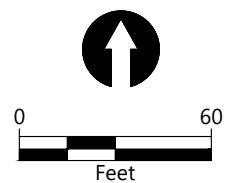
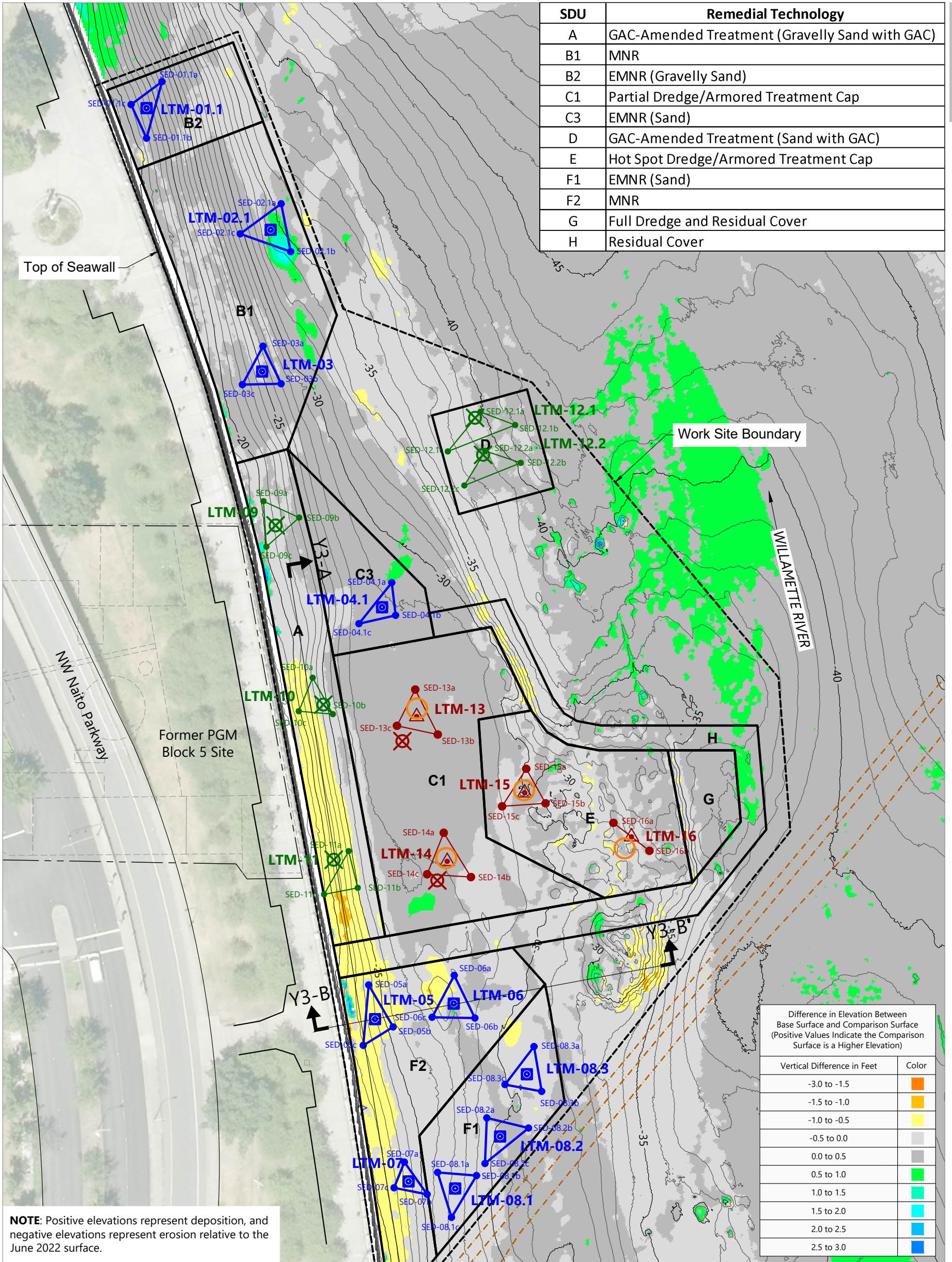


**SOURCE:** Hydrographic survey conducted by eTrac on June 20, 2023.  
Aerial Photograph from Oregon Metro, dated October 25, 2017.  
**HORIZONTAL DATUM:** Oregon State Plane North Zone, North American Datum of 1983 (NAD83), International Feet  
**VERTICAL DATUM:** City of Portland Datum (COP), converted from NAVD88 (-2.10 Feet)

- LEGEND:**
- City of Portland Sanitary Sewer Utility
  - Sediment Decision Unit (SDU) Area
  - Bollard Location and Number
  - June 2023 Bathymetric Contours (1- and 5-Foot Intervals)



SDU	Remedial Technology
A	GAC-Amended Treatment (Gravelly Sand with GAC)
B1	MNR
B2	EMNR (Gravelly Sand)
C1	Partial Dredge/Armored Treatment Cap
C3	EMNR (Sand)
D	GAC-Amended Treatment (Sand with GAC)
E	Hot Spot Dredge/Armored Treatment Cap
F1	EMNR (Sand)
F2	MNR
G	Full Dredge and Residual Cover
H	Residual Cover



Difference in Elevation Between Base Surface and Comparison Surface (Positive Values Indicate the Comparison Surface is a Higher Elevation)

Vertical Difference in Feet	Color
-3.0 to -1.5	Dark Orange
-1.5 to -1.0	Orange
-1.0 to -0.5	Light Orange
-0.5 to 0.0	Yellow
0.0 to 0.5	Light Green
0.5 to 1.0	Green
1.0 to 1.5	Light Blue
1.5 to 2.0	Blue
2.0 to 2.5	Dark Blue
2.5 to 3.0	Very Dark Blue

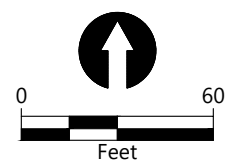
**NOTE:** Positive elevations represent deposition, and negative elevations represent erosion relative to the June 2022 surface.

**Existing Features:**

- City of Portland Sanitary Sewer Utility
- Sediment Decision Unit Areas
- Bollard Location and Number
- 2023 Bathymetric Contours (1- and 5-Foot Intervals)
- Direct TZW/SW Sample Adjacent to Manhole Sampling Device (Armored GAC-Amended Cap)

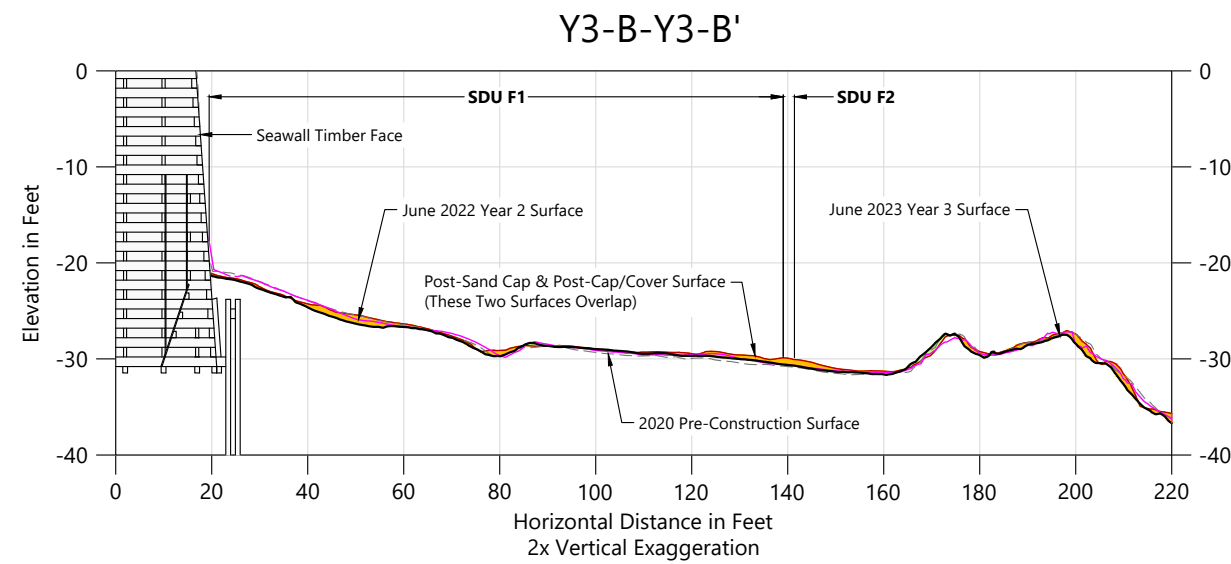
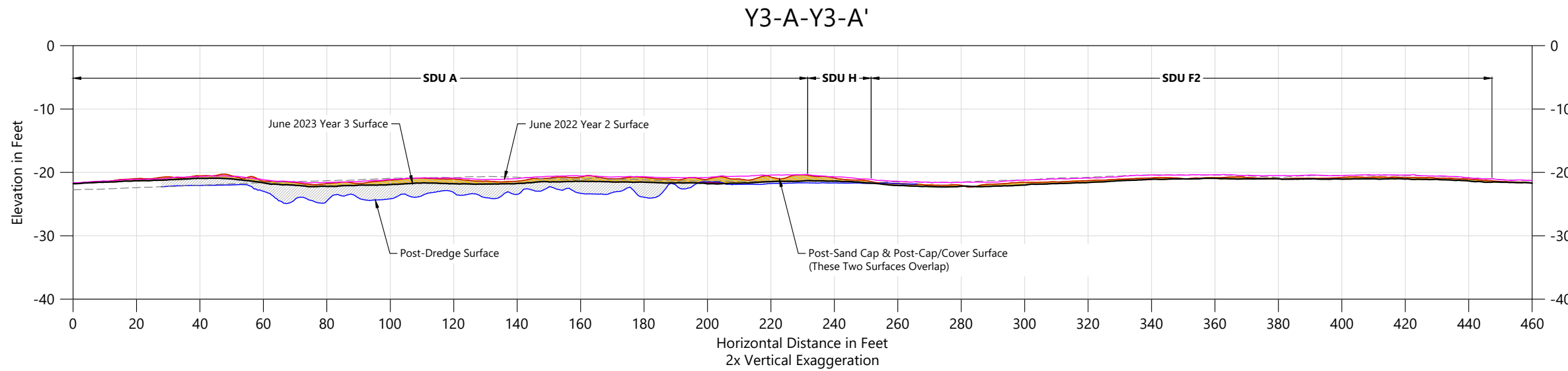
**Long-Term Monitoring Locations:**

- Surface Sediment Grab Sample (MNR/EMNR Areas)
- Colocated Surface Sediment Grab Sample and TZW/SW Sample (GAC-Amended Cover)
- Colocated Surface Sediment Grab Sample and Porewater Sample (Armored, GAC-Amended Cap)
- As-Built: Permanent, Manhole-Type Porewater Sampling Device



**SOURCE:** Year 2 hydrographic survey conducted by eTrac on June 14, 2022. Year 3 hydrographic survey conducted by eTrac on June 20, 2023. Aerial Photograph from Oregon Metro, dated October 25, 2017.  
**HORIZONTAL DATUM:** Oregon State Plane North Zone NAD83, International Feet  
**VERTICAL DATUM:** City of Portland (COP)

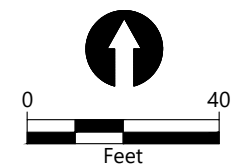
SDU	Remedial Technology
A	GAC-Amended Treatment (Gravelly Sand with GAC)
B1	MNR
B2	EMNR (Gravelly Sand)
C1	Partial Dredge/Armored Treatment Cap
C3	EMNR (Sand)
D	GAC-Amended Treatment (Sand with GAC)
E	Hot Spot Dredge/Armored Treatment Cap
F1	EMNR (Sand)
F2	MNR
G	Full Dredge and Residual Cover
H	Residual Cover

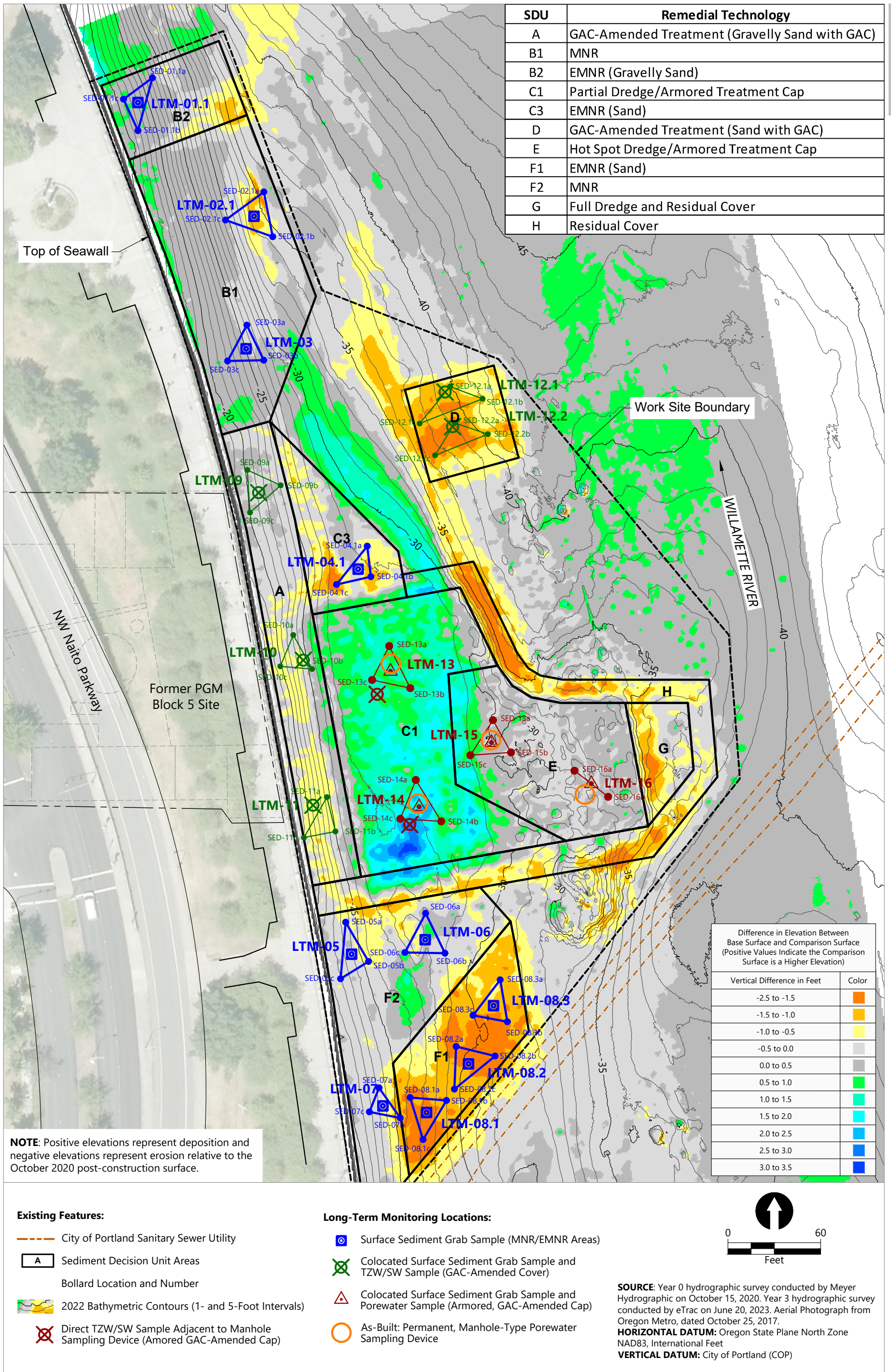


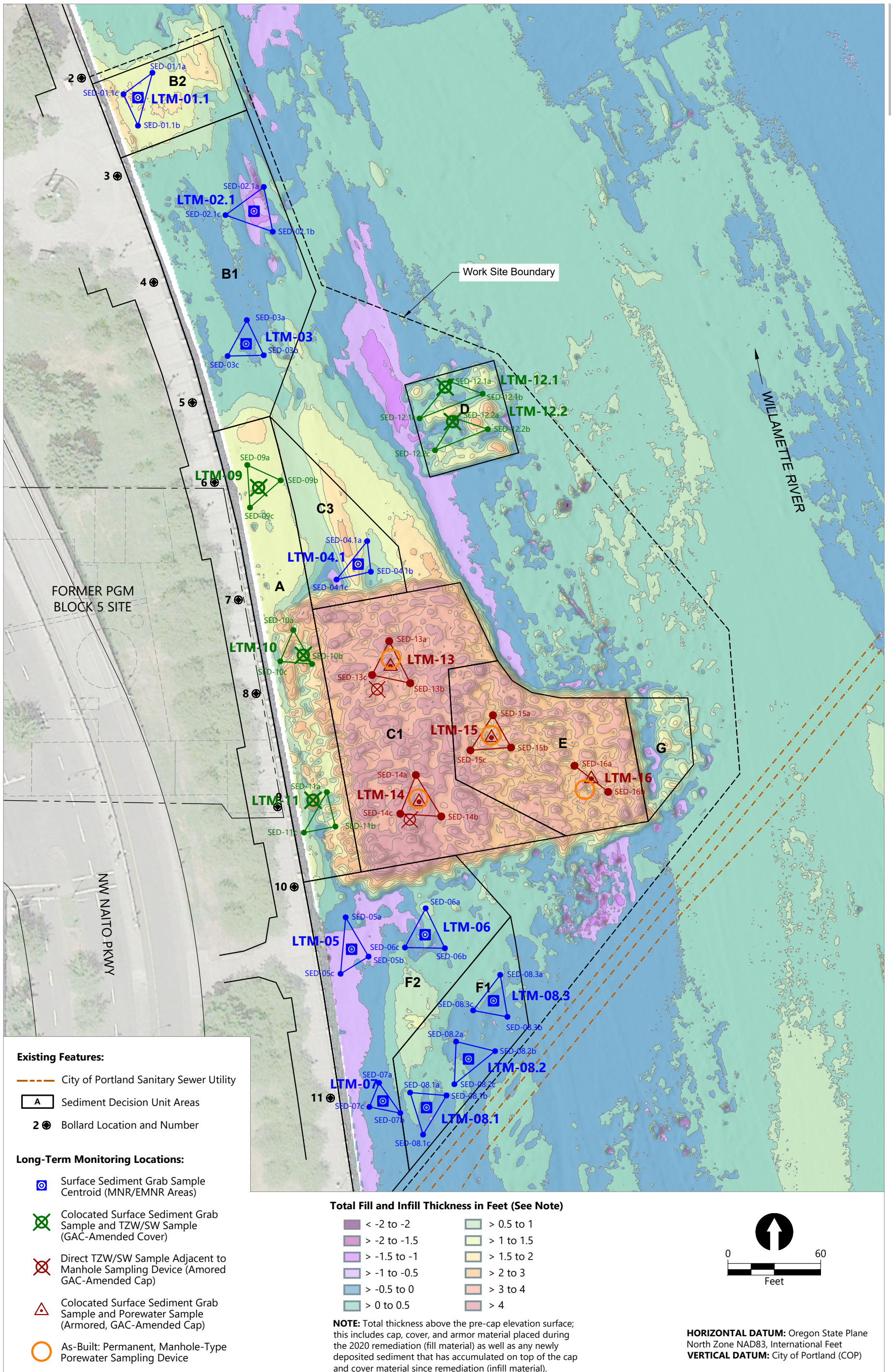
**LEGEND:**

- Cap/Cover Thickness
- Area of Cap/Cover/Sediment Erosion
- Area of Cap/Cover/Sediment Accretion
- Area of Erosion to Pre-Cap/Cover Elevation

**HORIZONTAL DATUM:** Oregon State Plane North Zone, North American Datum of 1983 (NAD83), International Feet  
**VERTICAL DATUM:** City of Portland Datum (COP), converted from NAVD88 (-2.10 Feet)



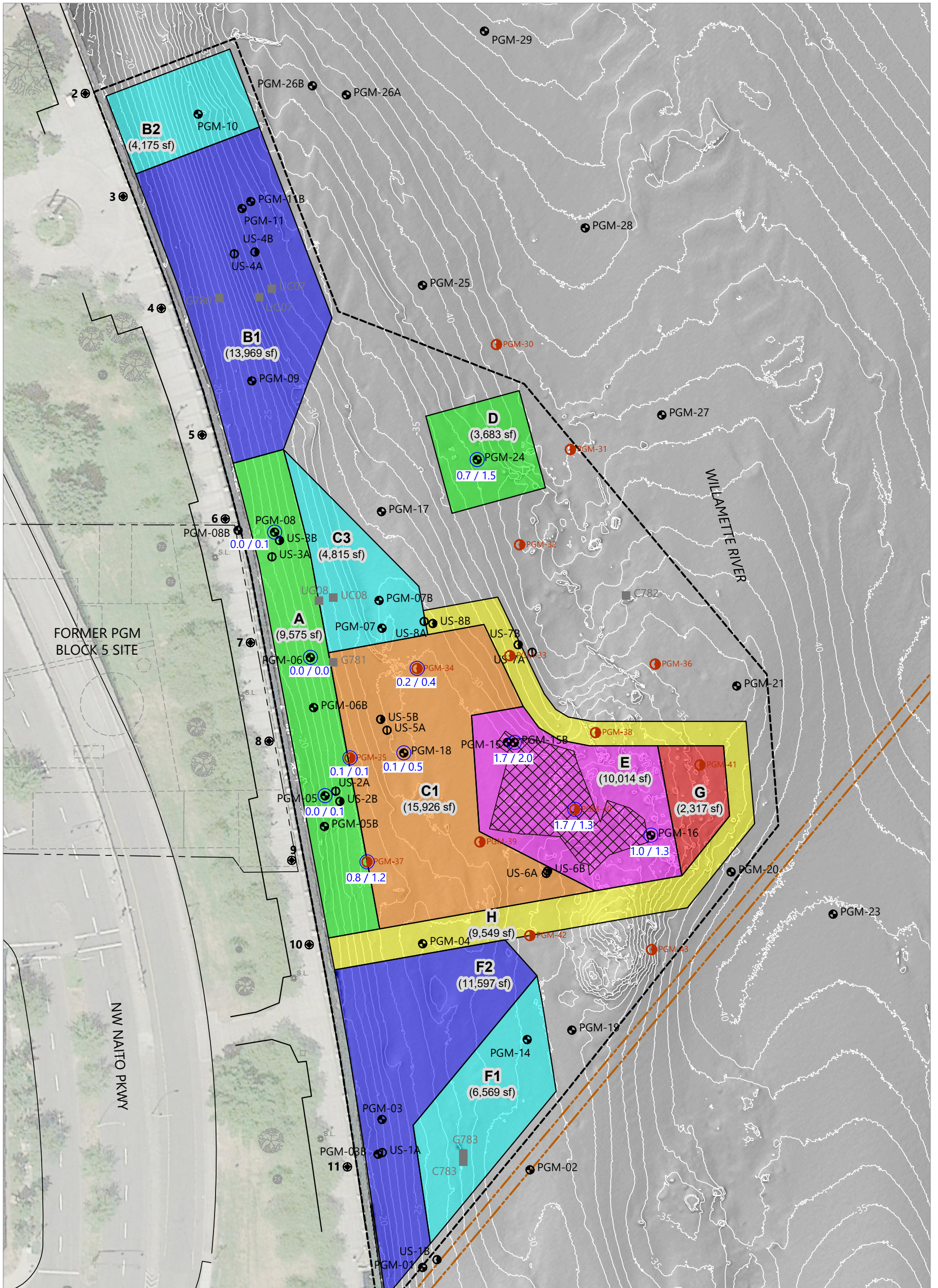




Publish Date: 2023/07/06 5:00 PM | User: jbiggsby  
 Filepath: K:\Projects\0029-NW Natural Gas Co\Portland Gas Manufacturing Site\Long Term Monitoring\Year 3 Monitoring Report\0029-RP-006 (Cap\_Cover\_Infill Thickness-Year 3 MR).dwg Figure 9



**Figure 9**  
**June 2023 Cap, Cover, and Infill Thickness**  
 Year 3 Monitoring Report  
 Former Portland Gas Manufacturing Site



**LEGEND:**

- PGM Sediment Core Location
- Historical Sediment Sampling Location
- ▨ Surface Tar-Like Material
- City of Portland Sanitary Sewer Utilities
- Sediment Decision Unit Areas
- - - Work Site Boundary (Containment and Sorbent Booms)

2017 Bathymetric Contours (1-Foot Intervals)

● 2017 Sediment Chemistry Boring (Dredge and Cap Delineation)

○ Sediment Core Evaluated in Cap Model

Predicted GAC Requirement (% Dry Weight) See Tables C-4 and C-5

Base Case Worst Case  
0.8 / 1.2

**REMEDIAL TECHNOLOGIES:**

- B1, F2 Monitored Natural Recovery (MNR)
- B2, C3, F1 Enhanced MNR (EMNR)
- A, D GAC-Amended Treatment Cover
- C1 Partial Dredge and Armored Treatment Cap
- E Surface Product Removal with Armored Treatment Cap
- G Full Dredge and Residual Cover

H Side Slope Dredge and Residual Cover



**HORIZONTAL DATUM:** Oregon State Plane North, NAD83, International Feet

**VERTICAL DATUM:** City of Portland Datum  
**NOTE:** GAC = Granular Activated Carbon

**Table x**

**Average SDU and Site-Wide Bathymetric Differences and Cap/Cover/Infill Thicknesses**

SDU	Average Bathymetric Difference Measurement (feet)				Estimated Cap/Cover/Infill Thickness (feet)
	Year 1	Year 2	Year 3	Cumulative	
<b>Start:</b>	<b>October 2020</b>	<b>July 2021</b>	<b>June 2022</b>	<b>October 2020</b>	<b>June/August 2020<sup>1</sup></b>
<b>End:</b>	<b>July 2021</b>	<b>June 2022</b>	<b>June 2023</b>	<b>June 2023</b>	<b>June 2023</b>
<b>Armored Cap</b>					
C1	0.90	-0.01	0.16	1.05	3.85
E	0.52	-0.28	-0.03	0.21	3.11
<b>GAC/Sand Cover</b>					
A	0.38	-0.29	-0.36	-0.24	1.42
D	-0.89	-0.24	-0.03	-1.17	0.61
<b>Sand Cover (EMNR)</b>					
B2	0.26	-0.30	-0.01	-0.04	1.20
C3	-0.26	-0.36	0.24	-0.38	1.13
F1	-0.63	-0.58	-0.13	-1.33	0.04
<b>MNR</b>					
B1	0.32	-0.38	0.10	0.06	0.07
F2	0.43	-0.35	-0.37	-0.27	-0.16
<b>Residuals Cover</b>					
G	-0.44	-0.34	0.13	-0.65	0.60
H	-0.23	-0.26	-0.04	-0.52	0.57
<b>No Action</b>					
Other <sup>2</sup>	0.09	-0.22	0.10	-0.03	0.13
<b>Work Site Total</b>					
	0.19	-0.26	0.00	-0.06	0.97

Legend for Average Bathymetric Difference Measurements:

	Measurable deposition occurred during the specified time interval.
	Measurable erosion occurred during the specified time interval.
	Bathymetric difference greater than ± 0.3 feet (Year 3 only)
	Bathymetric difference is within the range of survey measurement accuracy (± 0.5 feet), indicating deposition and/or erosion are uncertain.

Notes:

1. Post-dredge/post-debris removal surface (pre-cap/pre-cover) merged with pre-construction surface in undredged areas.

2. Includes outer peripheral areas within the PGM Work Site not assigned to an SDU.

EMNR: enhanced monitored natural recovery

GAC: granular activated carbon

MNR: monitored natural recovery

PGM: Portland Gas Manufacturing

SDU: Sediment Decision Unit