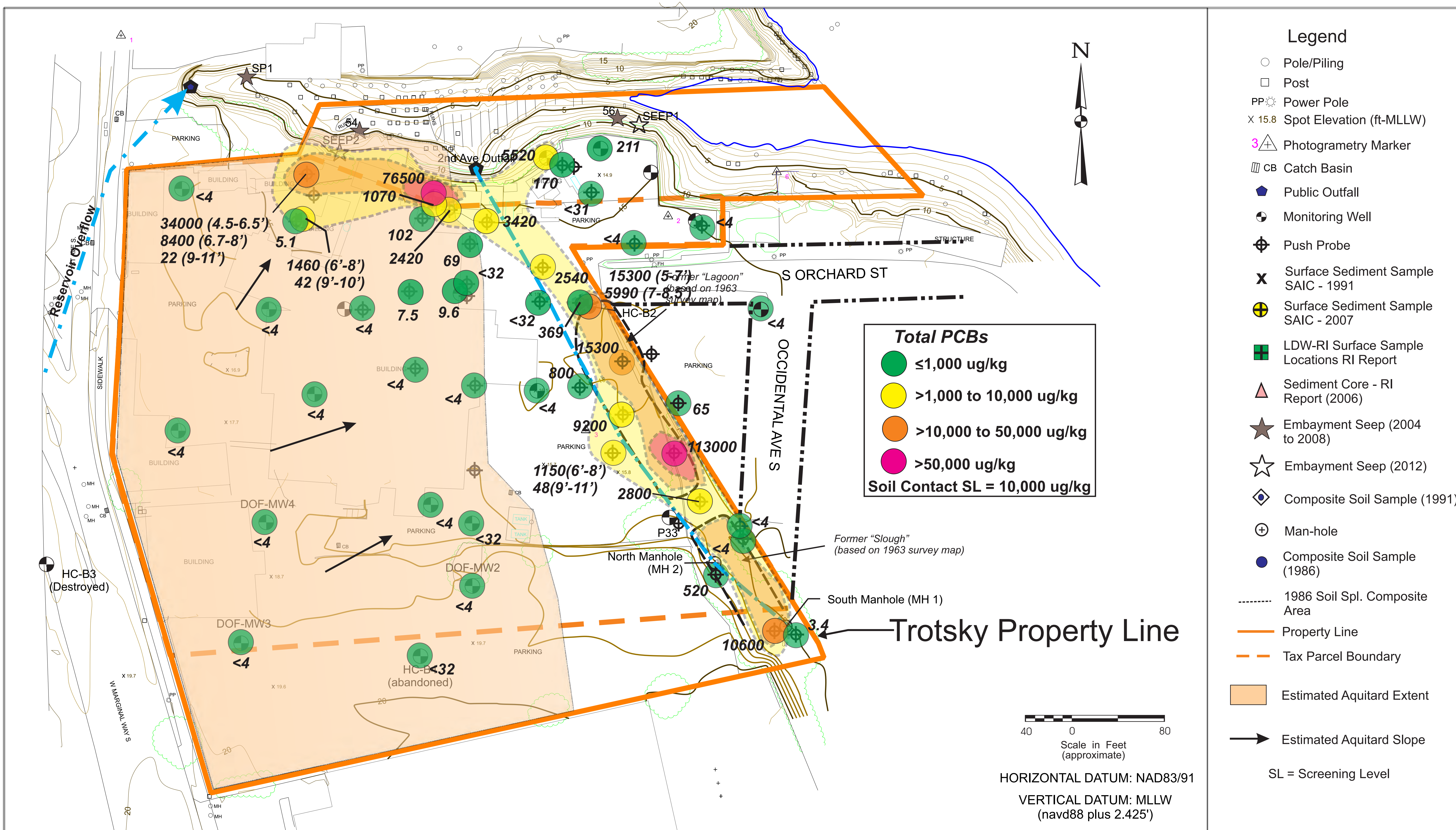
Extent of Total PCBs in Soil Less than Five Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-8a

Ref: Upland Phase2a TPCB.cdr



Ref: Upland Phase2a TPCB.cdr

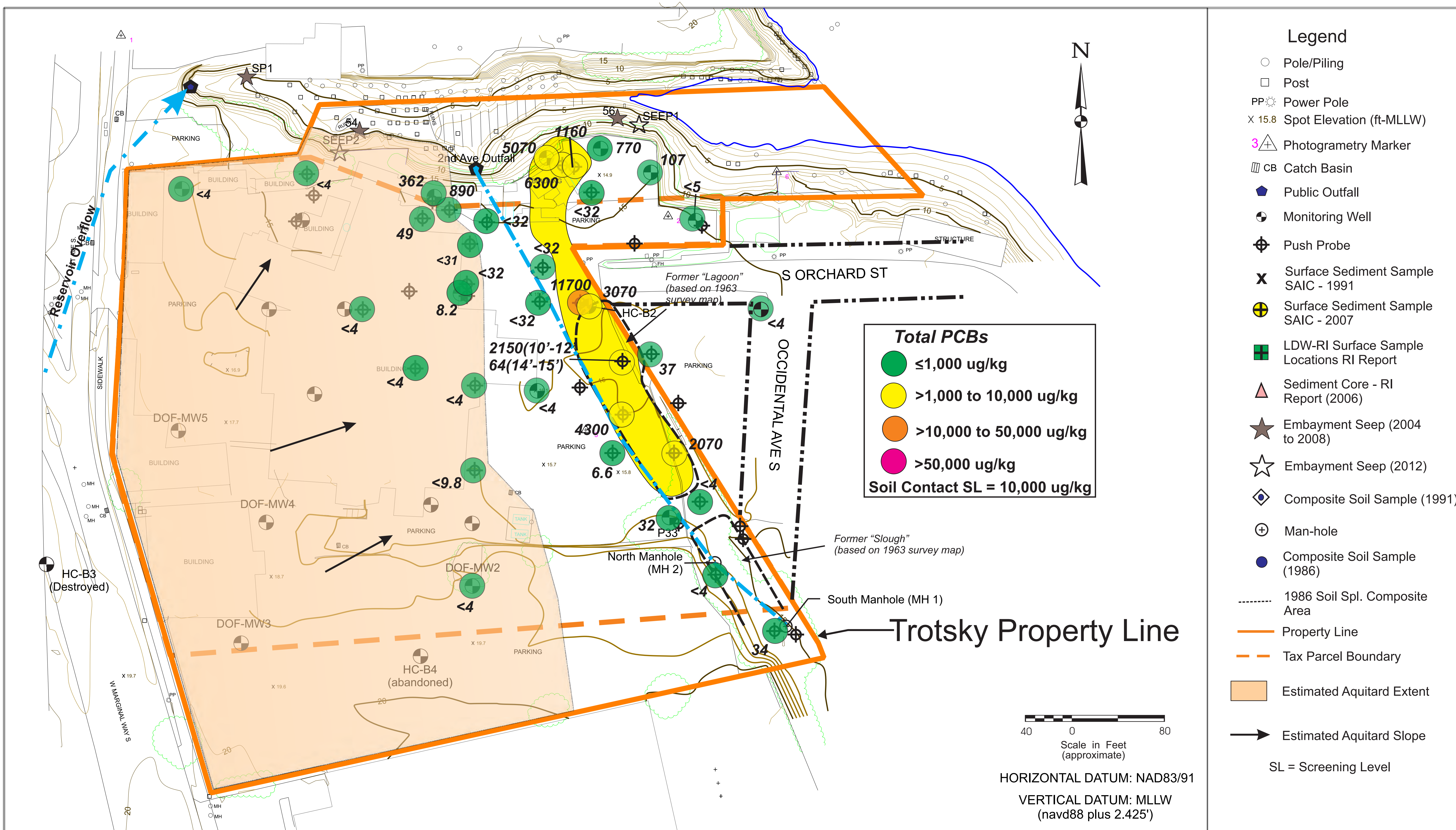
ICS/NW Cooperage Site

Extent of Total PCBs in Soil Five to Ten Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-8b



ICS/NW Cooperage Site

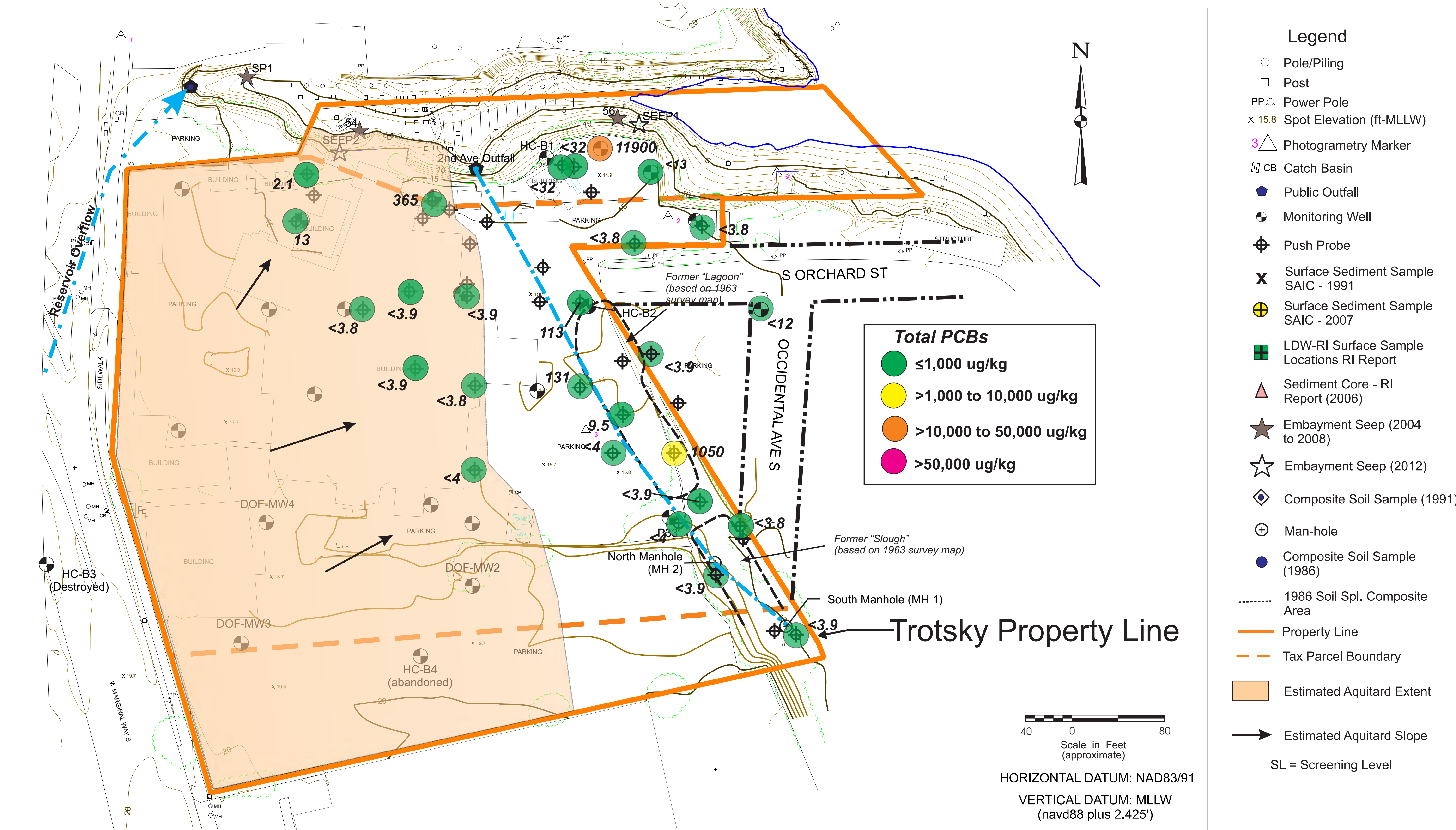
Extent of Total PCBs in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) *March 2018*

FIGURE 6-8c

Dalton, Olmsted & Fuglevand, Inc.

Ref: Upland Phase2a TPCB.cdr



ICS/NW Cooperage Site

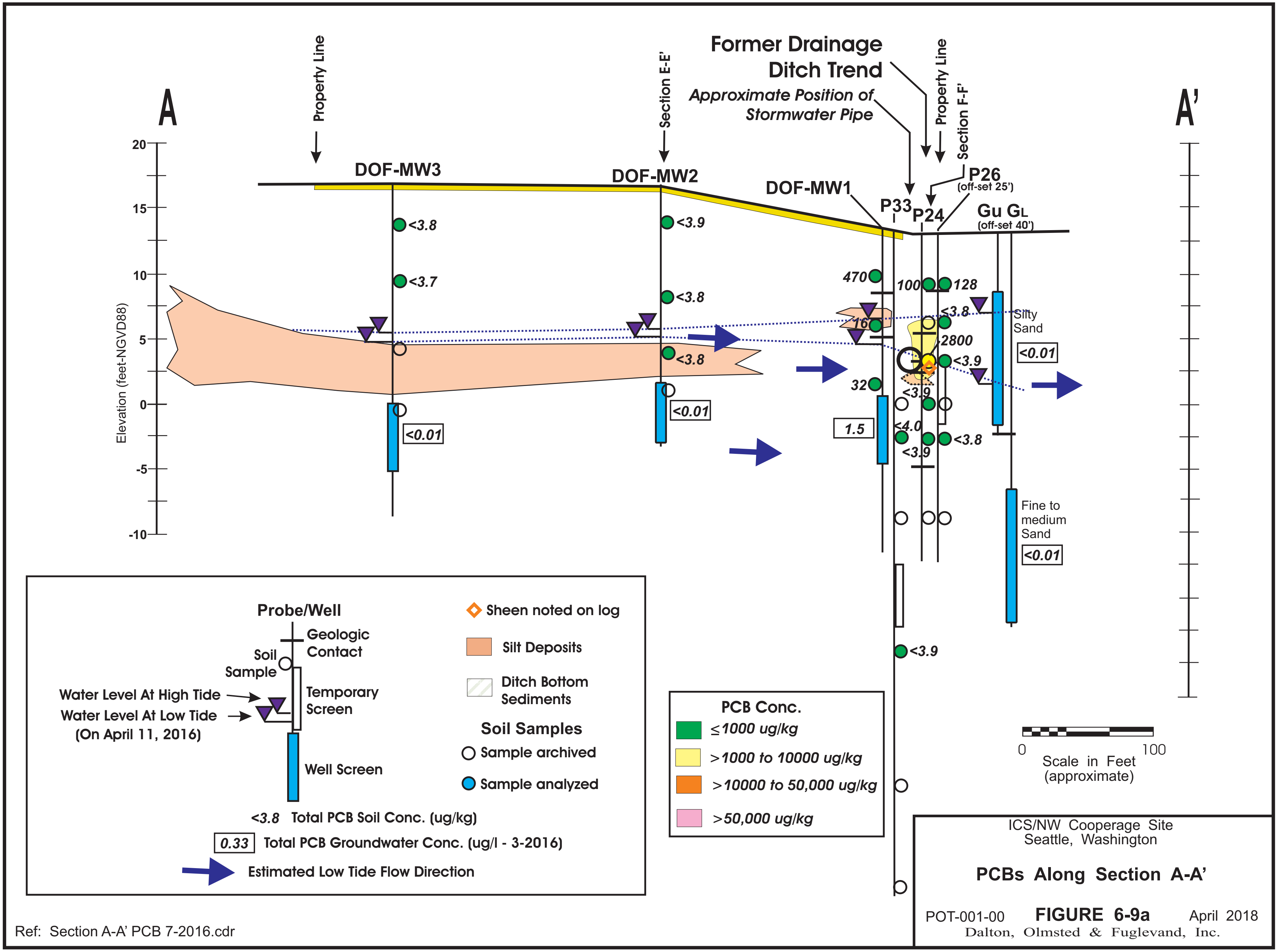
Extent of Total PCBs in Soil Fifteen to Twenty Feet Deep

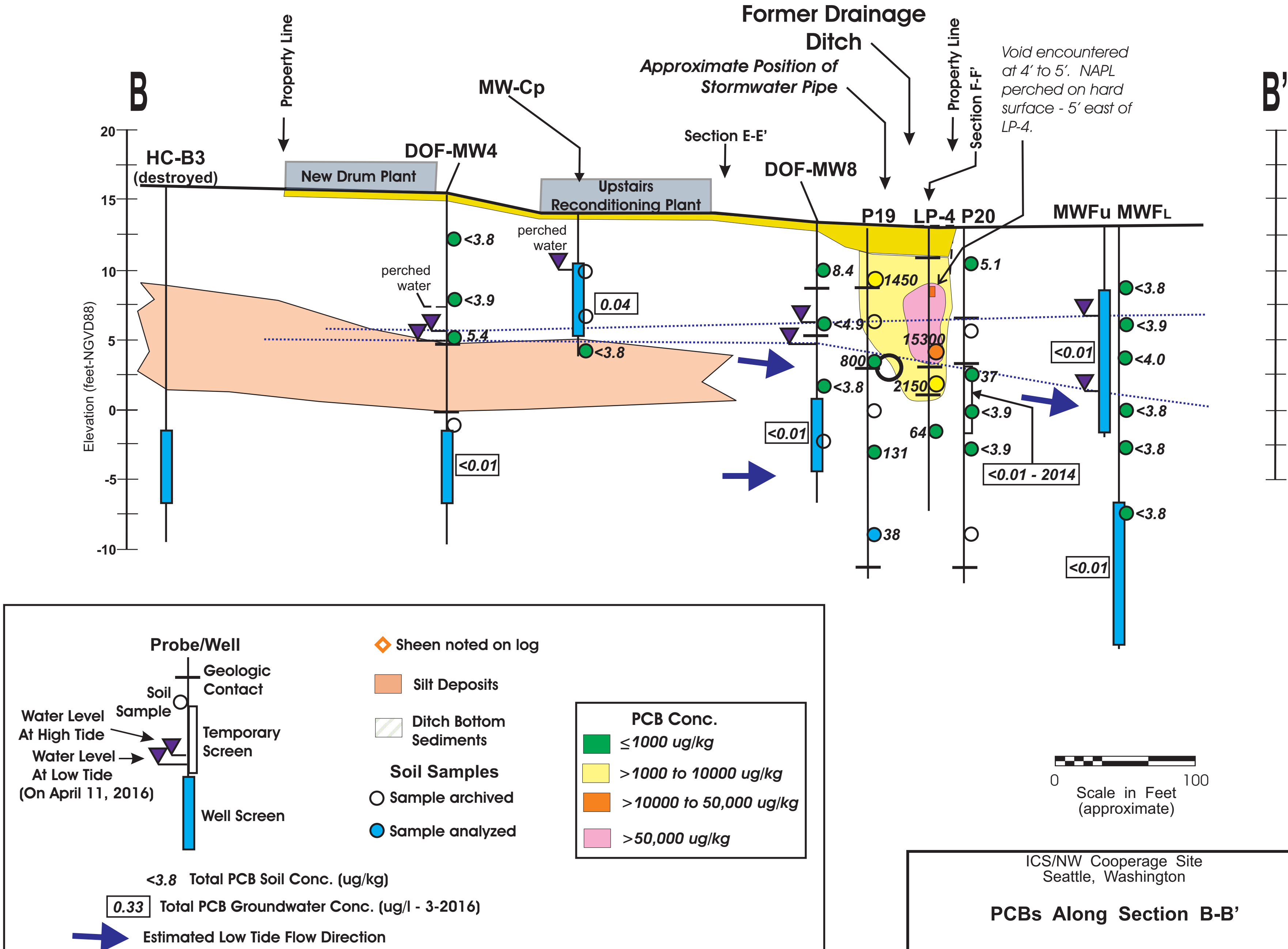
SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-8d

Ref: Upland Phase2a TPCB.cdr


A
A'
Property Line
Section E-E'
Former Drainage Ditch Trend
Approximate Position of Stormwater Pipe
Property Line
Section F-F'
DOF-MW3
DOF-MW2
DOF-MW1
P33
P24
P26 (off-set 25')
Gu GL (off-set 40')
Elevation (feet-NGVD88)
20
15
10
5
0
-5
-10
<3.8
<3.7
<0.01
<3.9
<3.8
<3.8
<0.01
470
16
32
1.5
<4.0
100
128
<3.8
2800
<3.9
<3.9
<3.9
<3.8
Silty Sand
<0.01
Fine to medium Sand
<0.01
<3.9
Probe/Well
Geologic Contact
Soil Sample
Temporary Screen
Water Level At High Tide
Water Level At Low Tide (On April 11, 2016)
Well Screen
<3.8 Total PCB Soil Conc. (ug/kg)
0.33 Total PCB Groundwater Conc. (ug/l - 3-2016)
Estimated Low Tide Flow Direction
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample archived
Sample analyzed
PCB Conc.
≤1000 ug/kg
>1000 to 10000 ug/kg
>10000 to 50,000 ug/kg
>50,000 ug/kg
0
100
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
PCBs Along Section A-A'
POT-001-00
FIGURE 6-9a
April 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Section A-A' PCB 7-2016.cdr

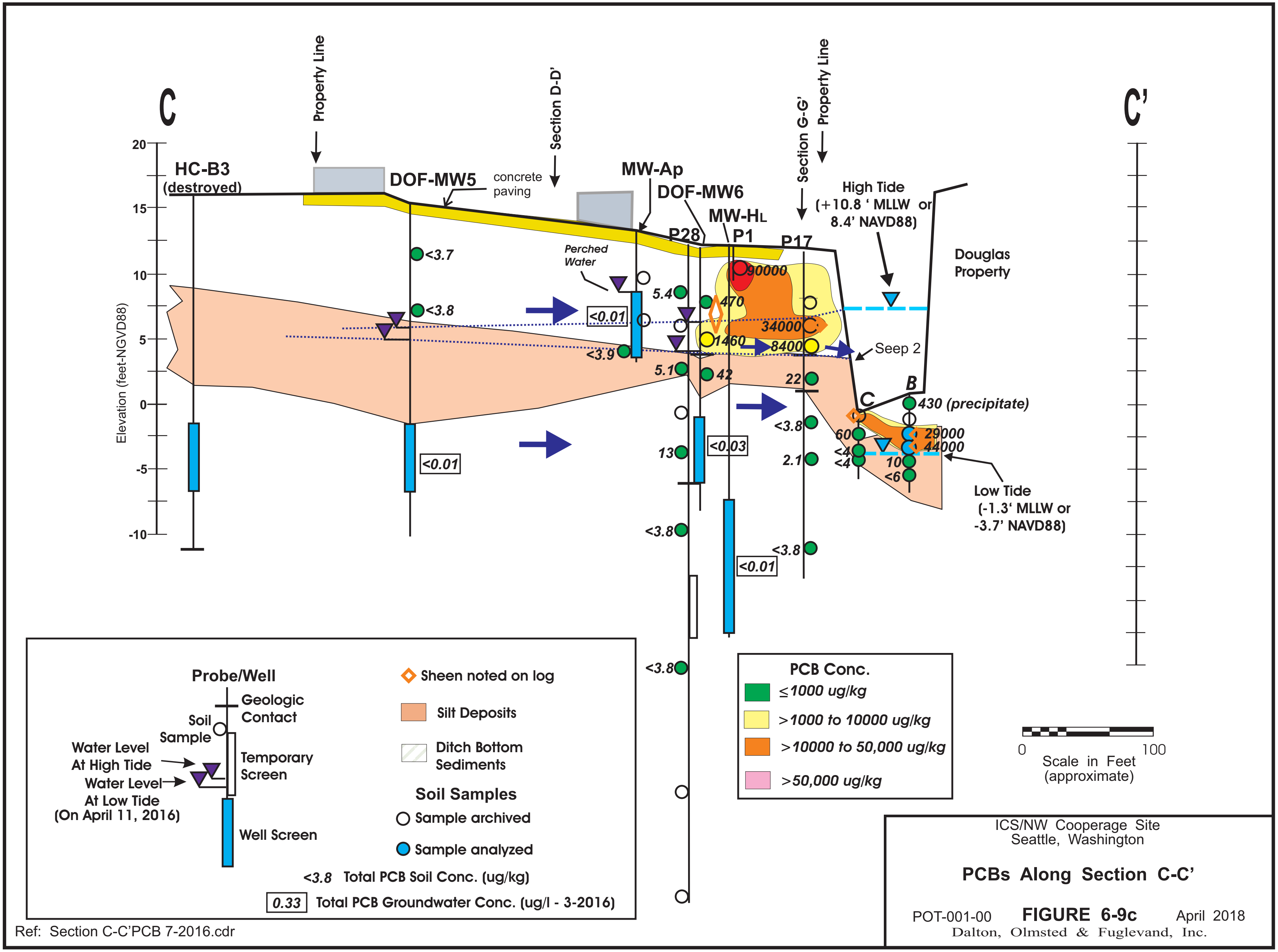


ICS/NW Cooperage Site
Seattle, Washington

PCBs Along Section B-B'

POT-001-00 **FIGURE 6-9b** April 2018
Dalton, Olmsted & Fuglevand, Inc.

Ref: Section B-B'7-2016.cdr

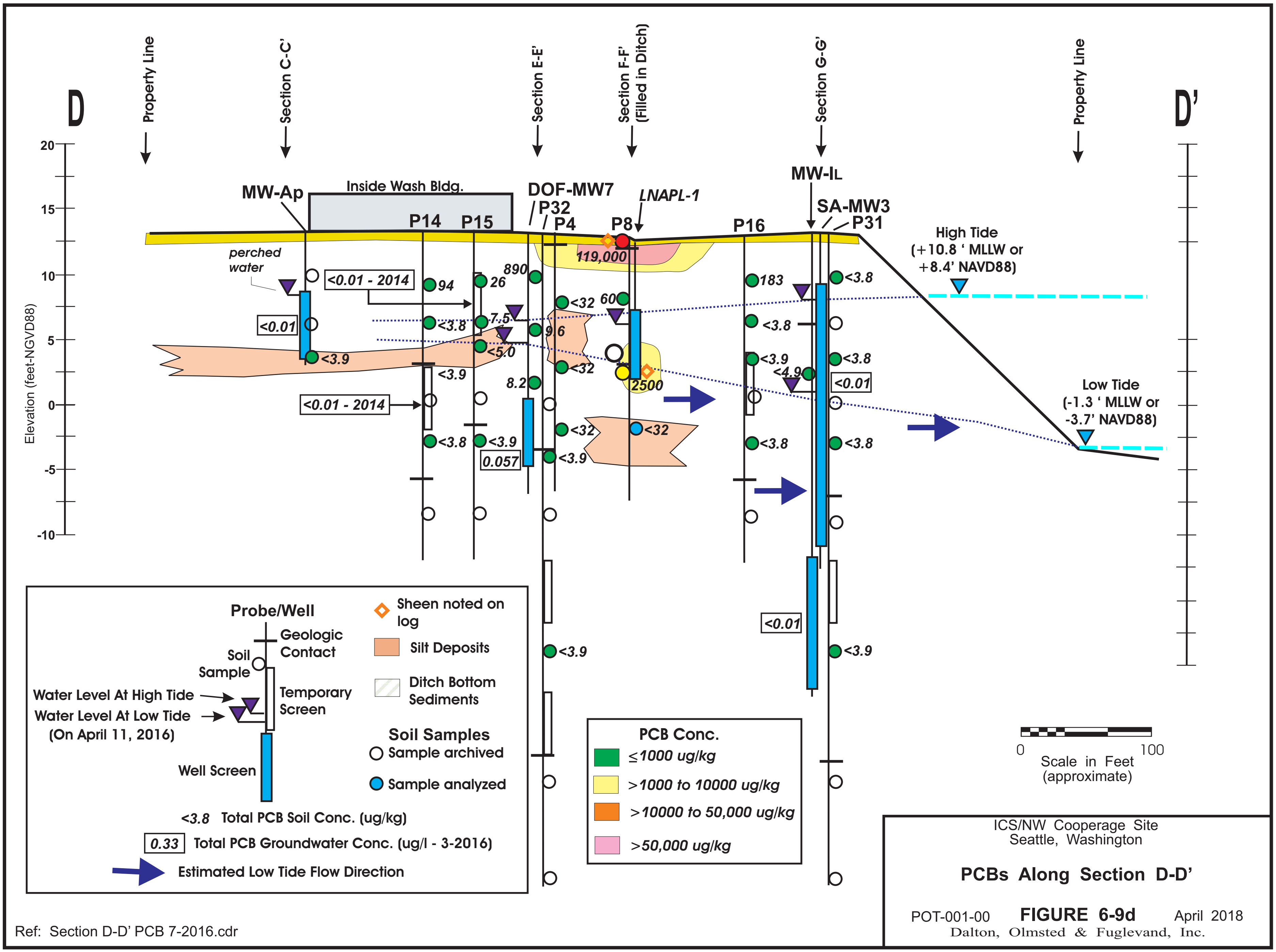


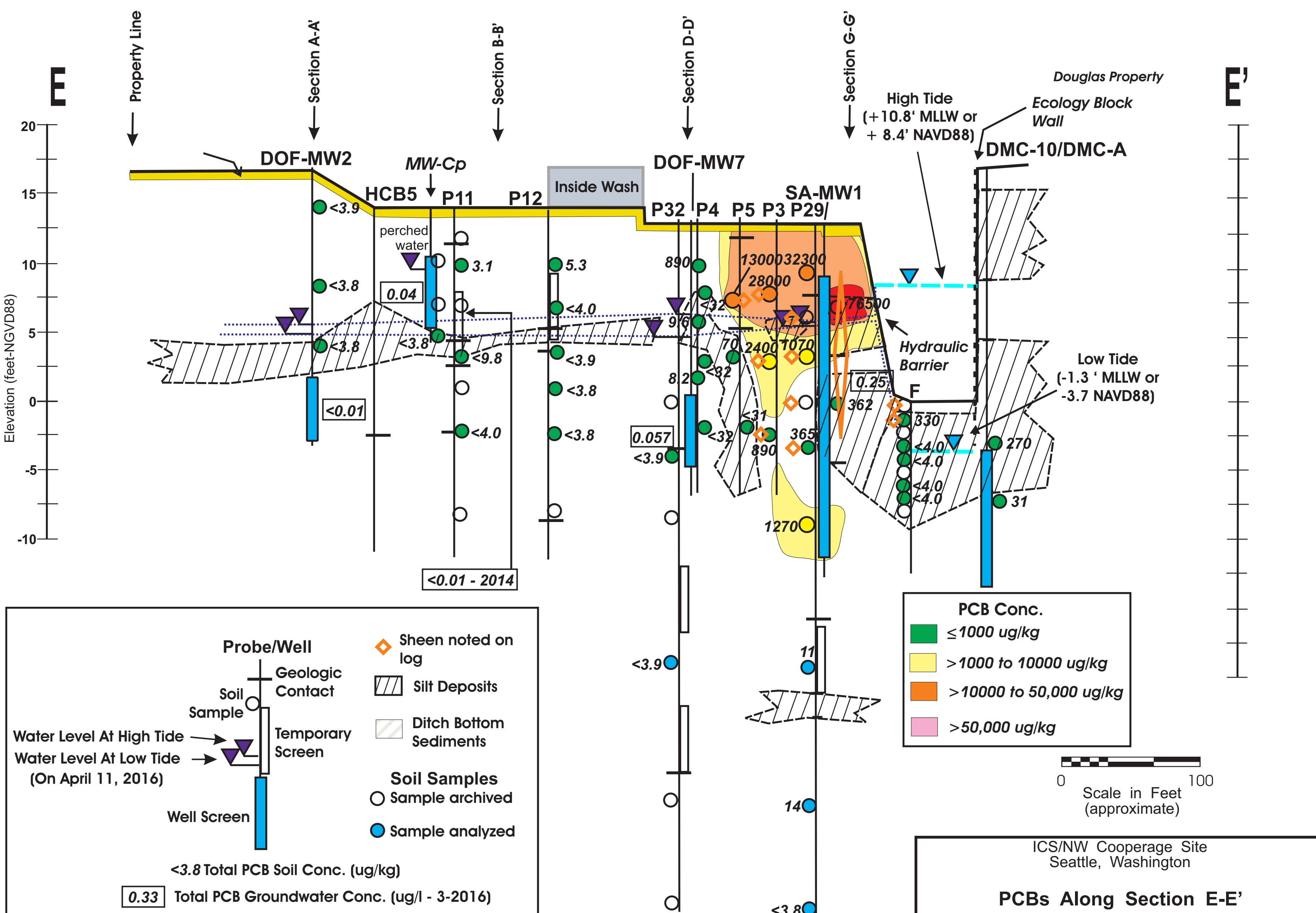
ICS/NW Cooperage Site
Seattle, Washington

PCBs Along Section C-C'

POT-001-00 **FIGURE 6-9c** April 2018

Dalton, Olmsted & Fuglevand, Inc.


D
D'
Property Line
Section C-C'
Section E-E'
Section F-F' (Filled in Ditch)
Section G-G'
Property Line
Elevation (feet-NGVD88)
20
15
10
5
0
-5
-10
MW-Ap
Inside Wash Bldg.
P14
P15
DOF-MW7
P32
P4
P8
LNAPL-1
P16
MW-IL
SA-MW3
P31
perched water
High Tide (+10.8 ' MLLW or +8.4' NAVD88)
Low Tide (-1.3 ' MLLW or -3.7' NAVD88)
<0.01 - 2014
<0.01
<3.9
94
26
890
119,000
183
<3.8
<3.8
7.5
<32
60
9.6
<5.0
<3.9
8.2
<32
2500
<3.9
<3.8
<4.9
<0.01
<0.01 - 2014
<3.8
<3.9
<32
<32
<3.8
<3.8
0.057
<3.9
<0.01
<3.9
<3.9
Probe/Well
Geologic Contact
Soil Sample
Water Level At High Tide
Water Level At Low Tide
(On April 11, 2016)
Temporary Screen
Well Screen
Sheen noted on log
Silt Deposits
Ditch Bottom Sediments
Soil Samples
Sample archived
Sample analyzed
<3.8 Total PCB Soil Conc. (ug/kg)
0.33 Total PCB Groundwater Conc. (ug/l - 3-2016)
Estimated Low Tide Flow Direction
PCB Conc.
≤1000 ug/kg
>1000 to 10000 ug/kg
>10000 to 50,000 ug/kg
>50,000 ug/kg
0
100
Scale in Feet (approximate)
ICS/NW Cooperage Site
Seattle, Washington
PCBs Along Section D-D'
POT-001-00
FIGURE 6-9d
April 2018
Dalton, Olmsted & Fuglevand, Inc.
Ref: Section D-D' PCB 7-2016.cdr



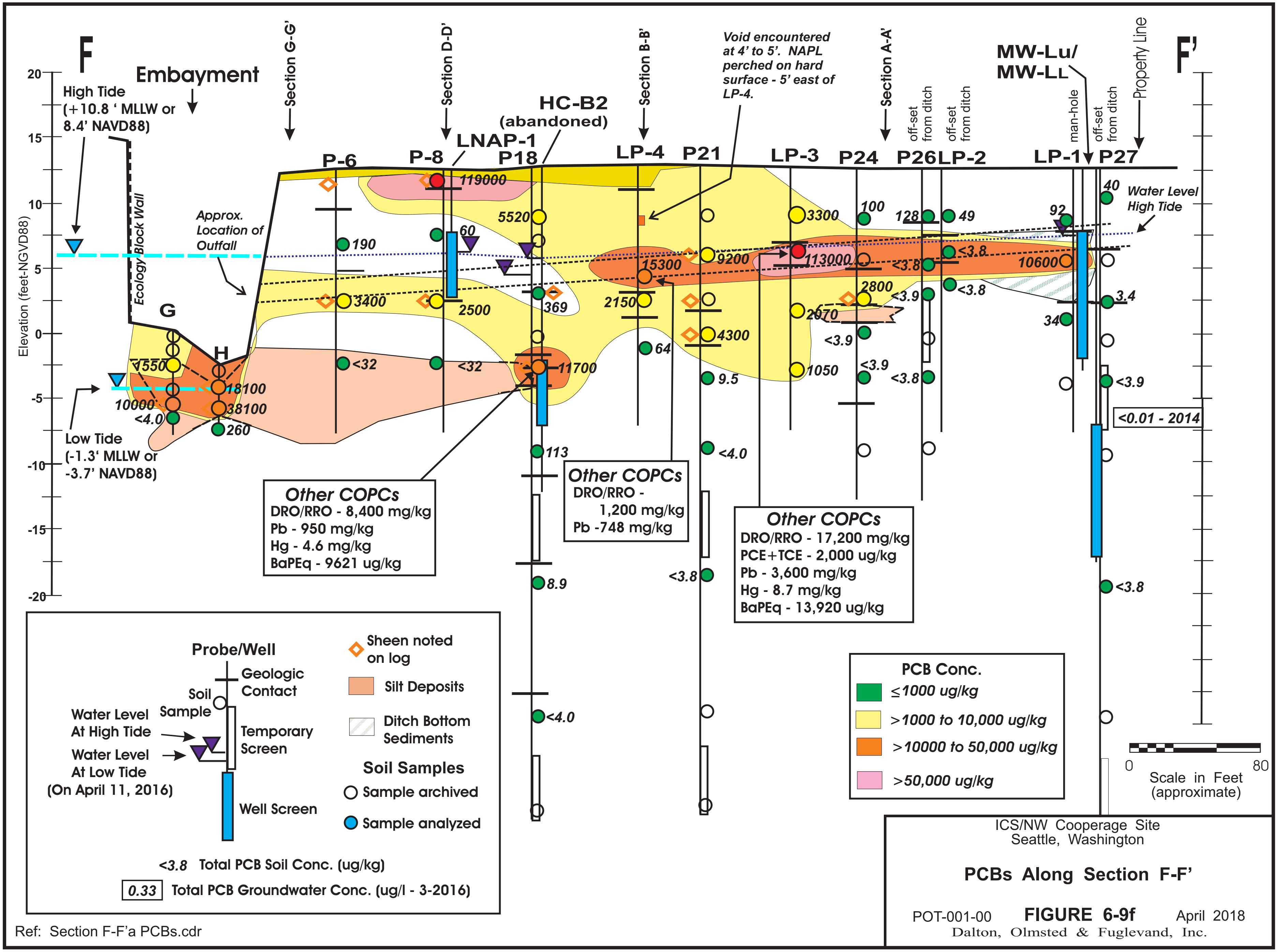
Ref: Section E-E' PCB7-2016.cdr

ICS/NW Cooperage Site
Seattle, Washington

PCBs Along Section E-E'

POT-001-00 **FIGURE 6-9e** April 2018

Dalton, Olmsted & Fuglevand, Inc.

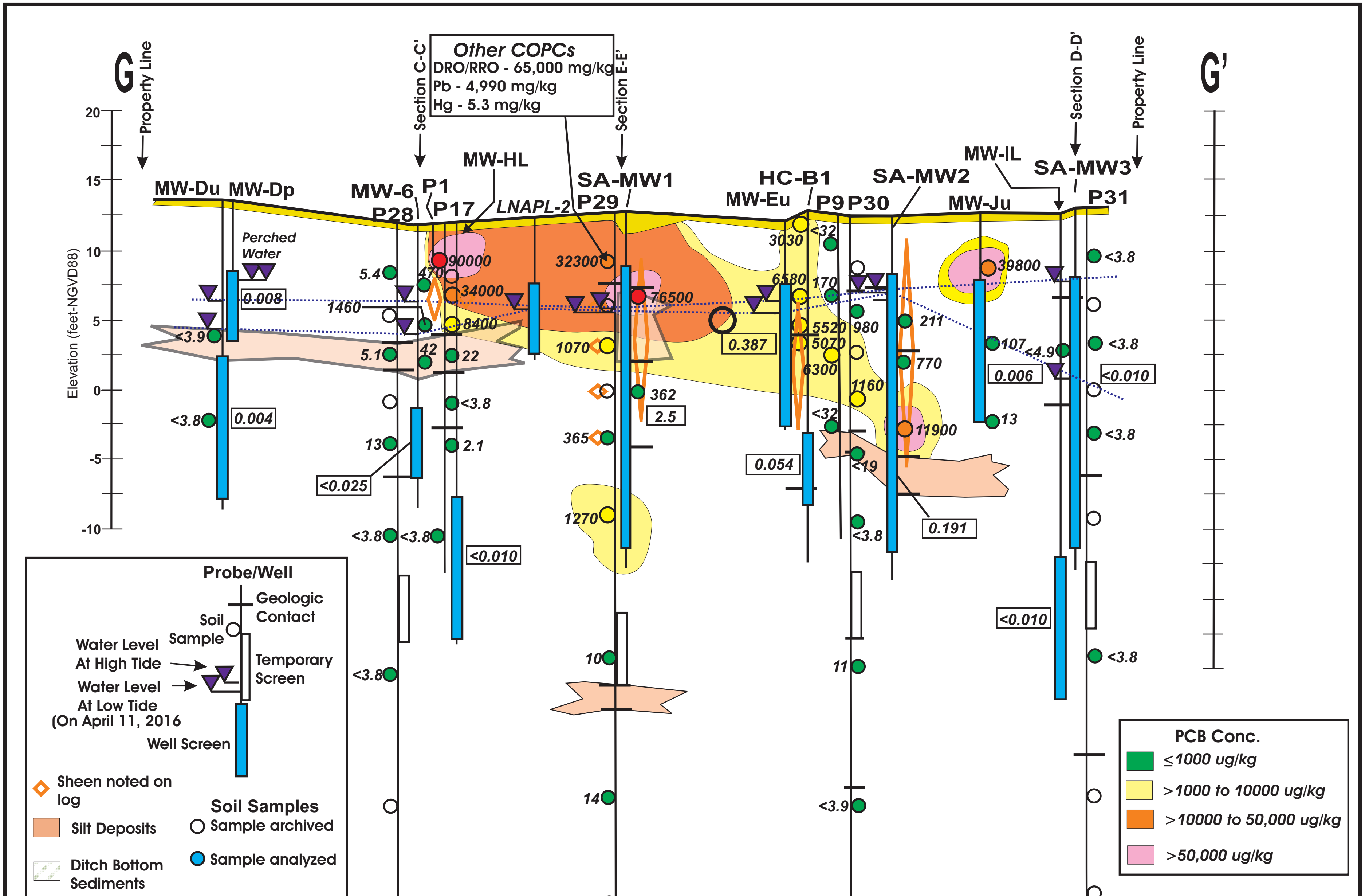


ICS/NW Cooperage Site
Seattle, Washington

PCBs Along Section F-F'

POT-001-00 **FIGURE 6-9f** April 2018

Dalton, Olmsted & Fuglevand, Inc.



ICS/NW Cooperage Site
Seattle, Washington

PCBs Along Section G-G'

POT-001-00 **FIGURE 6-9g** April 2018

Dalton, Olmsted & Fuglevand, Inc.

Ref: Section G-G'7-2016 PCBs.cdr

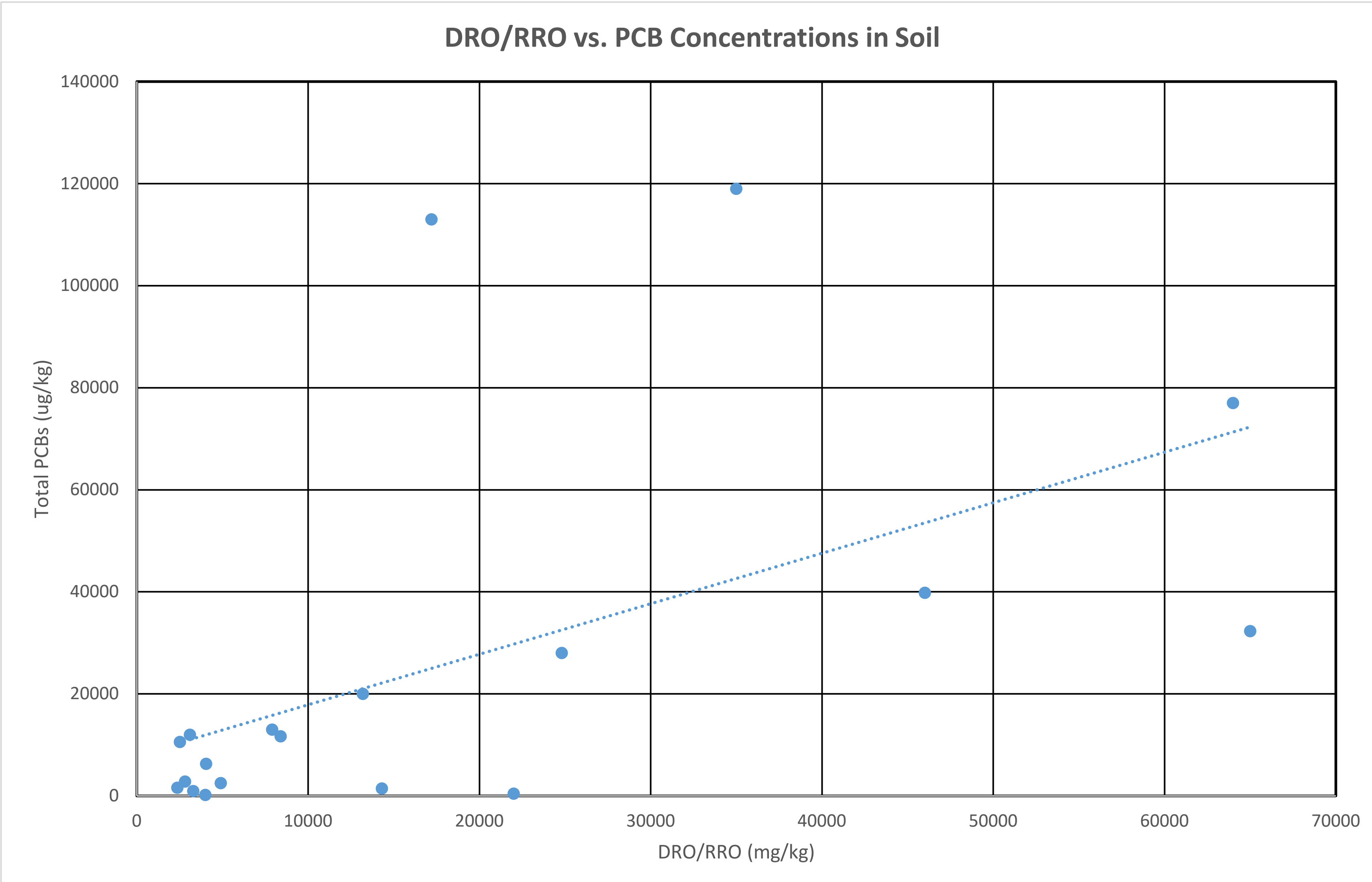


FIGURE 6-10 - DRO/RRO vs. PCBs in Soil

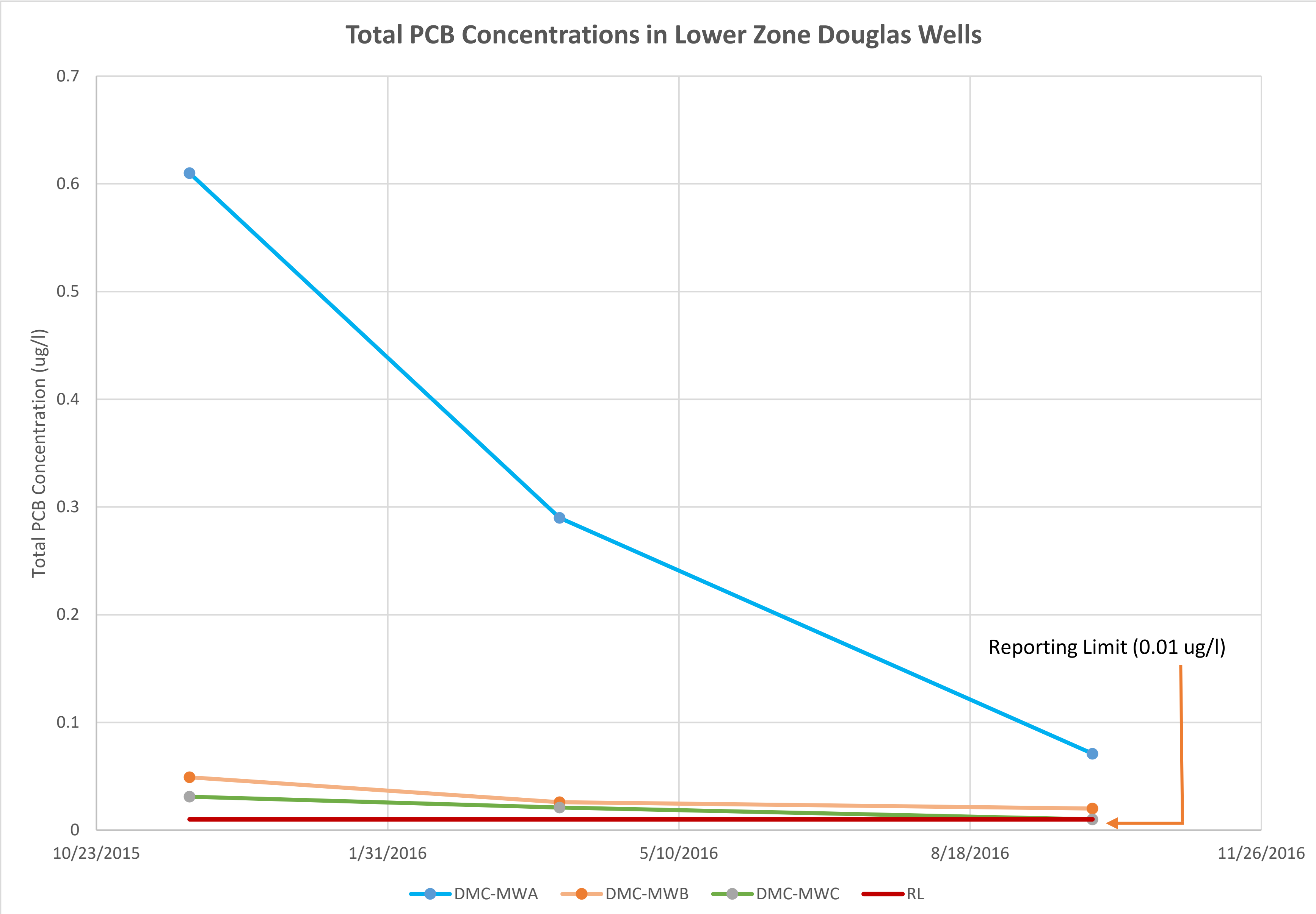
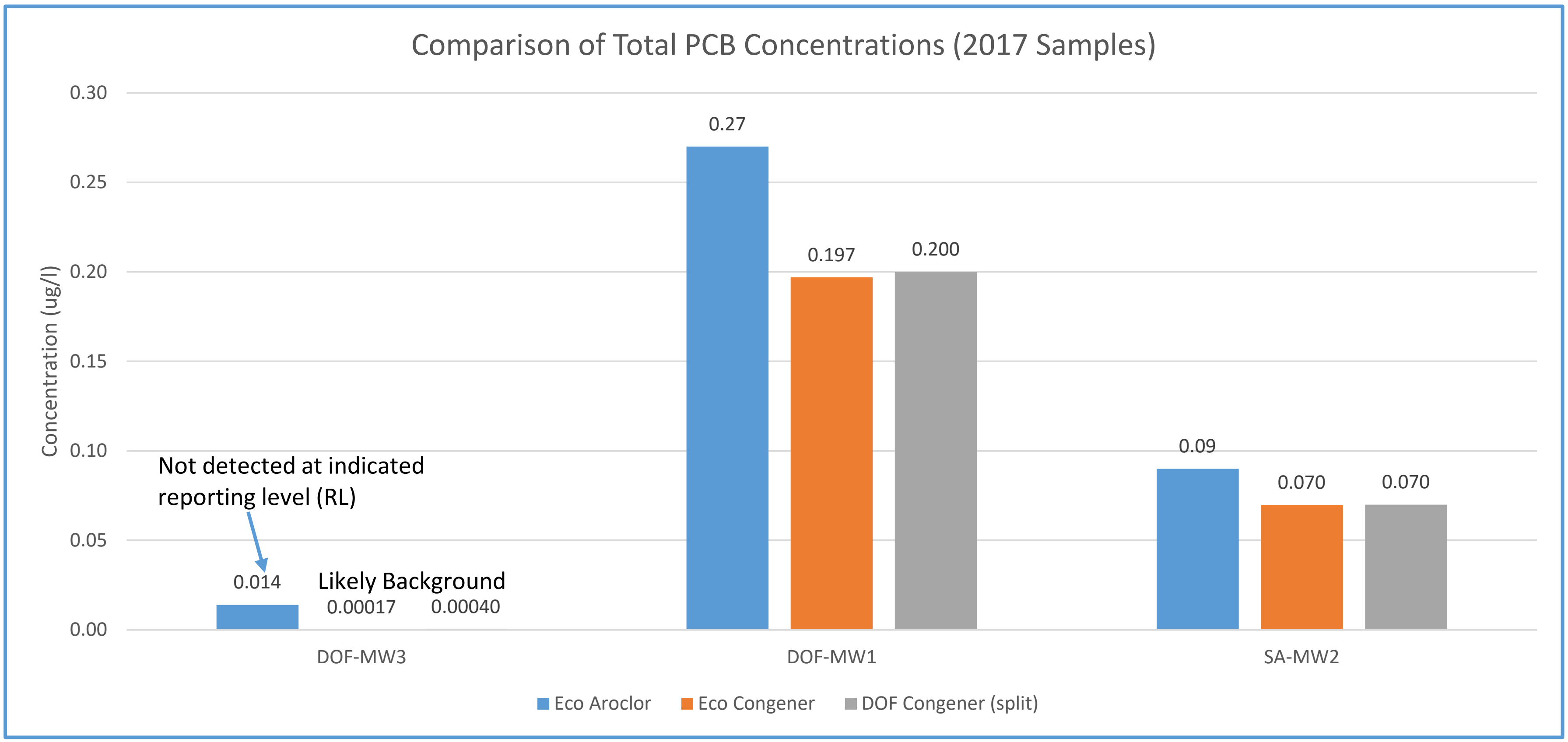


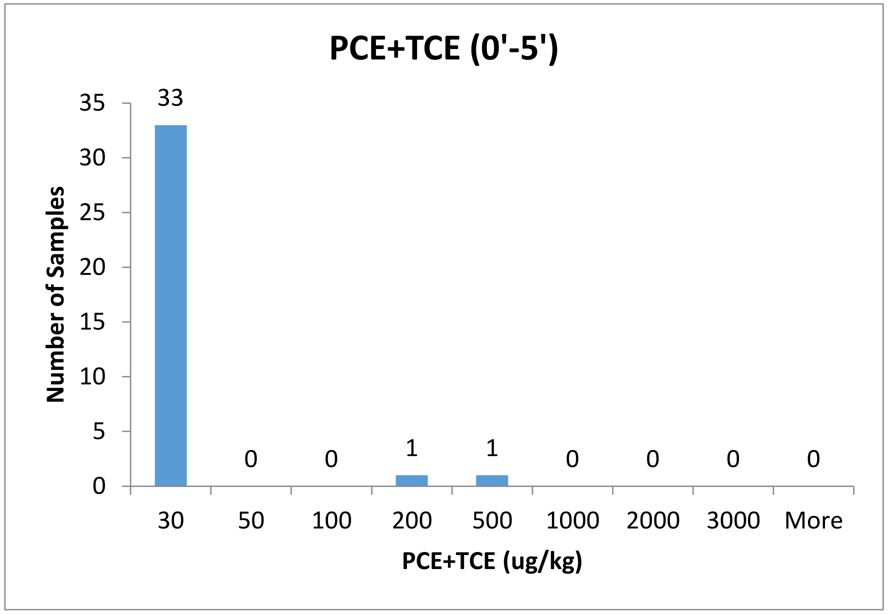
FIGURE 6-11 - PCB Concentration Trends
Lower Zone Douglas Wells

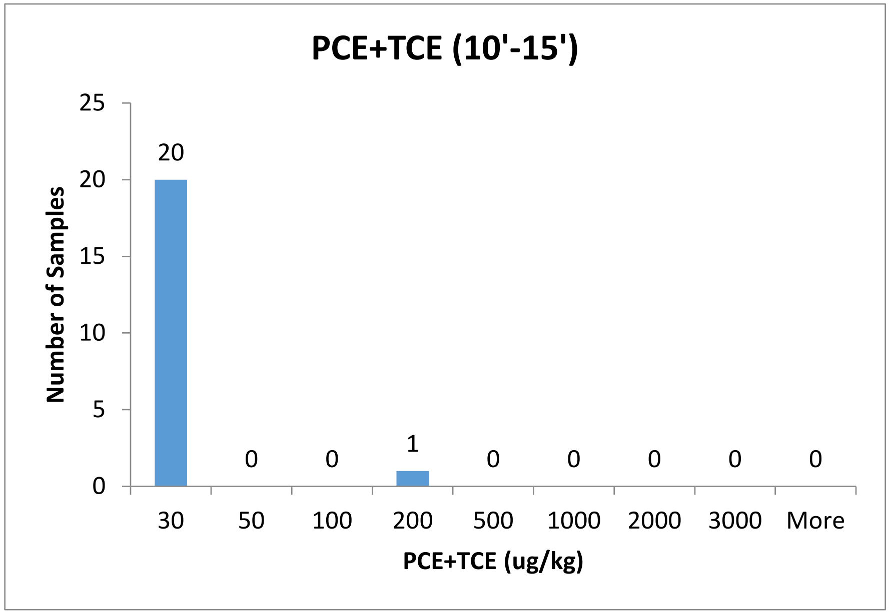
Location	Aroclor Analyses				Congener Analyses (2017)	
	DOF Analyses (RI - 2012-2016)			Ecology (2017)	Ecology	DOF Split
	Result (ug/l)	No. Spls.	Avg. (ug/l)	Result (ug/l)	Result (ug/l)	Result (ug/l)
DOF- MW3 (background)	nd (<0.010)	3	nd (<0.010)	nd (<0.014)	0.00017	0.00040
DOF-MW1	0.16 to 1.5	4	0.65	0.27	0.197	0.200
SA-MW2	0.12 to 0.40	4	0.20	0.09	0.070	0.070

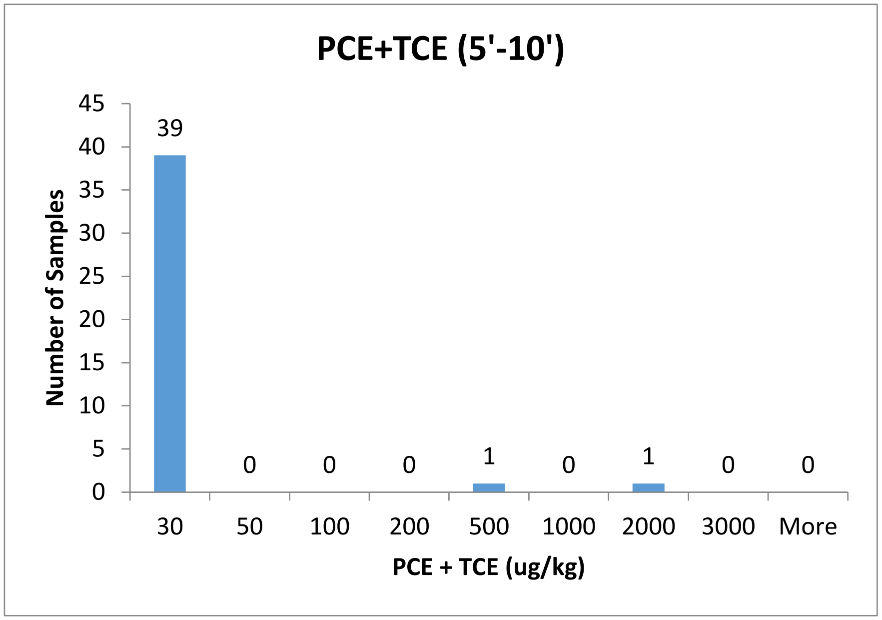


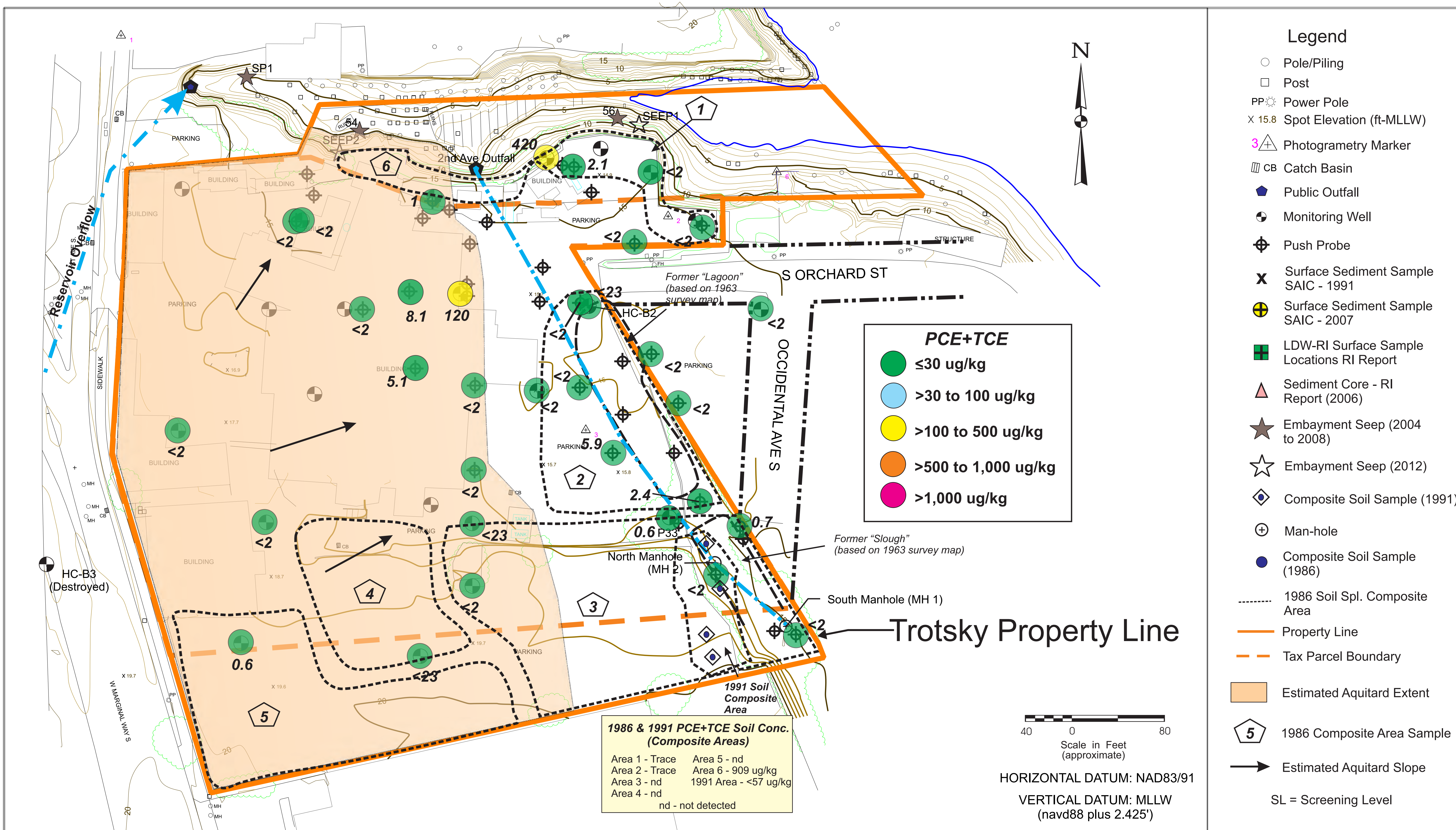
(Compare PCB Congener Conc. 4-8-18.xlsx-Sheet1)

FIGURE 6-12 - Comparison of Aroclor and Congener PCBs in Groundwater


PCE+TCE (0'-5')
Number of Samples
0
5
10
15
20
25
30
35
33
0
0
1
1
0
0
0
0
30
50
100
200
500
1000
2000
3000
More
PCE+TCE (ug/kg)


PCE+TCE (10'-15')
Number of Samples
0
5
10
15
20
25
20
0
0
1
0
0
0
0
0
30
50
100
200
500
1000
2000
3000
More
PCE+TCE (ug/kg)


PCE+TCE (5'-10')
Number of Samples
0
5
10
15
20
25
30
35
40
45
39
0
0
0
1
0
1
0
0
30
50
100
200
500
1000
2000
3000
More
PCE + TCE (ug/kg)



Soil Contact Screening Levels (SLs)
PCE - 21,000,000 ug/kg
TCE - 1,750,000 ug/kg

Ref: Upland Phase2a PCE+TCE.cdr

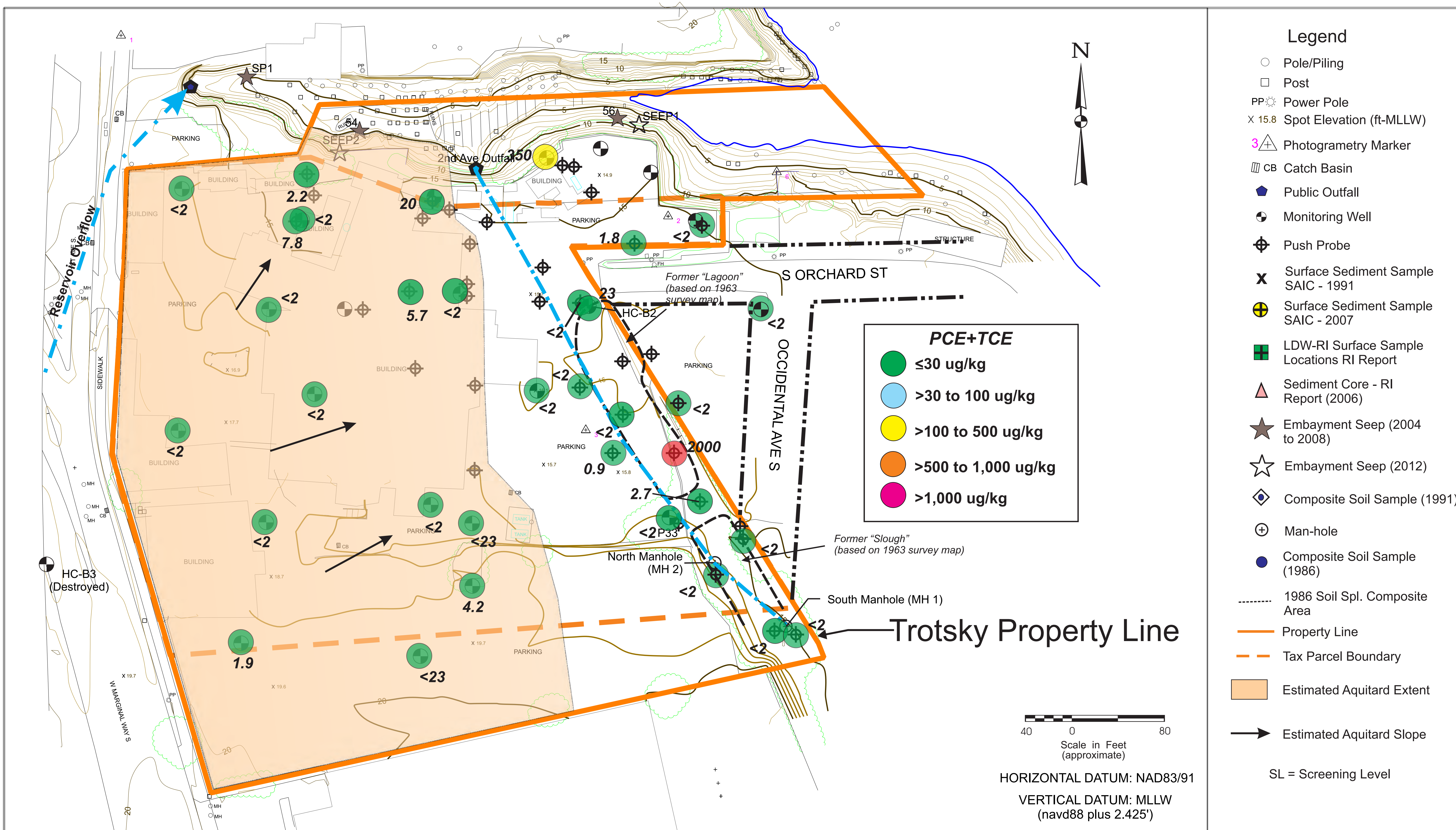
ICS/NW Cooperage Site

Extent of PCE+TCE in Soil Less than Five Feet Deep

SUM-008-00 (ICS) ***March 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-14a



Soil Contact Screening Levels (SLs)
PCE - 21,000,000 ug/kg
TCE - 1,750,000 ug/kg

Ref: Upland Phase2a PCE+TCE.cdr

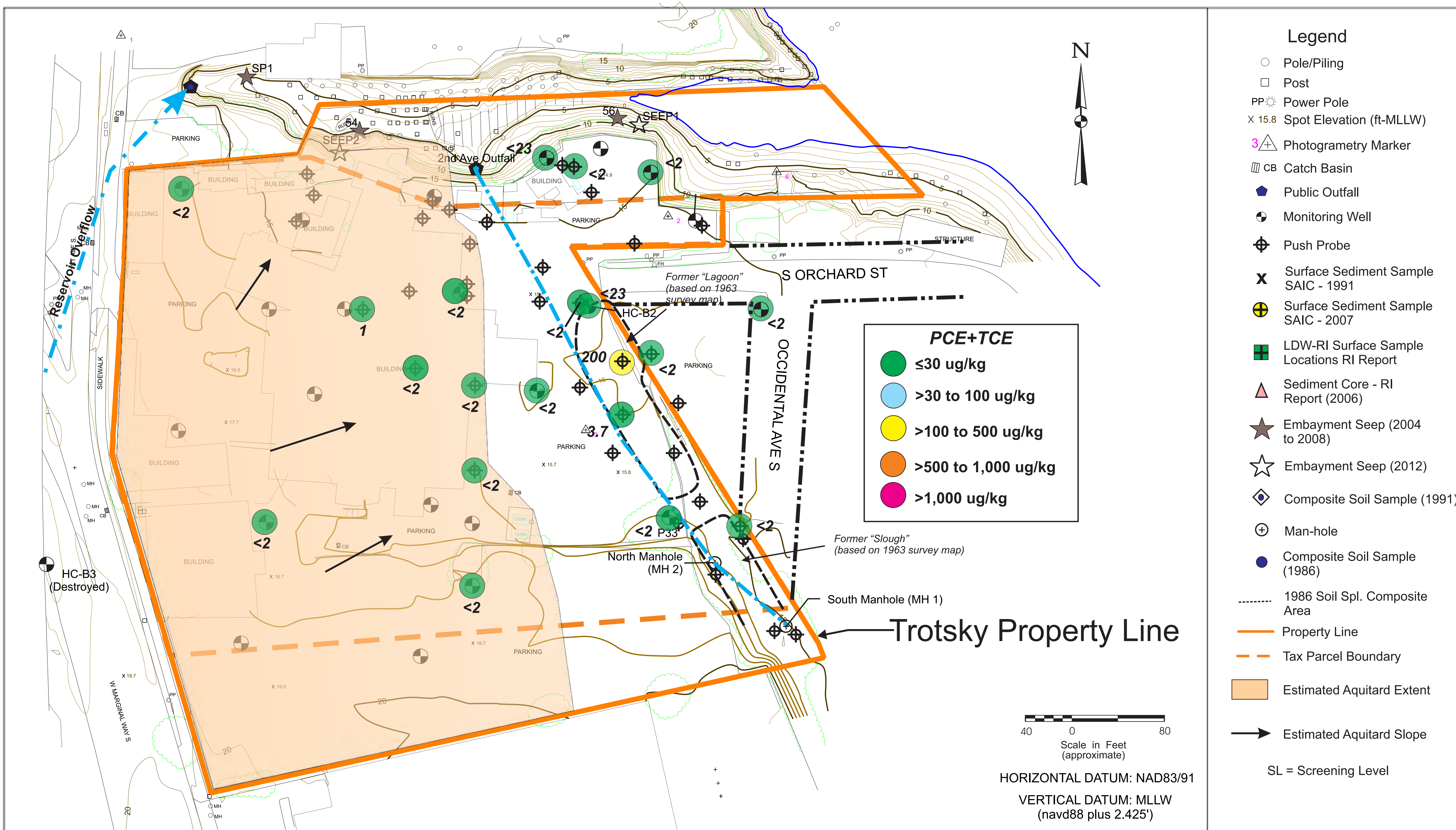
ICS/NW Cooperage Site

Extent of PCE+TCE in Soil Five to Ten Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-14b



Soil Contact Screening Levels (SLs)
PCE - 21,000,000 ug/kg
TCE - 1,750,000 ug/kg

Ref: Upland Phase2a PCE+TCE.cdr

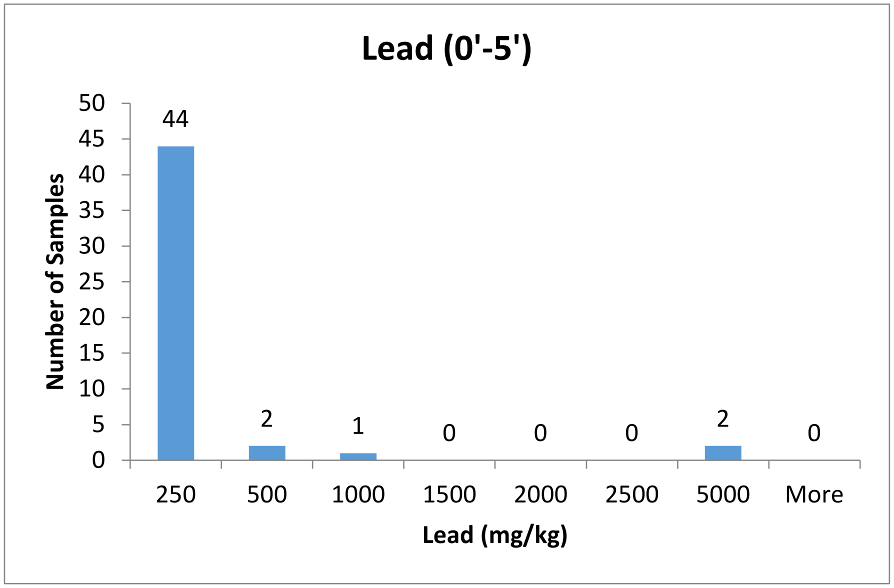
ICS/NW Cooperage Site

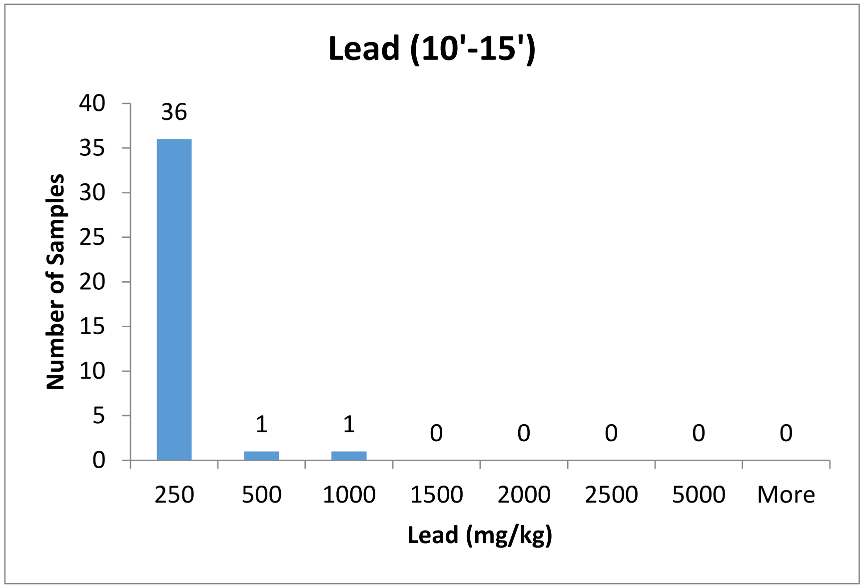
Extent of PCE+TCE in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) ***March 2018***

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-14c





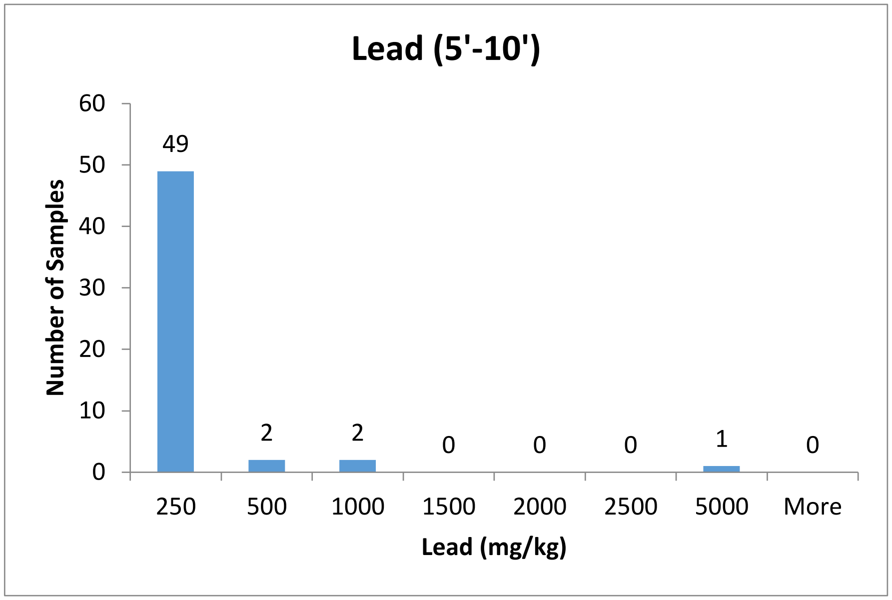
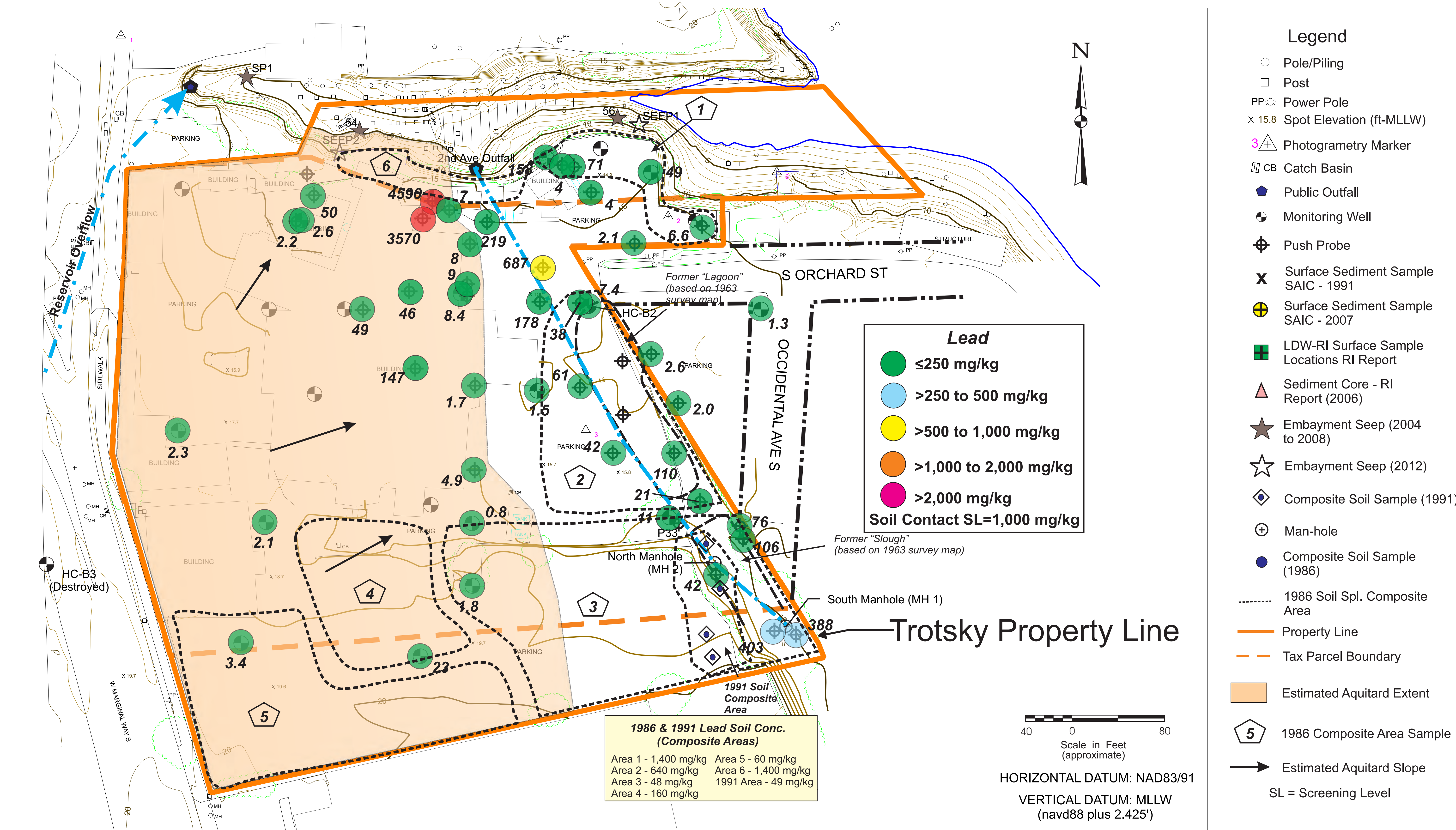


FIGURE 6-15- Lead In Soil Histograms

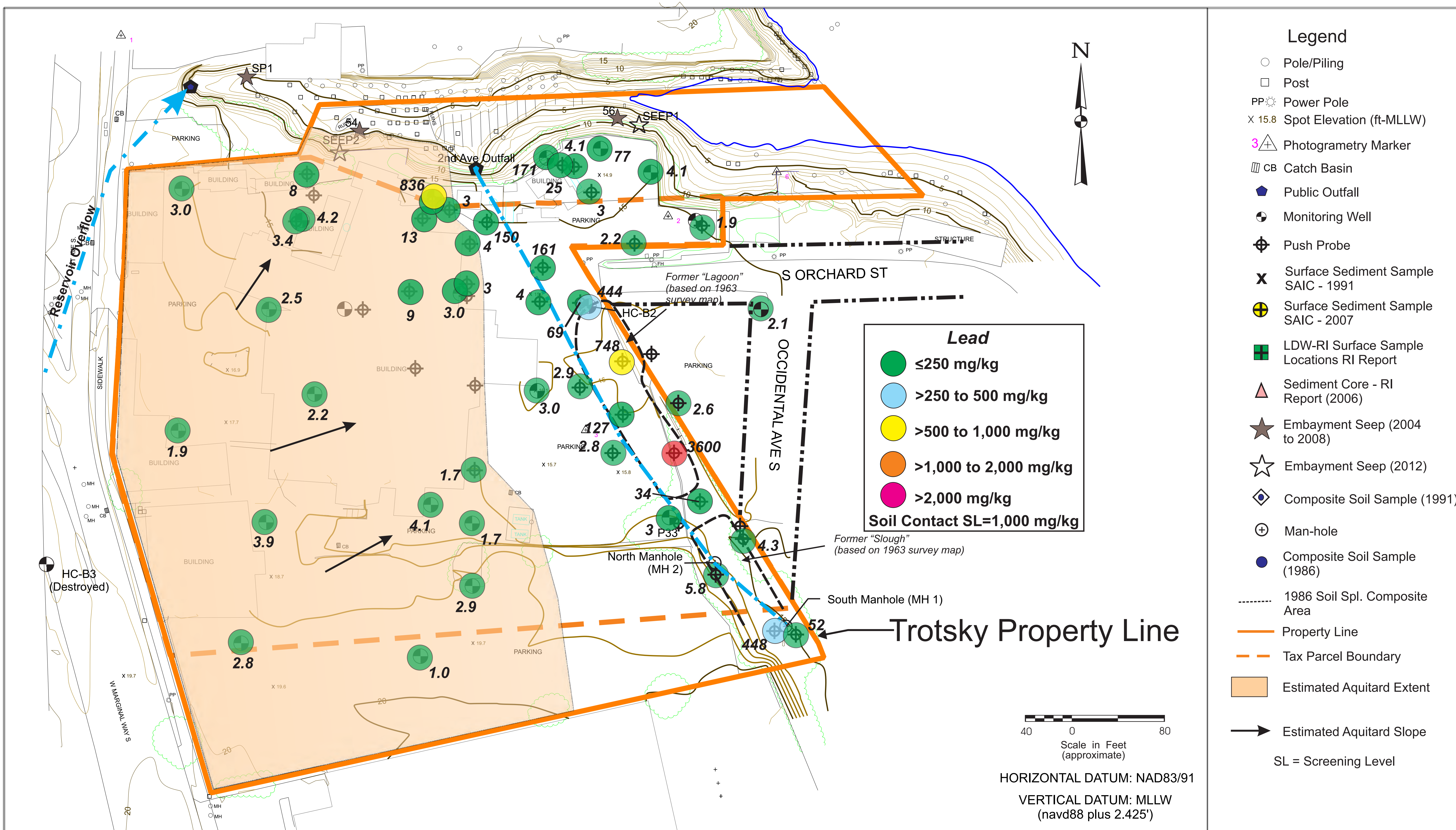


Notes:

ICS/NW Cooperage Site	
Extent of Lead in Soil Less than Five Feet Deep	
SUM-008-00 (ICS)	*March 2018*
Dalton, Olmsted & Fuglevand, Inc.	

FIGURE 6-16a

Ref: Upland Phase2a Lead.cdr



Notes:

Ref: Upland Phase2a Lead.cdr

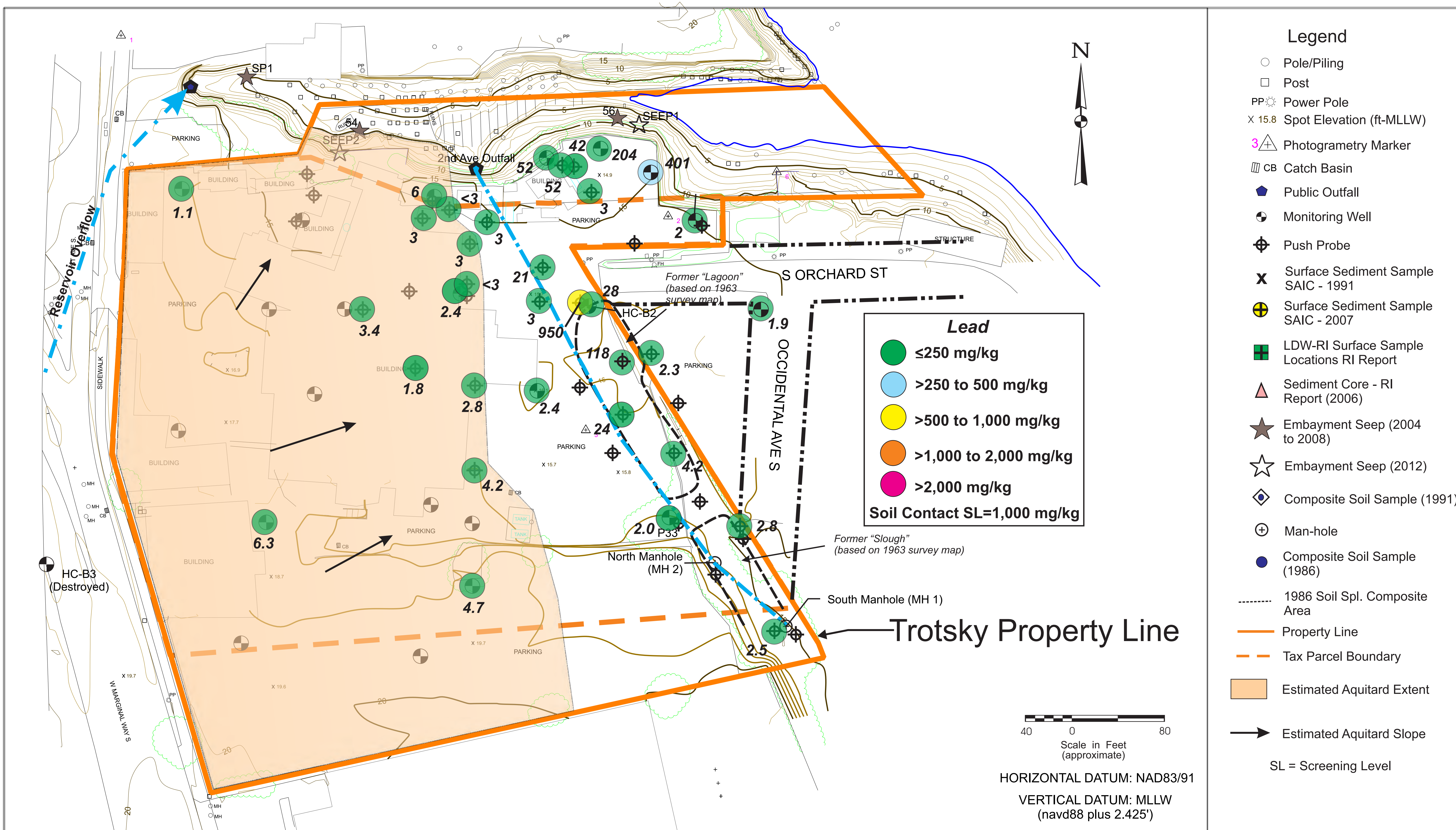
ICS/NW Cooperage Site

Extent of Lead in Soil Five to Ten Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-16b



Ref: Upland Phase2a Lead.cdr

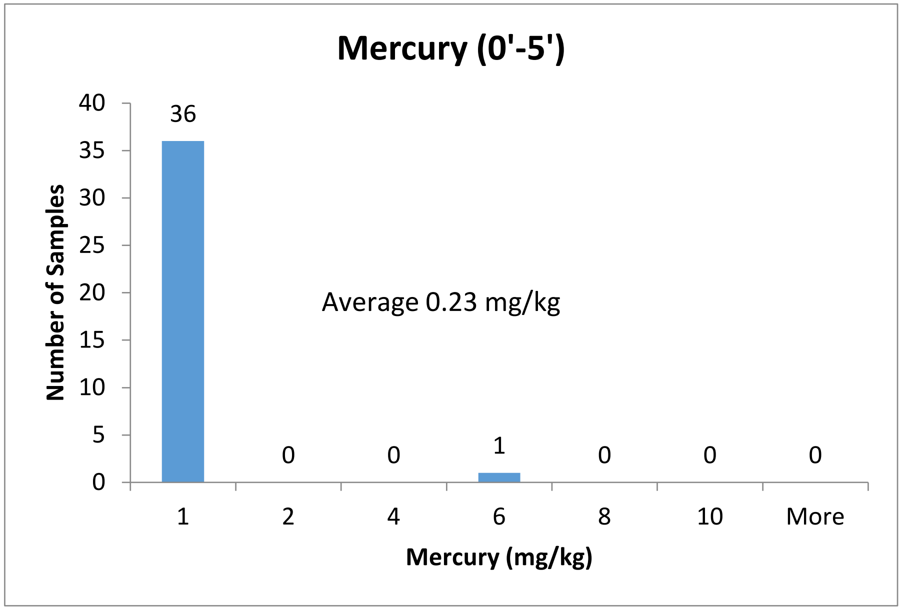
ICS/NW Cooperage Site

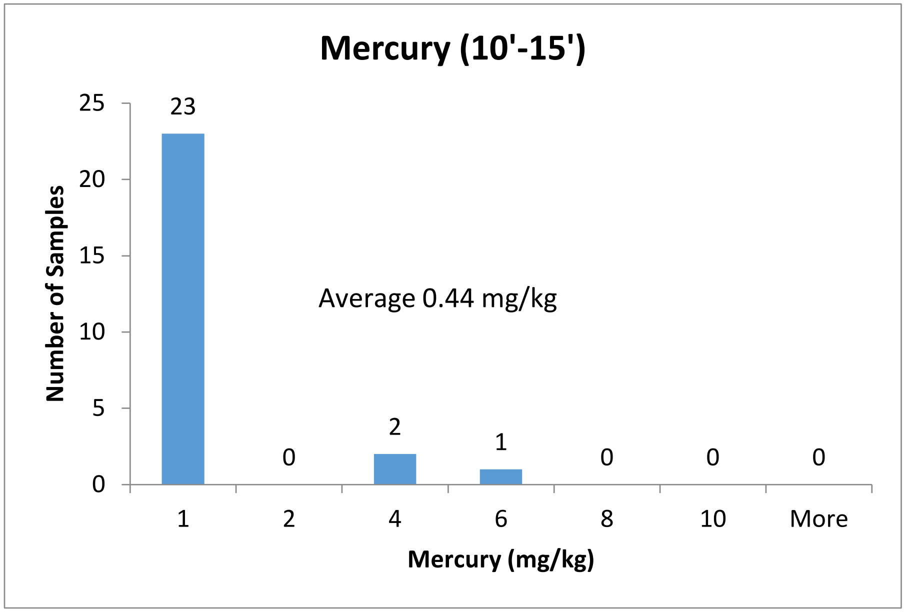
Extent of Lead in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-16c





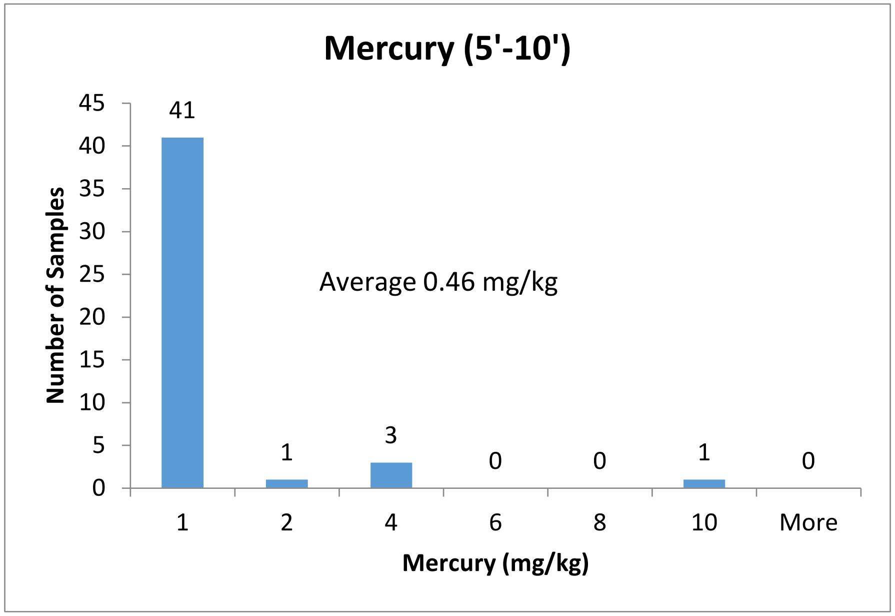
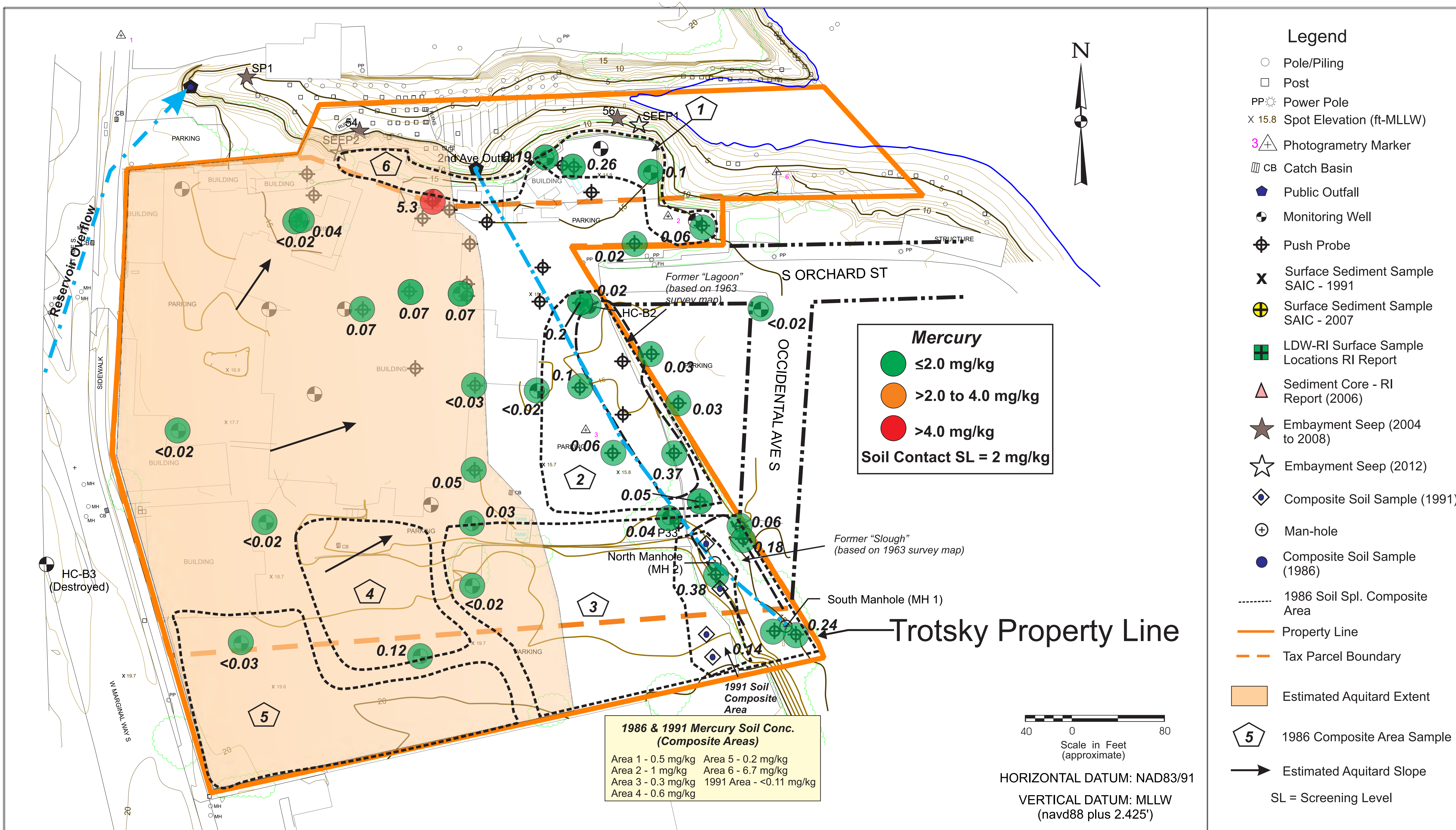


FIGURE 6-17 - Mercury In Soil Histograms



ICS/NW Cooperage Site

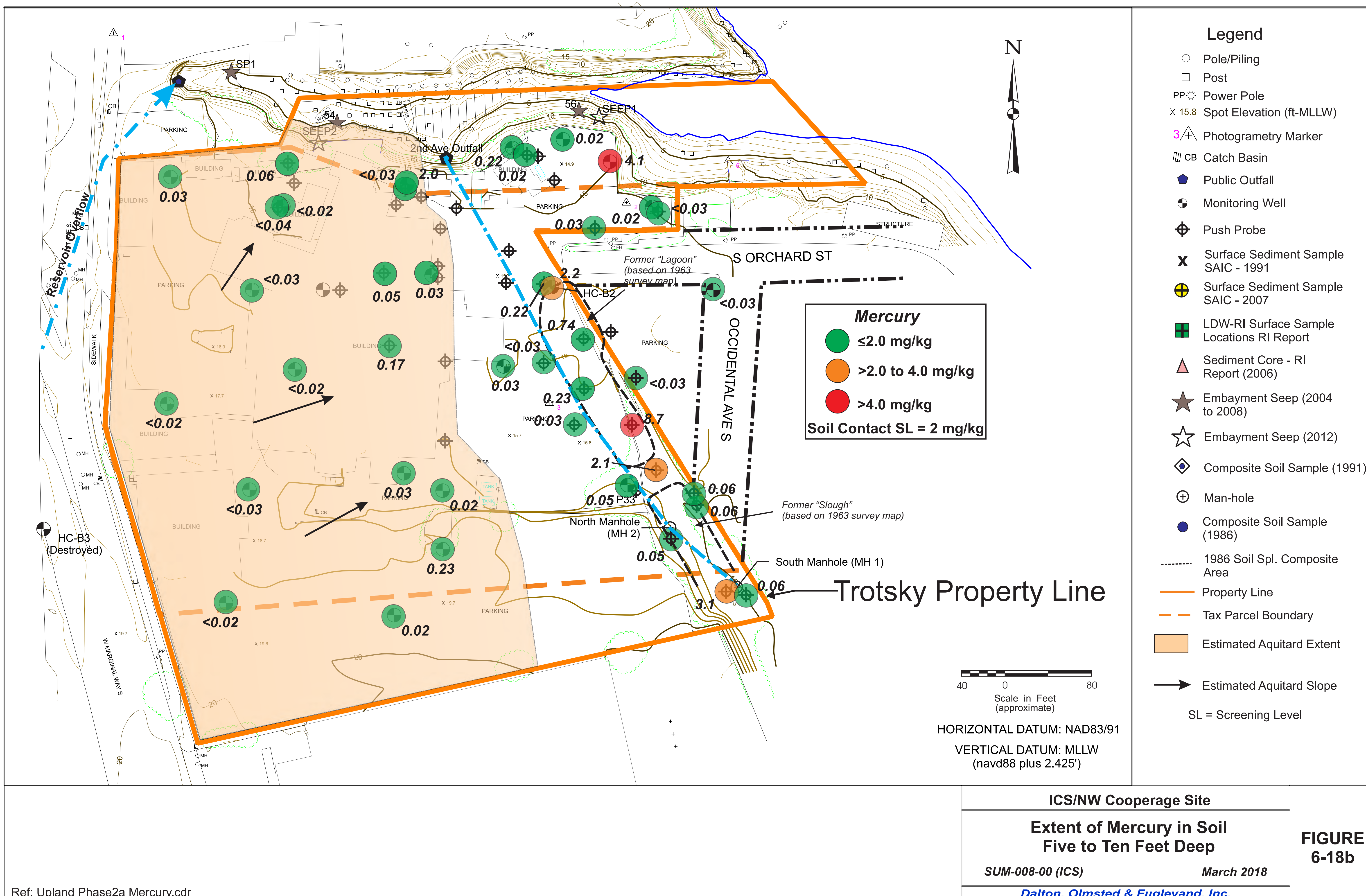
Extent of Mercury in Soil Less than Five Feet Deep

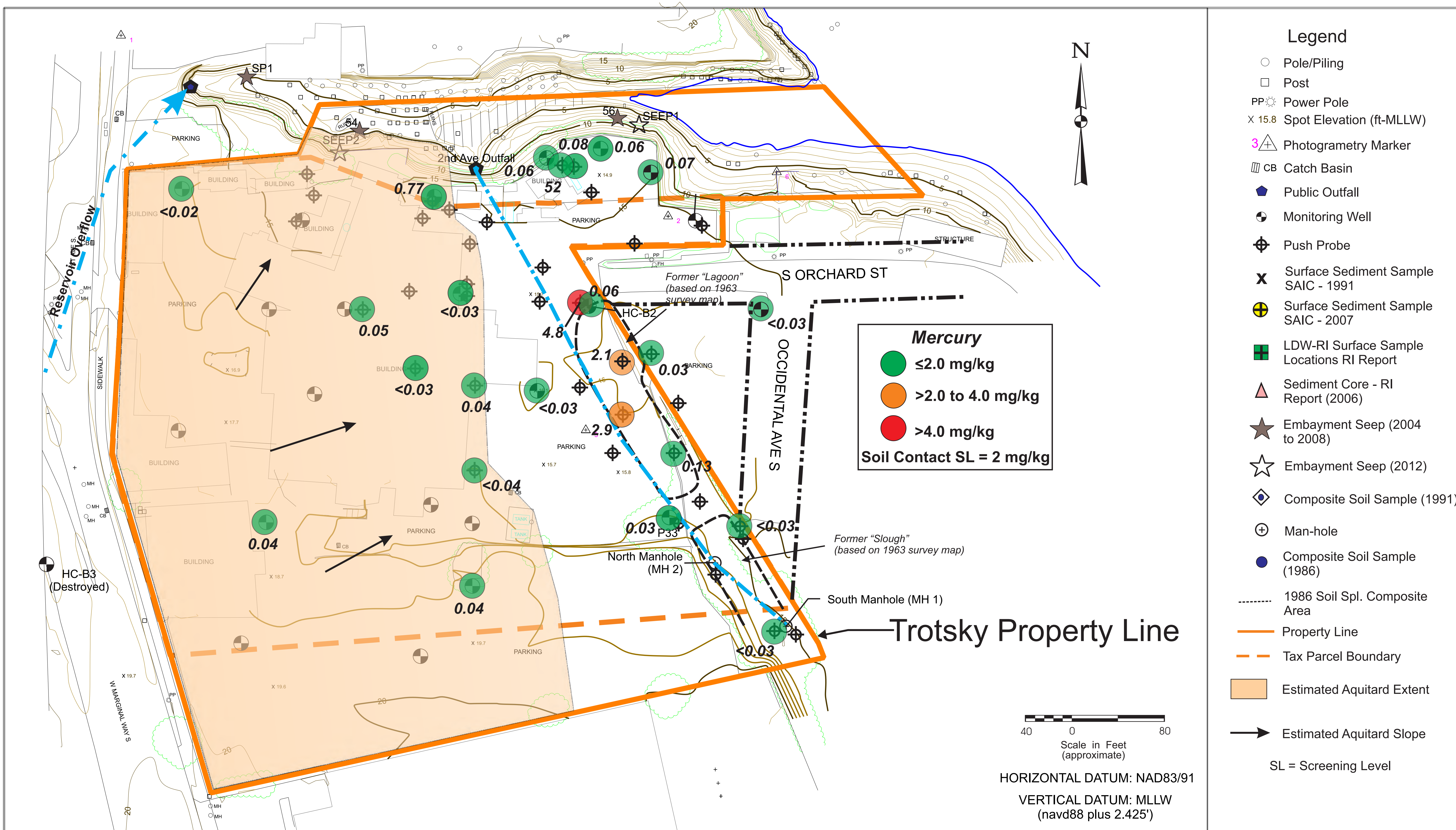
SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-18a

Ref: Upland Phase2a Mercury.cdr


N
Legend
Pole/Piling
Post
Power Pole
Spot Elevation (ft-MLLW)
Photogrammetry Marker
Catch Basin
Public Outfall
Monitoring Well
Push Probe
Surface Sediment Sample SAIC - 1991
Surface Sediment Sample SAIC - 2007
LDW-RI Surface Sample Locations RI Report
Sediment Core - RI Report (2006)
Embayment Seep (2004 to 2008)
Embayment Seep (2012)
Composite Soil Sample (1991)
Man-hole
Composite Soil Sample (1986)
1986 Soil Spl. Composite Area
Property Line
Tax Parcel Boundary
Estimated Aquitard Extent
Estimated Aquitard Slope
SL = Screening Level
Mercury
≤2.0 mg/kg
>2.0 to 4.0 mg/kg
>4.0 mg/kg
Soil Contact SL = 2 mg/kg
Trotsky Property Line
S ORCHARD ST
OCCIDENTAL AVE S
Reservoir Overflow
2nd Ave Outfall
SP1
SEEP1
SEEP2
HC-B2
HC-B3 (Destroyed)
Former "Lagoon" (based on 1963 survey map)
Former "Slough" (based on 1963 survey map)
North Manhole (MH 2)
South Manhole (MH 1)
P33
Scale in Feet (approximate)
40 0 80
HORIZONTAL DATUM: NAD83/91
VERTICAL DATUM: MLLW (navd88 plus 2.425')
ICS/NW Cooperage Site
Extent of Mercury in Soil Five to Ten Feet Deep
SUM-008-00 (ICS)
March 2018
Dalton, Olmsted & Fuglevand, Inc.
FIGURE 6-18b
Ref: Upland Phase2a Mercury.cdr



ICS/NW Cooperage Site

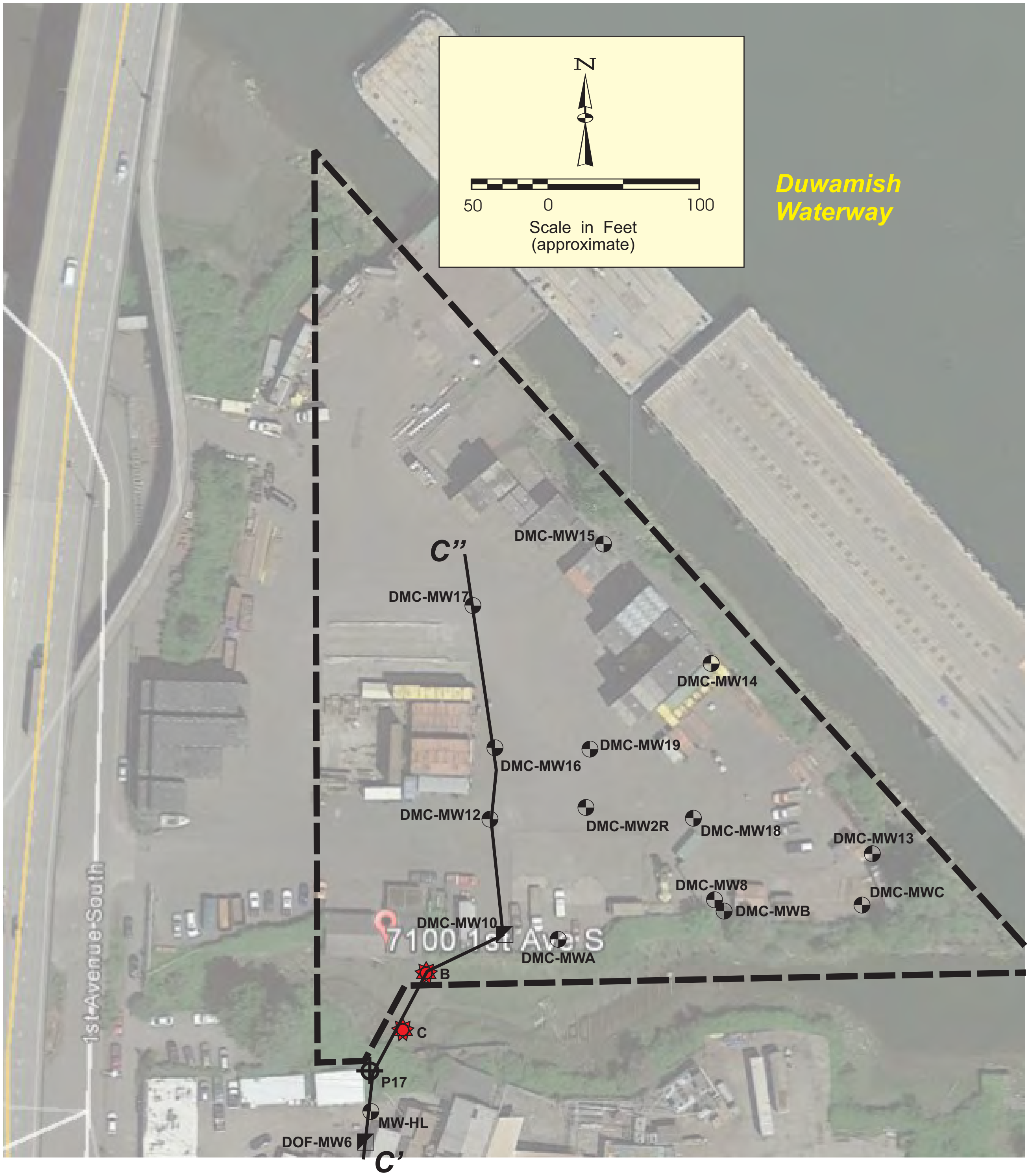
Extent of Mercury in Soil Ten to Fifteen Feet Deep

SUM-008-00 (ICS) *March 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-18c

Ref: Upland Phase2a Mercury.cdr



DMC-MW11 Deeper Monitoring Well with Soil Samples Below 0' MLLW

DOF-MW6 Upper Zone Monitoring Well

B Sediment Core

P17 Push-Probe

C'—— C'' Section Trend

Ref: Douglas Deeper Spl. Locations

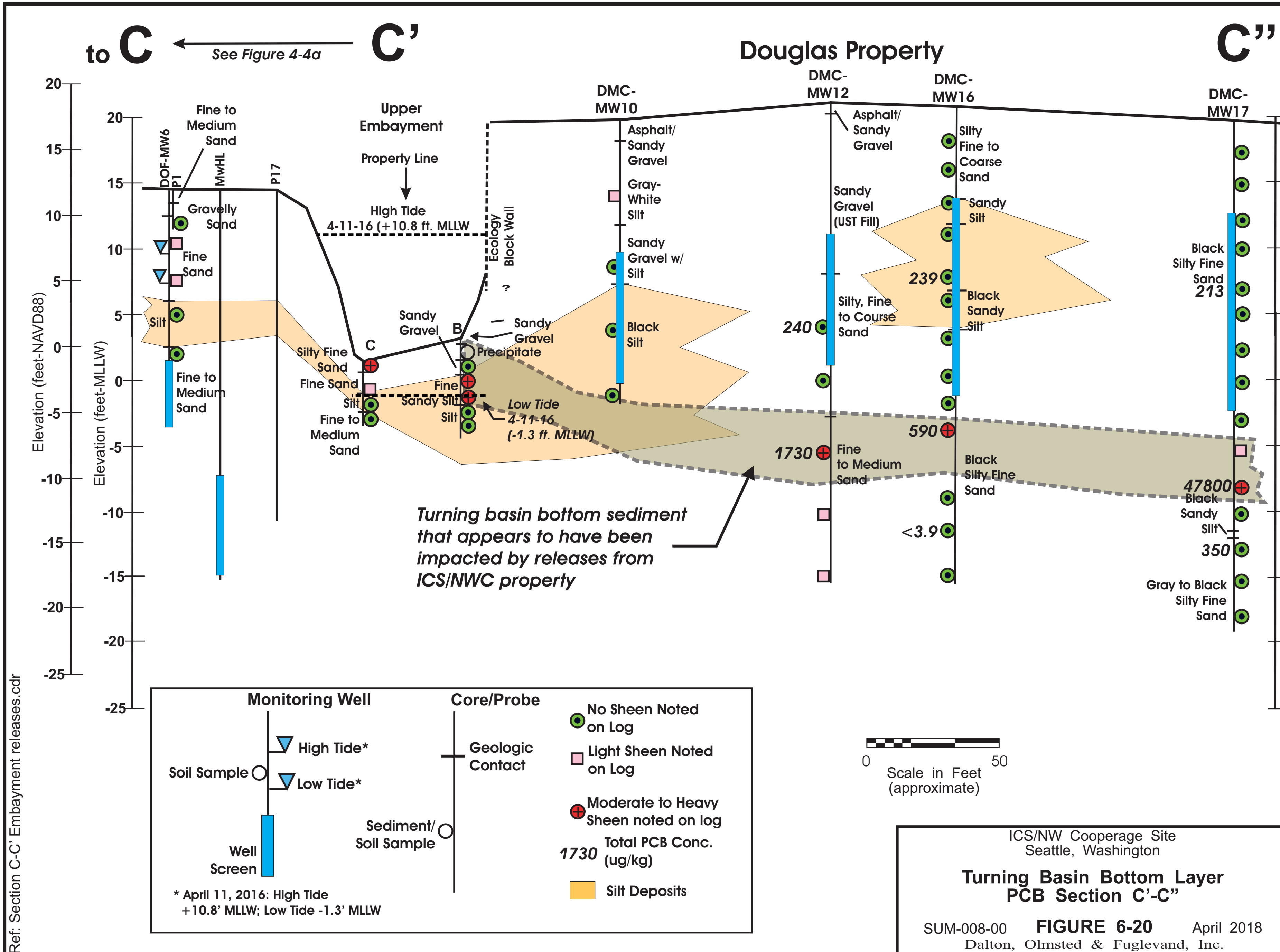
ICS/NW Cooperage Site

Douglas Property Deeper Soil Sample Locations

SUM-008-00 (ICS) *April 2018*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 6-19



ICS/NW Cooperage Site
Seattle, Washington

Turning Basin Bottom Layer PCB Section C'-C"

SUM-008-00 **FIGURE 6-20** April 2018

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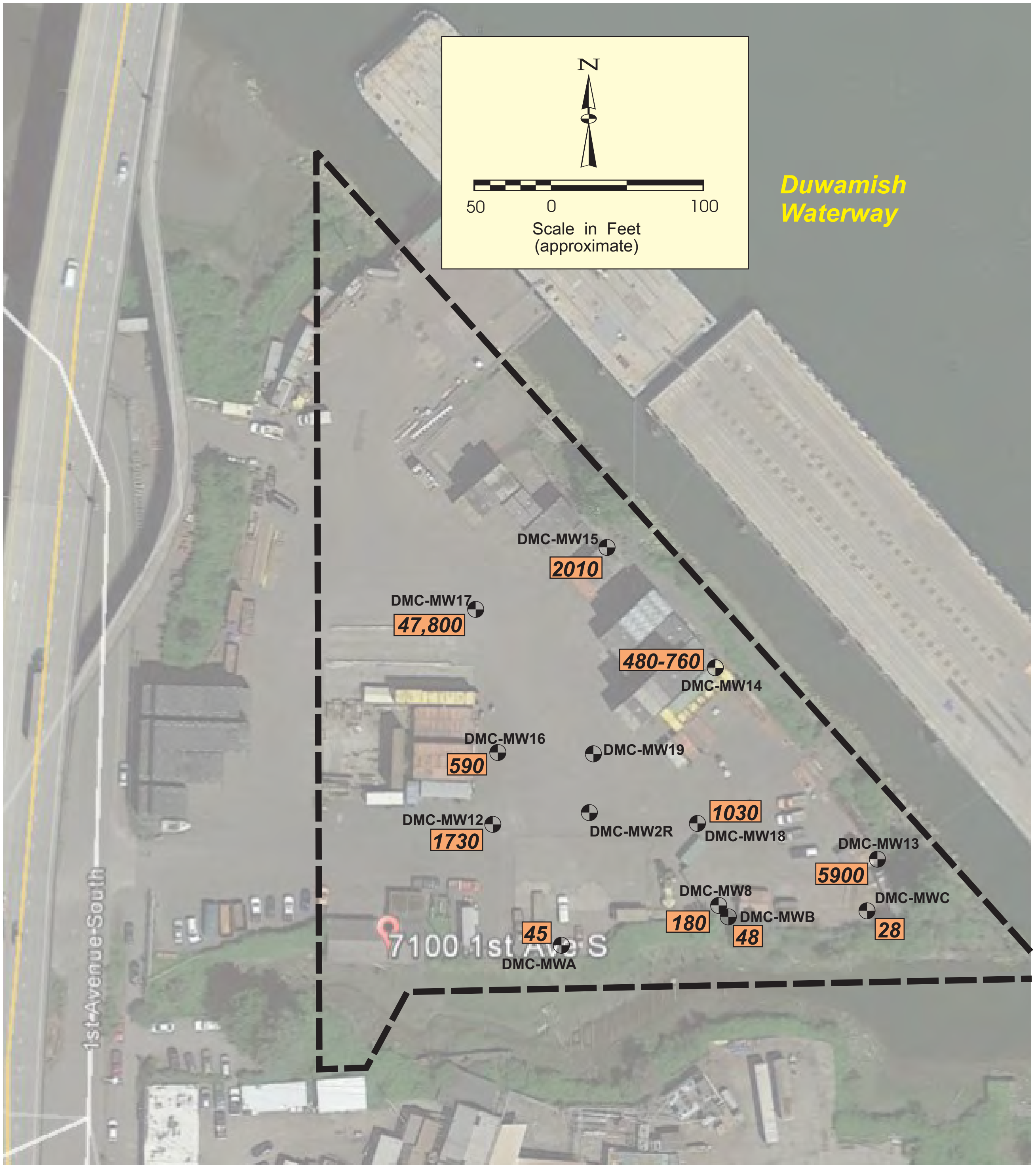

DMC-MW11 Deeper Monitoring Well with Soil Samples Below 0' MLLW

1730 PCB Conc. (ug/kg) in Former Turning Basin Sediment

Ref: Douglas TB Bottom PCB Conc.cdr

ICS/NW Cooperage Site

Douglas Property PCB Concentrations In Turning Basin Bottom Sediment

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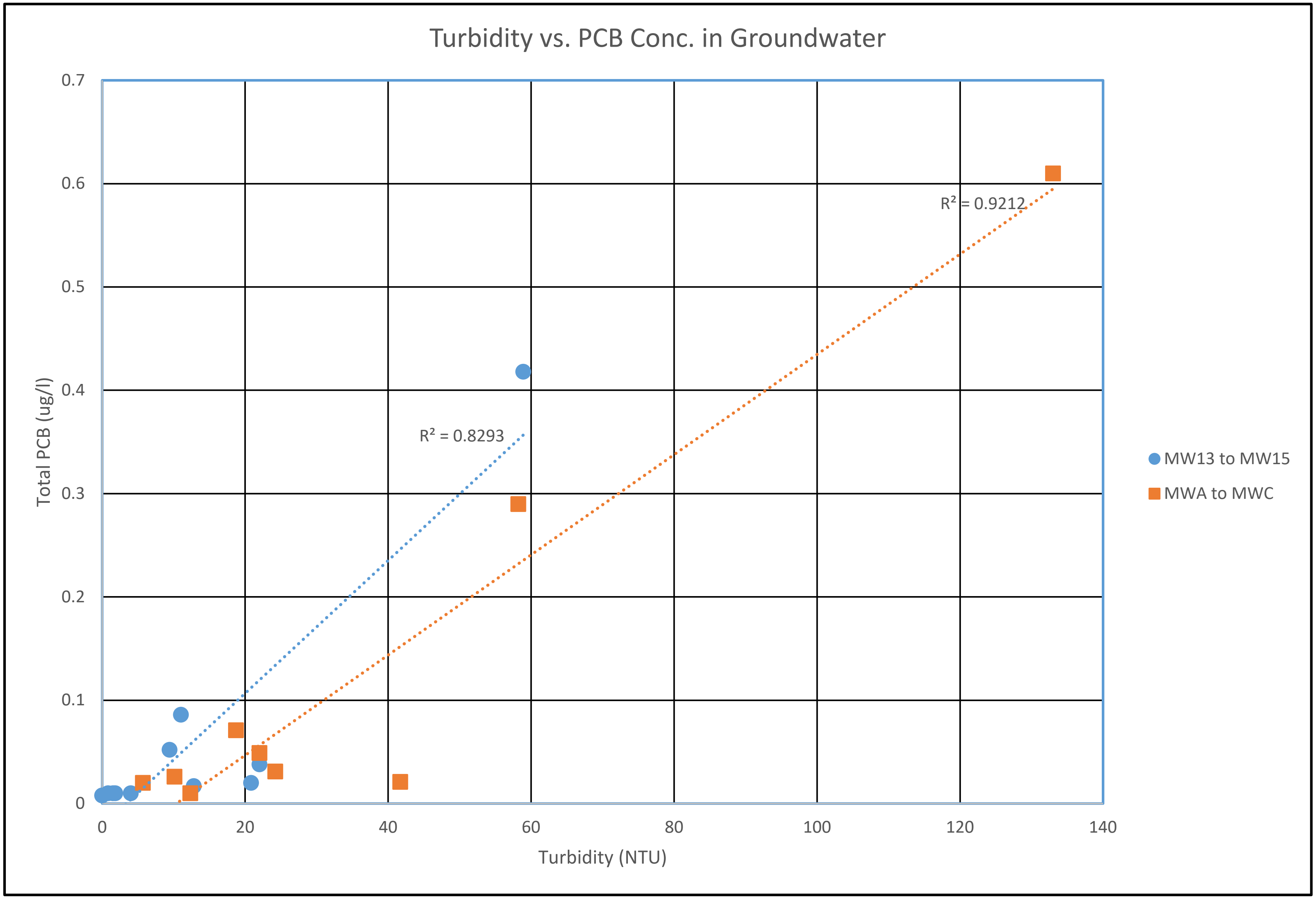
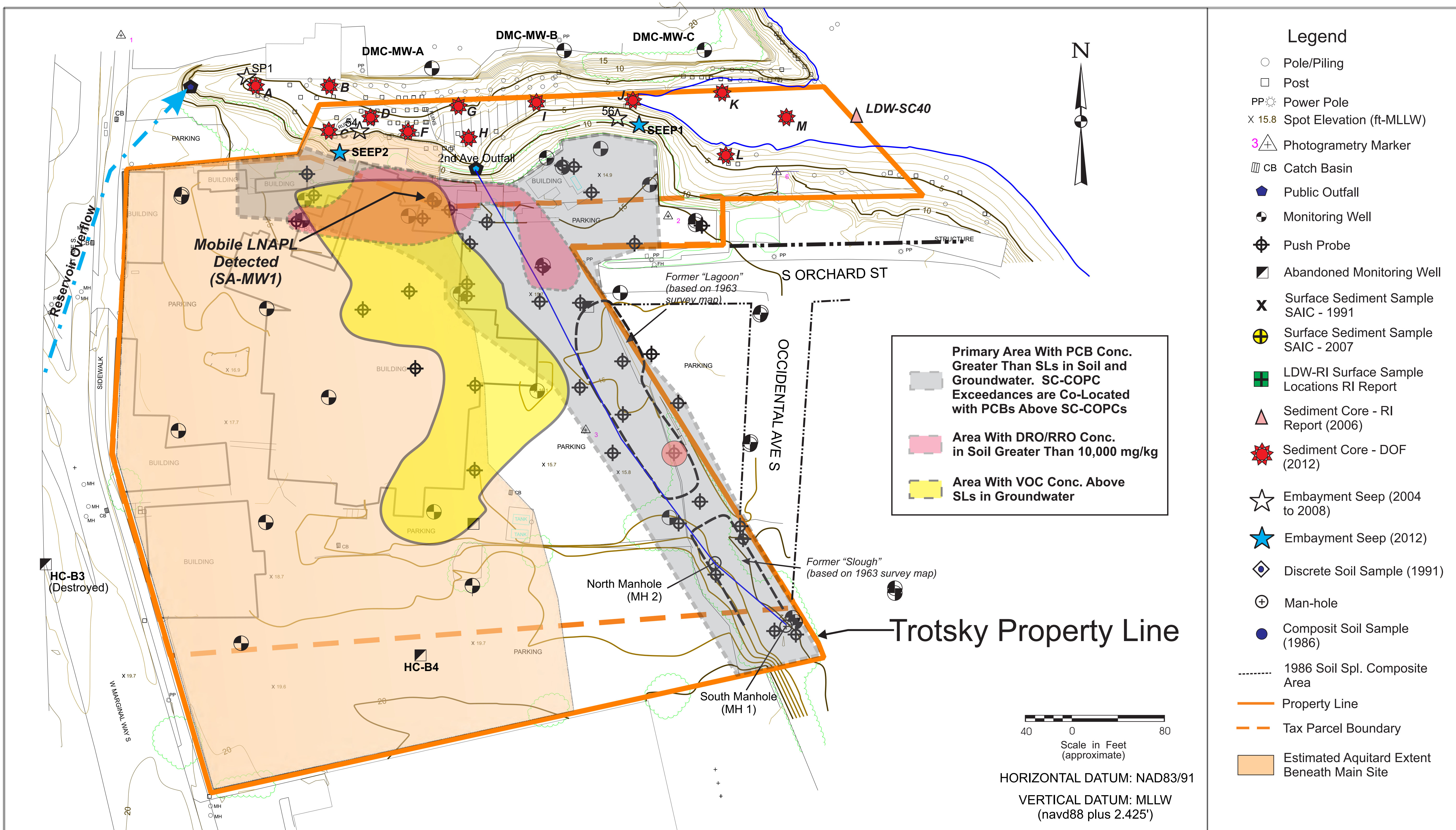
FIGURE 6-21


Turbidity vs. PCB Conc. in Groundwater
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Total PCB (ug/l)
0
20
40
60
80
100
120
140
Turbidity (NTU)
R² = 0.9212
R² = 0.8293
MW13 to MW15
MWA to MWC



ICS/NW Cooperage Site

Areas of Concern ICS/NWC Property

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FIGURE 7-1

Ref: GW Areas rev.cdr