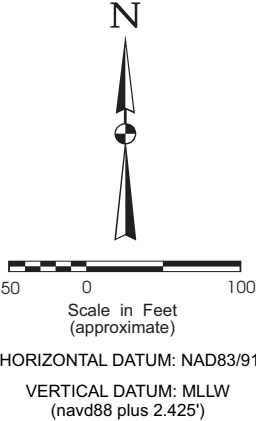
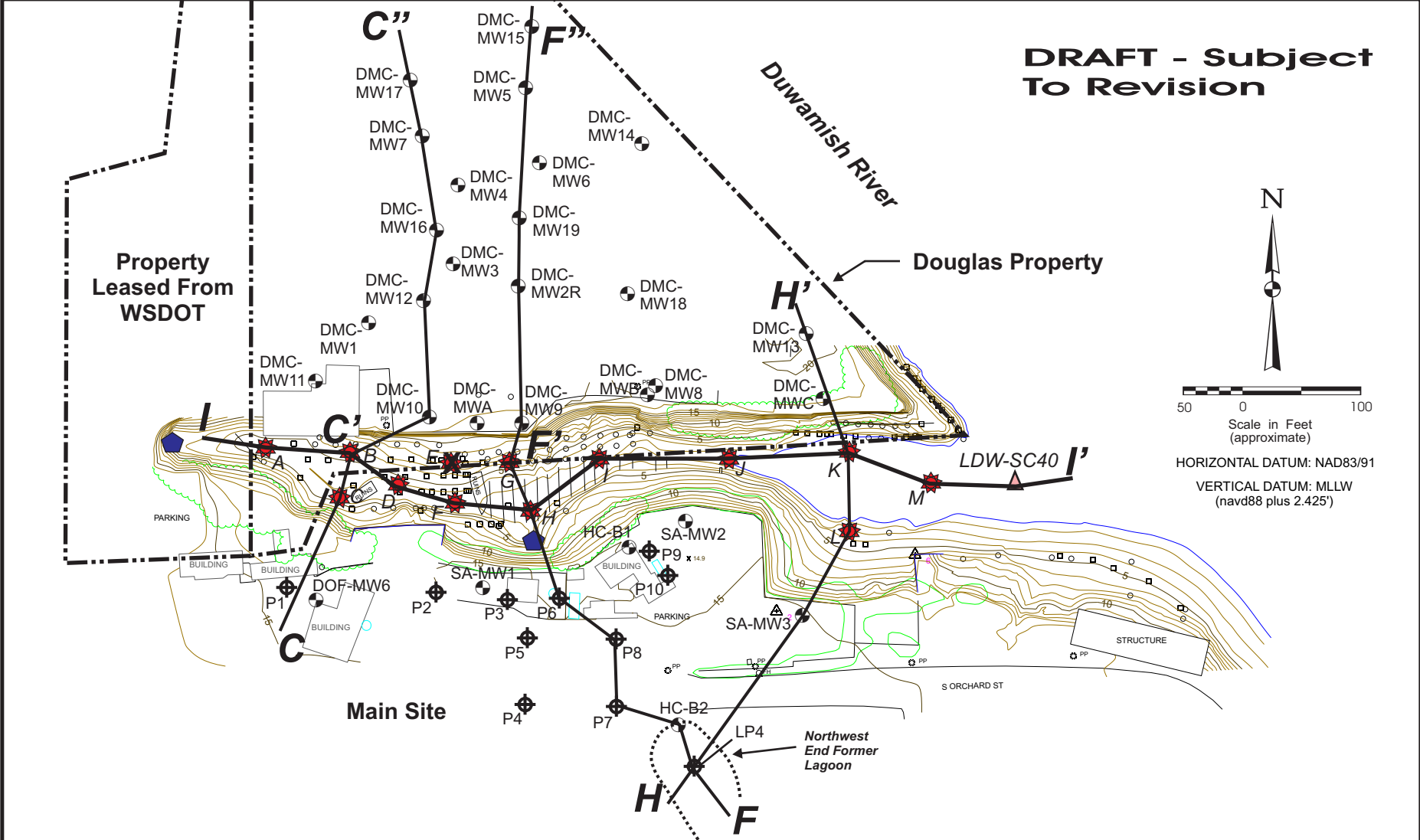


**DRAFT - Subject  
To Revision**

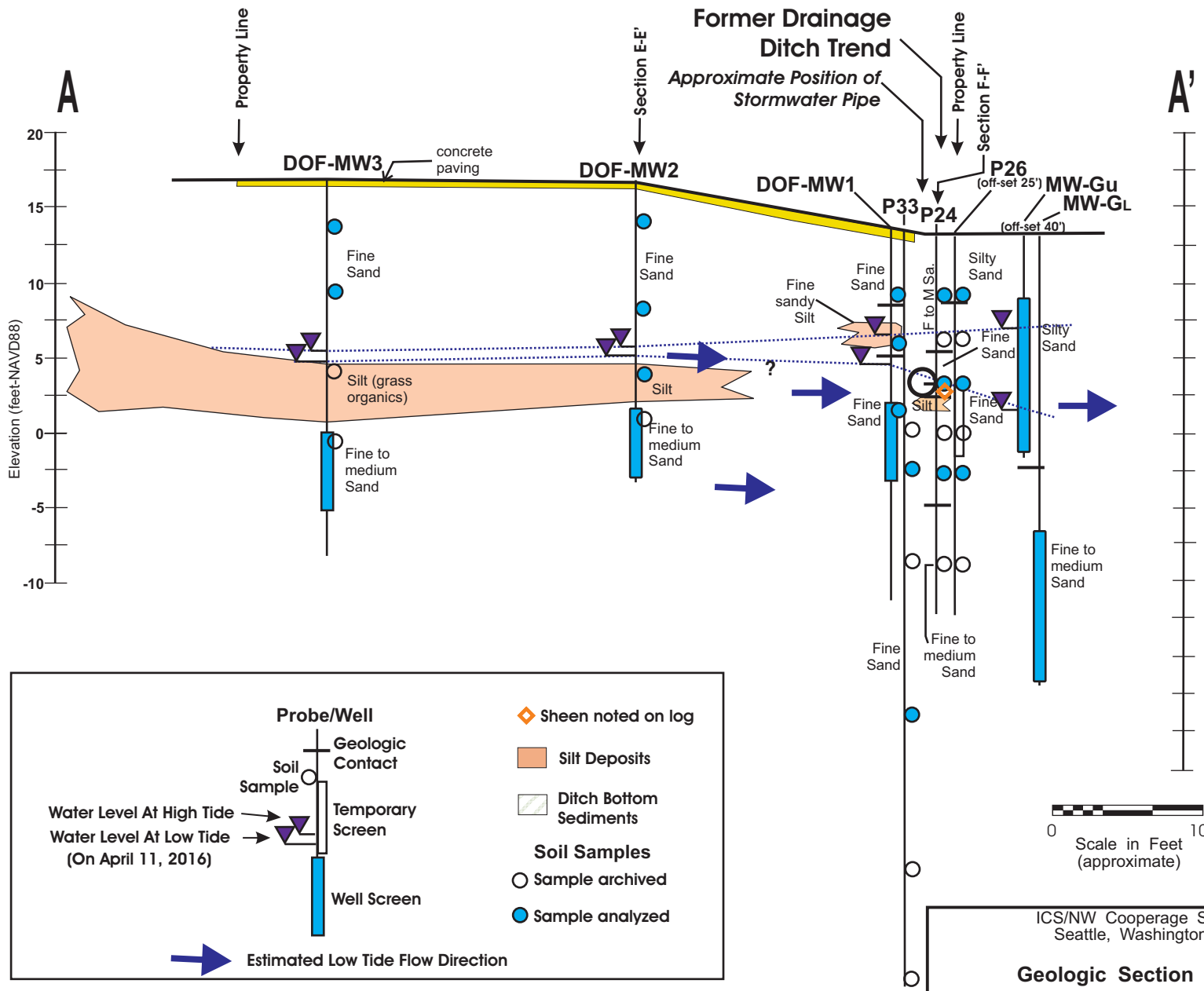


	Push Probe		Public Outfall
	Monitoring Well		Sediment Core Location (2012)
	Previous Sediment Core (2006)		Core Not Collected - Obstruction

Section Trend

<b>ICS/NW Cooperaage Site</b>	
<b>Section Trend Locations Douglas Property and Embayment</b>	
SUM-008-00 (ICS)	Mar. 2018
<i>Dalton, Olmsted &amp; Fuglevand, Inc.</i>	

**FIGURE  
4-1b**

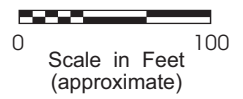
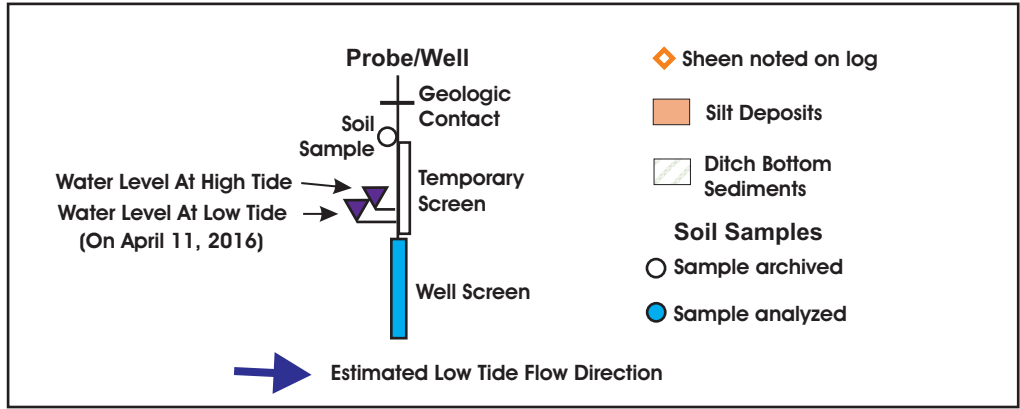
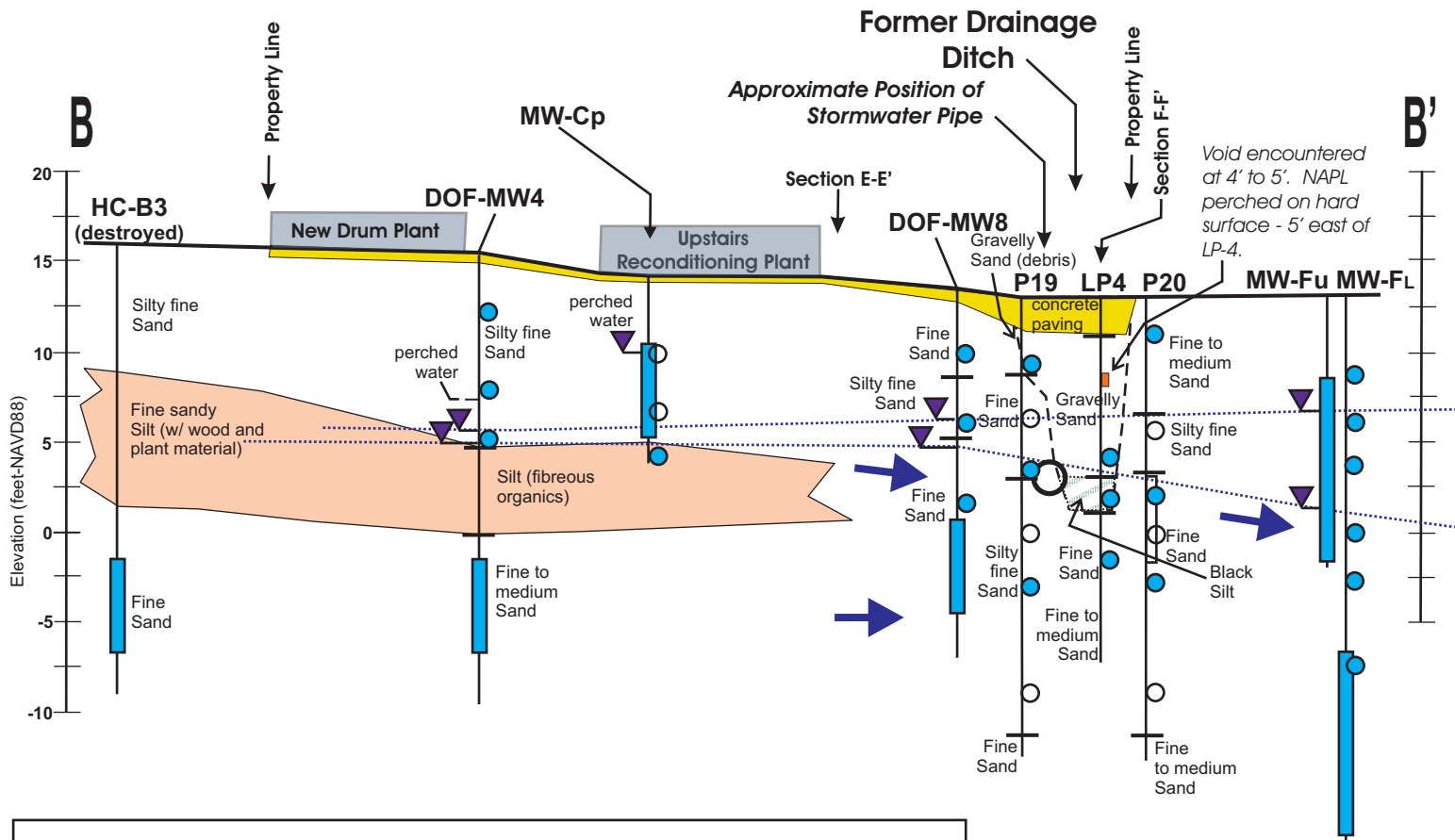


ICS/NW Cooperage Site  
 Seattle, Washington

**Geologic Section A-A'**

SUM-008-00 **FIGURE 4-2** Mar. 2018  
 Dalton, Olmsted & Fuglevand, Inc.

Ref: Section A-A' 7-2016 rev.cdr



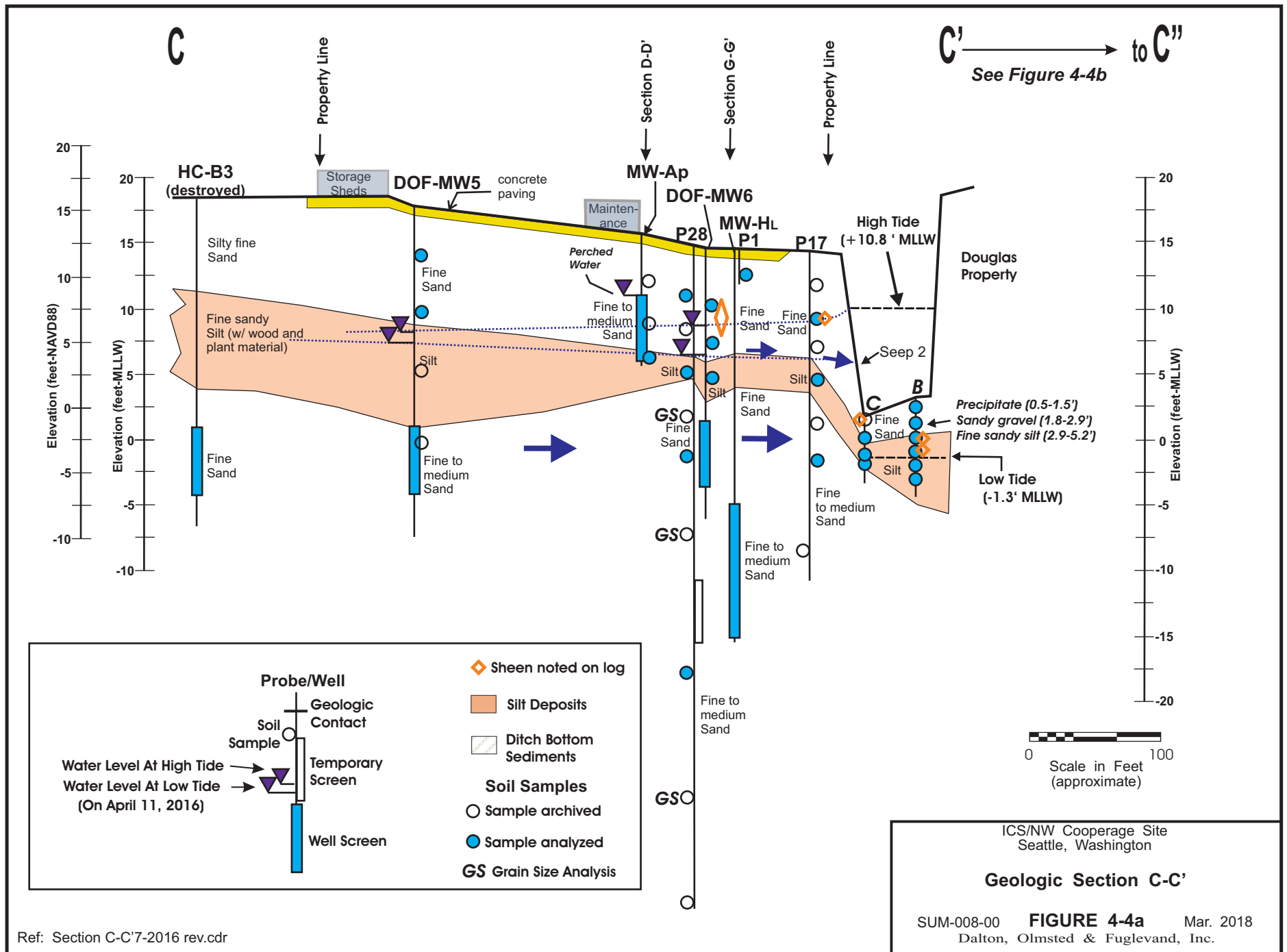
ICS/NW Cooperage Site  
 Seattle, Washington

**Geologic Section B-B'**

SUM-008-00 **FIGURE 4-3** Mar. 2018  
 Dalton, Olmsted & Fuglevand, Inc.

Ref: Section B-B'7-2016 rev.cdr

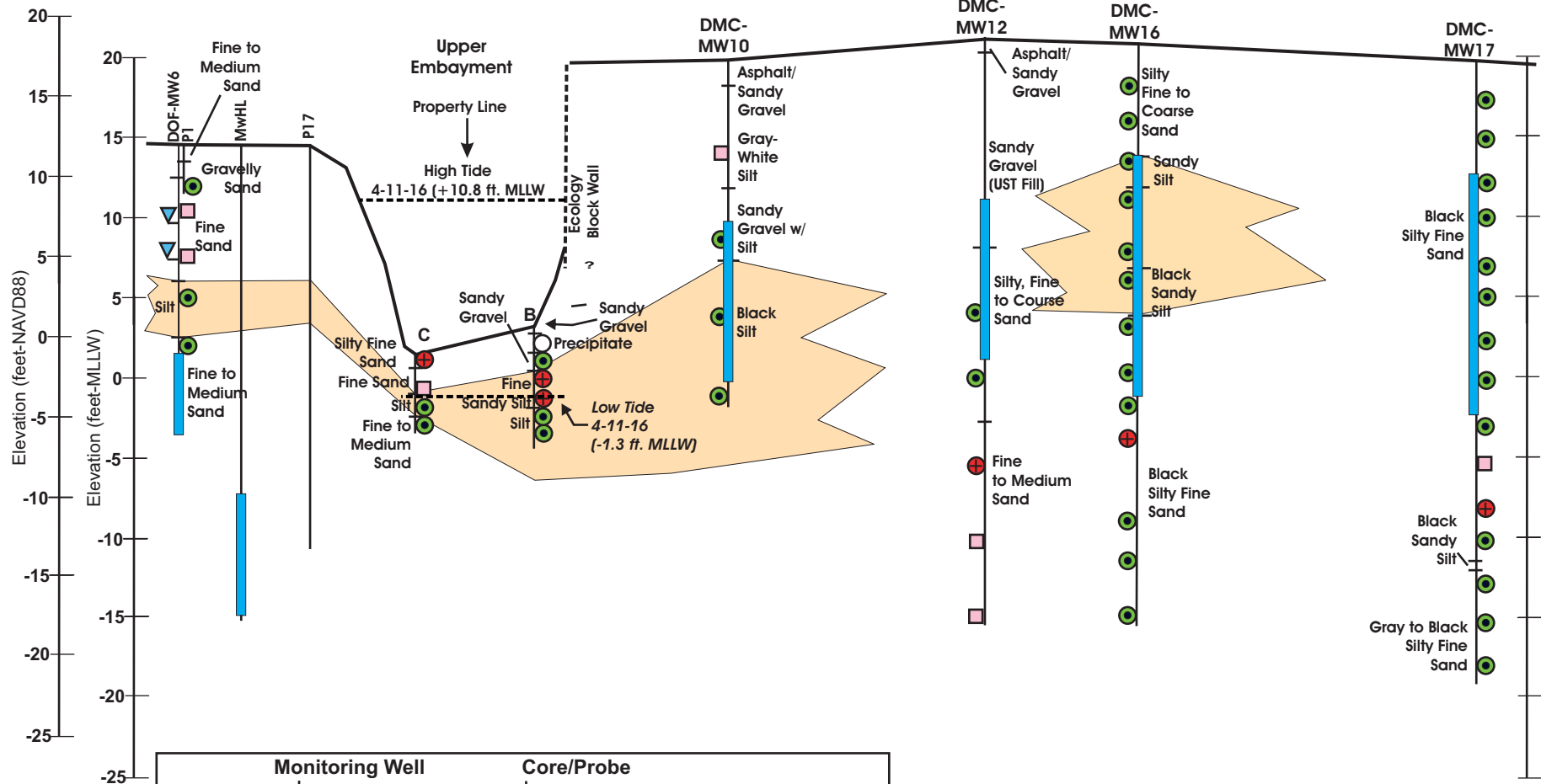




to C ← See Figure 4-4a C'

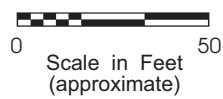
# Douglas Property

C''



Monitoring Well	Core/Probe
<p>High Tide*</p> <p>Low Tide*</p> <p>Soil Sample</p> <p>Well Screen</p>	<p>Geologic Contact</p> <p>Sediment/Soil Sample</p>
<p>* April 11, 2016: High Tide + 10.8' MLLW; Low Tide -1.3' MLLW</p>	

- No Sheen Noted on Log
- Light Sheen Noted on Log
- Moderate to Heavy Sheen noted on log
- Silt Deposits

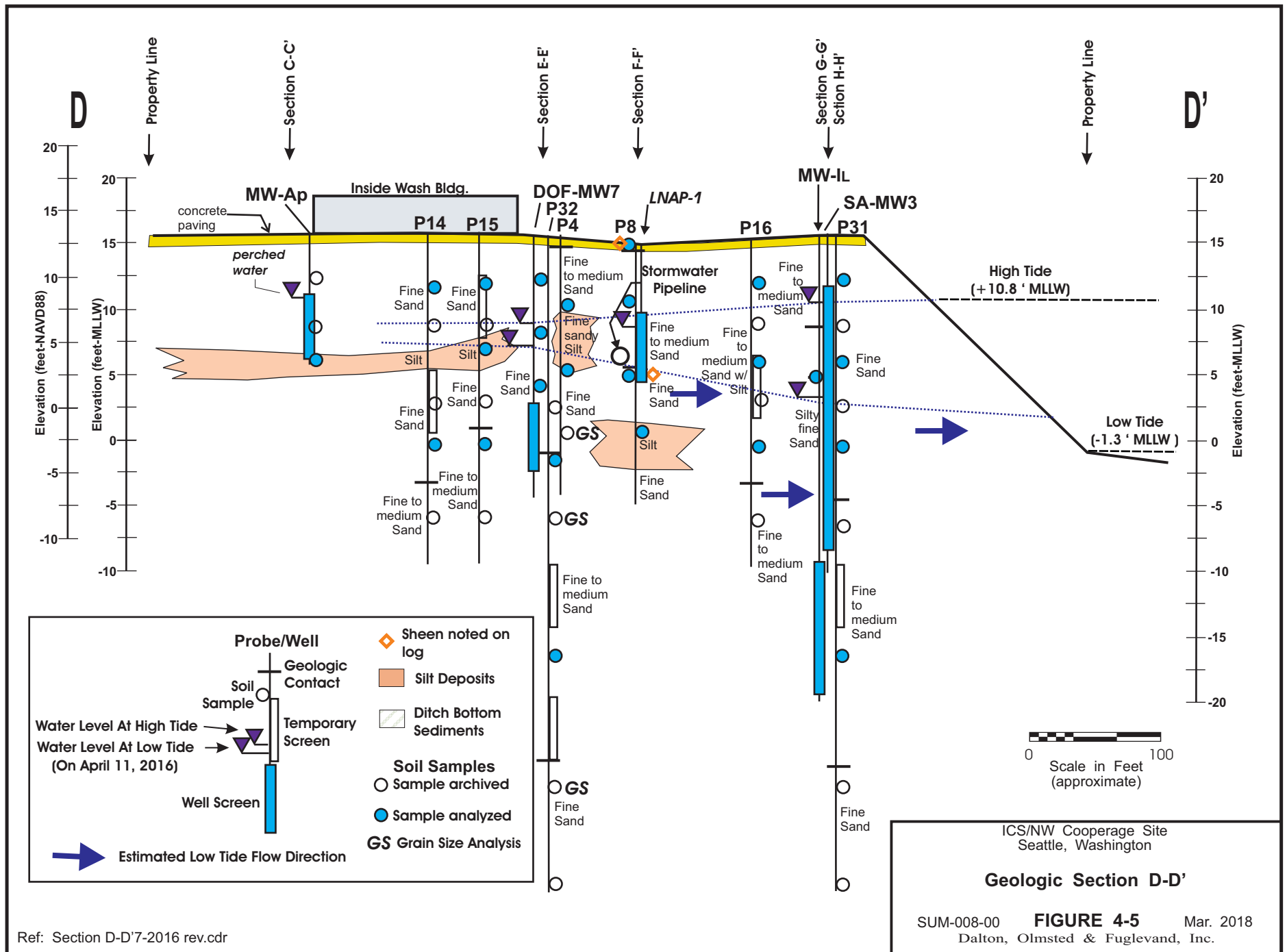


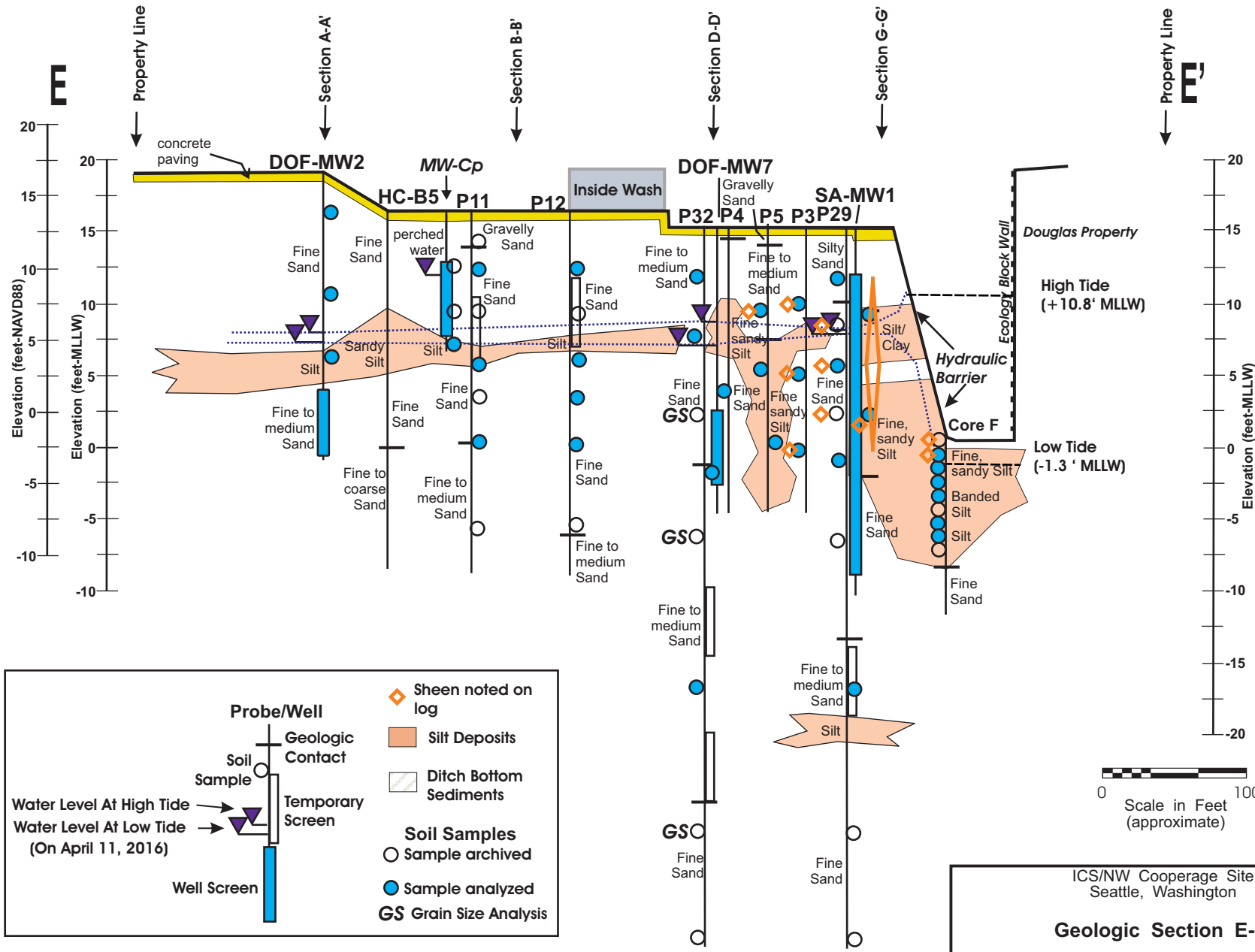
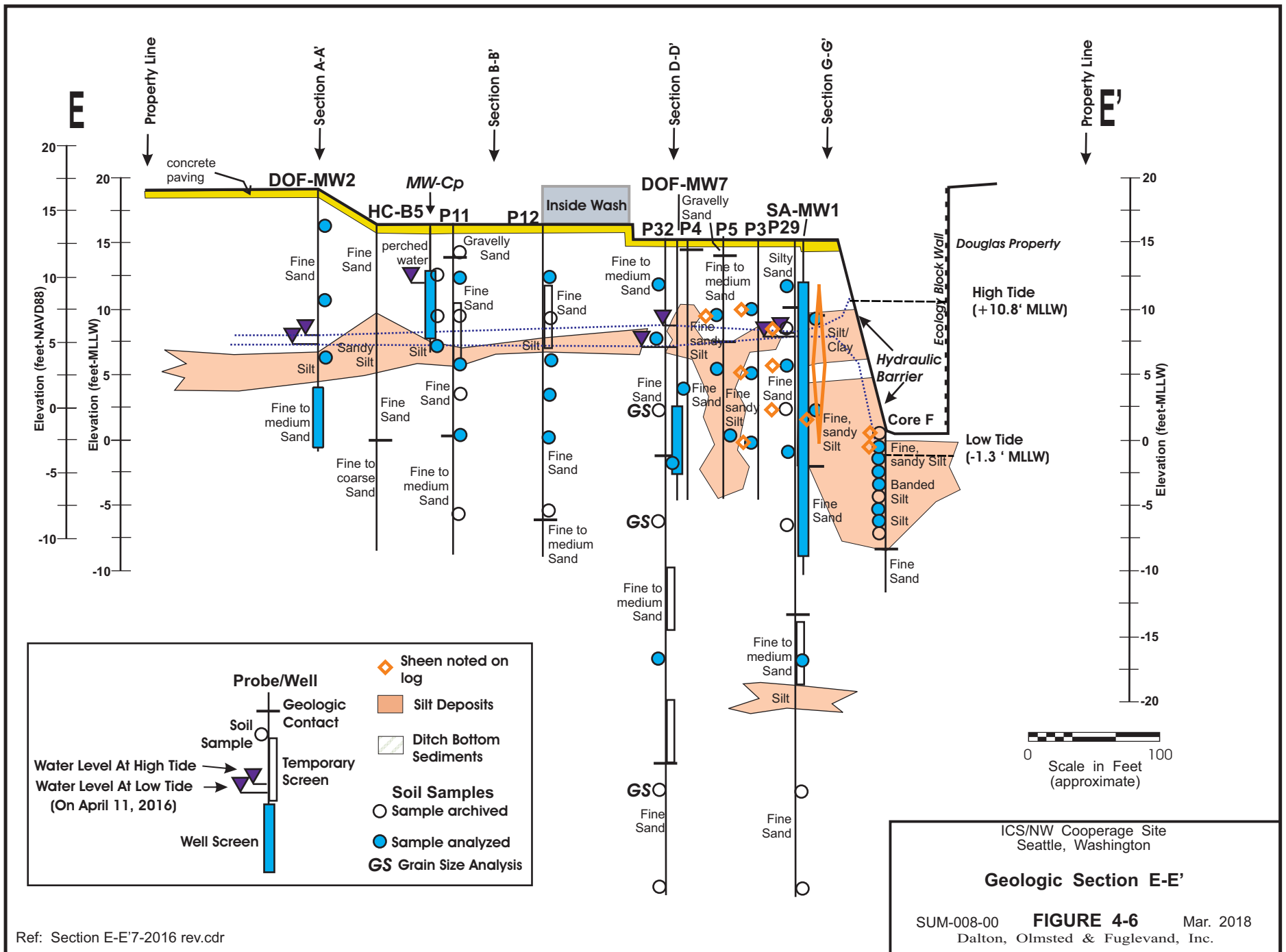
ICS/NW Cooperage Site  
Seattle, Washington

**Geologic Section C'-C''**

SUM-008-00 **FIGURE 4-4b** Mar. 2018  
Dalton, Olmsted & Fuglevand, Inc.

Ref: Section C-C' Embayment rev c.cdr





**Probe/Well**

- Soil Sample
- Water Level At High Tide (On April 11, 2016)
- Water Level At Low Tide
- Well Screen

**Geologic Contact**

- Temporary Screen

**Silt Deposits**

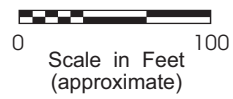
- Ditch Bottom Sediments

**Soil Samples**

- Sample archived
- Sample analyzed
- GS Grain Size Analysis

**Other Symbols**

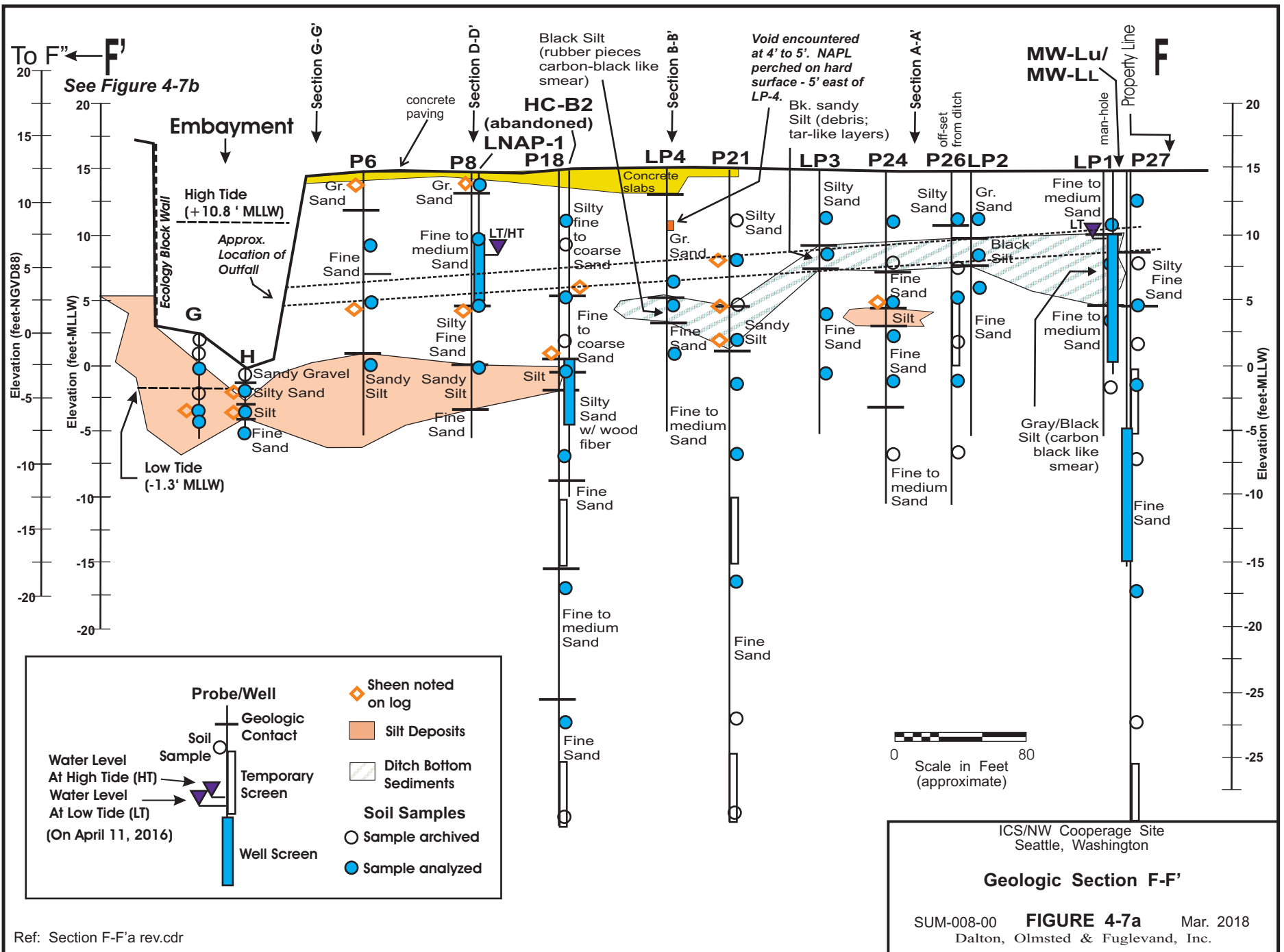
- Sheen noted on log



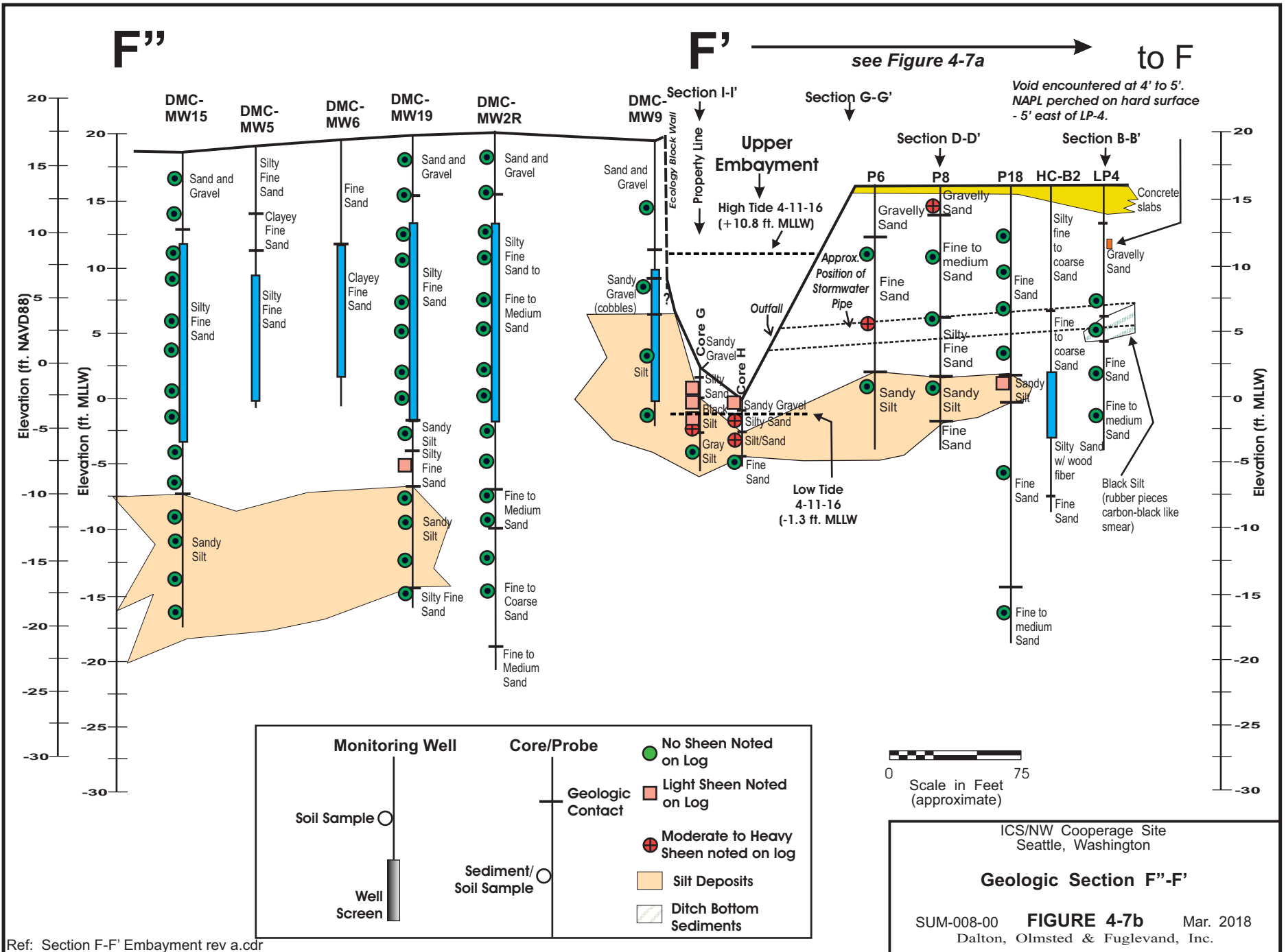
ICS/NW Cooperage Site  
Seattle, Washington

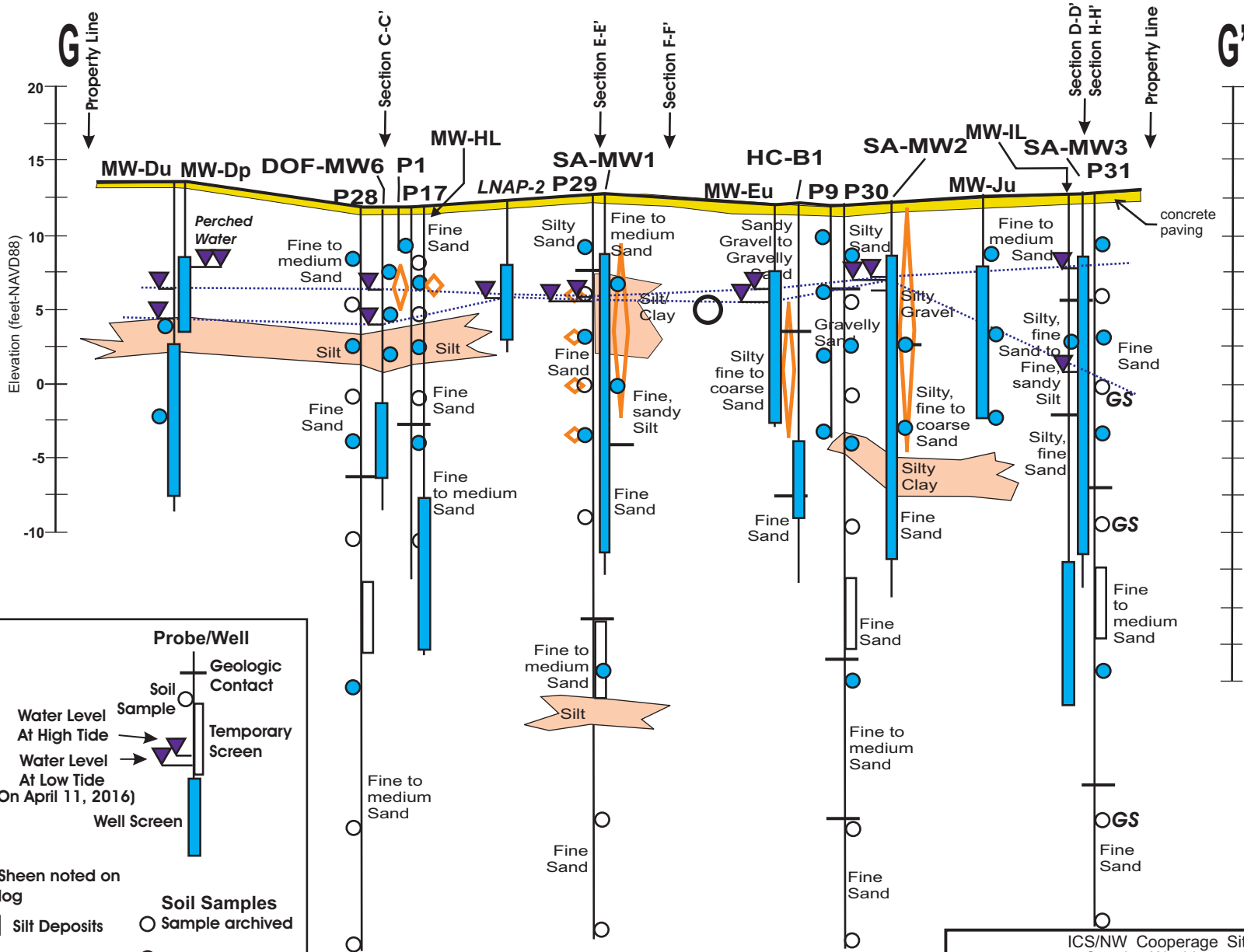
**Geologic Section E-E'**

SUM-008-00 **FIGURE 4-6** Mar. 2018  
Dalton, Olmsted & Fuglevand, Inc.









**Probe/Well**

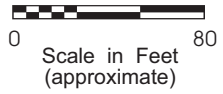
- Geologic Contact
- Soil Sample
- Water Level At High Tide
- Water Level At Low Tide (On April 11, 2016)
- Well Screen
- Temporary Screen

**Soil Samples**

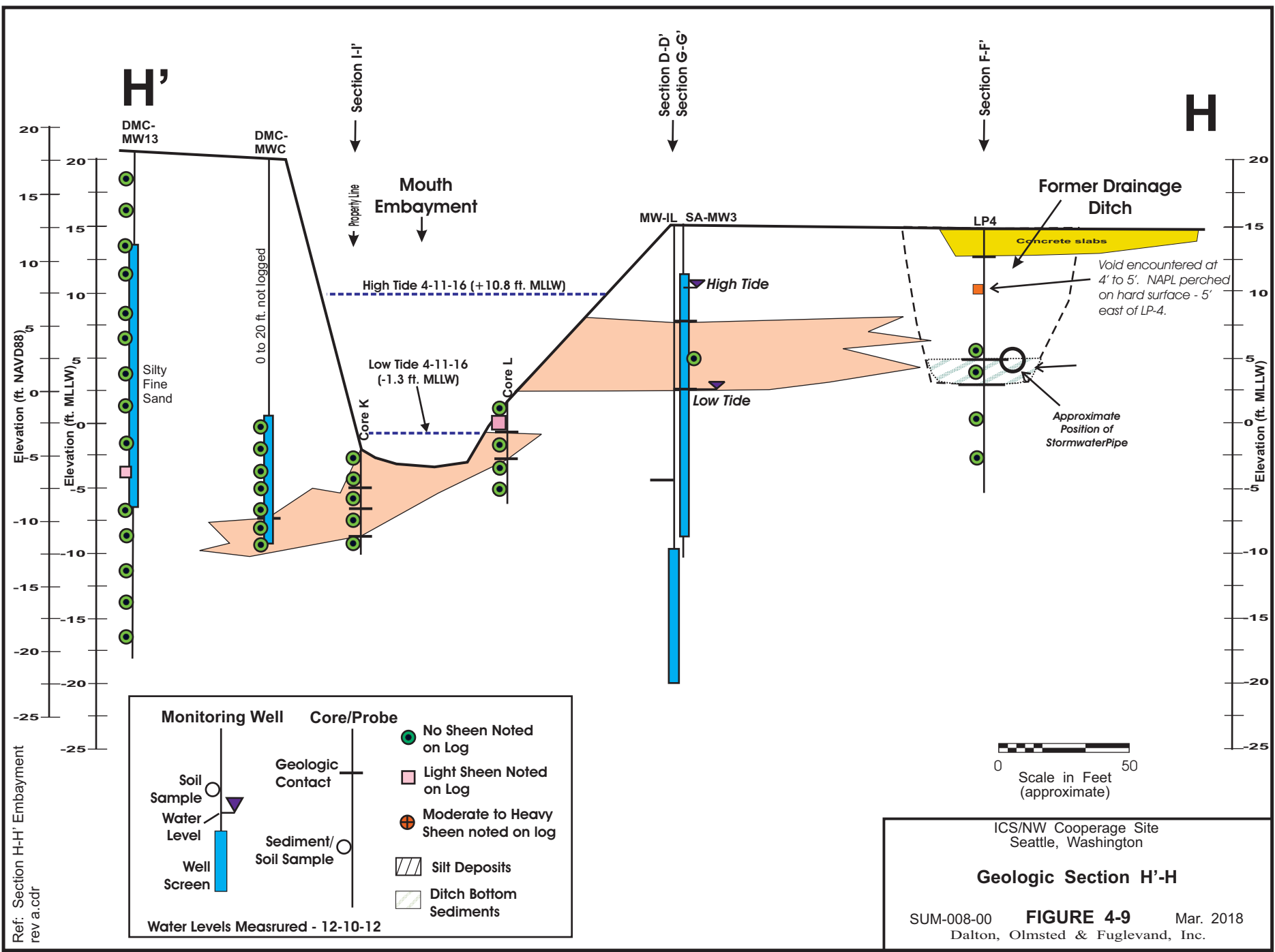
- Sample archived
- Sample analyzed
- GS Grain Size Analysis

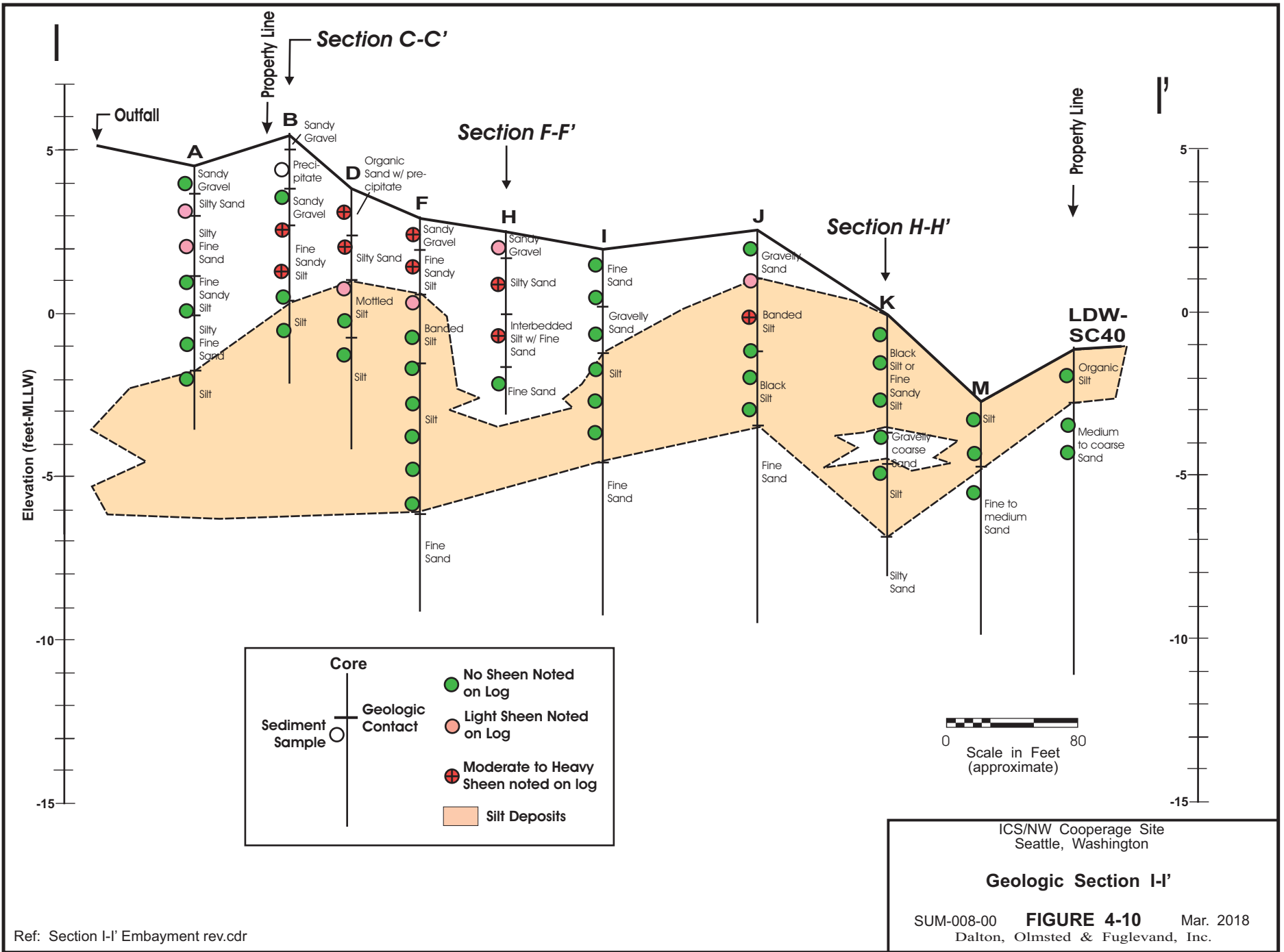
**Other Symbols:**

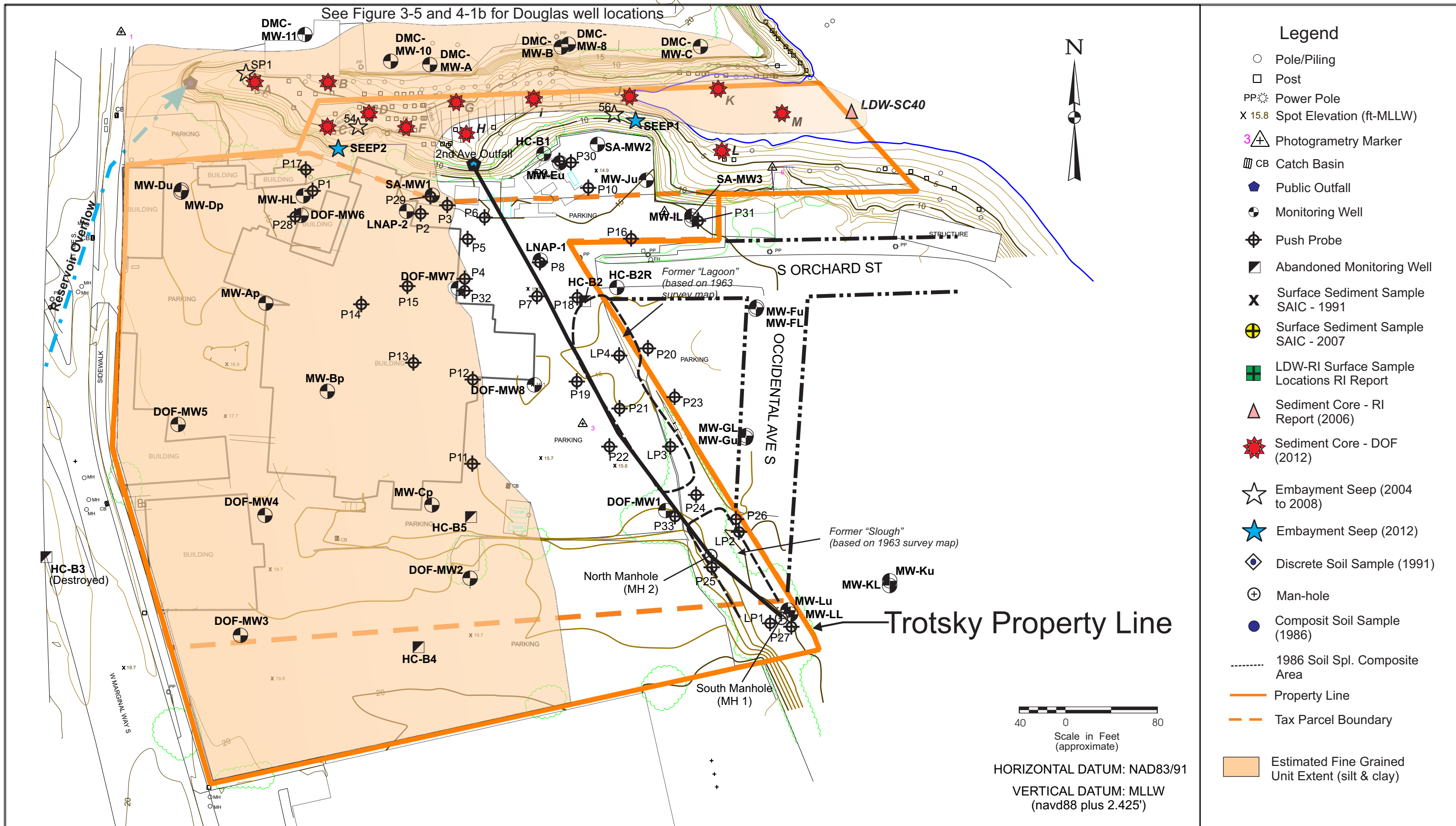
- ◆ Sheen noted on log
- Silt Deposits
- ▨ Ditch Bottom Sediments



ICS/NW Cooperage Site  
Seattle, Washington  
**Geologic Section G-G'**  
SUM-008-00 **FIGURE 4-8** Mar. 2016  
Dalton, Olmsted & Fuglevand, Inc.







**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
- Abandoned Monitoring Well
- X Surface Sediment Sample SAIC - 1991
- ⊕ Surface Sediment Sample SAIC - 2007
- LDW-RI Surface Sample Locations RI Report
- Sediment Core - RI Report (2006)
- Sediment Core - DOF (2012)
- ☆ Embayment Seep (2004 to 2008)
- ★ Embayment Seep (2012)
- ◇ Discrete Soil Sample (1991)
- ⊕ Man-hole
- Composit Soil Sample (1986)
- ..... 1986 Soil Spl. Composite Area
- Property Line
- Tax Parcel Boundary
- Estimated Fine Grained Unit Extent (silt & clay)

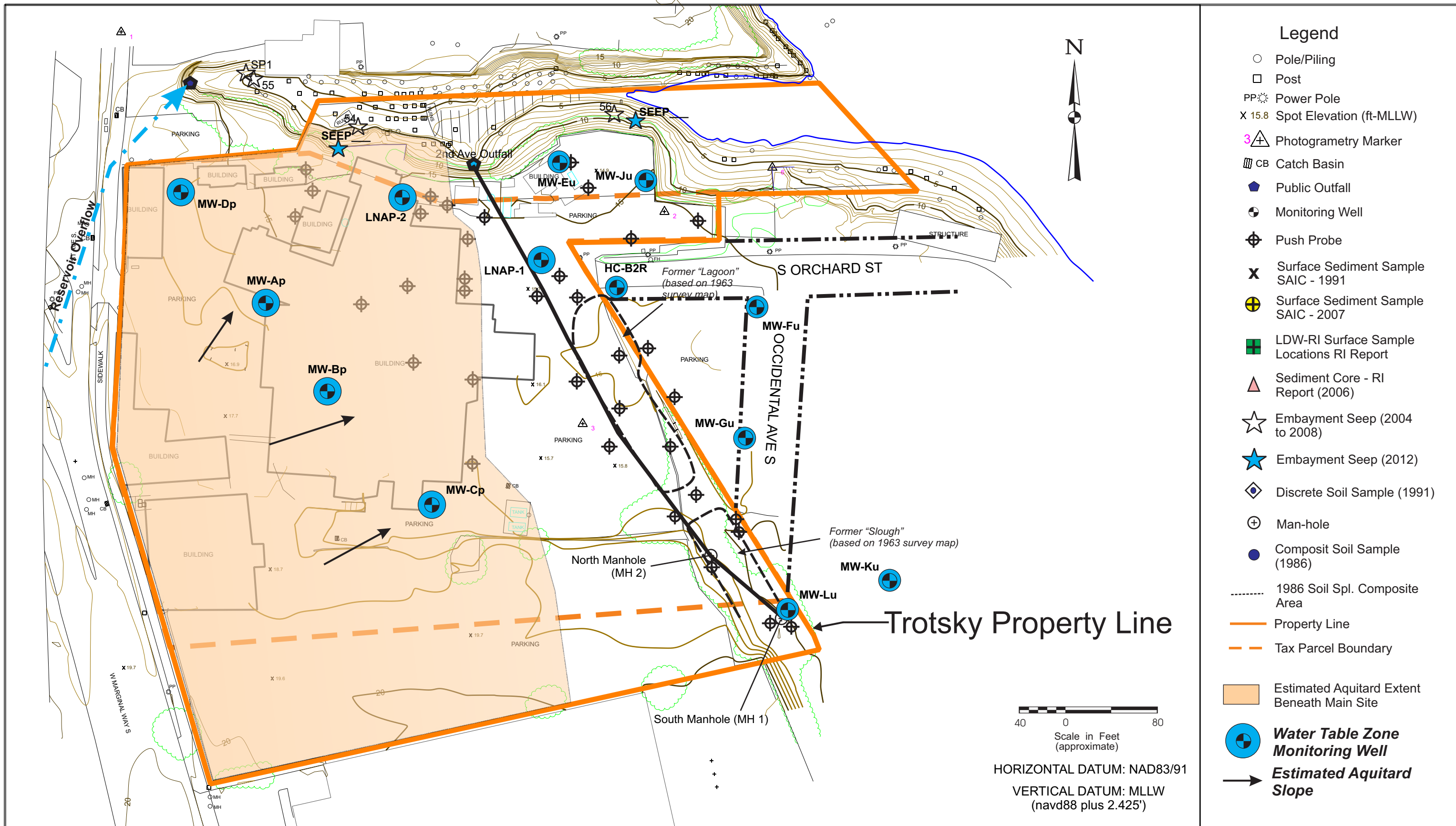
**Notes:**

- 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

<b>ICS/NW Cooprage Site</b>		<b>FIGURE 4-11</b>
<b>Extent of Fine Grained Unit</b>		
SUM-008-00 (ICS)	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: Upland Phase Well Loc by Zone rev.cdr

ICS/NW Cooprage Site

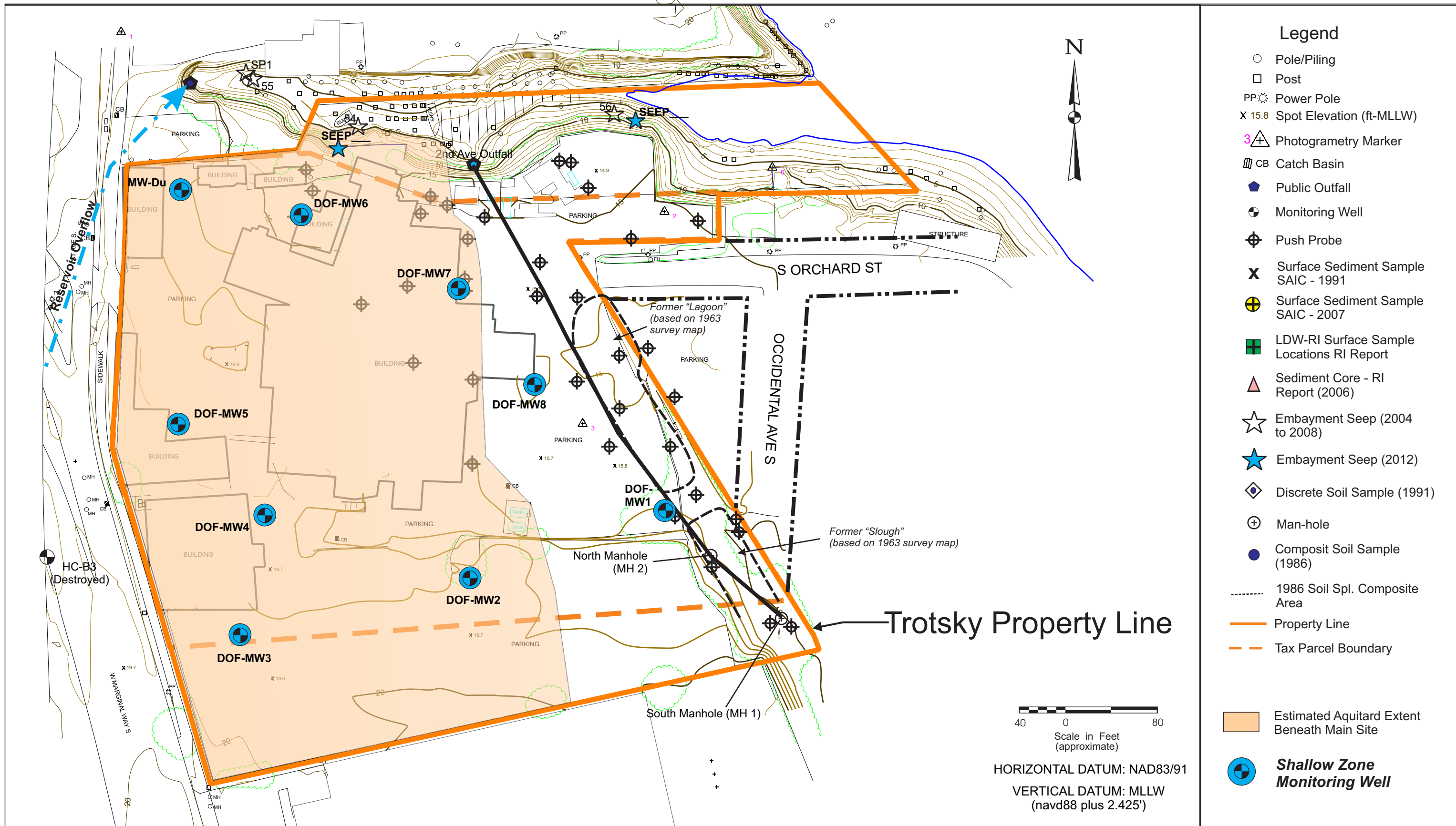
**Water Table Zone Monitoring Wells  
ICS-NWC Property**

SUM-008-00 (ICS)

Mar. 2018

Dalton, Olmsted & Fuglevand, Inc.

**FIGURE  
4-12a**



**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
- X 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
- - - Tax Parcel Boundary
- Estimated Aquitard Extent Beneath Main Site
- Shallow Zone Monitoring Well

40 0 80  
Scale in Feet (approximate)

HORIZONTAL DATUM: NAD83/91  
VERTICAL DATUM: MLLW (navd88 plus 2.425')

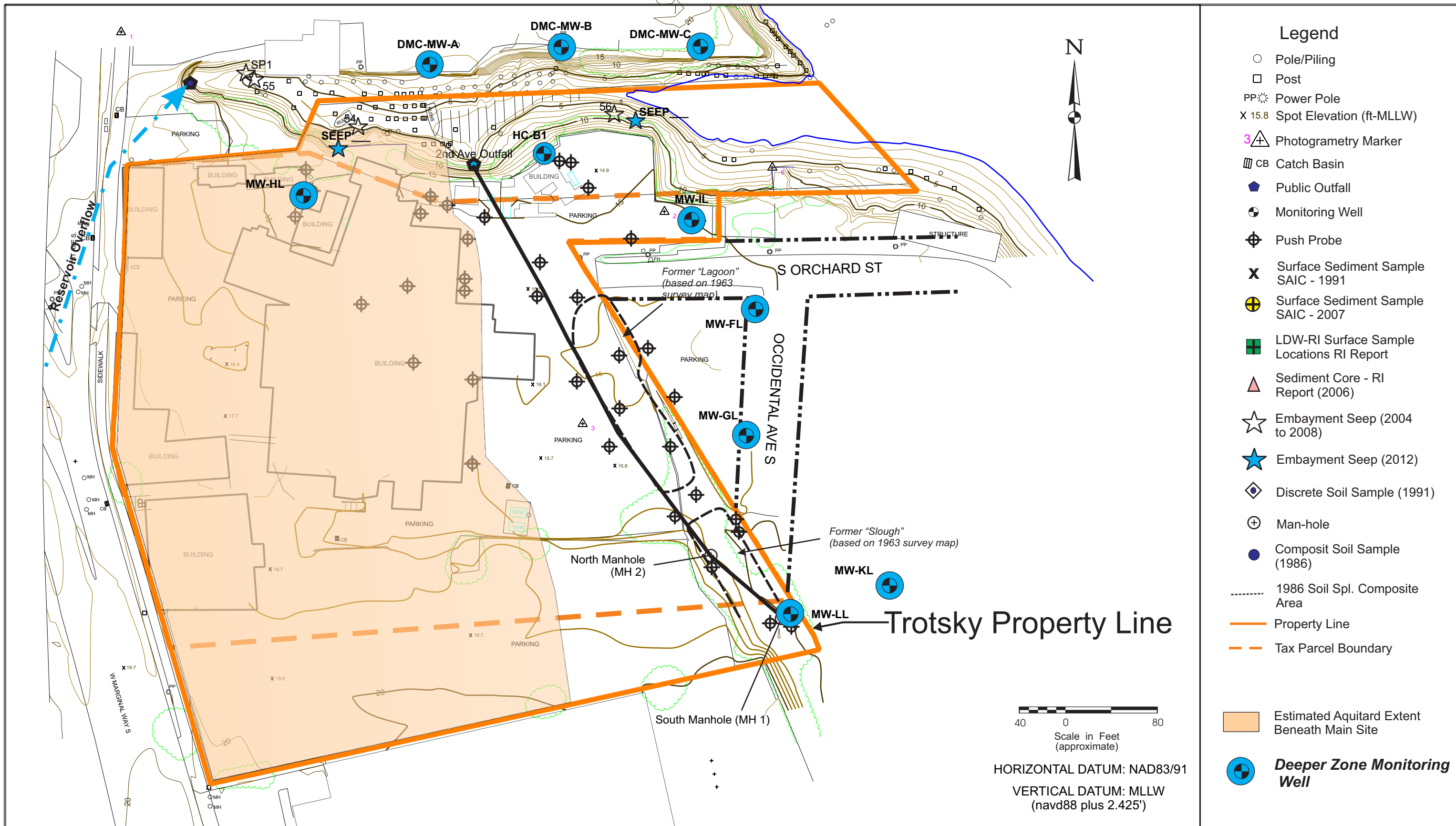
**Notes:**

- 1) Property Survey by Continental Survey Co. (12-15-09)
- 2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Upland Phase Well Loc by Zone rev.cdr

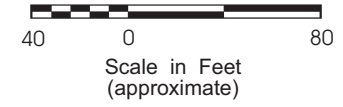
<b>ICS/NW Cooprage Site</b>		<b>FIGURE 4-12b</b>
<b>Upper Zone Monitoring Wells ICS-NWC Property</b>		
SUM-008-00 (ICS)	Mar. 2018	
<i>Dalton, Olmsted &amp; Fuglevand, Inc.</i>		





**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
- X 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
- - - Tax Parcel Boundary
- Estimated Aquitard Extent Beneath Main Site
- ⊕ **Deeper Zone Monitoring Well**



HORIZONTAL DATUM: NAD83/91  
 VERTICAL DATUM: MLLW (navd88 plus 2.425')

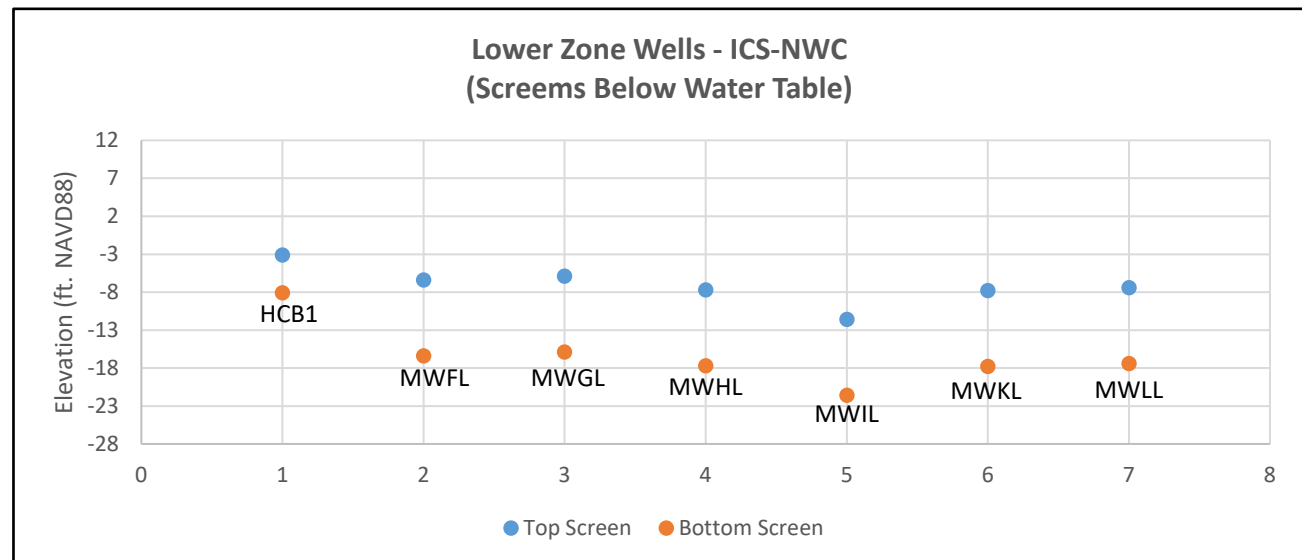
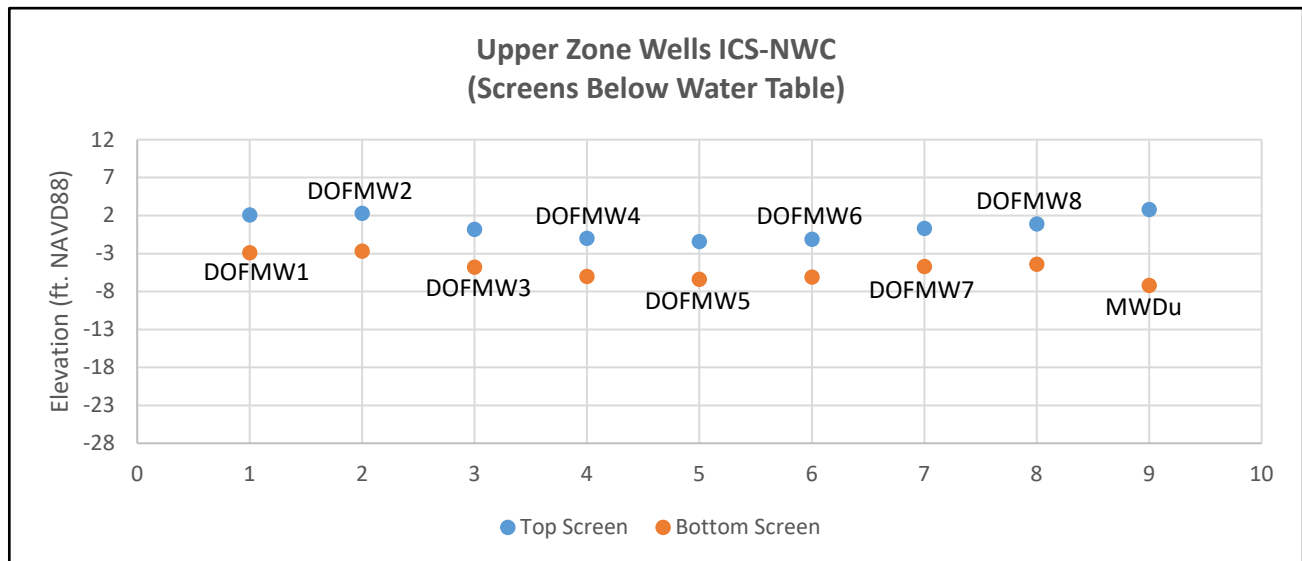
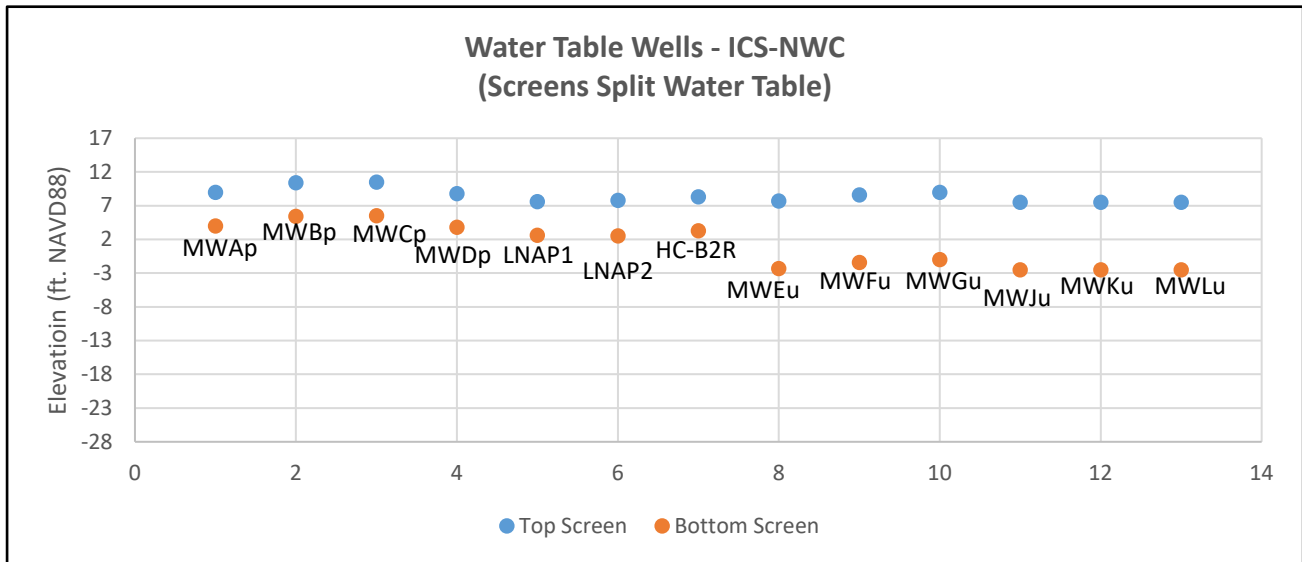
**Trotsky Property Line**

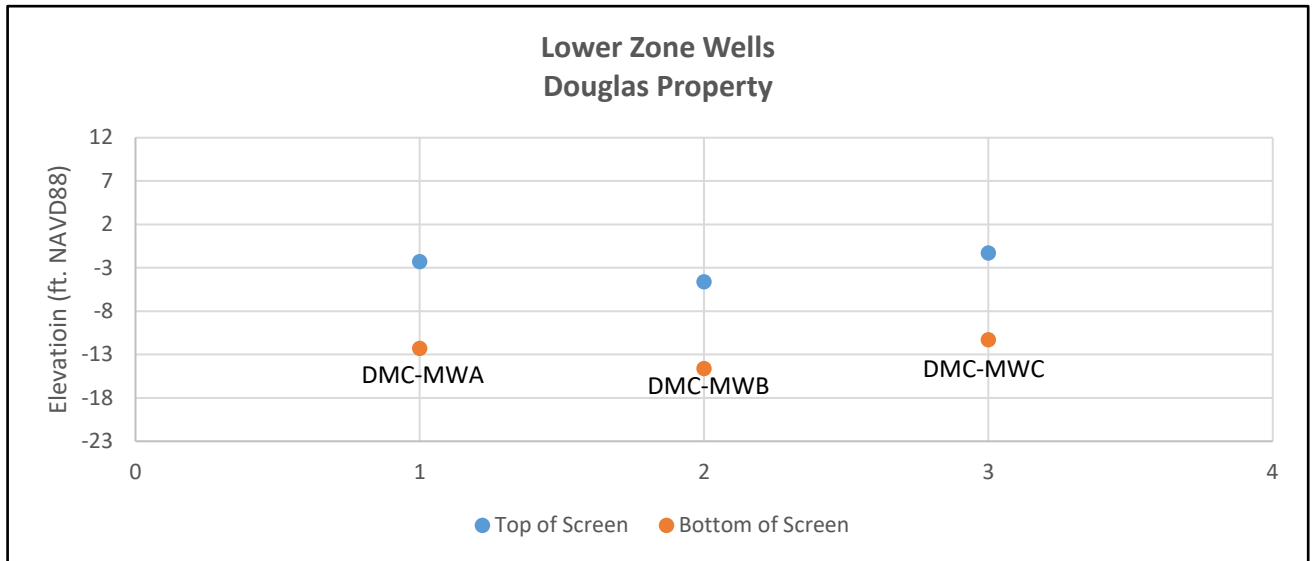
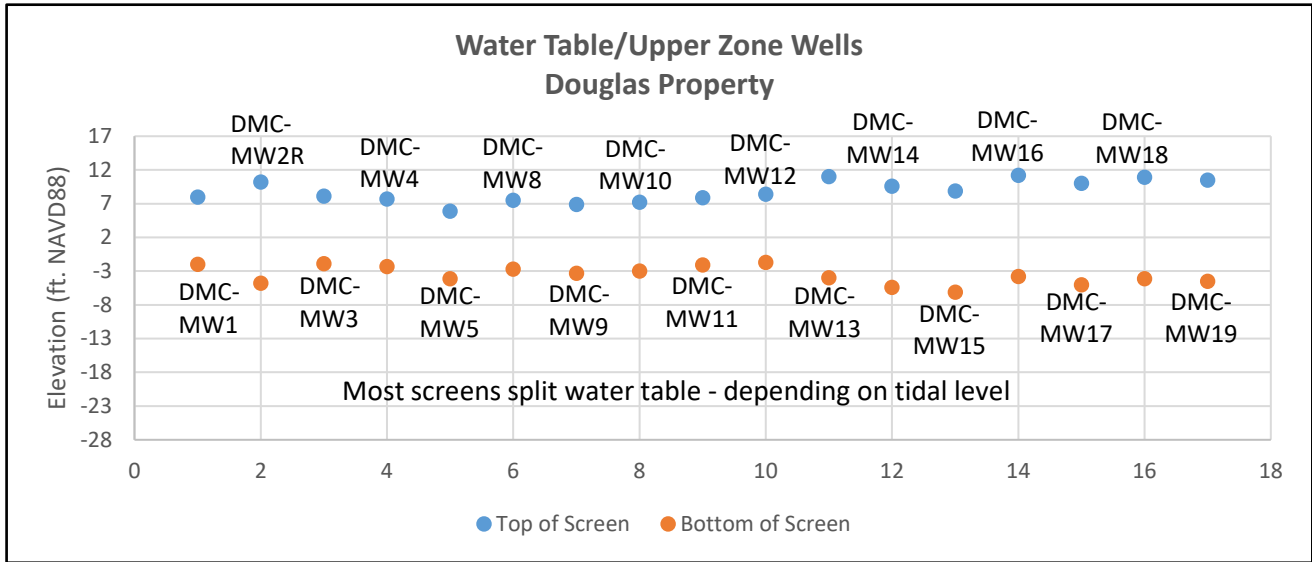
**Notes:**

- 1) Property Survey by Continental Survey Co. (12-15-09)
- 2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

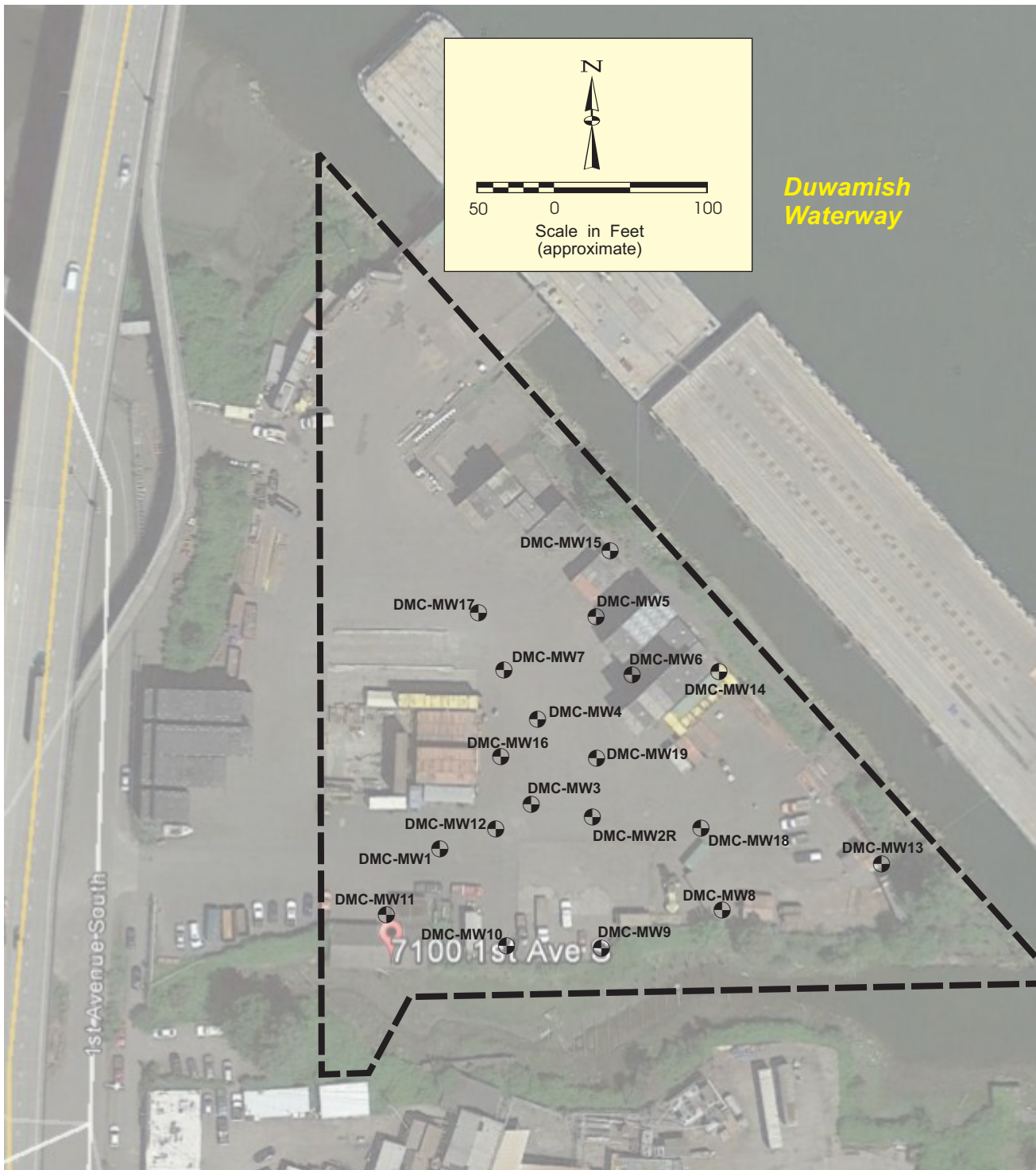
Ref: Upland Phase Well Loc by Zone rev.cdr

<b>ICS/NW Cooprage Site</b>		<b>FIGURE 4-12c</b>
<b>Lower Zone Monitoring Wells ICS-NWC and Douglas Property</b>		
SUM-008-00 (ICS)	Mar. 2018	
<i>Dalton, Olmsted &amp; Fuglevand, Inc.</i>		





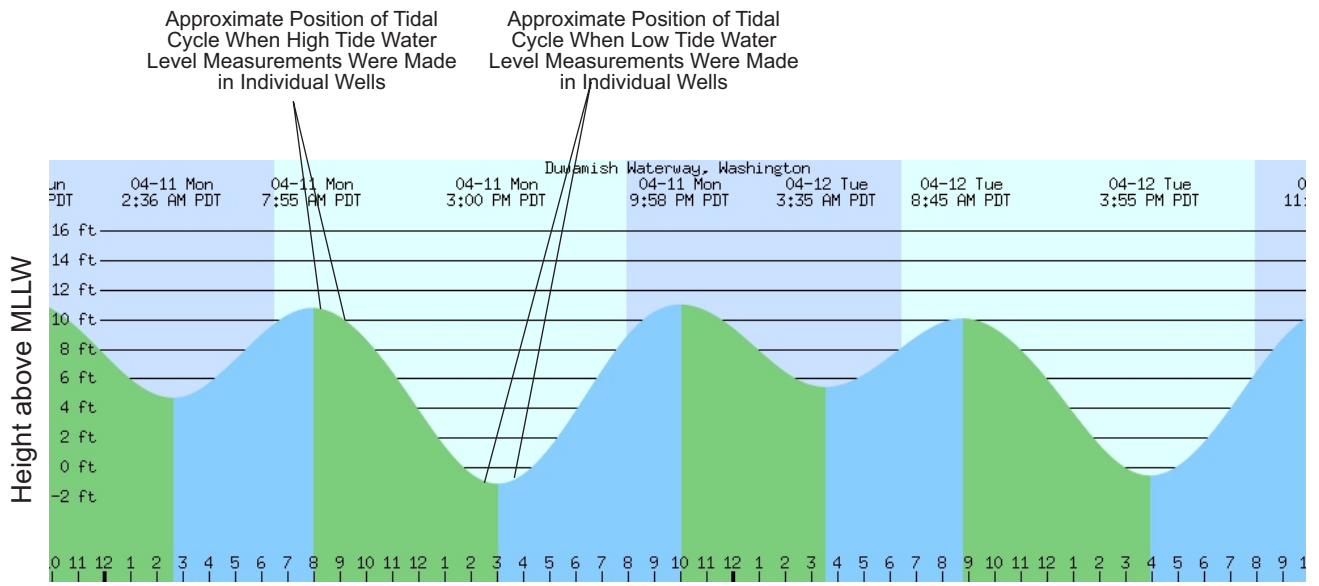




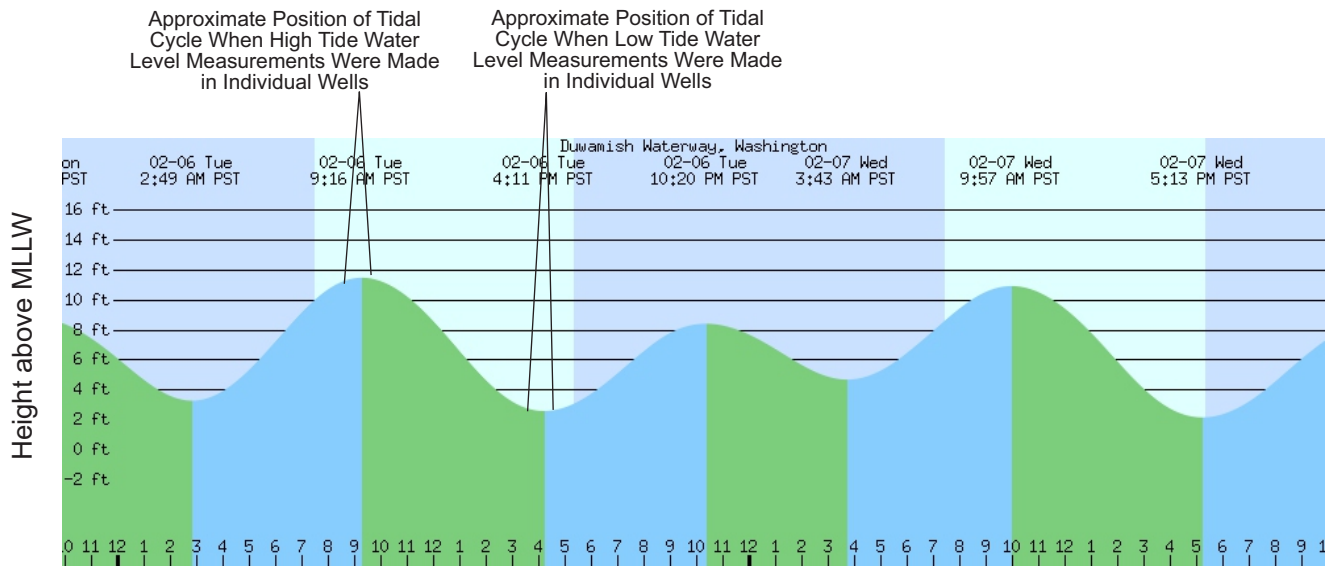
DMC-MW11  Monitoring Well

<b>ICS/NW Cooperage Site</b>	
<b>Douglas Property Water Table/Upper Zone Well Locations</b>	
<i>SUM-008-00 (ICS)</i>	<i>March 2018</i>
<i>Dalton, Olmsted &amp; Fuglevand, Inc.</i>	

**FIGURE  
4-14**



## April 2016

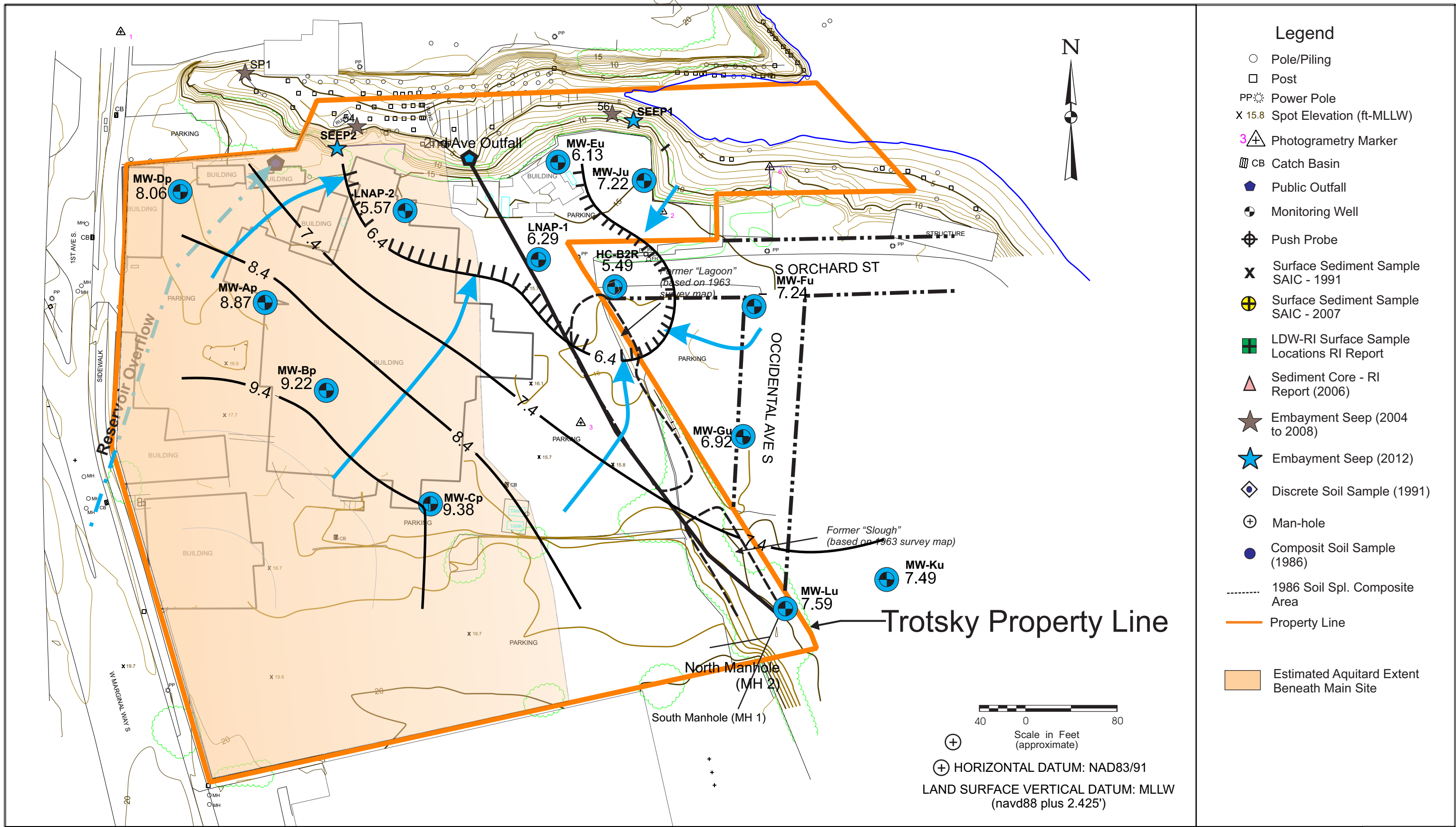


## February 2018

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)

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)

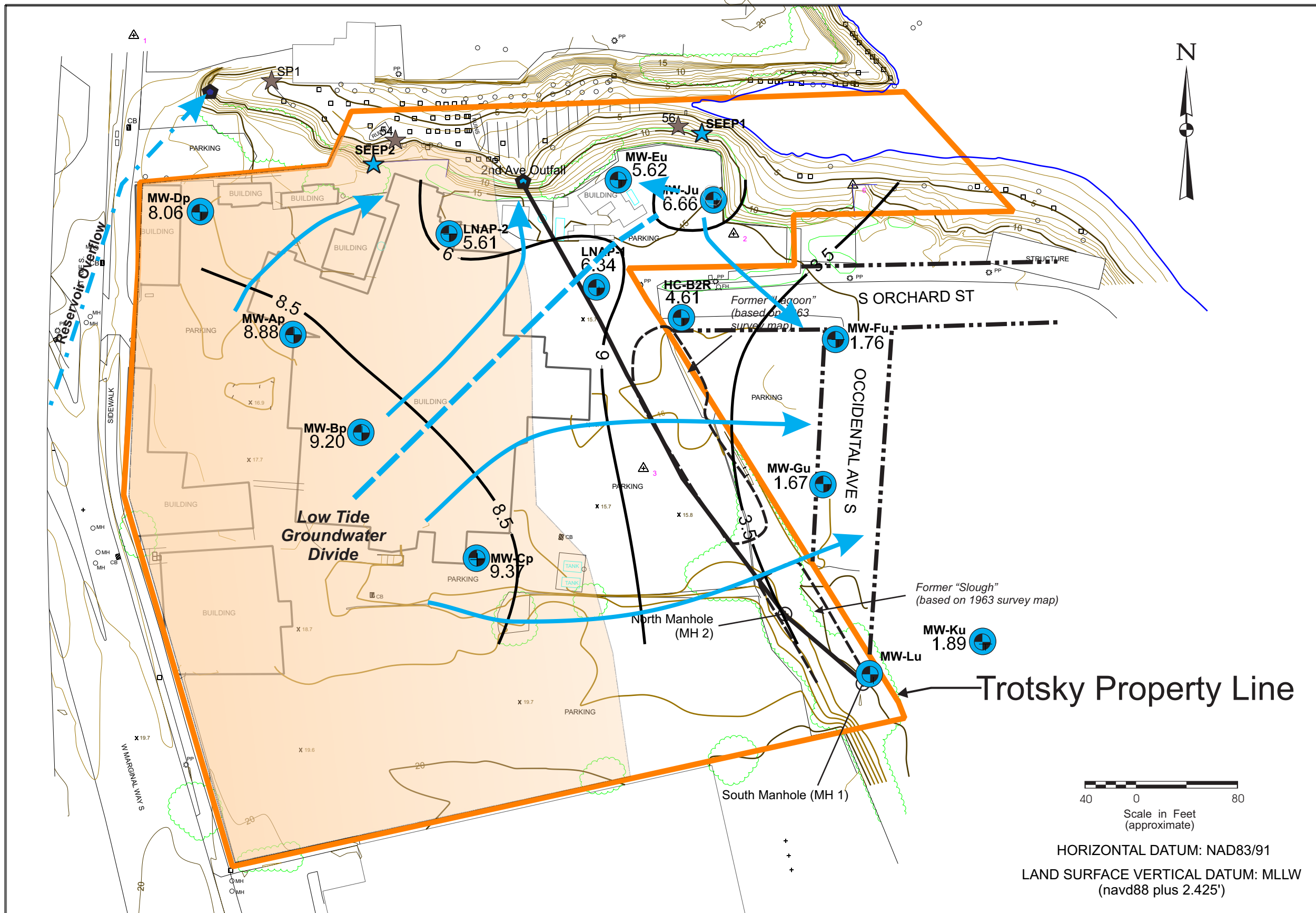
**Monitoring Well and Water Level Elevation (NAVD88)**  
**Estimated Flow Direction Gradient**  
**Groundwater Contour**

**ICS/NW Cooprage 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**

Ref: GW Flow Directions April 11, 2016 rev a.cdr

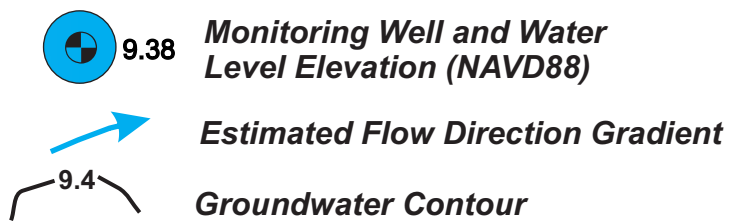




- ### Legend
- Pole/Piling
  - Post
  - PP Power Pole
  - X 15.8 Spot Elevation (ft-MLLW)
  - 3△ Photogrammetry Marker
  - ▨ CB Catch Basin
  - ◆ Public Outfall
  - ⊕ Monitoring Well
  - ⊕ Push Probe
  - X Surface Sediment Sample SAIC - 1991
  - ⊕ Surface Sediment Sample SAIC - 2007
  - ⊕ LDW-RI Surface Sample Locations RI Report
  - △ Sediment Core - RI Report (2006)
  - ★ Embayment Seep (2004 to 2008)
  - ★ Embayment Seep (2012)
  - ◇ Discrete Soil Sample (1991)
  - ⊕ Man-hole
  - Composit Soil Sample (1986)
  - ..... 1986 Soil Spl. Composite Area
  - Property Line
  - Estimated Aquitard Extent Beneath Main Site

**Notes:**

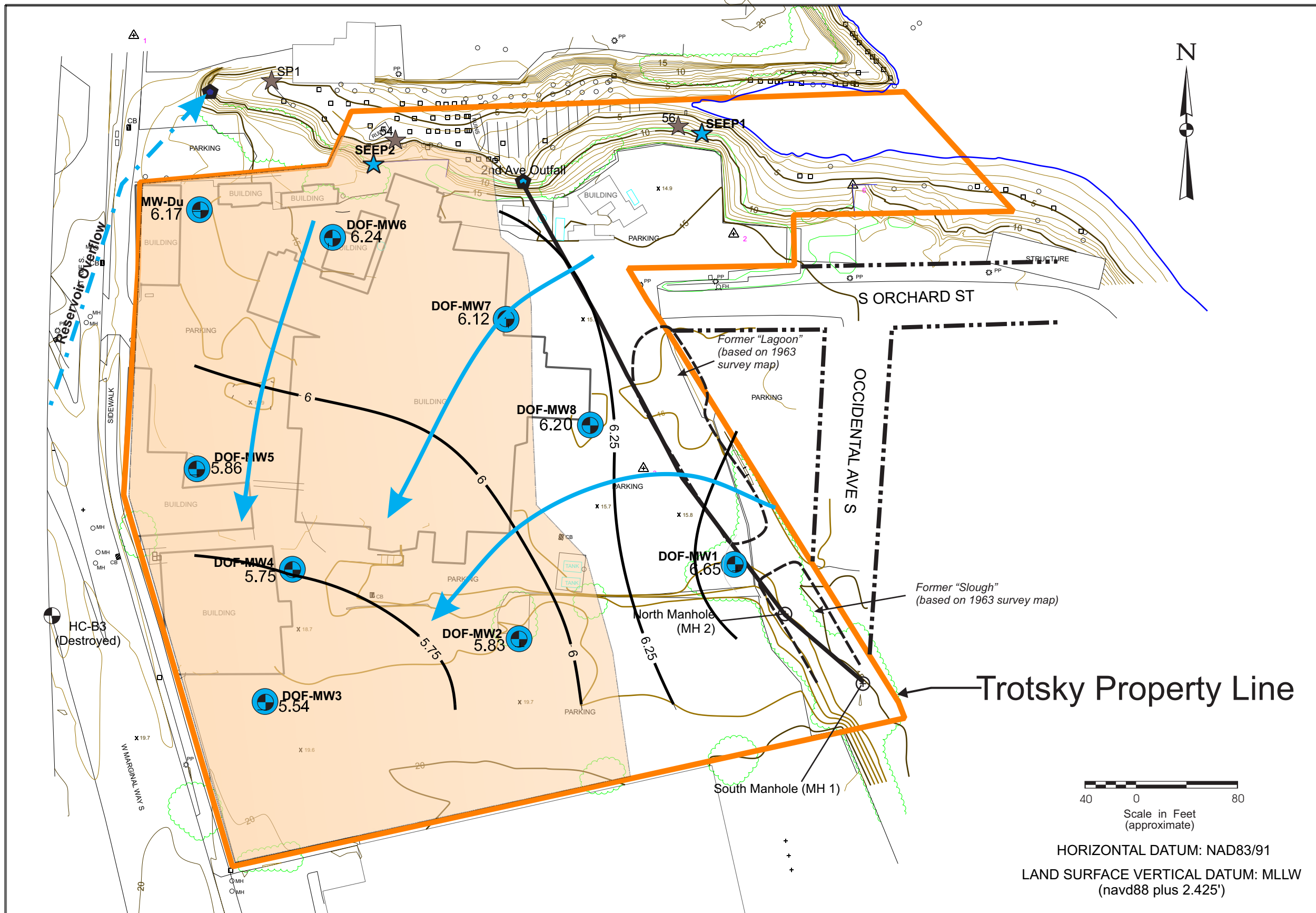
- 1) Property Survey by Continental Survey Co. (12-15-09)
- 2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)



**ICS/NW Cooprage 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**

Ref: GW Flow Directions April 11, 2016 rev a.cdr



- ### 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
  - X 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
  - Composit Soil Sample (1986)
  - ⋯ 1986 Soil Spl. Composite Area
  - Property Line
  - Estimated Aquitard Extent Beneath Main Site

**Notes:**

- 1) Property Survey by Continental Survey Co. (12-15-09)
- 2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

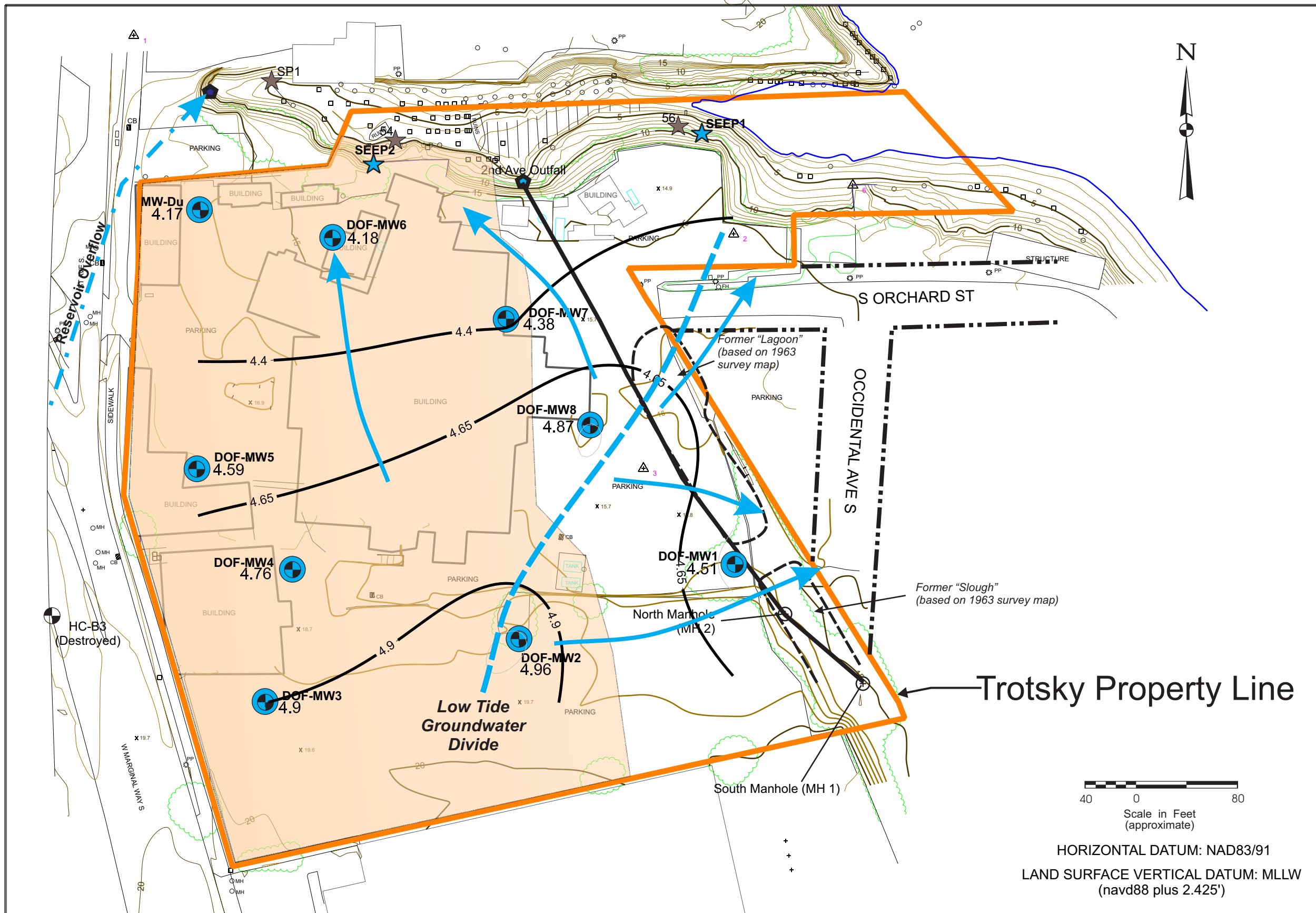
9.38 **Monitoring Well and Water Level Elevation (NAVD88)**  
**Estimated Flow Direction Gradient**  
 9.4 **Groundwater Contour**

**ICS/NW Cooprage 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**

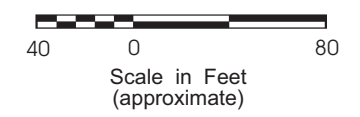
Ref: GW Flow Directions April 11, 2016 rev a.cdr





- ### 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
  - X 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
  - Composit Soil Sample (1986)
  - ..... 1986 Soil Spl. Composite Area
  - Property Line
  - - - Tax Parcel Boundary
  - Estimated Aquitard Extent Beneath Main Site

Trotsky Property Line



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)

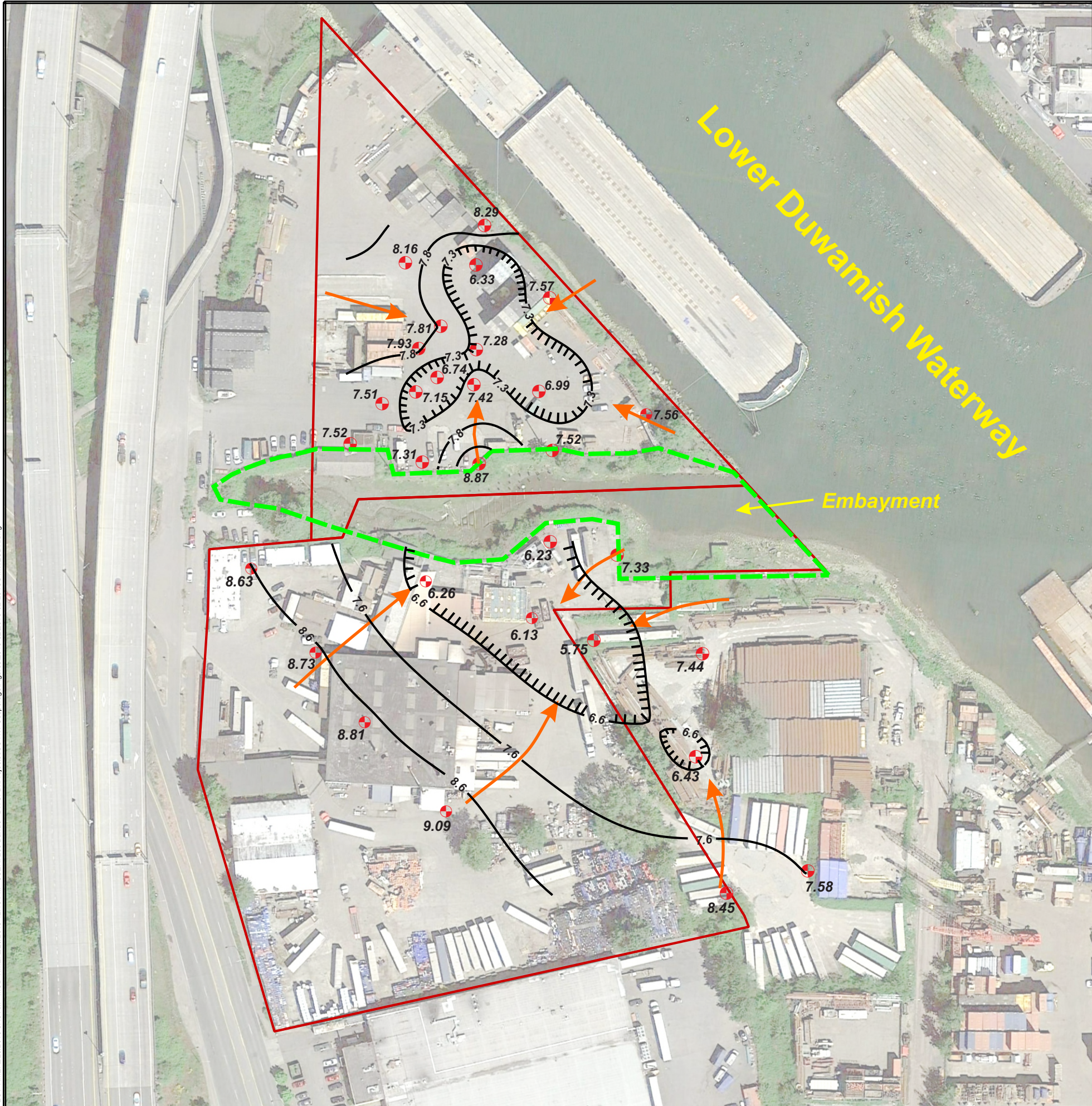
- 9.38 **Monitoring Well and Water Level Elevation (NAVD88)**
- Estimated Flow Direction Gradient**
- 9.4 **Groundwater Contour**




**ICS/NW Cooprage 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**

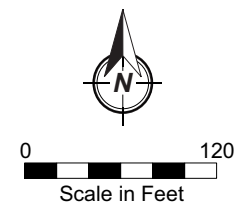


PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02\2018-02-23 ICS MWZCDR.dwg



-  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.



Feb 18 Flow Directions.cdr

ICS/NW Cooperage Site  
Seattle, Washington

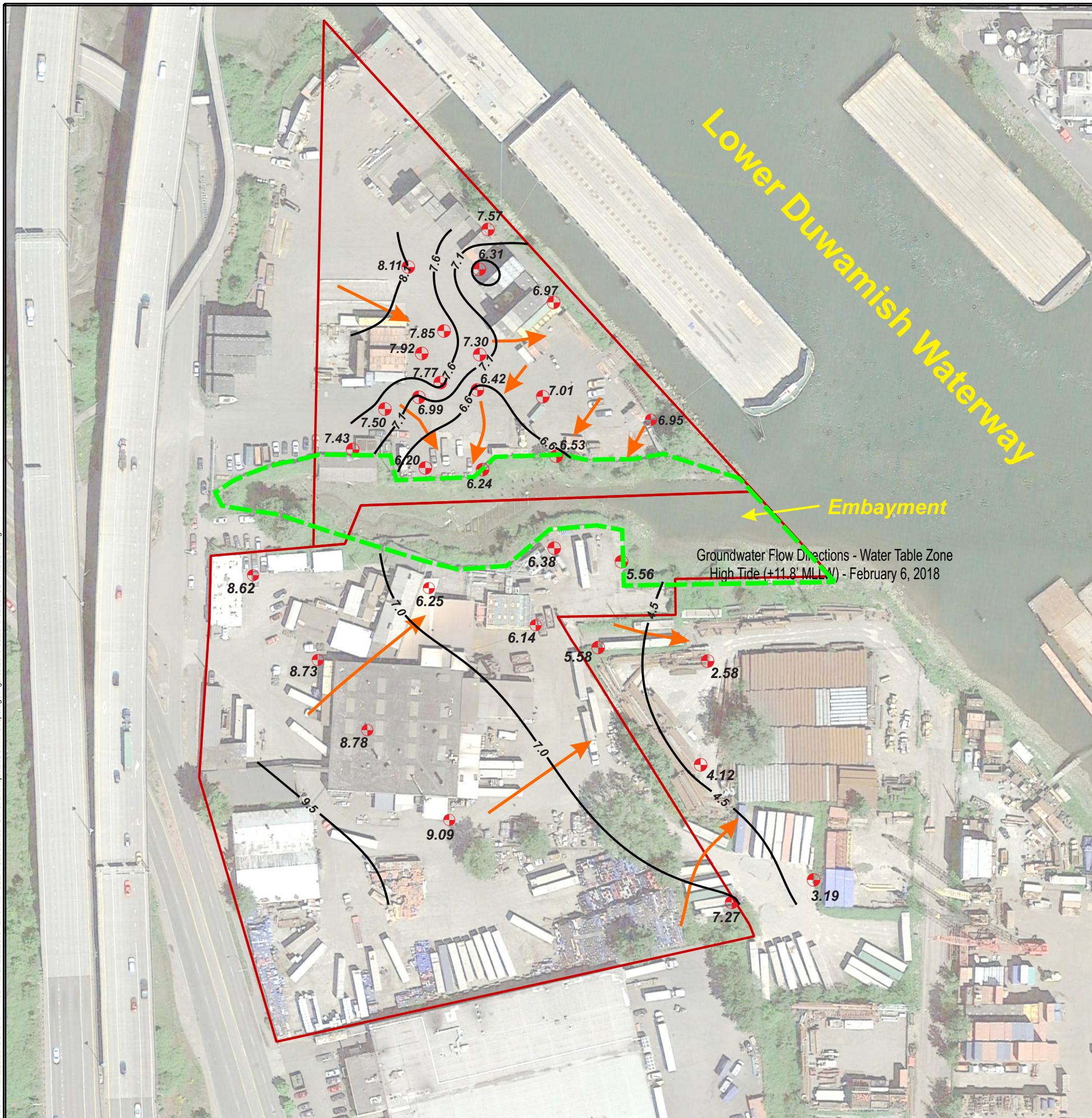
Groundwater Flow Directions - Water Table Zone  
High Tide (+11.8' MLLW) - February 6, 2018



**FIGURE**  
**4-18a**  
March 2018

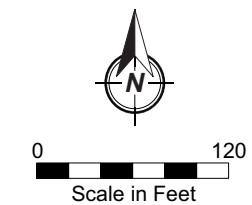


PLOT TIME: 2/23/2018 8:40 AM MOD TIME: 2/23/2018 12:10 PM USER: Lee Barras DWG: D:\Projects\ICS-NW Cooperage\Figures\2018-02-2018-02-23 ICS MWZCDR.dwg



- 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.



Feb 18 Flow Directions.cdr

ICS/NW Cooperage Site  
Seattle, Washington

Groundwater Flow Directions - Water Table Zone  
Low Tide (+2.5' MLLW) - February 6, 2018

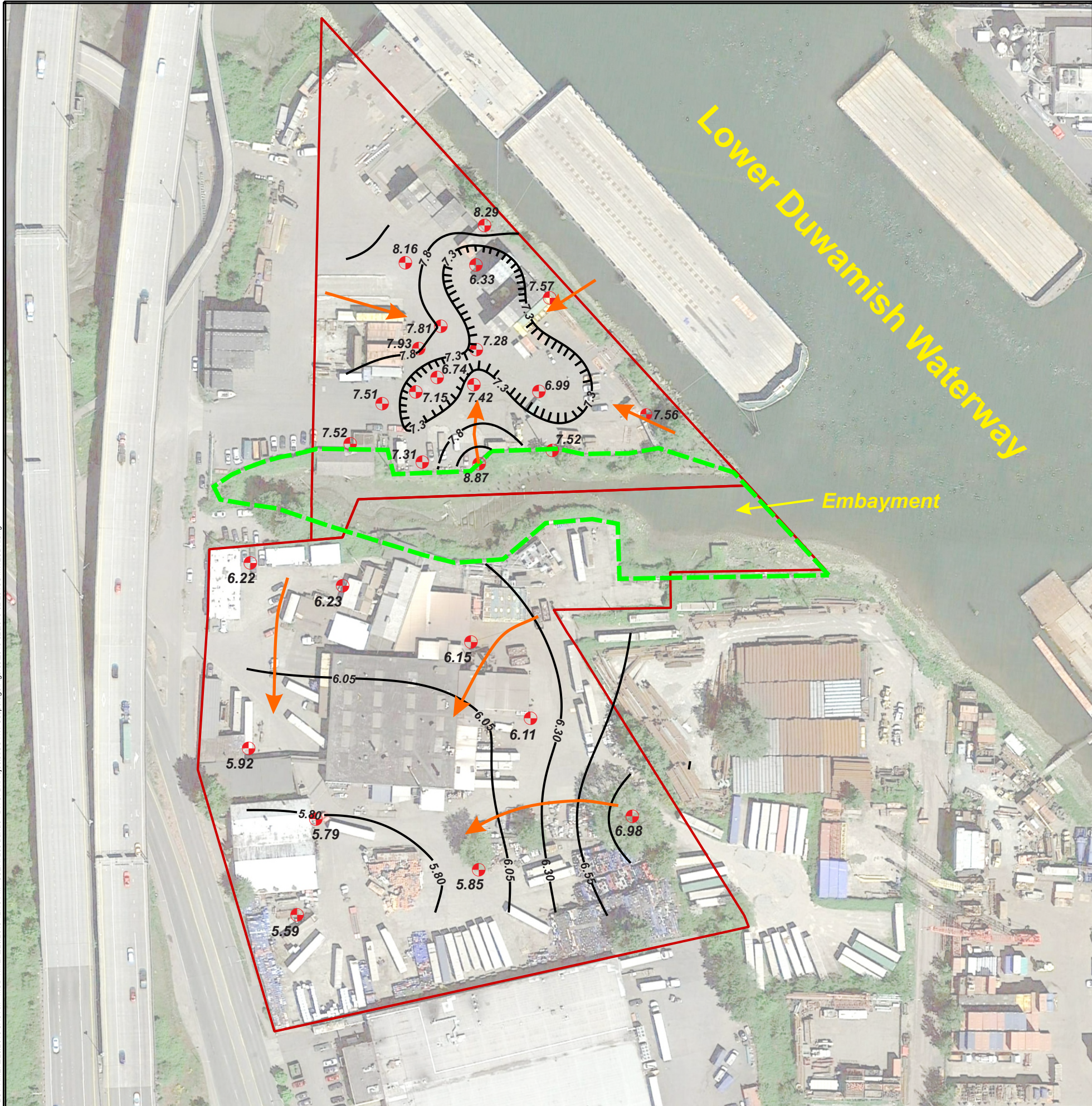
**DOF** DALTON  
OLMSTED  
FUGLEVAND




**FIGURE**  
4-18b

March 2018



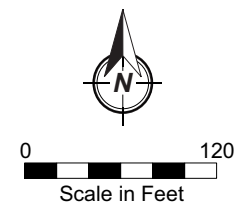
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-  Monitoring Well
- 7.33 Water Level Elevation (ft. NAVD88)
-  8.0 Groundwater Contour (ft. NAVD88)
-  Estimated High Tide Flow Gradient Direction
-  Property Boundary

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.



Feb 18 Flow Directions.cdr

ICS/NW Cooperaage Site  
Seattle, Washington

Groundwater Flow Directions - ICS Upper Zone  
High Tide (+11.8' MLLW) - February 6, 2018






**FIGURE**  
4-19a  
March 2018



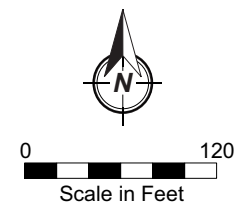
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Feb 18 Flow Directions.cdr

ICS/NW Cooperage Site  
Seattle, Washington

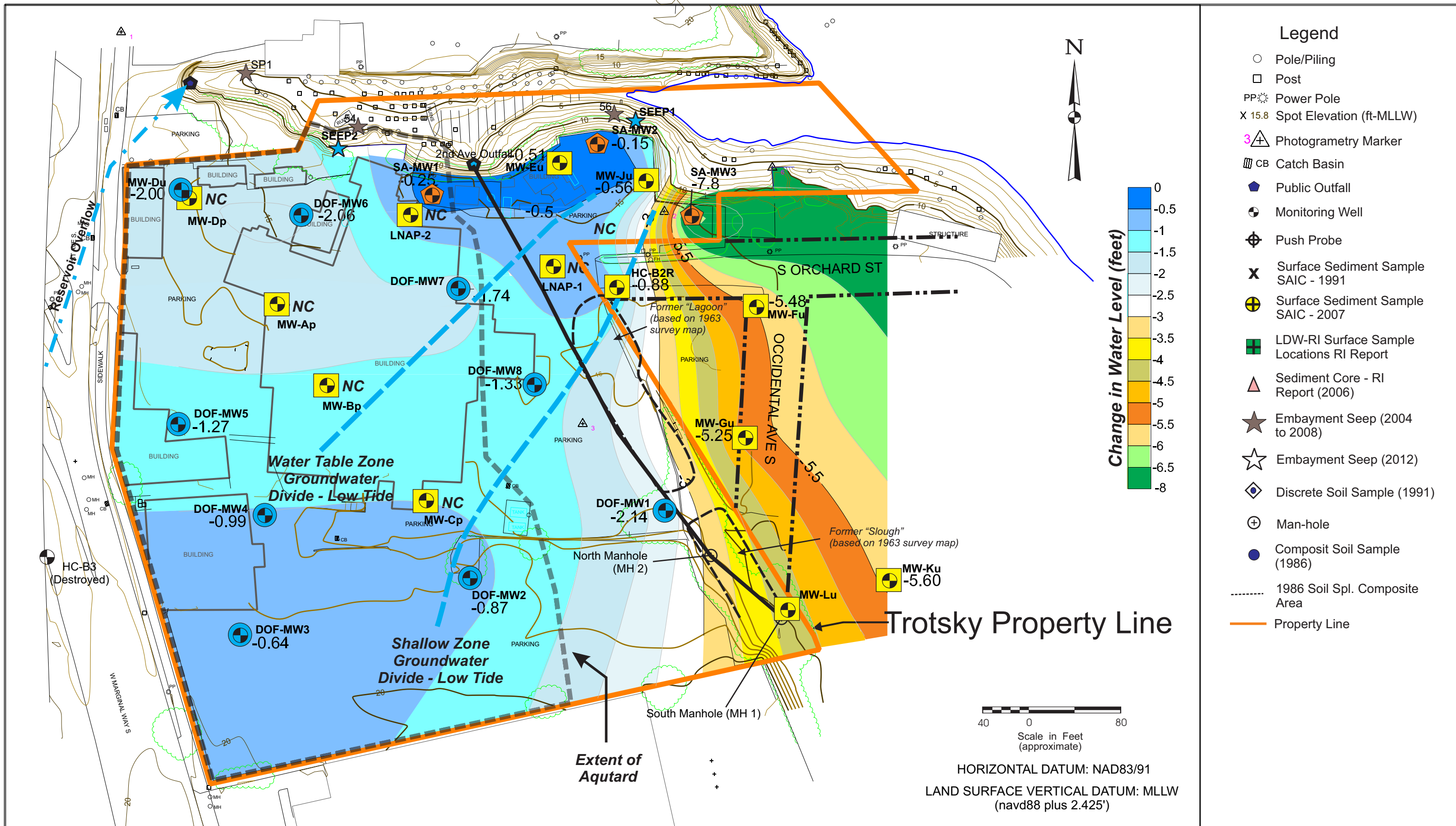
Groundwater Flow Directions - ICS Upper Zone  
Low Tide (+2.5' MLLW) - February 6, 2018



FIGURE  
4-19b

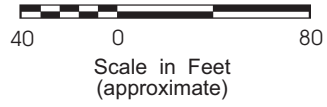
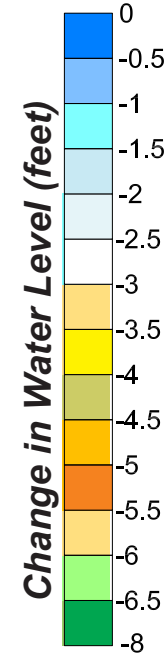
March 2018





**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
- Composit Soil Sample (1986)
- ..... 1986 Soil Spl. Composite Area
- Property Line



HORIZONTAL DATUM: NAD83/91  
 LAND SURFACE VERTICAL DATUM: MLLW (navd88 plus 2.425')

**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.

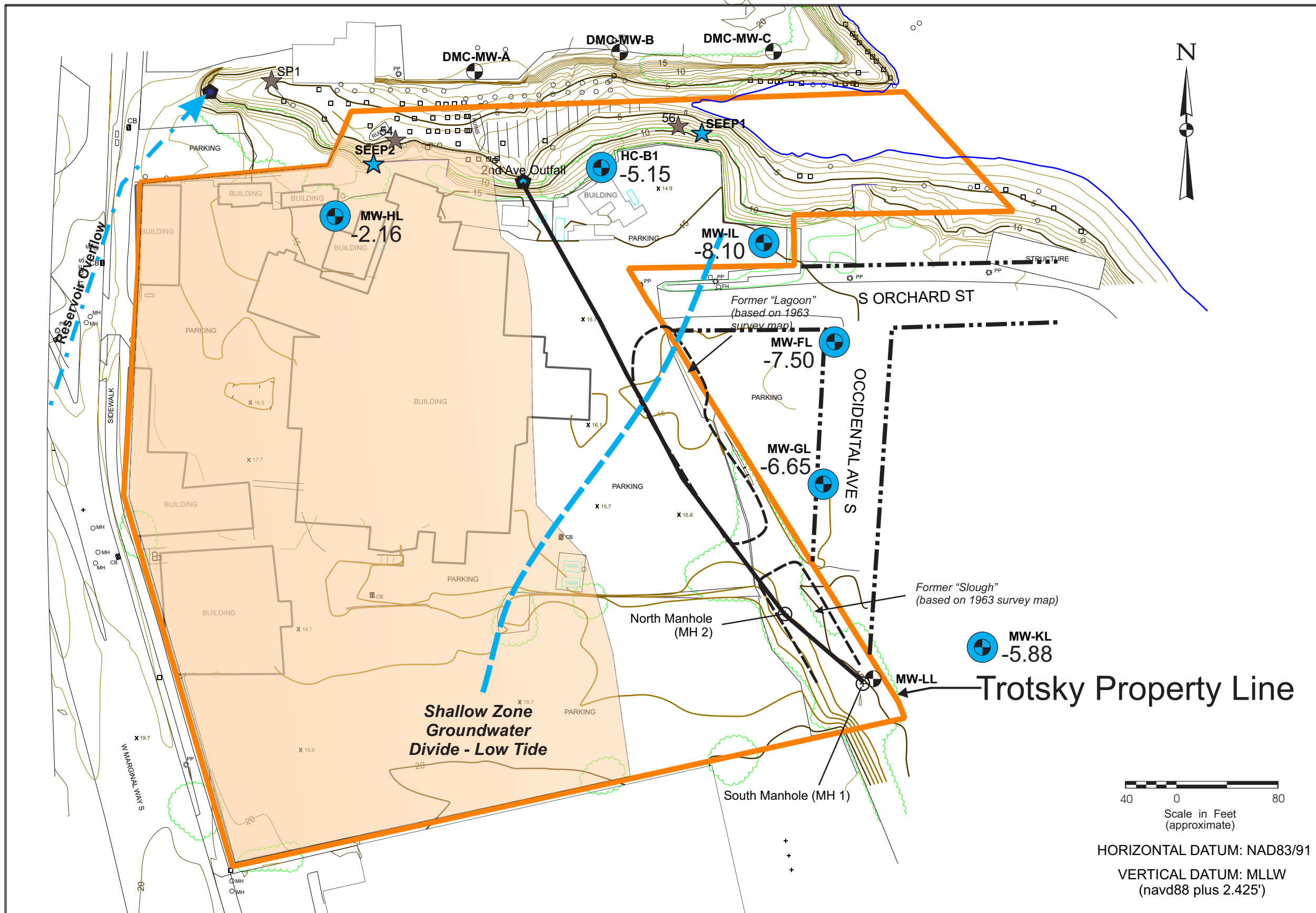
- Water Table Well
- ⊕ Upper Zone Well
- ◆ Well Screened Across Water Table and in Lower Zone
- 0.87 Change in Water Level - High to Low Tide in Feet
- NC - No Significant Change

ICS/NW Cooperaage 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**

Ref: GW Flow Directions April 11, 2016Rev.cdr





**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
- X Surface Sediment Sample SAIC - 1991
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- ⊕ LDW-RI Surface Sample Locations RI Report
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- ◆ Discrete Soil Sample (1991)
- ⊕ Man-hole
- Composite Soil Sample (1986)
- ..... 1986 Soil Spl. Composite Area
- Property Line
- Estimated Aquitard Extent Beneath Main Site

**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

Ref: GW Flow Directions April 11, 2016Rev.cdr

<b>ICS/NW Cooprage Site</b>		<b>FIGURE 4-20b</b>
<b>Change in Water Levels - Lower Zone High to Low Tide (10.8' to -1.3' MLLW) April 11, 2016</b>		
SUM-008-00 (ICS)	Mar. 2018	
<i>Dalton, Olmsted &amp; Fuglevand, Inc.</i>		