

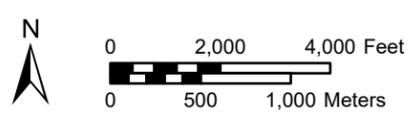
# Figures

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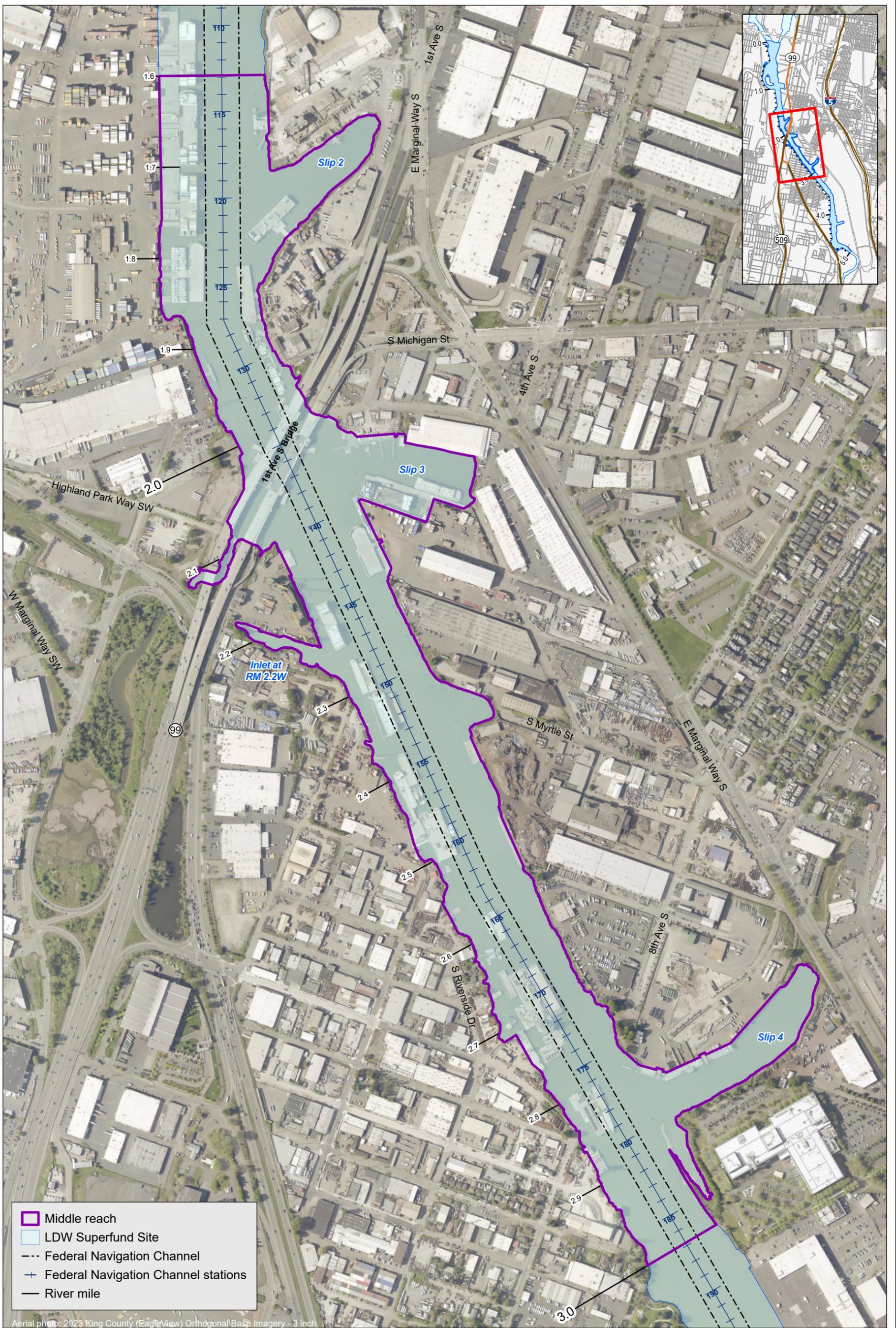
Middle reach  
 LDW Superfund Site  
 City line  
 River mile

Aerial photo: 2023 King County (EagleView) Orthogonal Base Imagery - 3 inch



**Figure 2-1. LDW Superfund Site Vicinity Map**  
 30% REMEDIAL DESIGN BASIS OF DESIGN  
 REPORT FOR THE LDW MIDDLE REACH  
 OCTOBER 27, 2025

Prepared by craigh, 10/22/2025: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx Fig 02-1 7069 Vicinity map

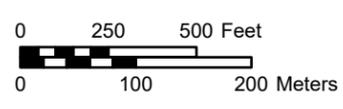


- Middle reach
- LDW Superfund Site
- Federal Navigation Channel
- + Federal Navigation Channel stations
- River mile

Aerial photo: 2023 King County (EagleView) OrthogonalBase Imagery - 3 inch

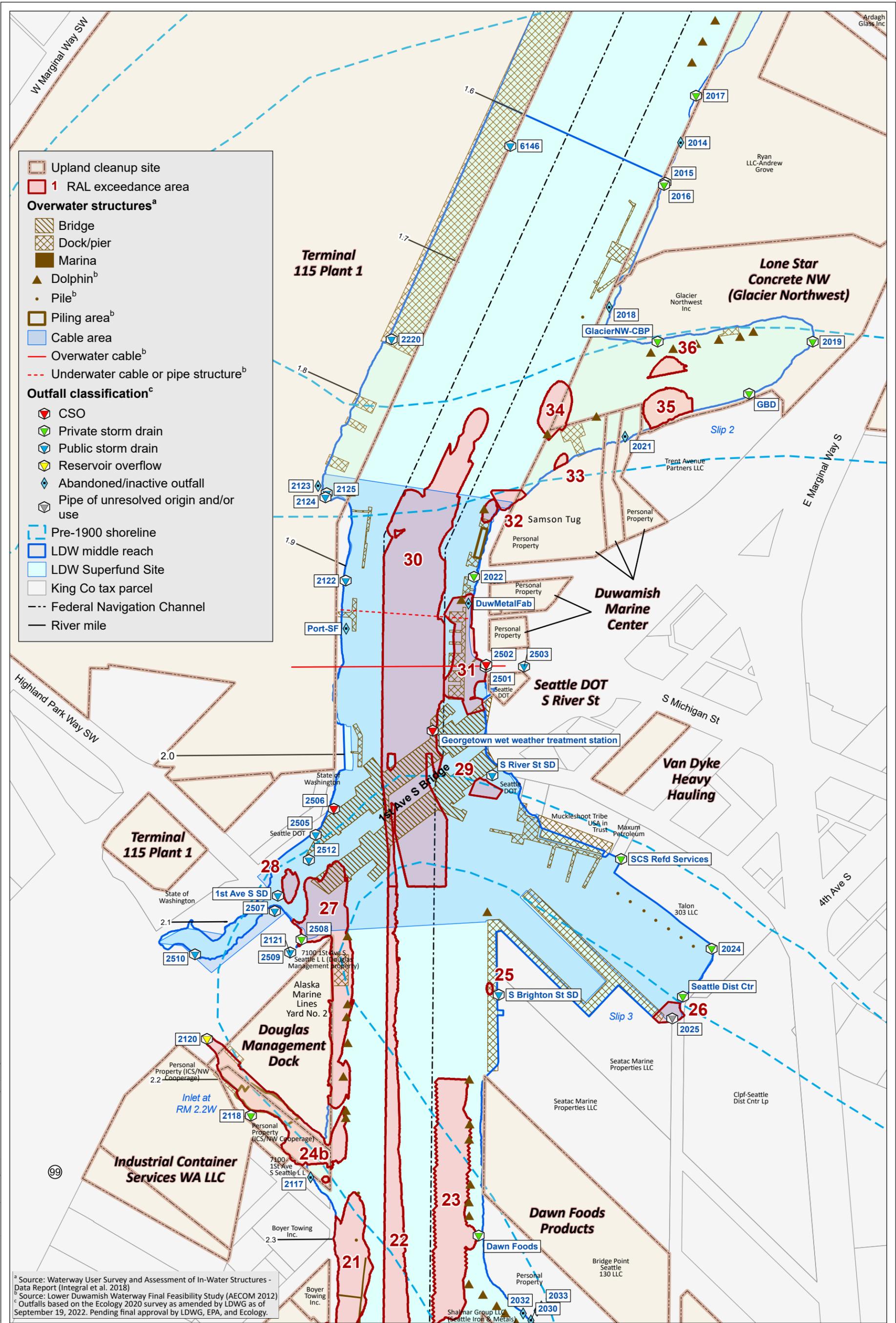


**Lower Duwamish Waterway Group**  
 City of Seattle / King County / The Boeing Company



**Figure 2-2. Middle Reach Vicinity Map**  
 30% REMEDIAL DESIGN BASIS OF DESIGN  
 REPORT FOR THE LDW MIDDLE REACH  
 OCTOBER 27, 2025

Prepared by craigh, 10/22/2025: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 percent\30 Percent Design.aprx|Fig 02-2 7069 Middle reach vicinity map



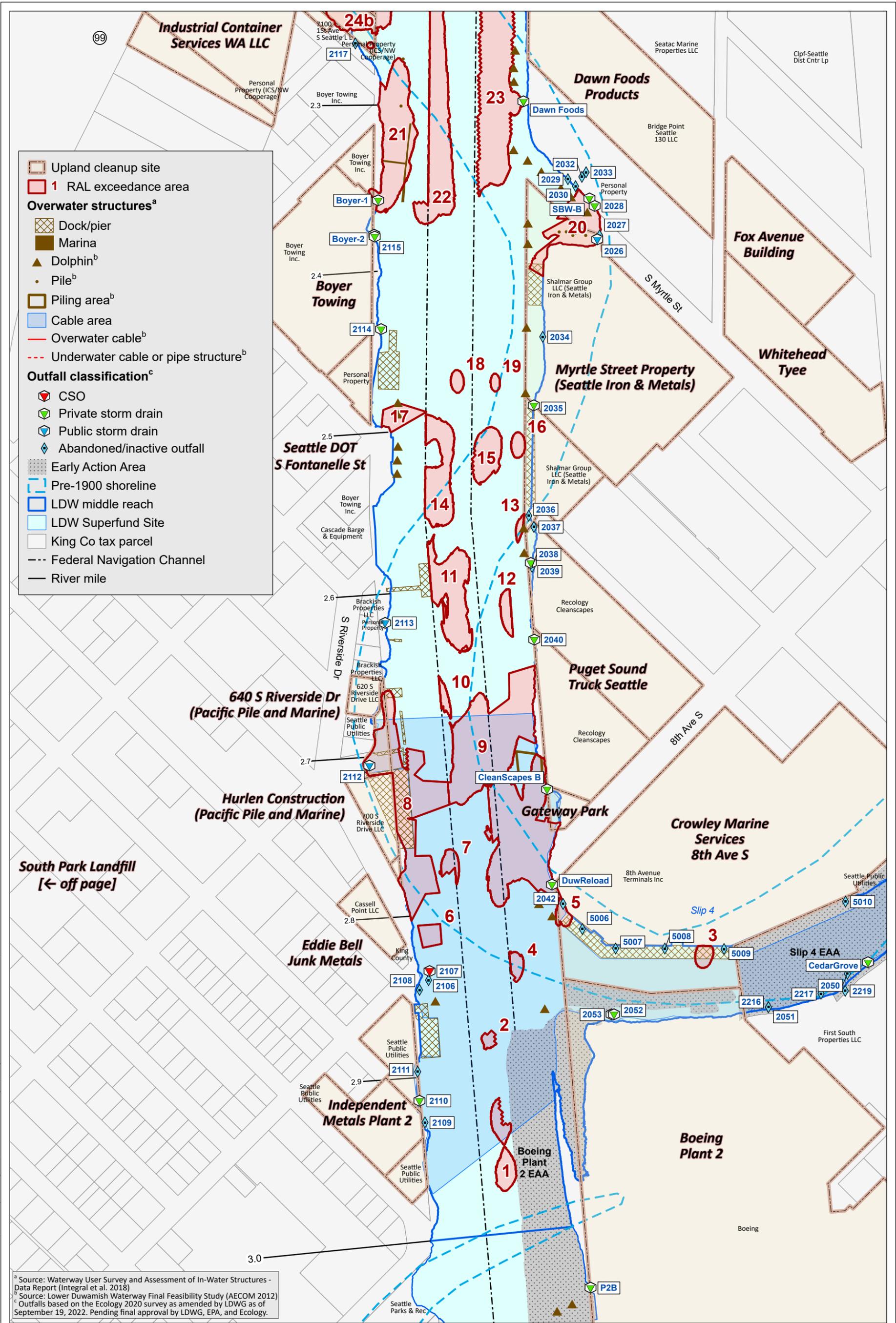
<sup>a</sup> Source: Waterway User Survey and Assessment of In-Water Structures - Data Report (Integral et al. 2018)  
<sup>b</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)  
<sup>c</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology.



**Figure 2-3a. Infrastructure, Early Action Areas, Upland Sites, and Land Ownership, RM 1.6 to RM 2.3**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH  
 OCTOBER 27, 2025

Prepared by craigh, 10/27/2025; W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 percent\30 Percent Design.aprx; Fig 02-3 7480 Infrastructure, EMAs, and upland sites

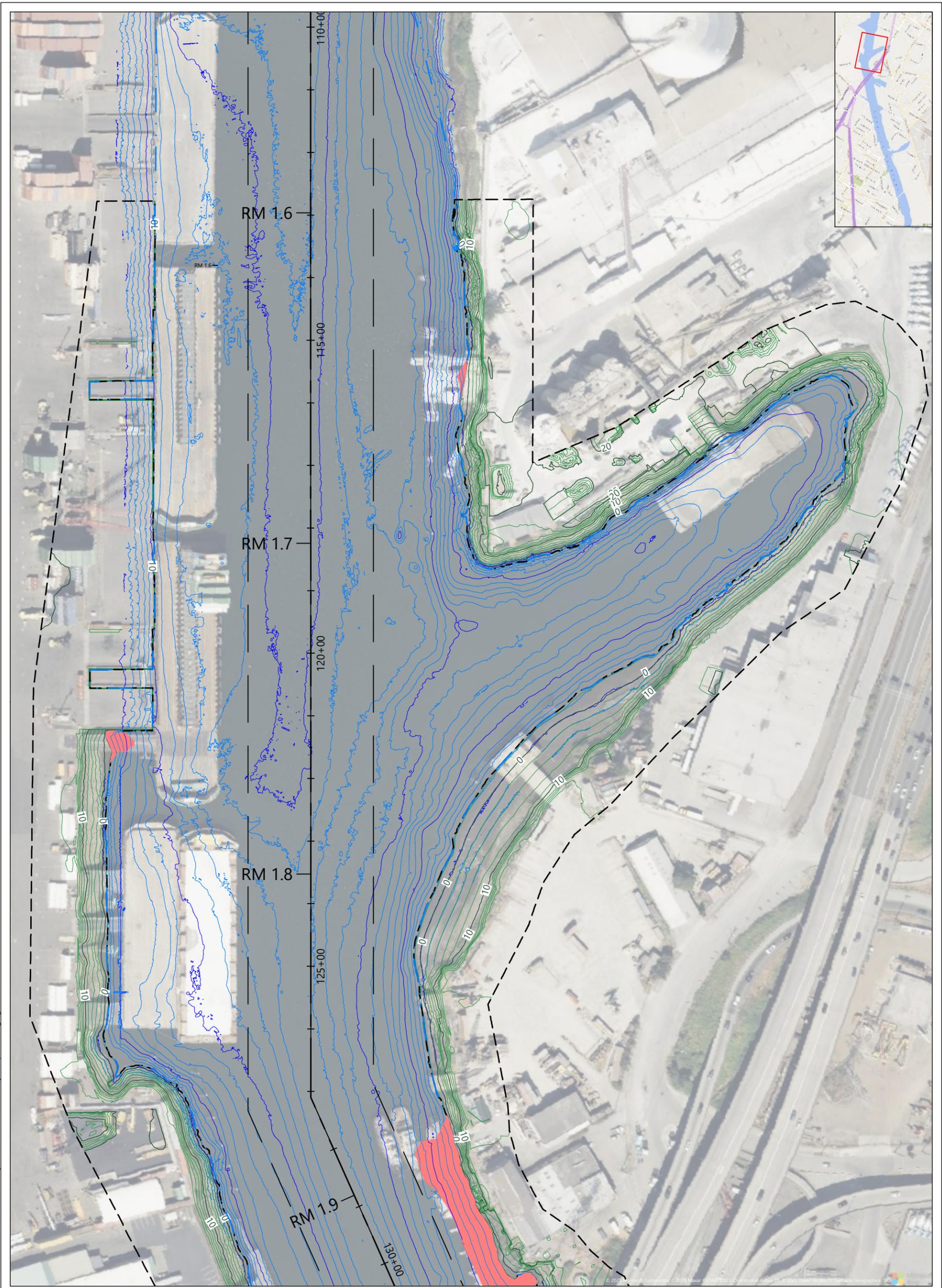


<sup>a</sup> Source: Waterway User Survey and Assessment of In-Water Structures - Data Report (Integral et al. 2018)  
<sup>b</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)  
<sup>c</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology.



**Figure 2-3b. Infrastructure, Early Action Areas, Upland Sites, and Land Ownership, RM 2.3 to RM 3.0**  
 30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH  
 OCTOBER 27, 2025

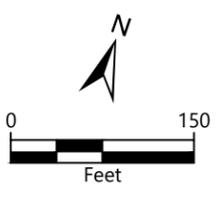
Prepared by craigh, 10/27/2025; W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx Fig 02-3 7480 Infrastructure, EAs, and upland sites



**Source:** Miller Creek Associates (photogrammetric survey, site flow on June 6, 2024) and True North Surveying (ground survey, shots collected on August 19-23, 2024). Northwest Hydro performed the bathymetric survey in 2021, as well as the bathymetric surveys between January and June 2023.

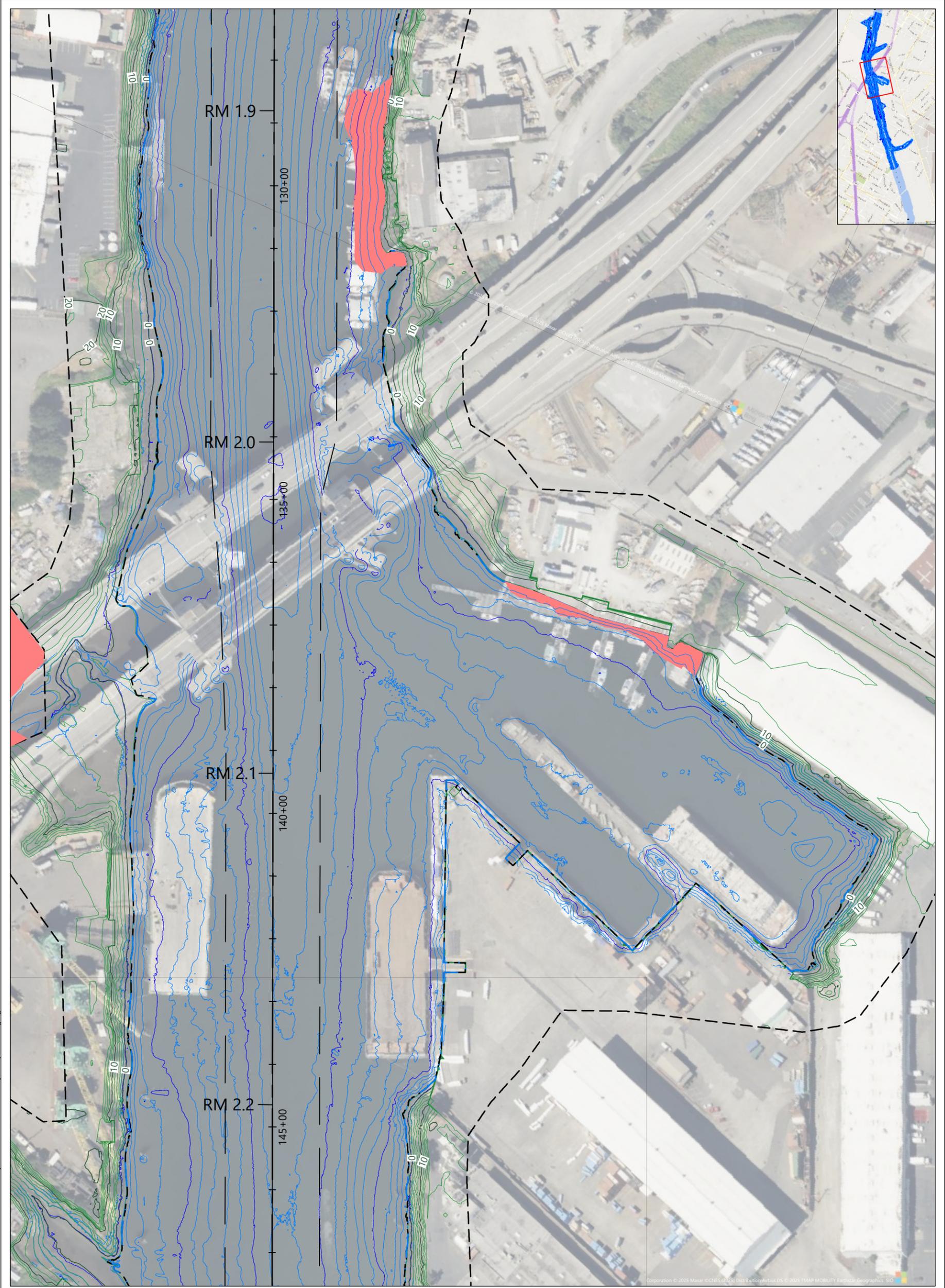
**Legend:**

- Federal Navigation Channel
- 2024 Topography (2' & 10' Intervals)
- 2021/2023 Bathymetry (2' & 10' Intervals)
- Interpolated Areas
- 2024 Topography Survey Limits
- Channel Centerline and Stationing
- Waterward extent of topographic survey



**Figure 2-4a. Bathymetric and Topographic Interpolation Areas, River Mile 1.5 to 1.9**

K:\Projects\0075-City of Seattle\Middle Reach of the Lower Duwamish Waterway\0075-RP-005 LDW-MR Surveys\Interpolation.dwg Figure 2-4b



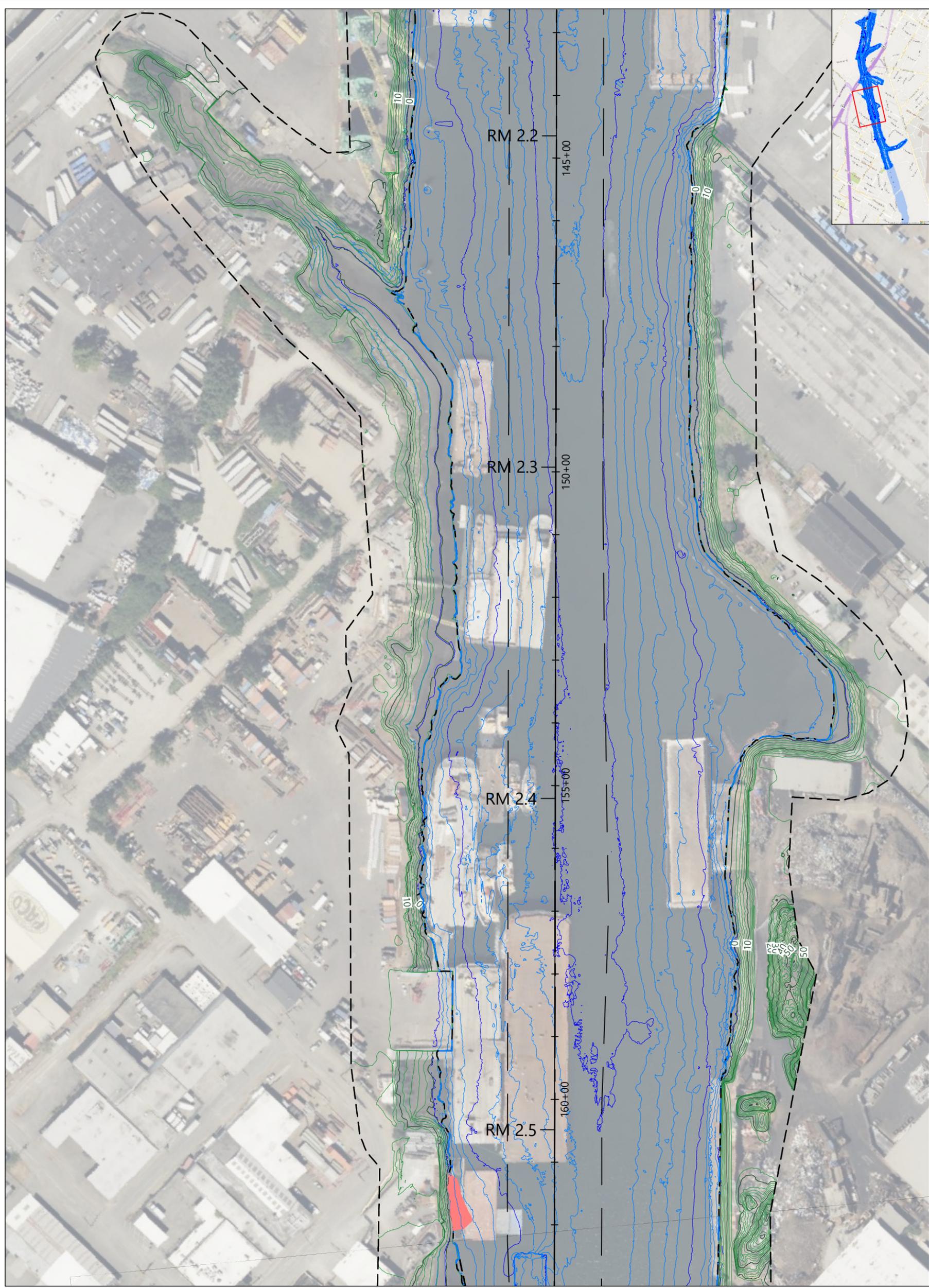
**Source:** Miller Creek Associates (photogrammetric survey, site flow on June 6, 2024) and True North Surveying (ground survey, shots collected on August 19-23, 2024). Northwest Hydro performed the bathymetric survey in 2021, as well as the bathymetric surveys between January and June 2023.

**Legend:**

- Federal Navigation Channel
- 2024 Topography Survey Limits
- 2024 Topography (2' & 10' Intervals)
- 2021/2023 Bathymetry (2' & 10' Intervals)
- Interpolated Areas
- Channel Centerline and Stationing
- Waterward extent of topographic survey

**Figure 2-4b. Bathymetric and Topographic Interpolation Areas, River Mile 1.9 to 2.2**

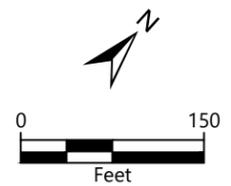
K:\Projects\0075-City of Seattle\Middle Reach of the Lower Duwamish Waterway\0075-RP-005-LDWMR-Surveys\Interpolation.dwg Figure 2-4c



**Source:** Miller Creek Associates (photogrammetric survey, site flow on June 6, 2024) and True North Surveying (ground survey, shots collected on August 19-23, 2024). Northwest Hydro performed the bathymetric survey in 2021, as well as the bathymetric surveys between January and June 2023.

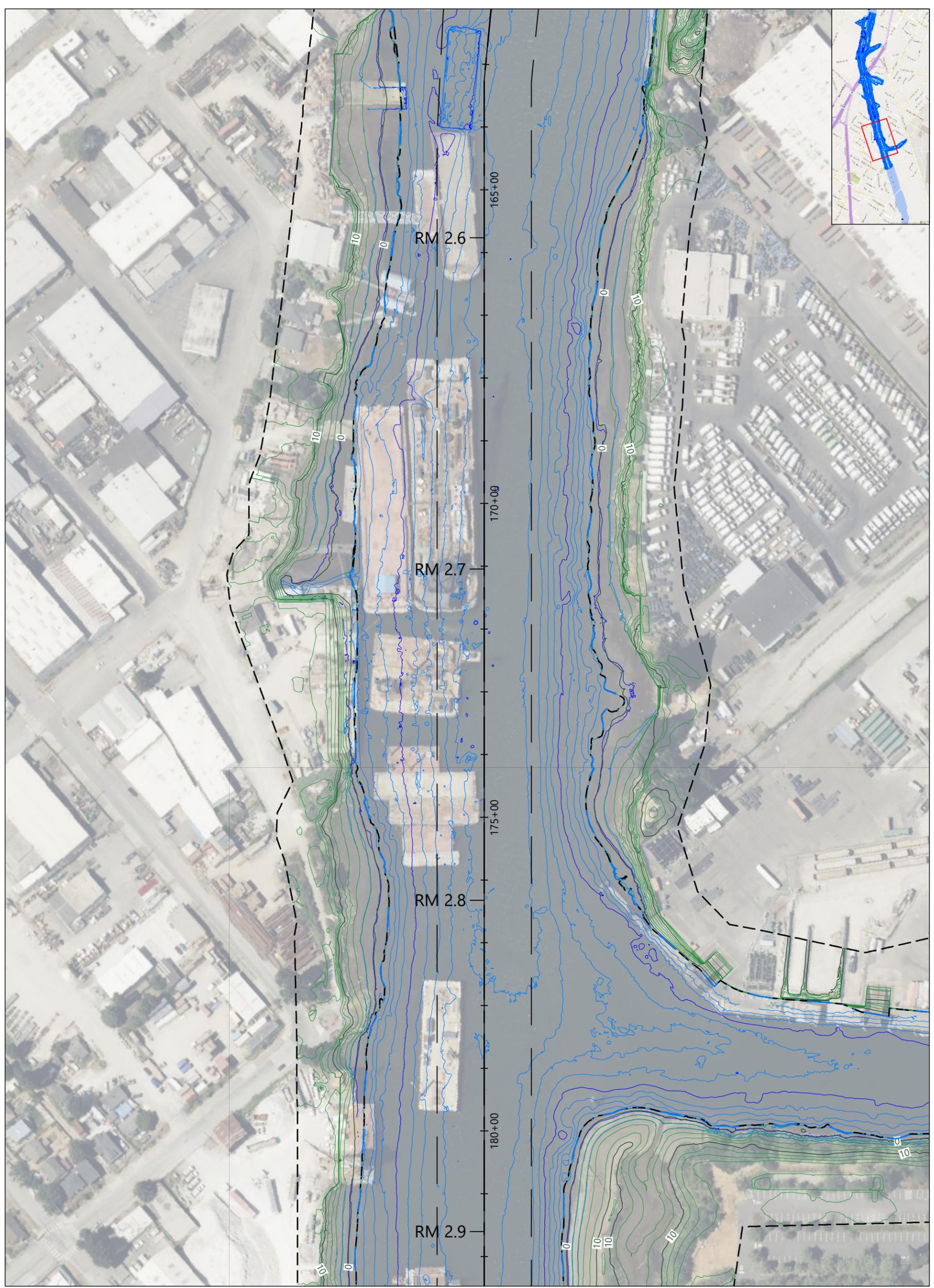
**Legend:**

- Federal Navigation Channel
- 2024 Topography Survey Limits
- 2024 Topography (2' & 10' Intervals)
- 2021/2023 Bathymetry (2' & 10' Intervals)
- Channel Centerline and Stationing
- Interpolated Areas
- Waterward extent of topographic survey



**Figure 2-4c. Bathymetric and Topographic Interpolation Areas, River Mile 2.2 to 2.5**

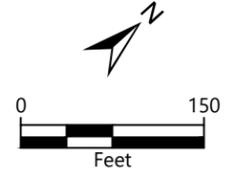
K:\Projects\0075-City of Seattle\Middle Reach of the Lower Duwamish Waterway\0075-RP-005-LDWMR-Surveys\Interpolation.dwg Figure 2-4d



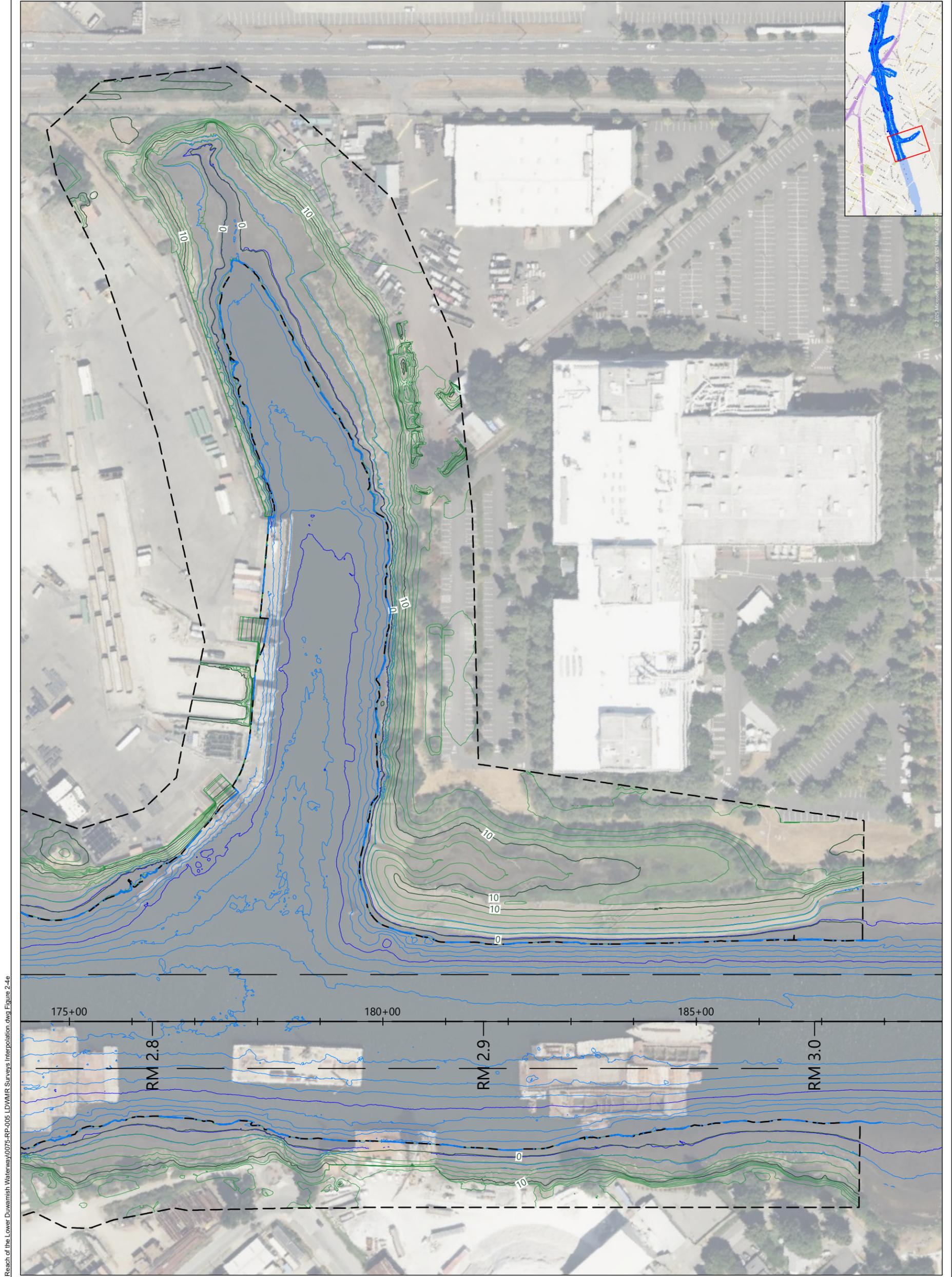
**Source:** Miller Creek Associates (photogrammetric survey, site flow on June 6, 2024) and True North Surveying (ground survey, shots collected on August 19-23, 2024). Northwest Hydro performed the bathymetric survey in 2021, as well as the bathymetric surveys between January and June 2023.

**Legend:**

- Federal Navigation Channel
- 2024 Topography Survey Limits
- 2024 Topography (2' & 10' Intervals)
- 2021/2023 Bathymetry (2' & 10' Intervals)
- Interpolated Areas
- Channel Centerline and Stationing
- Waterward extent of topographic survey



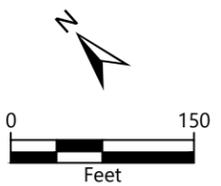
**Figure 2-4d. Bathymetric and Topographic Interpolation Areas, River Mile 2.6 to 2.9**



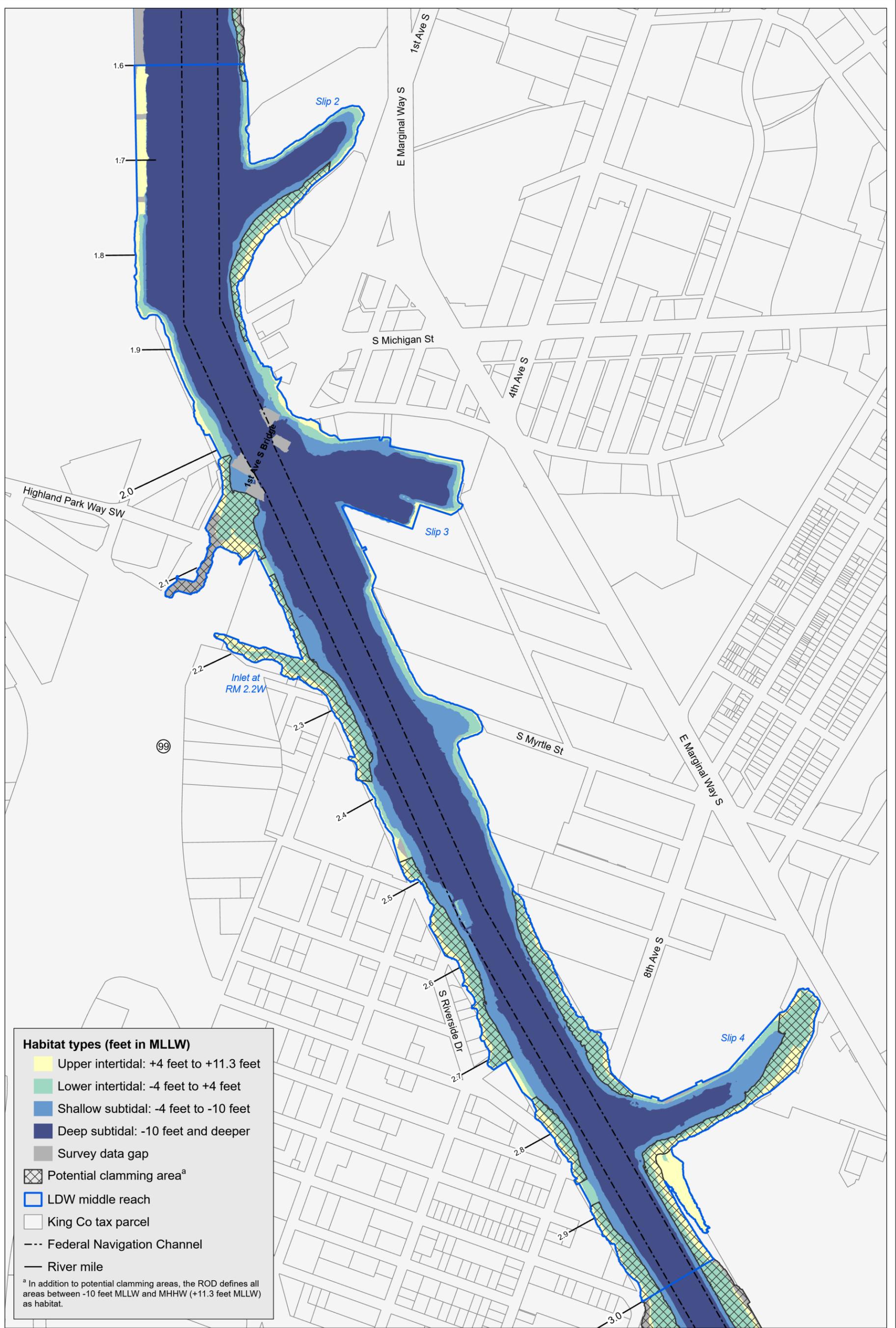
**Source:** Miller Creek Associates (photogrammetric survey, site flow on June 6, 2024) and True North Surveying (ground survey, shots collected on August 19-23, 2024). Northwest Hydro performed the bathymetric survey in 2021, as well as the bathymetric surveys between January and June 2023.

**Legend:**

- Federal Navigation Channel
- 2024 Topography (2' & 10' Intervals)
- 2021/2023 Bathymetry (2' & 10' Intervals)
- Interpolated Areas
- 2024 Topography Survey Limits
- Channel Centerline and Stationing
- Waterward extent of topographic survey



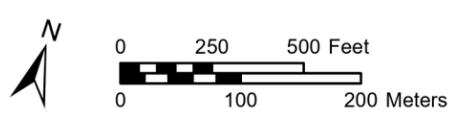
**Figure 2-4e. Bathymetric and Topographic Interpolation Areas, River Mile 2.8 to 3.0**

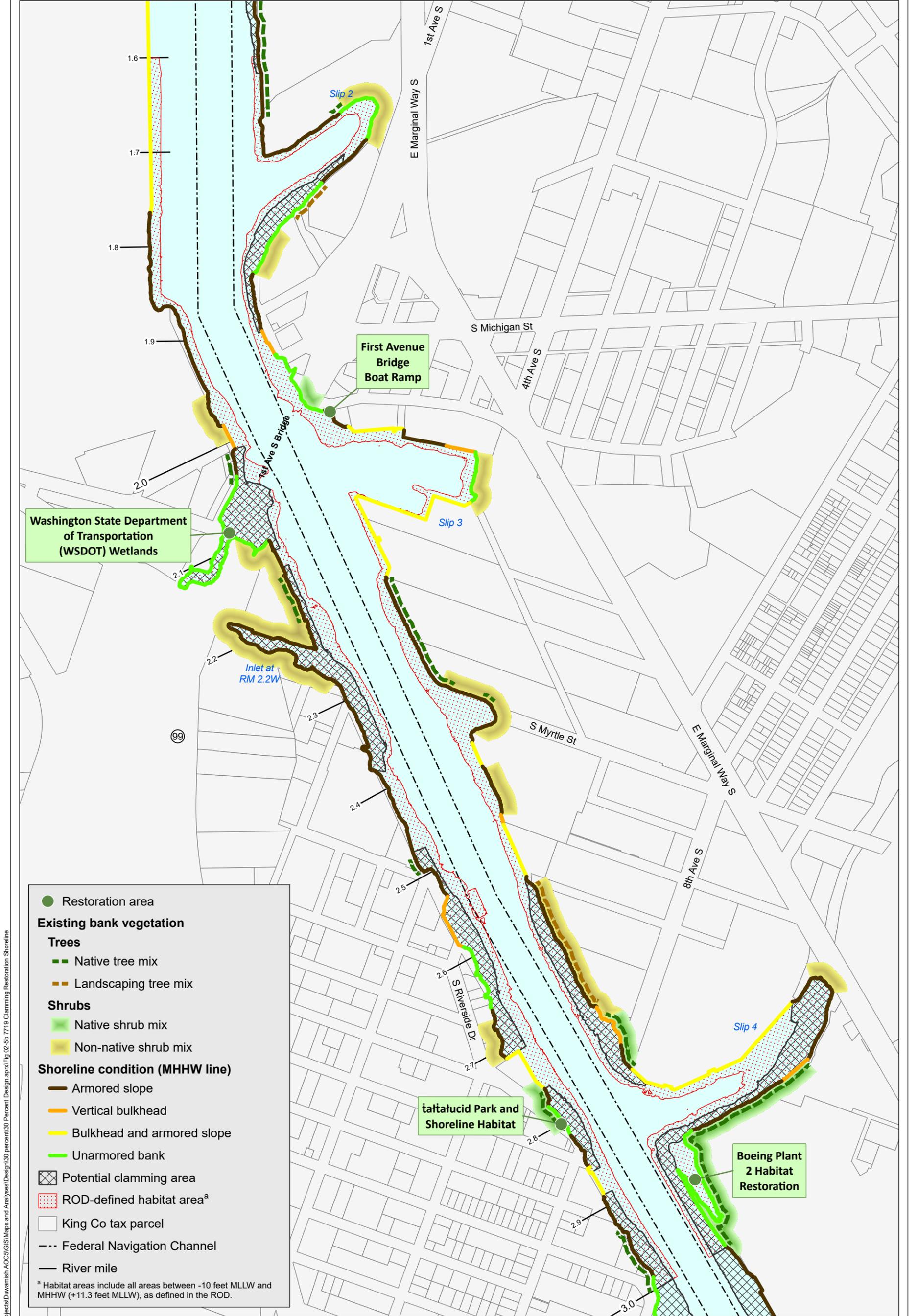


**Habitat types (feet in MLLW)**

- Upper intertidal: +4 feet to +11.3 feet
- Lower intertidal: -4 feet to +4 feet
- Shallow subtidal: -4 feet to -10 feet
- Deep subtidal: -10 feet and deeper
- Survey data gap
- Potential clamming area<sup>a</sup>
- LDW middle reach
- King Co tax parcel
- Federal Navigation Channel
- River mile

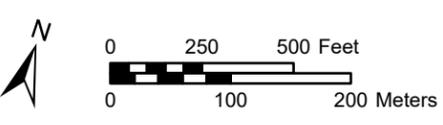
<sup>a</sup> In addition to potential clamming areas, the ROD defines all areas between -10 feet MLLW and MHHW (+11.3 feet MLLW) as habitat.





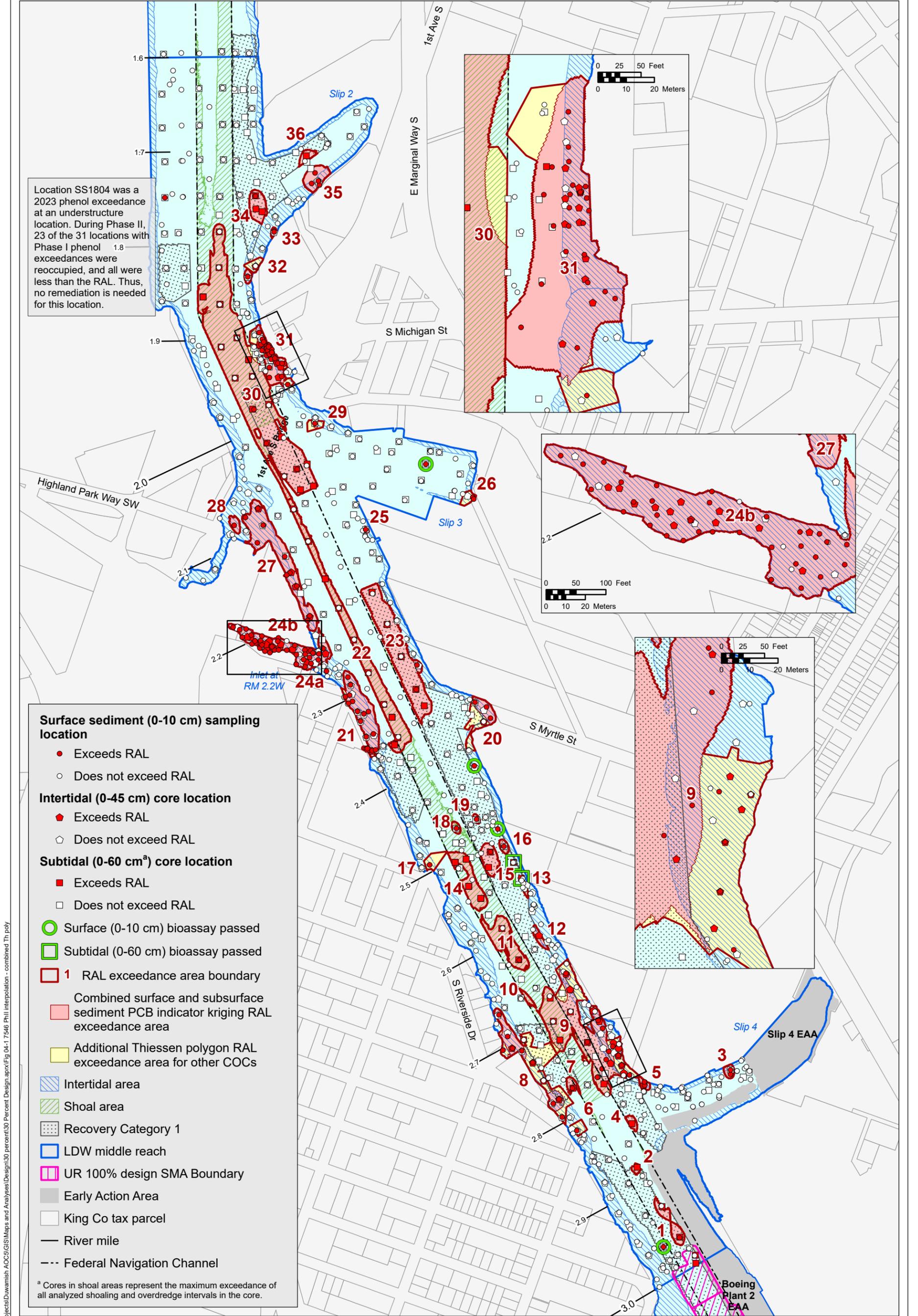
Prepared by craigh, 10/22/2025: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx Fig 02-5b-7719 Clamming Restoration Shoreline

- Restoration area
  - Existing bank vegetation**
  - Trees**
  - Native tree mix
  - Landscaping tree mix
  - Shrubs**
  - Native shrub mix
  - Non-native shrub mix
  - Shoreline condition (MHHW line)**
  - Armored slope
  - Vertical bulkhead
  - Bulkhead and armored slope
  - Unarmored bank
  - ▨ Potential clamming area
  - ▨ ROD-defined habitat area<sup>a</sup>
  - King Co tax parcel
  - Federal Navigation Channel
  - River mile
- <sup>a</sup> Habitat areas include all areas between -10 feet MLLW and MHHW (+11.3 feet MLLW), as defined in the ROD.



**Figure 2-5b. Existing Potential Clamming Areas, Restoration Areas, and Shoreline Conditions**

30% REMEDIAL DESIGN BASIS OF DESIGN  
 REPORT FOR THE LDW MIDDLE REACH  
 OCTOBER 27, 2025



Location SS1804 was a 2023 phenol exceedance at an understructure location. During Phase II, 23 of the 31 locations with Phase I phenol 1.8 exceedances were reoccupied, and all were less than the RAL. Thus, no remediation is needed for this location.

**Surface sediment (0-10 cm) sampling location**

- Exceeds RAL
- Does not exceed RAL

**Intertidal (0-45 cm) core location**

- ◆ Exceeds RAL
- ◇ Does not exceed RAL

**Subtidal (0-60 cm<sup>a</sup>) core location**

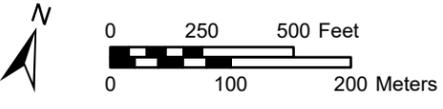
- Exceeds RAL
- Does not exceed RAL

- Surface (0-10 cm) bioassay passed
- Subtidal (0-60 cm) bioassay passed

- 1 RAL exceedance area boundary
- Combined surface and subsurface sediment PCB indicator kriging RAL exceedance area
- Additional Thiessen polygon RAL exceedance area for other COCs
- Intertidal area
- Shoal area
- Recovery Category 1
- LDW middle reach
- UR 100% design SMA Boundary
- Early Action Area
- King Co tax parcel
- River mile
- Federal Navigation Channel

<sup>a</sup> Cores in shoal areas represent the maximum exceedance of all analyzed shoaling and overdredge intervals in the core.

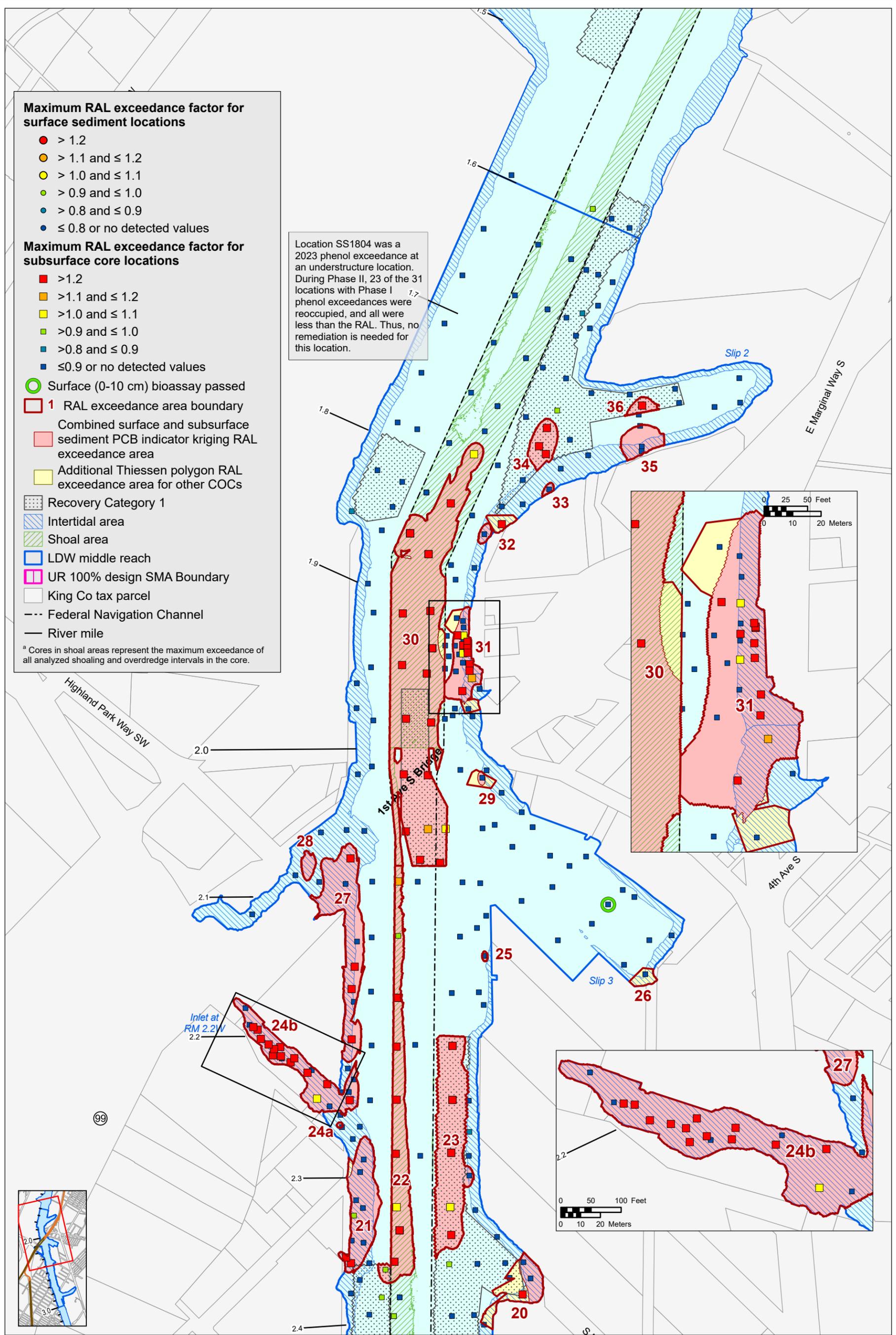
Prepared by craigh, 10/22/2025; W:\Projects\Duwamish\_AOC5\GIS\Maps and Analyses\Design\30 percent\30 Percent Design.aprx;Fig 04-1 17546 Phtl interpolation - combined Th poly



**Figure 4-1. Total PCB Combined Surface and Subsurface Sediment Indicator Kriging Interpolation with Thiessen Polygons for Other COCs for the Middle Reach**  
 30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH  
 OCTOBER 27, 2025

- Maximum RAL exceedance factor for surface sediment locations**
- > 1.2
  - > 1.1 and ≤ 1.2
  - > 1.0 and ≤ 1.1
  - > 0.9 and ≤ 1.0
  - > 0.8 and ≤ 0.9
  - ≤ 0.8 or no detected values
- Maximum RAL exceedance factor for subsurface core locations**
- > 1.2
  - > 1.1 and ≤ 1.2
  - > 1.0 and ≤ 1.1
  - > 0.9 and ≤ 1.0
  - > 0.8 and ≤ 0.9
  - ≤ 0.8 or no detected values
- Surface (0-10 cm) bioassay passed
  - 1 RAL exceedance area boundary
  - Combined surface and subsurface sediment PCB indicator kriging RAL exceedance area
  - Additional Thiessen polygon RAL exceedance area for other COCs
  - Recovery Category 1
  - Intertidal area
  - Shoal area
  - LDW middle reach
  - UR 100% design SMA Boundary
  - King Co tax parcel
  - Federal Navigation Channel
  - River mile
- <sup>a</sup> Cores in shoal areas represent the maximum exceedance of all analyzed shoaling and overdredge intervals in the core.

Location SS1804 was a 2023 phenol exceedance at an understructure location. During Phase II, 23 of the 31 locations with Phase I phenol exceedances were reoccupied, and all were less than the RAL. Thus, no remediation is needed for this location.



**Figure 4-2a. RAL Exceedance Areas and Magnitude of RAL Exceedance Factors by Sample Location, RM 1.6 to RM 2.3**

30% REMEDIAL DESIGN BASIS OF DESIGN  
REPORT FOR THE LDW MIDDLE REACH  
OCTOBER 27, 2025

**Maximum RAL exceedance factor for surface sediment locations**

- > 1.2
- > 1.1 and ≤ 1.2
- > 1.0 and ≤ 1.1
- > 0.9 and ≤ 1.0
- > 0.8 and ≤ 0.9
- ≤ 0.8 or no detected values

**Maximum RAL exceedance factor for subsurface core locations**

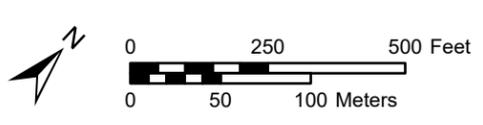
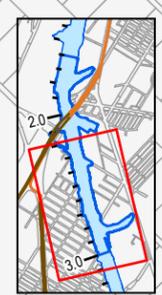
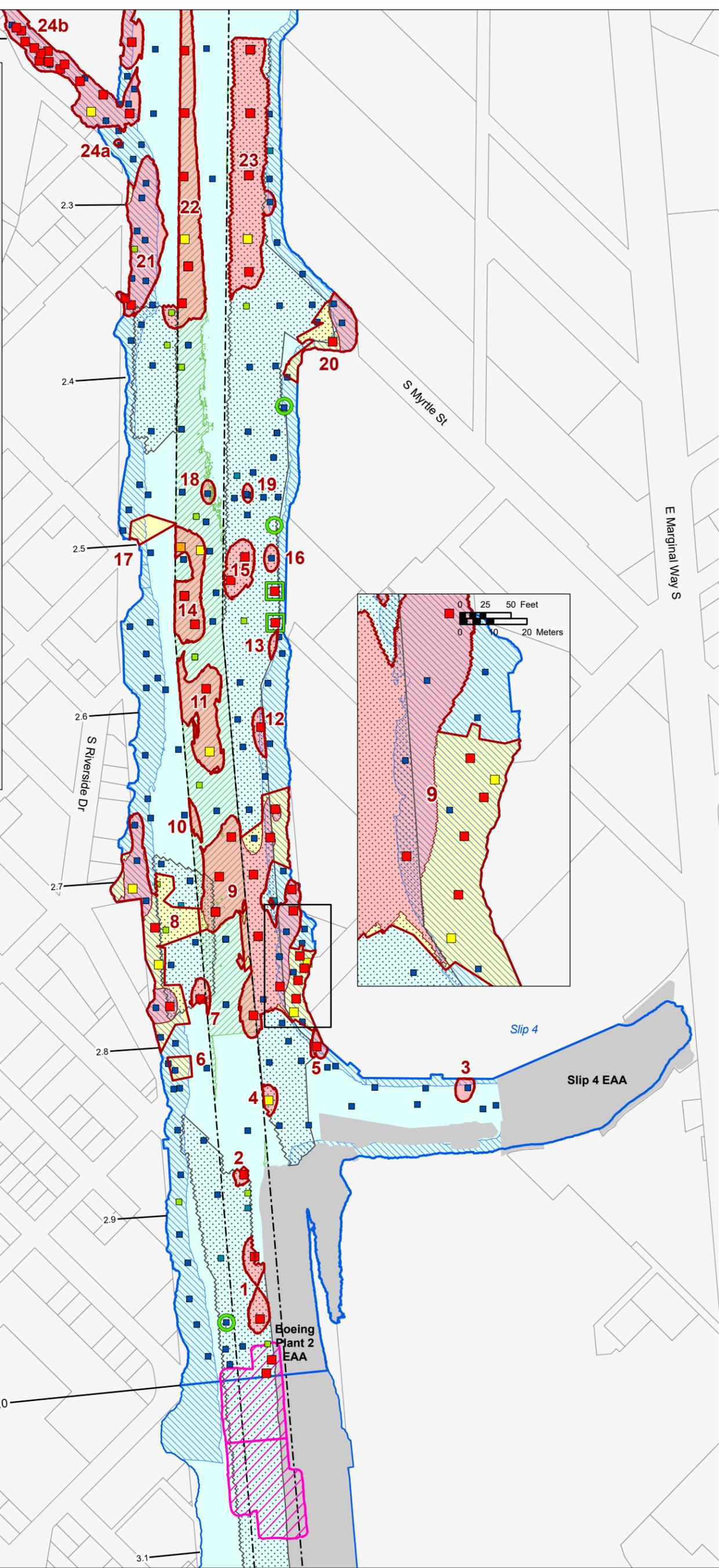
- >1.2
- >1.1 and ≤ 1.2
- >1.0 and ≤ 1.1
- >0.9 and ≤ 1.0
- >0.8 and ≤ 0.9
- ≤0.9 or no detected values

○ Surface (0-10 cm) bioassay passed  
 □ Subtidal (0-60 cm) bioassay passed

1 RAL exceedance area boundary  
 Combined surface and subsurface sediment PCB indicator kriging RAL exceedance area  
 Additional Thiessen polygon RAL exceedance area for other COCs

Recovery Category 1  
 Early Action Area  
 Intertidal area  
 Shoal area  
 LDW middle reach  
 UR 100% design SMA Boundary  
 King Co tax parcel  
 Federal Navigation Channel  
 River mile

<sup>a</sup> Cores in shoal areas represent the maximum exceedance of all analyzed shoaling and overdredge intervals in the core.

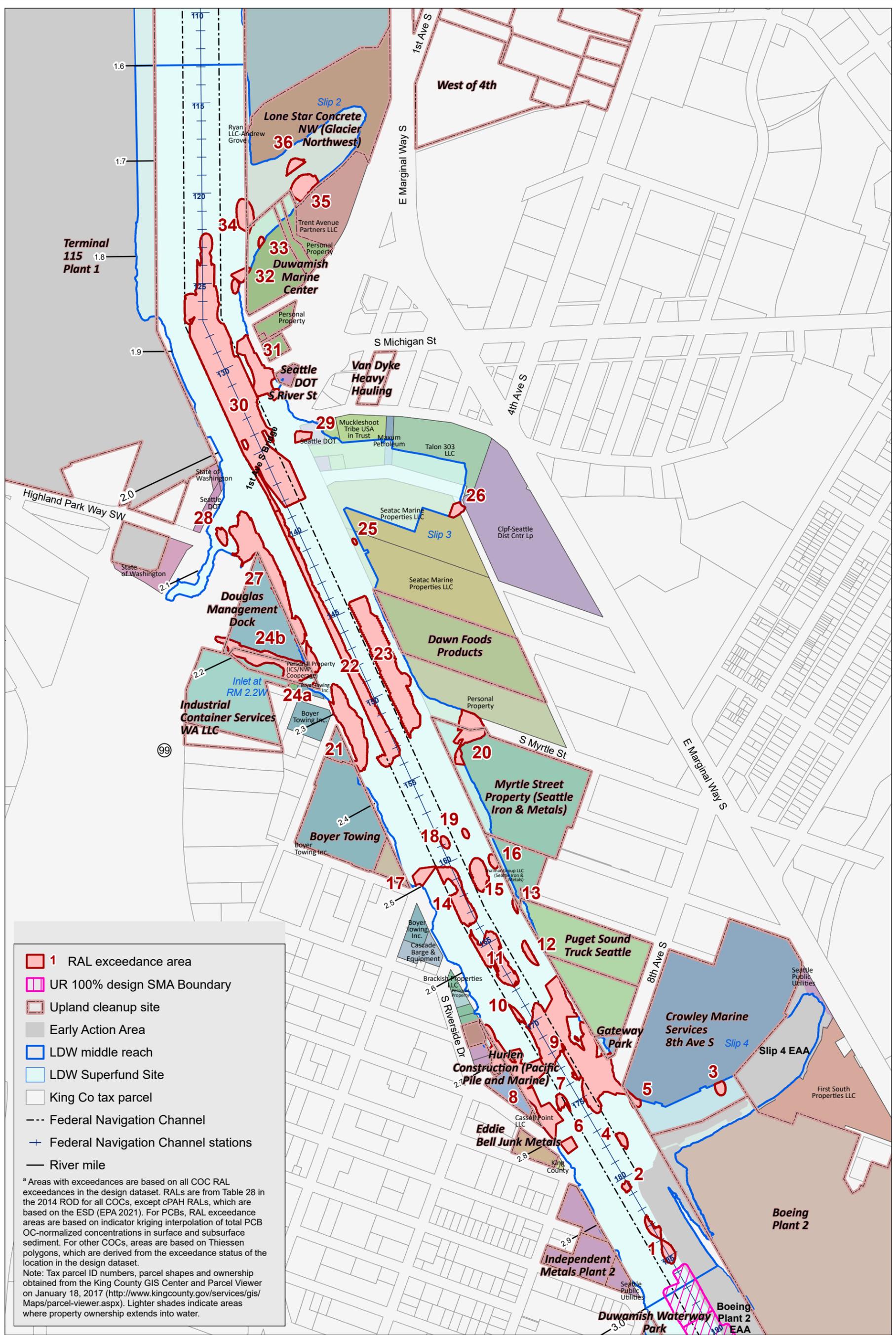


**Figure 4-2b. RAL Exceedance Areas and Magnitude of RAL Exceedance Factors by Sample Location, RM 2.3 to RM 3.0**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH **OCTOBER 27, 2025**

Prepared by craigh, 10/22/2025; W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design\aprx\Fig 04-2 7718 Rhl\interpolation - combined Th poly w EFs

Prepared by craigh, 10/22/2025; W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx; Fig 04-3 7546 RAL exceedance areas w property ownership



**1** RAL exceedance area

**UR 100% design SMA Boundary**

Upland cleanup site

Early Action Area

LDW middle reach

LDW Superfund Site

King Co tax parcel

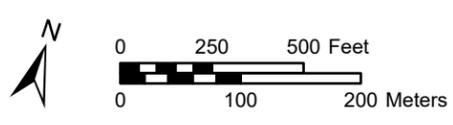
--- Federal Navigation Channel

+ Federal Navigation Channel stations

— River mile

<sup>a</sup> Areas with exceedances are based on all COC RAL exceedances in the design dataset. RALs are from Table 28 in the 2014 ROD for all COCs, except cPAH RALs, which are based on the ESD (EPA 2021). For PCBs, RAL exceedance areas are based on indicator kriging interpolation of total PCB OC-normalized concentrations in surface and subsurface sediment. For other COCs, areas are based on Thiessen polygons, which are derived from the exceedance status of the location in the design dataset.

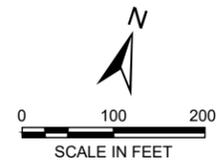
Note: Tax parcel ID numbers, parcel shapes and ownership obtained from the King County GIS Center and Parcel Viewer on January 18, 2017 (<http://www.kingcounty.gov/services/gis/Maps/parcel-viewer.aspx>). Lighter shades indicate areas where property ownership extends into water.





- LEGEND:**
- 118+00 USACE CHANNEL CENTERLINE
  - FEDERAL NAVIGATION CHANNEL
  - RM 1.7 RIVER MILE LABEL
  - LDW MIDDLE REACH BOUNDARY
  - EXISTING GRADE CONTOURS IN FEET MLLW (2' & 10' INTERVALS)
  - DREDGE PRISM FOOTPRINT BOUNDARY (TOE OF CUT)
  - ESTIMATED DREDGE PRISM DAYLIGHT BOUNDARY
  - DREDGE SLOPE SYMBOL
  - ENHANCED NATURAL RECOVERY
  - ENGINEERED CAP
  - UTILITY CROSSING COVER
  - 9C RAA NUMBER
  - PH2 RAL EXCEEDANCE AREA (9/30/25)
  - 35 RAL EXCEEDANCE AREA NUMBER

- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY BING MAPS.
  4. DREDGED AREAS WILL EITHER BE CAPPED OR RECEIVE BACKFILL OR RMC. REFER TO FIGURE 5-2 FOR ADDITIONAL DETAILS REGARDING AREAS DESIGNATED AS PARTIAL DREDGE AND CAP.
  5. ENHANCED NATURAL RECOVERY AREAS MAY BE AMENDED WITH ACTIVATED CARBON.
  6. ENGINEERED CAPS IN AREAS SHALLOWER THAN -10 FEET MLLW WILL BE MODIFIED TO INCLUDE A 45-CM HABITAT LAYER.



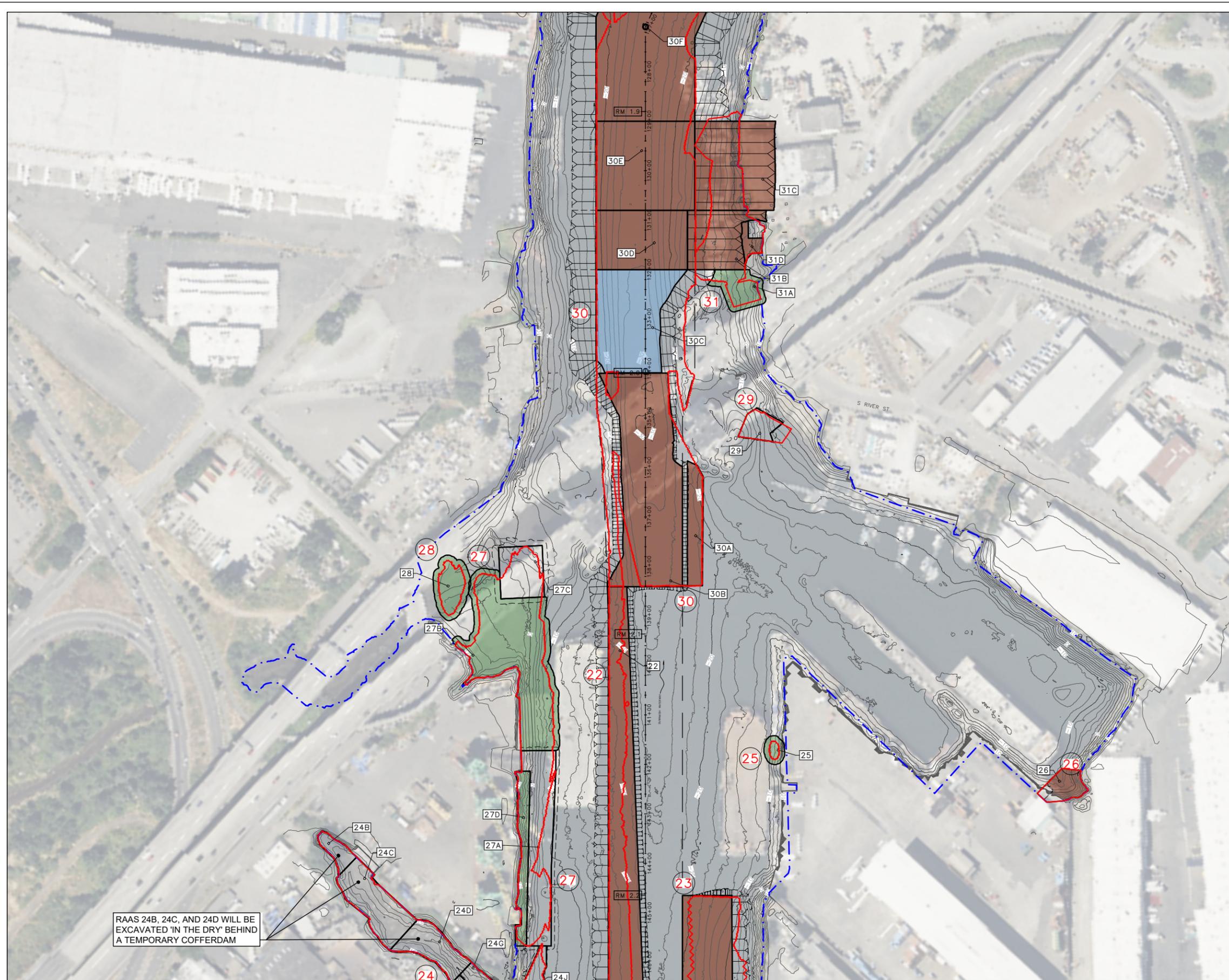
**Figure 5-1a. Remedial Action Areas, RM 1.6 to 1.9**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



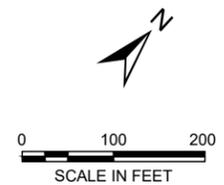
**Lower Duwamish Waterway Group**  
 City of Seattle / King County / The Boeing Company

Oct 23, 2025 12:02pm Igriga K:\Projects\075-City of Seattle\Middle Reach of the Lower Duwamish Waterway\075-RP-007-LDW\MR-BODR-RAA.dwg Figure 5-1b



- LEGEND:**
- USACE CHANNEL CENTERLINE
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - LDW MIDDLE REACH BOUNDARY
  - EXISTING GRADE CONTOURS IN FEET MLLW (2' & 10' INTERVALS)
  - DREDGE PRISM FOOTPRINT BOUNDARY (TOE OF CUT)
  - ESTIMATED DREDGE PRISM DAYLIGHT BOUNDARY
  - DREDGE SLOPE SYMBOL
  - ENHANCED NATURAL RECOVERY
  - ENGINEERED CAP
  - UTILITY CROSSING COVER
  - RAA NUMBER
  - PH2 RAL EXCEEDANCE AREA (9/30/25)
  - RAL EXCEEDANCE AREA NUMBER

- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY BING MAPS.
  4. DREDGED AREAS WILL EITHER BE CAPPED OR RECEIVE BACKFILL OR RMC. REFER TO FIGURE 5-2 FOR ADDITIONAL DETAILS REGARDING AREAS DESIGNATED AS PARTIAL DREDGE AND CAP.
  5. ENHANCED NATURAL RECOVERY AREAS MAY BE AMENDED WITH ACTIVATED CARBON.
  6. ENGINEERED CAPS IN AREAS SHALLOWER THAN -10 FEET MLLW WILL BE MODIFIED TO INCLUDE A 45-CM HABITAT LAYER.



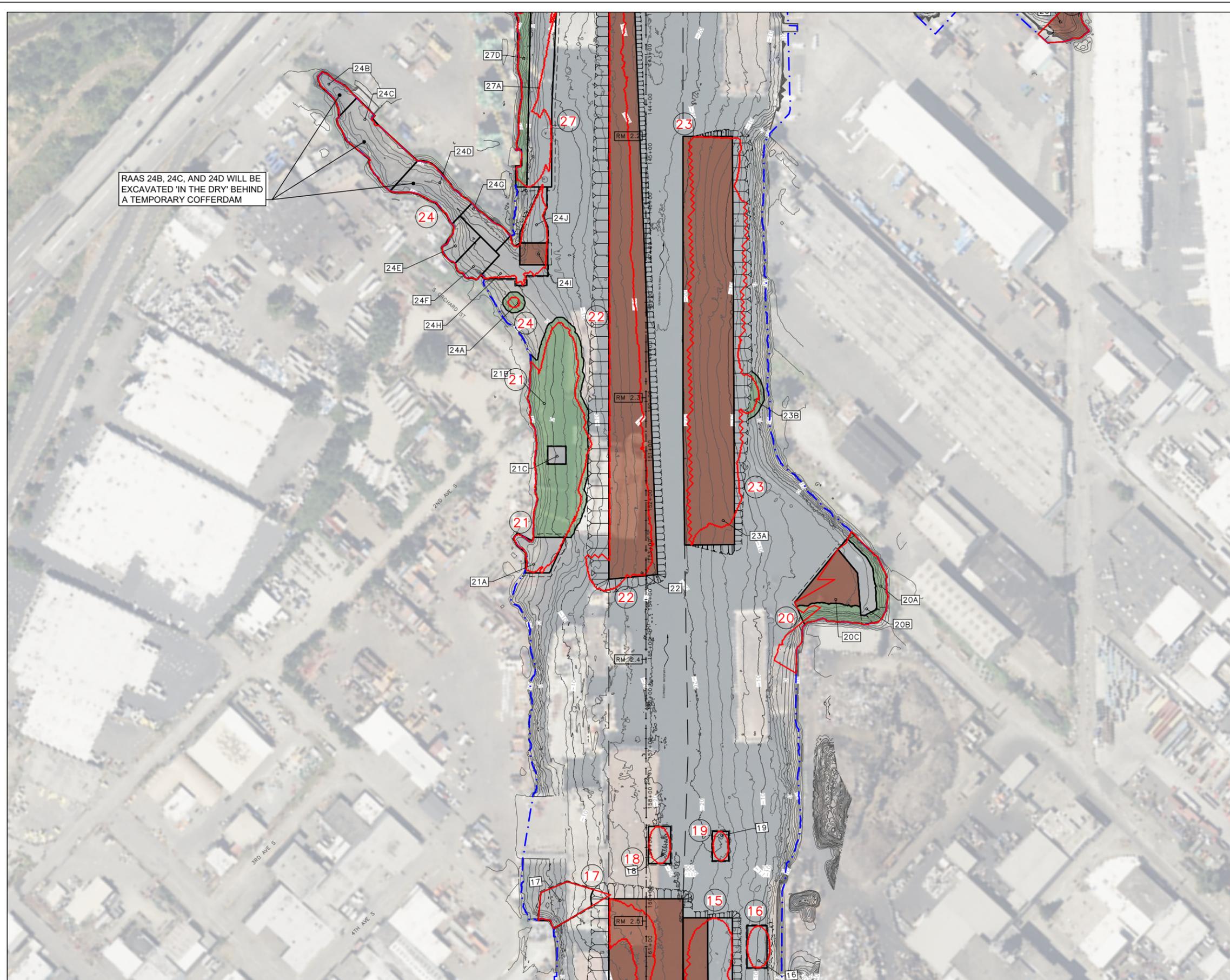
**Figure 5-1b. Remedial Action Areas, RM 1.9 to 2.2**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



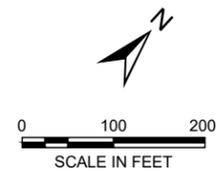
**Lower Duwamish Waterway Group**  
City of Seattle / King County / The Boeing Company

RAAs 24B, 24C, AND 24D WILL BE EXCAVATED 'IN THE DRY' BEHIND A TEMPORARY COFFERDAM



- LEGEND:**
- USACE CHANNEL CENTERLINE
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - LDW MIDDLE REACH BOUNDARY
  - EXISTING GRADE CONTOURS IN FEET MLLW (2' & 10' INTERVALS)
  - DREDGE PRISM FOOTPRINT BOUNDARY (TOE OF CUT)
  - ESTIMATED DREDGE PRISM DAYLIGHT BOUNDARY
  - DREDGE SLOPE SYMBOL
  - ENHANCED NATURAL RECOVERY
  - ENGINEERED CAP
  - UTILITY CROSSING COVER
  - RAA NUMBER
  - PH2 RAL EXCEEDANCE AREA (9/30/25)
  - RAL EXCEEDANCE AREA NUMBER

- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY BING MAPS.
  4. DREDGED AREAS WILL EITHER BE CAPPED OR RECEIVE BACKFILL OR RMC. REFER TO FIGURE 5-2 FOR ADDITIONAL DETAILS REGARDING AREAS DESIGNATED AS PARTIAL DREDGE AND CAP.
  5. ENHANCED NATURAL RECOVERY AREAS MAY BE AMENDED WITH ACTIVATED CARBON.
  6. ENGINEERED CAPS IN AREAS SHALLOWER THAN -10 FEET MLLW WILL BE MODIFIED TO INCLUDE A 45-CM HABITAT LAYER.



**Figure 5-1c. Remedial Action Areas, RM 2.2 to 2.4**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



**Lower Duwamish Waterway Group**  
 City of Seattle / King County / The Boeing Company

Oct 23, 2025 12:03pm Igriga K:\Projects\075-City of Seattle\Middle Reach of the Lower Duwamish Waterway\075-RP-007 LDW\MR.BODR.RAA.dwg Figure 5-1d



- LEGEND:**
- USACE CHANNEL CENTERLINE
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - LDW MIDDLE REACH BOUNDARY
  - EXISTING GRADE CONTOURS IN FEET MLLW (2' & 10' INTERVALS)
  - DREDGE PRISM FOOTPRINT BOUNDARY (TOE OF CUT)
  - ESTIMATED DREDGE PRISM DAYLIGHT BOUNDARY
  - DREDGE SLOPE SYMBOL
  - ENHANCED NATURAL RECOVERY
  - ENGINEERED CAP
  - UTILITY CROSSING COVER
  - RAA NUMBER
  - PH2 RAL EXCEEDANCE AREA (9/30/25)
  - RAL EXCEEDANCE AREA NUMBER

- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY BING MAPS.
  4. DREDGED AREAS WILL EITHER BE CAPPED OR RECEIVE BACKFILL OR RMC. REFER TO FIGURE 5-2 FOR ADDITIONAL DETAILS REGARDING AREAS DESIGNATED AS PARTIAL DREDGE AND CAP.
  5. ENHANCED NATURAL RECOVERY AREAS MAY BE AMENDED WITH ACTIVATED CARBON.
  6. ENGINEERED CAPS IN AREAS SHALLOWER THAN -10 FEET MLLW WILL BE MODIFIED TO INCLUDE A 45-CM HABITAT LAYER.

**Figure 5-1d. Remedial Action Areas, RM 2.4 to 2.6**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



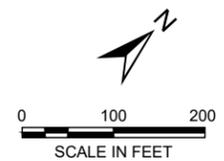
**Lower Duwamish Waterway Group**  
City of Seattle / King County / The Boeing Company



**LEGEND:**

- USACE CHANNEL CENTERLINE
- FEDERAL NAVIGATION CHANNEL
- RIVER MILE LABEL
- LDW MIDDLE REACH BOUNDARY
- EXISTING GRADE CONTOURS IN FEET MLLW (2' & 10' INTERVALS)
- DREDGE PRISM FOOTPRINT BOUNDARY (TOE OF CUT)
- ESTIMATED DREDGE PRISM DAYLIGHT BOUNDARY
- DREDGE SLOPE SYMBOL
- ENHANCED NATURAL RECOVERY
- ENGINEERED CAP
- UTILITY CROSSING COVER
- RAA NUMBER
- PH2 RAL EXCEEDANCE AREA (9/30/25)
- RAL EXCEEDANCE AREA NUMBER

- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY BING MAPS.
  4. DREDGED AREAS WILL EITHER BE CAPPED OR RECEIVE BACKFILL OR RMC. REFER TO FIGURE 5-2 FOR ADDITIONAL DETAILS REGARDING AREAS DESIGNATED AS PARTIAL DREDGE AND CAP.
  5. ENHANCED NATURAL RECOVERY AREAS MAY BE AMENDED WITH ACTIVATED CARBON.
  6. ENGINEERED CAPS IN AREAS SHALLOWER THAN -10 FEET MLLW WILL BE MODIFIED TO INCLUDE A 45-CM HABITAT LAYER.

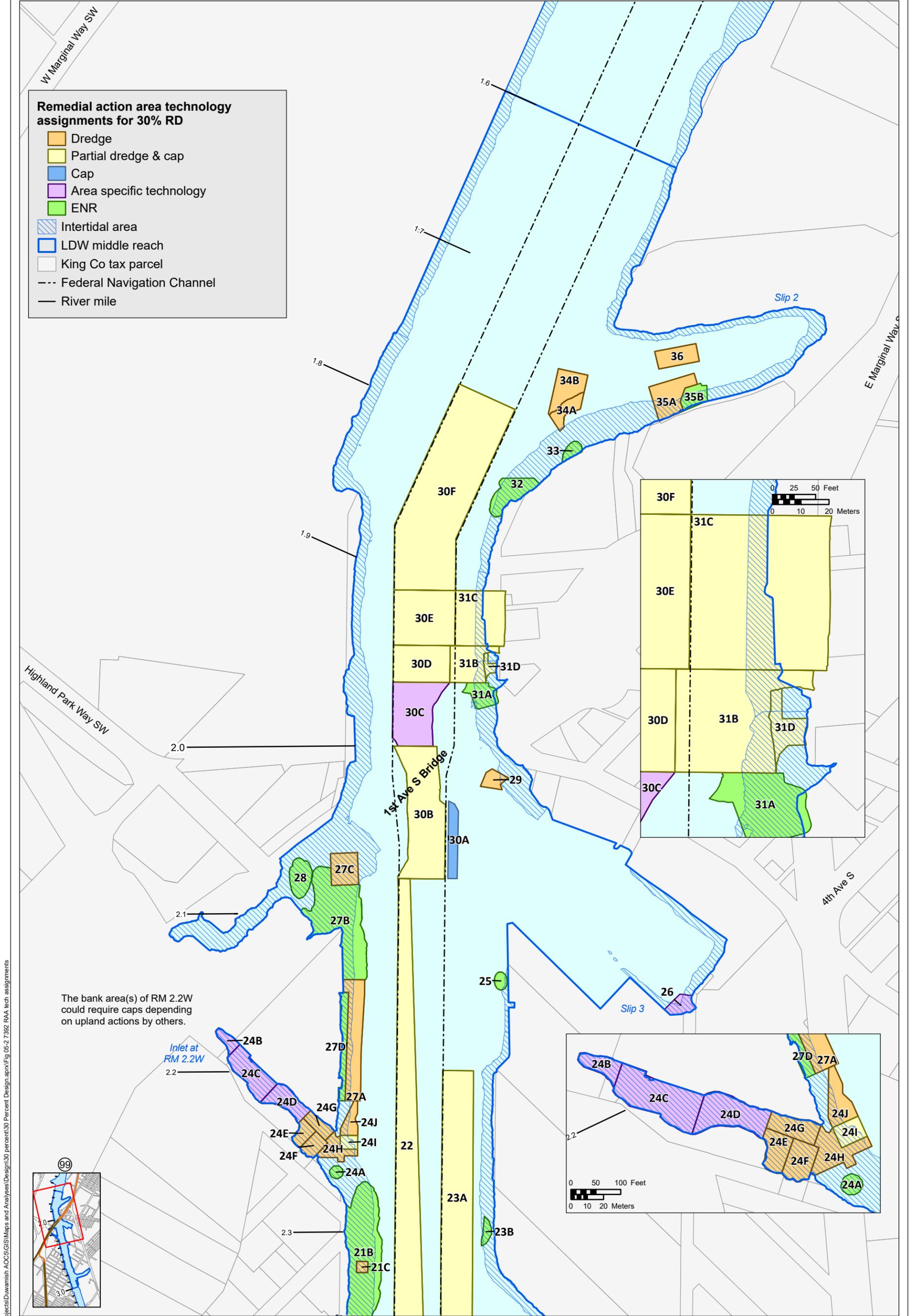


**Figure 5-1e. Remedial Action Areas, RM 2.6 to 3.0**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



**Lower Duwamish Waterway Group**  
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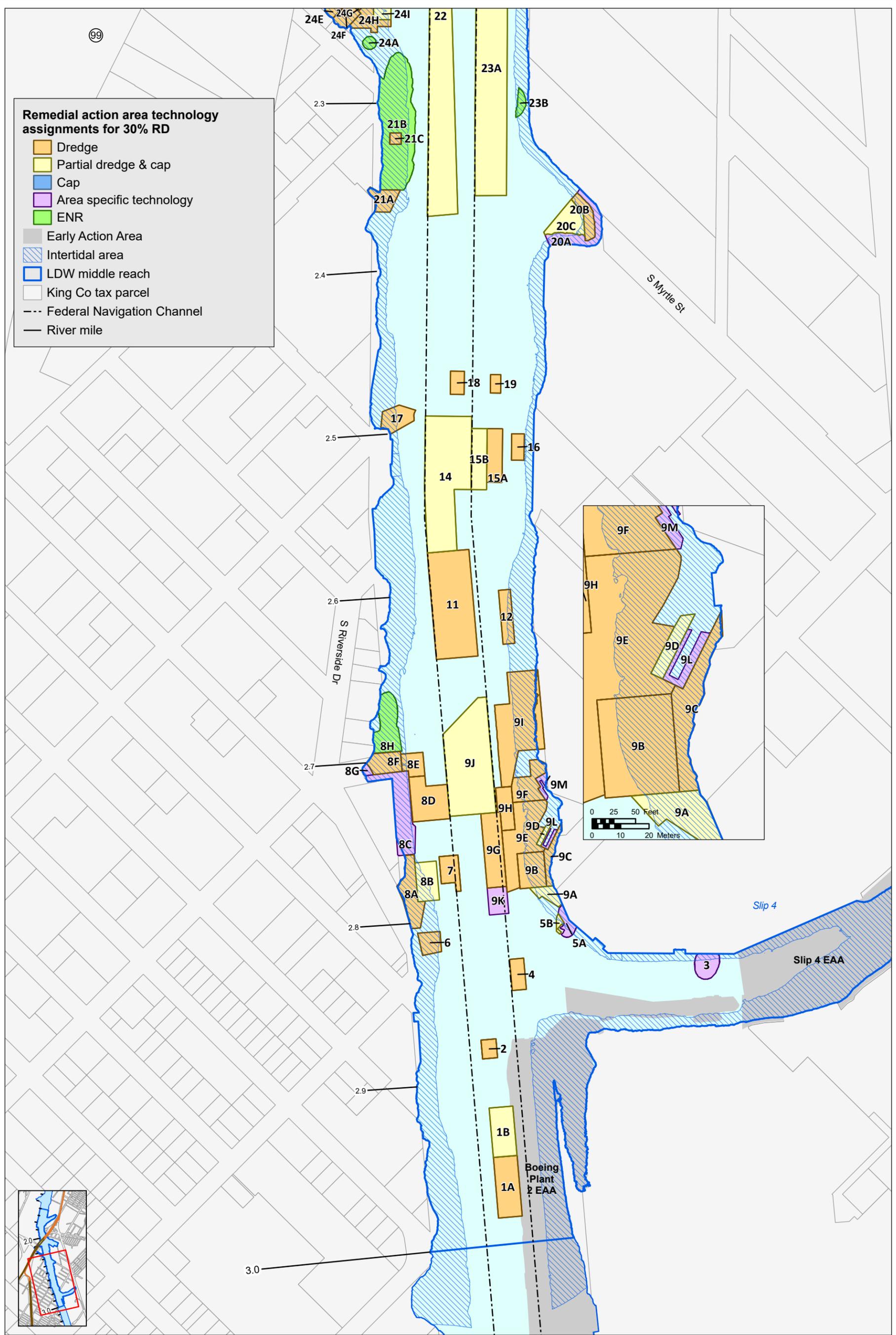


**Figure 5-2a. Technology Assignment by Remedial Action Area, RM 1.6 to RM 2.3**

30% REMEDIAL DESIGN BASIS OF DESIGN  
REPORT FOR THE LDW MIDDLE REACH  
OCTOBER 27, 2025

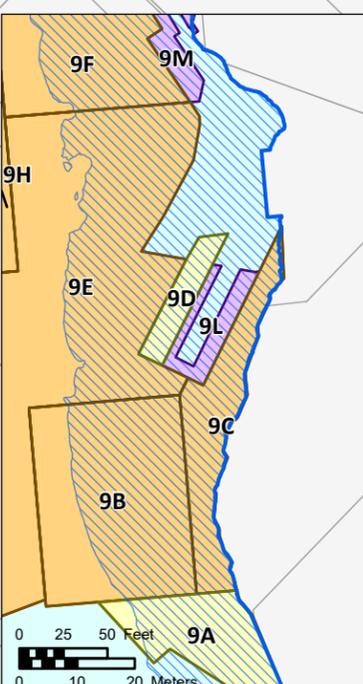
Prepared by craigh, 10/22/2025: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30\_Percent\_Design.aprx Fig 05-2 7392 RAA\_tech\_assignments

Prepared by craigh, 10/22/2025; W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx Fig 05-2 7392 RAA tech assignments

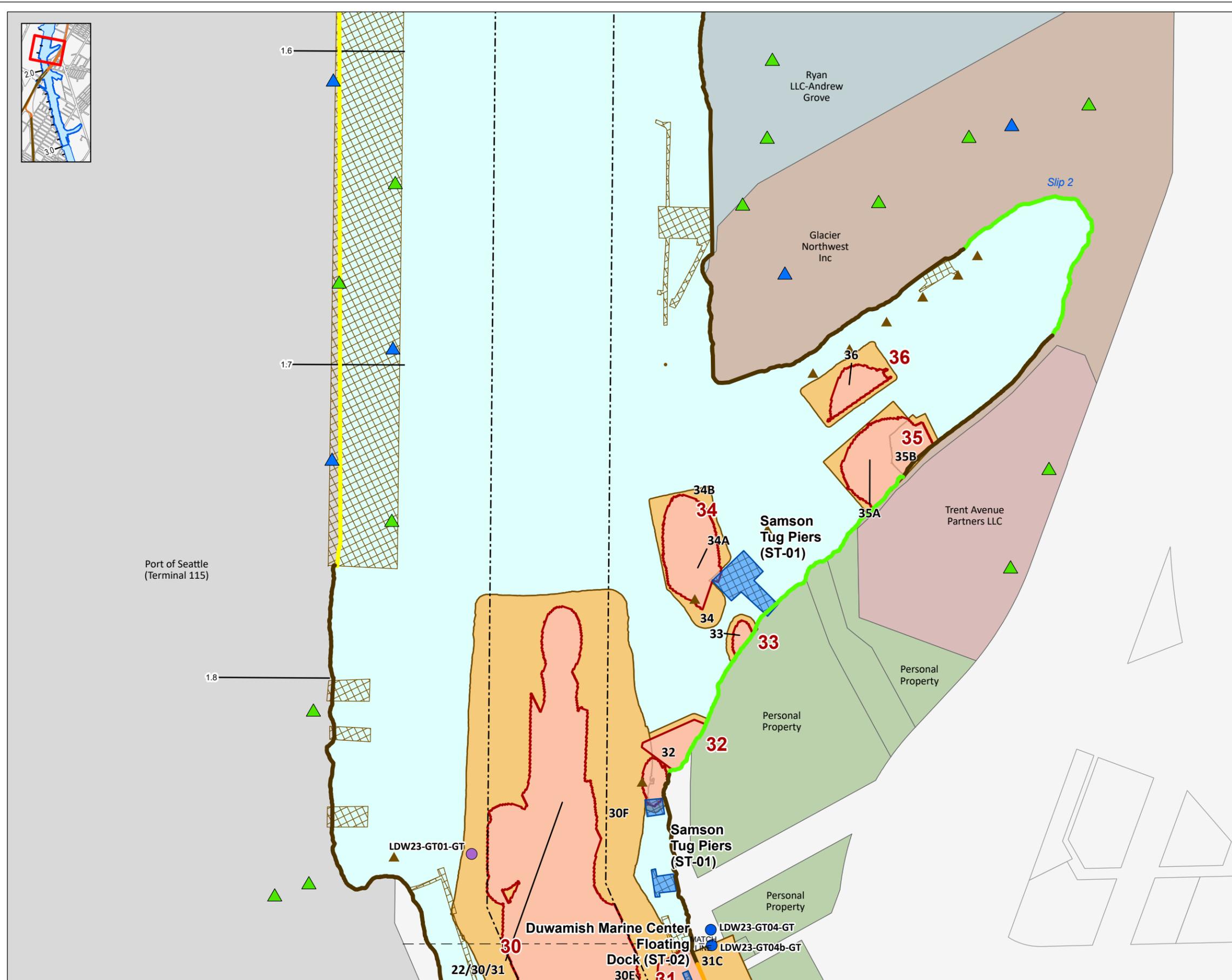


**Remedial action area technology assignments for 30% RD**

- Dredge
- Partial dredge & cap
- Cap
- Area specific technology
- ENR
- Early Action Area
- Intertidal area
- LDW middle reach
- King Co tax parcel
- Federal Navigation Channel
- River mile



Prepared by craigh\_10/24/2025: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 percent\30 Percent Design.aprx\Fig 07-1.7702\_Geotechnical data locations



**Phase II PDI geotechnical data collection locations**

- Cone penetrometer test location
- Geotechnical boring location
- Vane shear location

**Previous geotechnical studies by others**

- ▲ Cone penetrometer test location
- ▲ Standard penetration test location

**Legend**

- 1 RAL exceedance area
- 30% RD RAA boundary

**Bank condition**

- Armored slope
- Vertical bulkhead
- Bulkhead and armored slope
- Unarmored bank

**Overwater structures**

- Dock/pier
- Structure inspected during Phase II
- Pile<sup>a</sup>
- Dolphin<sup>a</sup>
- LDW Superfund Boundary
- King Co tax parcel
- Federal Navigation Channel
- River mile

<sup>a</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)



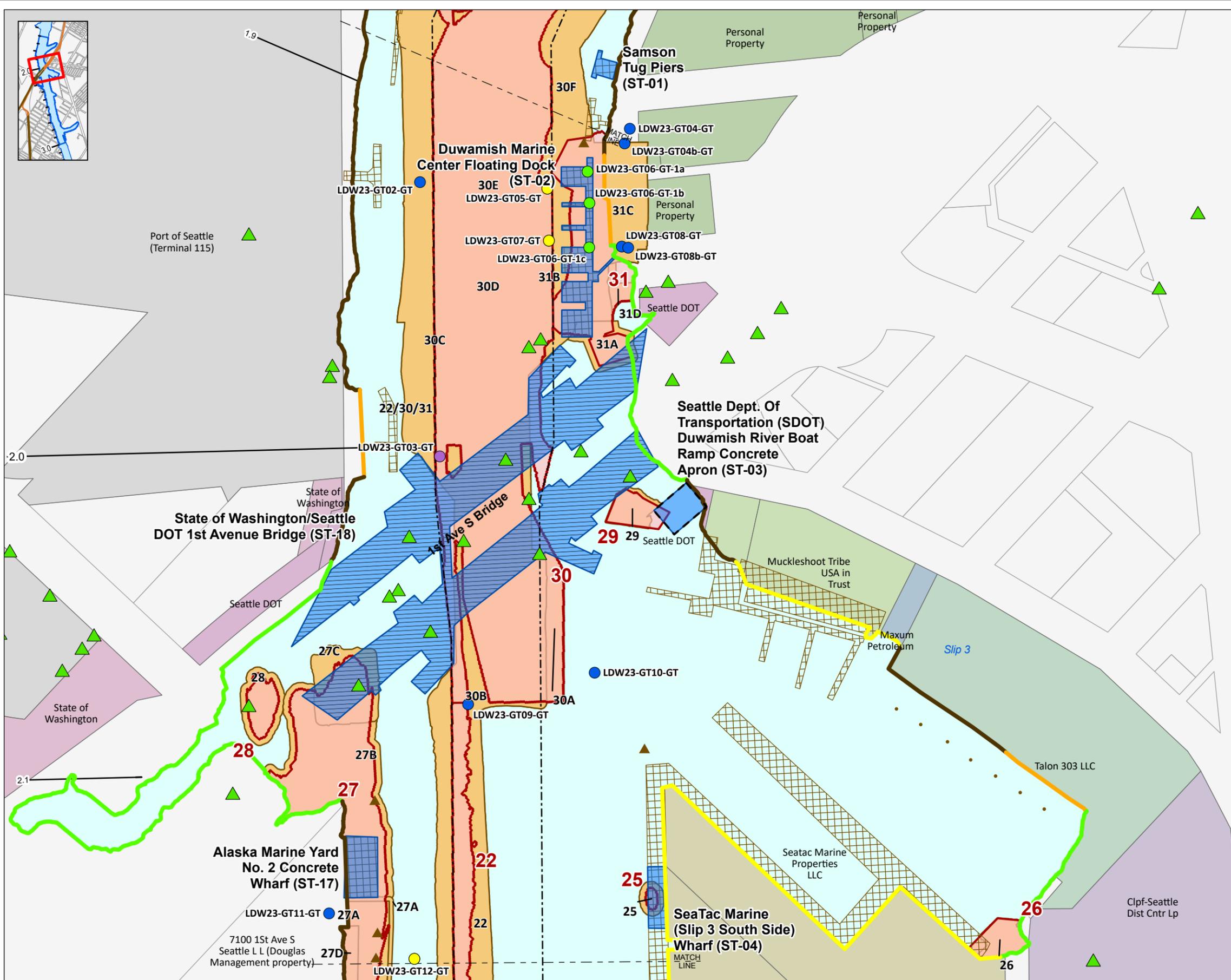
**Figure 7-1a. Middle Reach Geotechnical Data Locations, RM 1.6 to RM 1.85**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



**Lower Duwamish Waterway Group**  
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**Phase II PDI geotechnical data collection locations**

- Cone penetrometer test location
- Geotechnical boring location
- Vane shear location
- Full-flow penetrometer location

**Previous geotechnical studies by others**

- ▲ Standard penetration test location

**Legend**

- 1 RAL exceedance area
- 30% RD RAA boundary

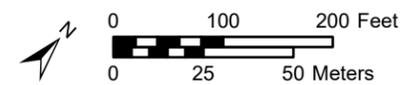
**Bank condition**

- Armored slope
- Vertical bulkhead
- Bulkhead and armored slope
- Unarmored bank

**Overwater structures**

- Bridge
- Dock/pier
- Structure inspected during Phase II
- Pile<sup>a</sup>
- Dolphin<sup>a</sup>
- LDW Superfund Boundary
- King Co tax parcel
- Federal Navigation Channel
- River mile

<sup>a</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)



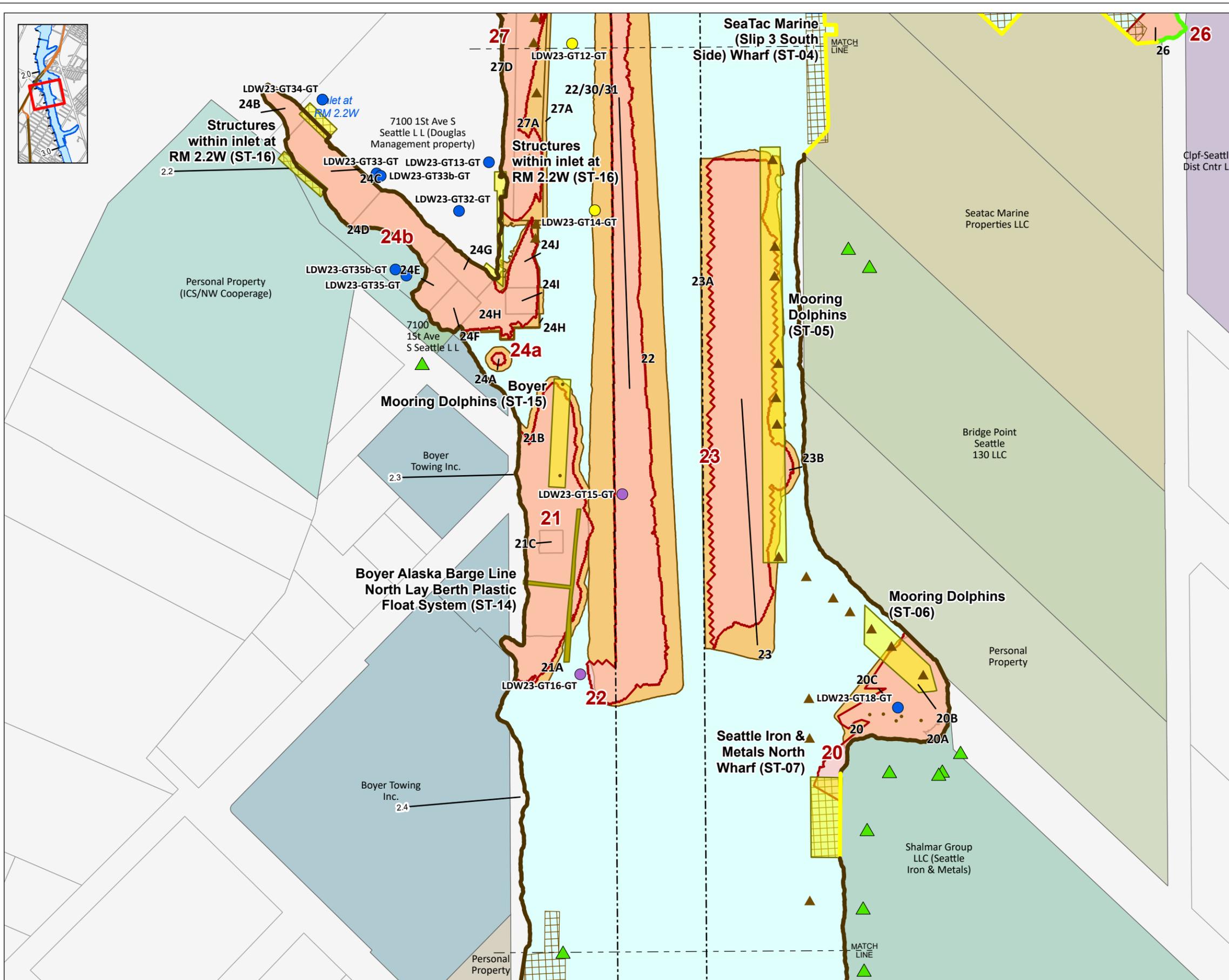
**Figure 7-1b. Middle Reach Geotechnical Data Locations, RM 1.85 to RM 2.15**

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**Lower Duwamish Waterway Group**  
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**Phase II PDI geotechnical data collection locations**

- Cone penetrometer test location
- Geotechnical boring location
- Full-flow penetrometer location

**Previous geotechnical studies by others**

- ▲ Standard penetration test location

**Legend**

- 1 RAL exceedance area
- 30% RD RAA boundary

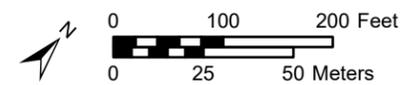
**Bank condition**

- Armored slope
- Bulkhead and armored slope
- Unarmored bank

**Overwater structures**

- Dock/pier
- Marina
- Structure inspected during Phase II
- Structure to be inspected (if necessary) during Phase III
- Pile<sup>a</sup>
- ▲ Dolphin<sup>a</sup>
- LDW Superfund Boundary
- King Co tax parcel
- Federal Navigation Channel
- River mile

<sup>a</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)



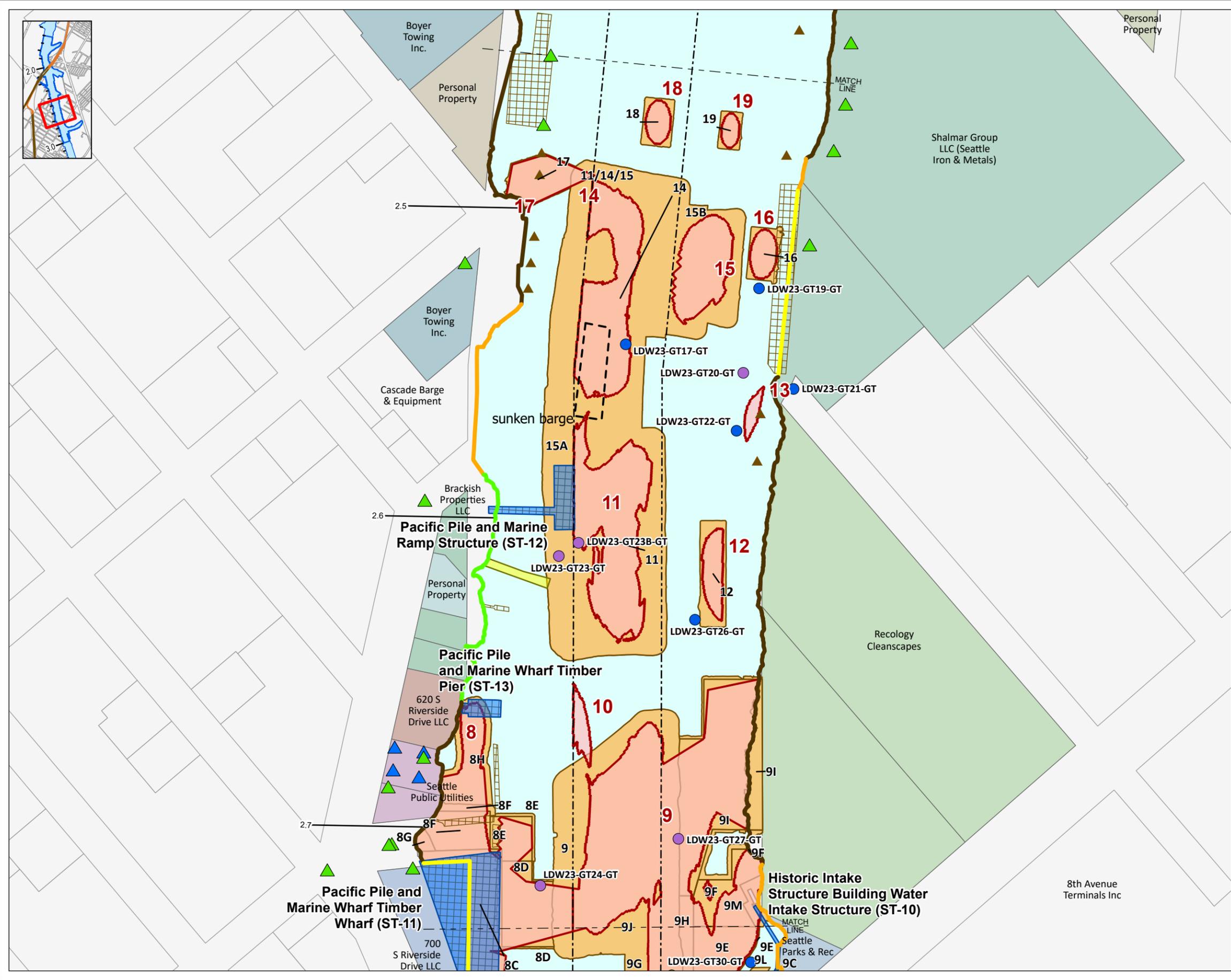
**Figure 7-1c. Middle Reach Geotechnical Data Locations, RM 2.15 to RM 2.45**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH OCTOBER 27, 2025



**Lower Duwamish Waterway Group**  
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**Phase II PDI geotechnical data collection locations**

- Cone penetrometer test location
- Geotechnical boring location
- Full-flow penetrometer location

**Previous geotechnical studies by others**

- ▲ Cone penetrometer test location
- ▲ Standard penetration test location

**Legend**

- 1 RAL exceedance area
- 30% RD RAA boundary

**Bank condition**

- Armored slope
- Vertical bulkhead
- Bulkhead and armored slope
- Unarmored bank

**Overwater structures**

- Dock/pier
- Structure inspected during Phase II
- Structure to be inspected (if necessary) during Phase III
- Dolphin<sup>a</sup>
- LDW Superfund Boundary
- King Co tax parcel
- Federal Navigation Channel
- River mile

<sup>a</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)

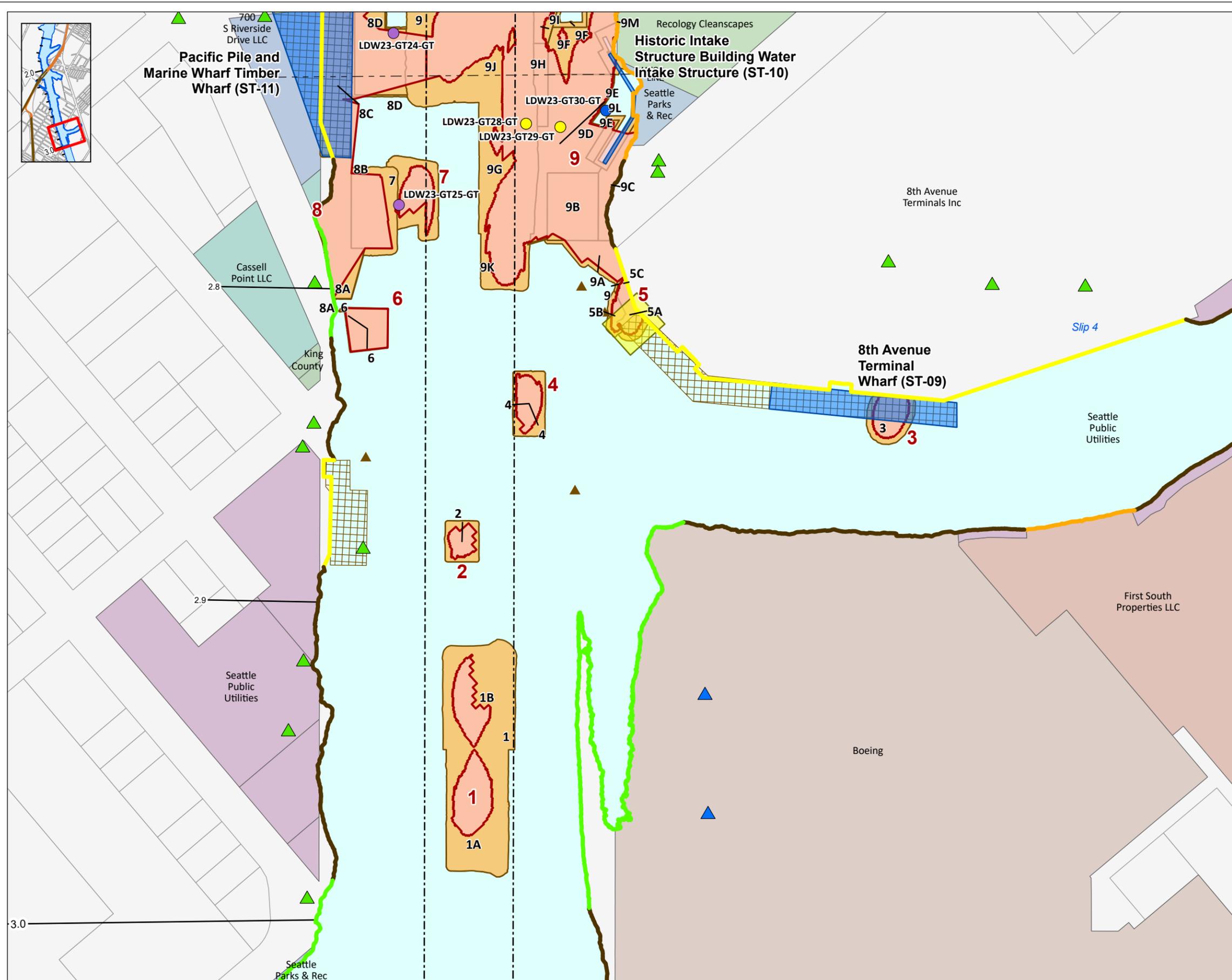


**Figure 7-1d. Middle Reach Geotechnical Data Locations, RM 2.45 to RM 2.75**

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**Lower Duwamish Waterway Group**  
 City of Seattle / King County / The Boeing Company

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**Phase II PDI geotechnical data collection locations**

- Cone penetrometer test location
- Geotechnical boring location
- Full-flow penetrometer location

**Previous geotechnical studies by others**

- ▲ Cone penetrometer test location
- ▲ Standard penetration test location

**RAL exceedance area**

- 1 RAL exceedance area

**30% RD RAA boundary**

- 30% RD RAA boundary

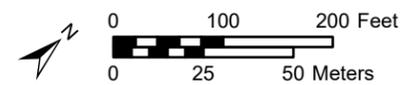
**Bank condition**

- Armored slope
- Vertical bulkhead
- Bulkhead and armored slope
- Unarmored bank

**Overwater structures**

- ▨ Dock/pier
- Structure inspected during Phase II
- Structure to be inspected (if necessary) during Phase III
- ▲ Dolphin<sup>a</sup>
- LDW Superfund Boundary
- King Co tax parcel
- - - Federal Navigation Channel
- River mile

<sup>a</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)



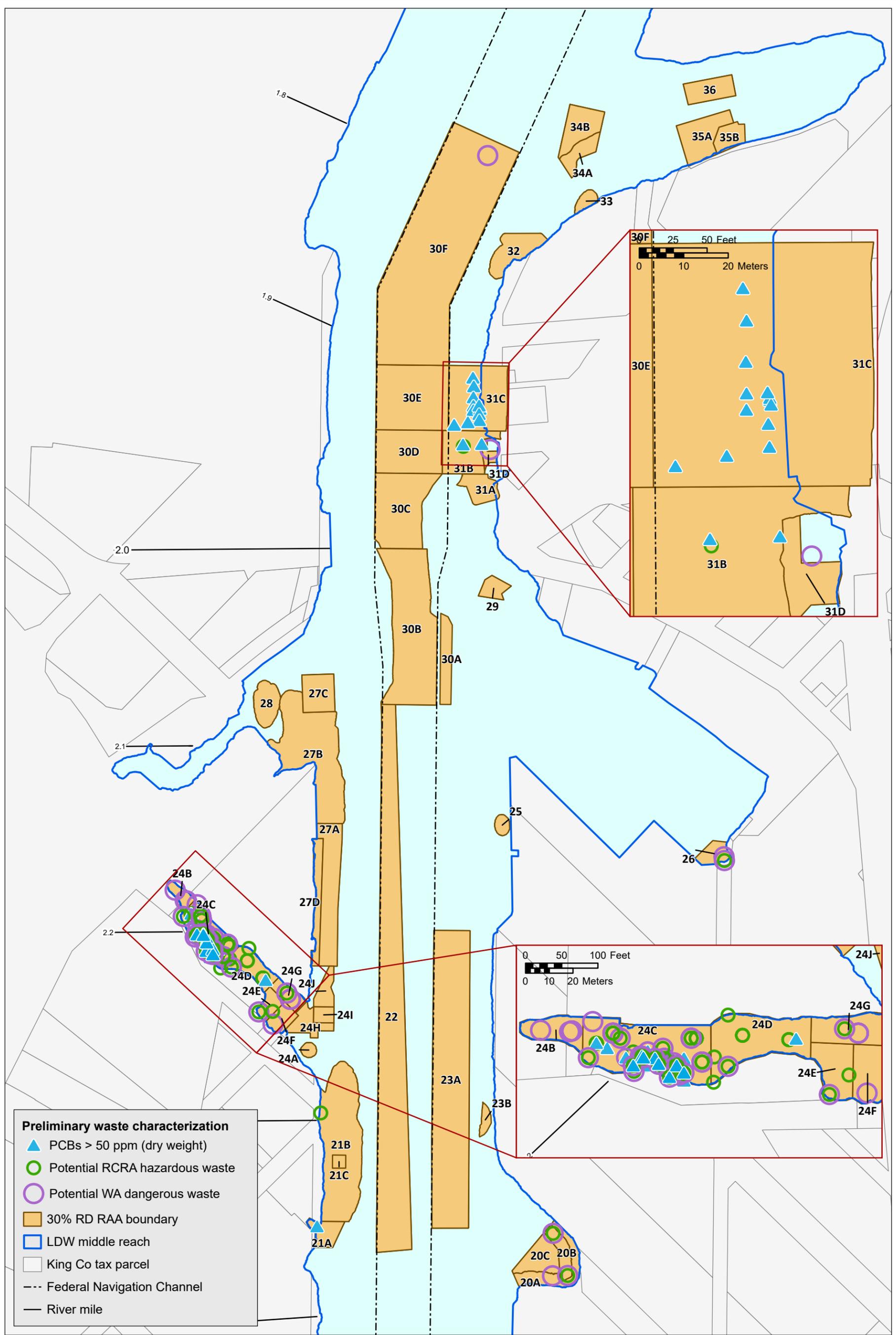
**Figure 7-1e. Middle Reach Geotechnical Data Locations, RM 2.75 to RM 3.0**

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Prepared by craigh, 10/27/2025, W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\09-17741 Preliminary waste characterization



- Preliminary waste characterization**
- ▲ PCBs > 50 ppm (dry weight)
  - Potential RCRA hazardous waste
  - Potential WA dangerous waste
  - 30% RD RAA boundary
  - ▭ LDW middle reach
  - King Co tax parcel
  - Federal Navigation Channel
  - River mile



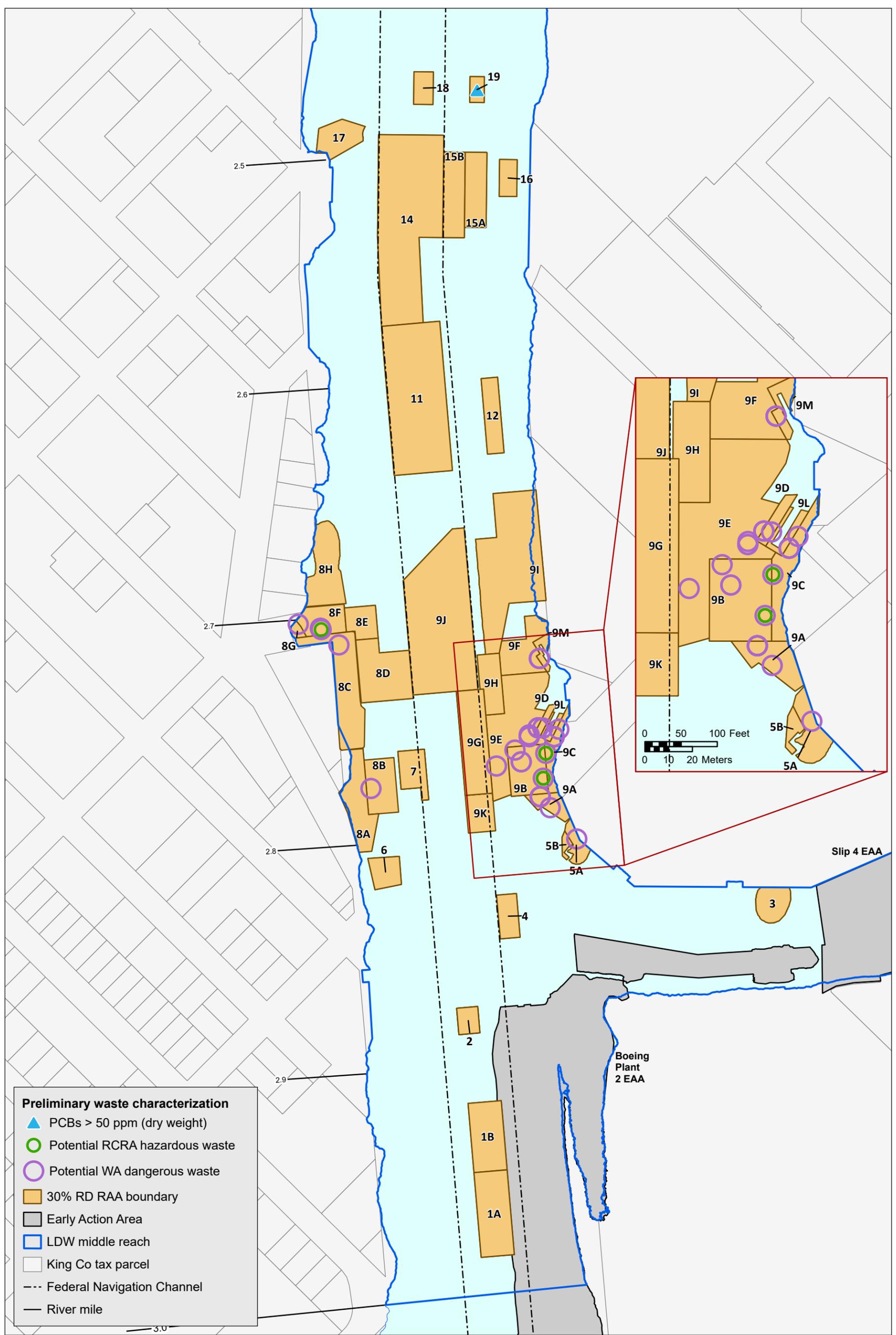
**Lower Duwamish Waterway Group**  
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**Map 9-1a. Preliminary Waste Characterization in the LDW Middle Reach, RM 1.6 to RM 2.7**

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Prepared by craigh, 10/27/2025, W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx Fig 09-1741 Preliminary waste characterization



Location SS1804 was a 2023 phenol exceedance at an understructure location. During Phase II, 23 of the 31 locations with Phase I phenol exceedances were reoccupied, and all were less than the RAL. Thus, no remediation is needed

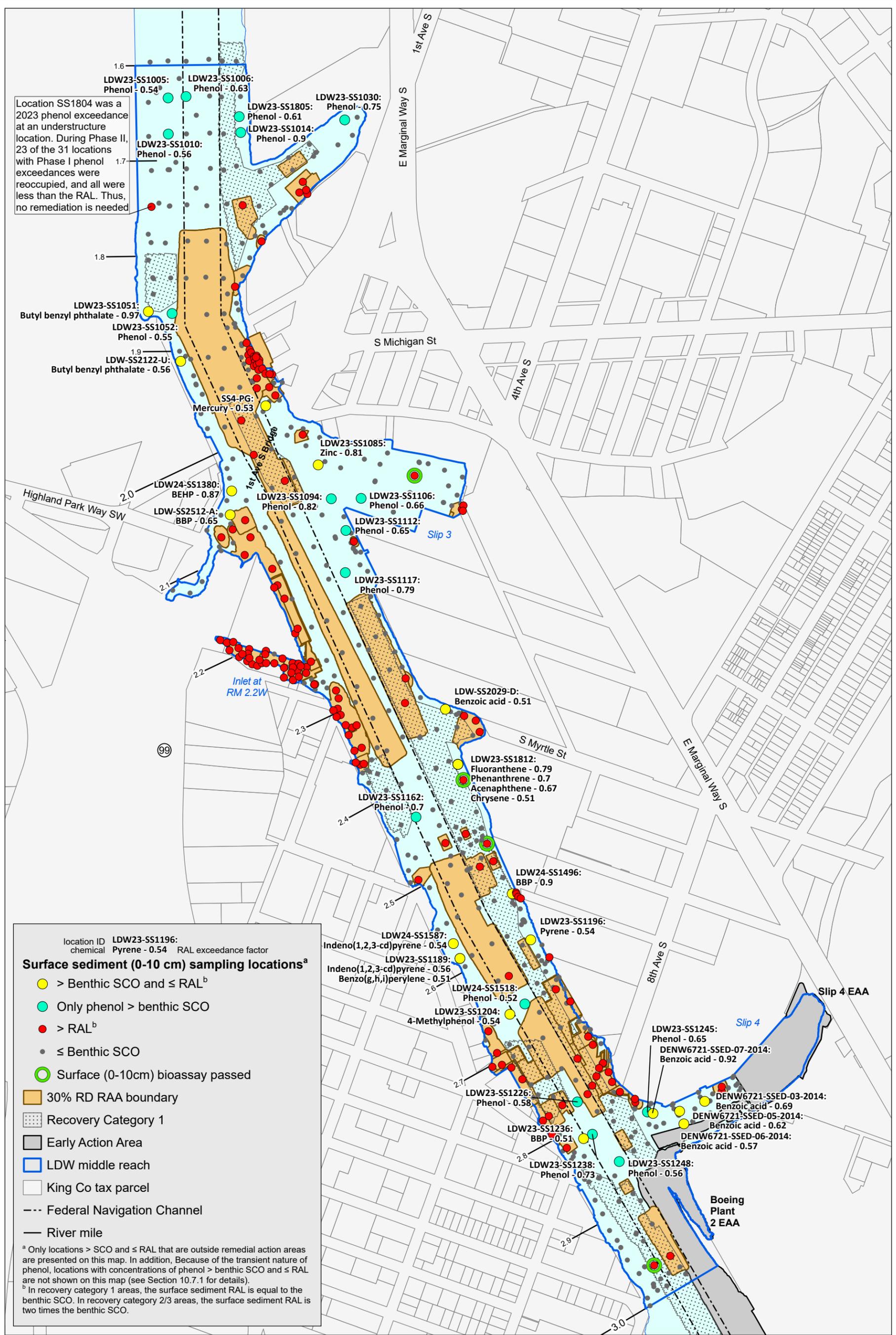
location ID	LDW23-SS1196:	chemical	Pyrene - 0.54	RAL exceedance factor
-------------	---------------	----------	---------------	-----------------------

**Surface sediment (0-10 cm) sampling locations<sup>a</sup>**

- Yellow circle: > Benthic SCO and ≤ RAL<sup>b</sup>
- Cyan circle: Only phenol > benthic SCO
- Red circle: > RAL<sup>b</sup>
- Grey circle: ≤ Benthic SCO
- Green circle: Surface (0-10cm) bioassay passed
- Orange shaded area: 30% RD RAA boundary
- Blue hatched area: Recovery Category 1
- Grey shaded area: Early Action Area
- Blue outline: LDW middle reach
- White outline: King Co tax parcel
- Dashed line: Federal Navigation Channel
- Black line: River mile

<sup>a</sup> Only locations > SCO and ≤ RAL that are outside remedial action areas are presented on this map. In addition, Because of the transient nature of phenol, locations with concentrations of phenol > benthic SCO and ≤ RAL are not shown on this map (see Section 10.7.1 for details).

<sup>b</sup> In recovery category 1 areas, the surface sediment RAL is equal to the benthic SCO. In recovery category 2/3 areas, the surface sediment RAL is two times the benthic SCO.

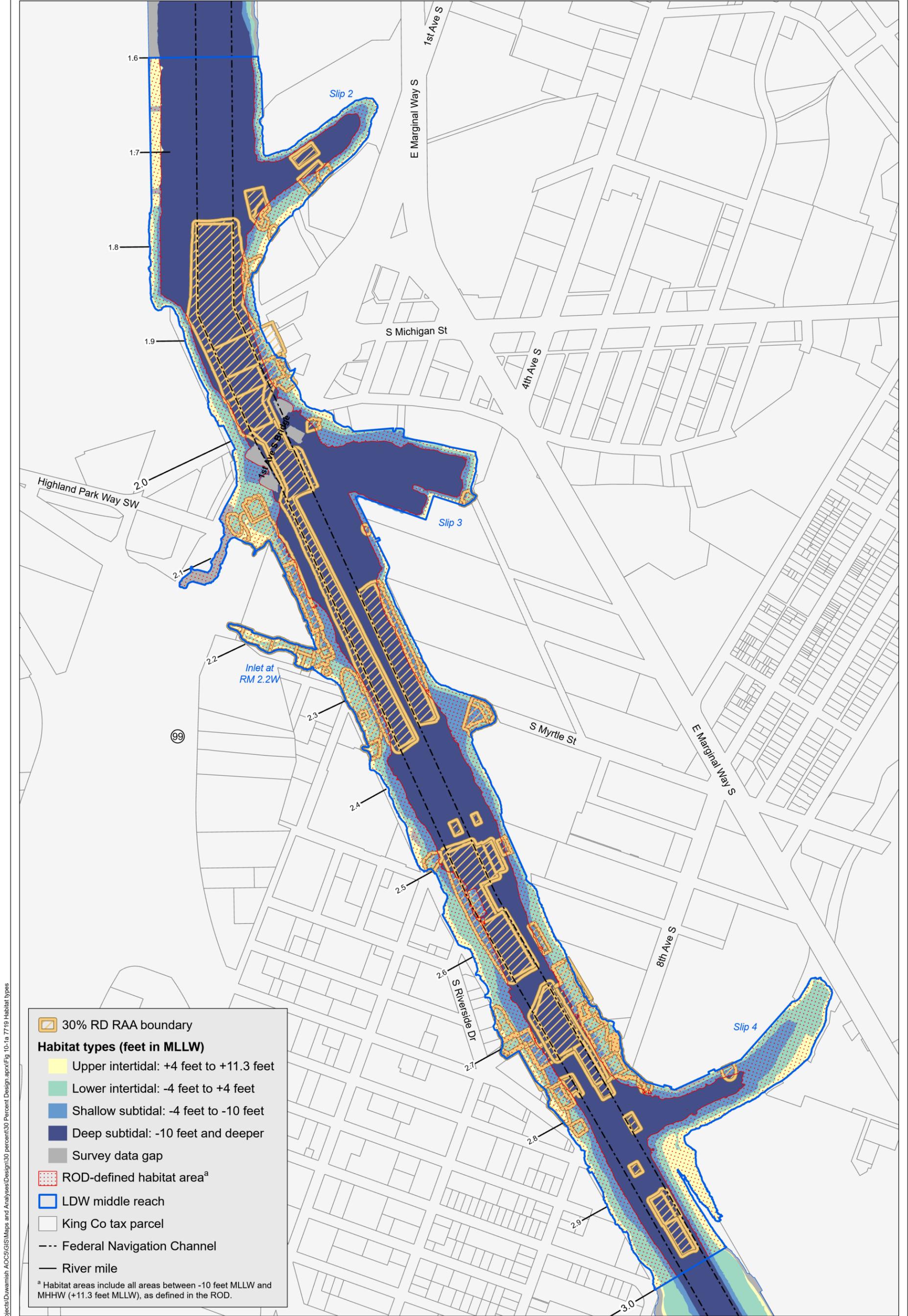


Prepared by craigh, 10/24/2025: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30 Percent Design.aprx\Fig 09-2 7701 Surf sed benthic SCO



**Figure 9-2. MNR to Benthic SCO Locations Compared with RAAs**

30% REMEDIAL DESIGN BASIS OF DESIGN  
REPORT FOR THE LDW MIDDLE REACH  
OCTOBER 27, 2025



**30% RD RAA boundary**

**Habitat types (feet in MLLW)**

- Upper intertidal: +4 feet to +11.3 feet
- Lower intertidal: -4 feet to +4 feet
- Shallow subtidal: -4 feet to -10 feet
- Deep subtidal: -10 feet and deeper
- Survey data gap

ROD-defined habitat area<sup>a</sup>

LDW middle reach

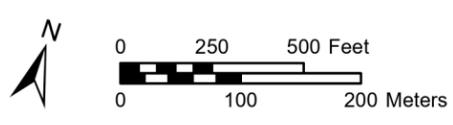
King Co tax parcel

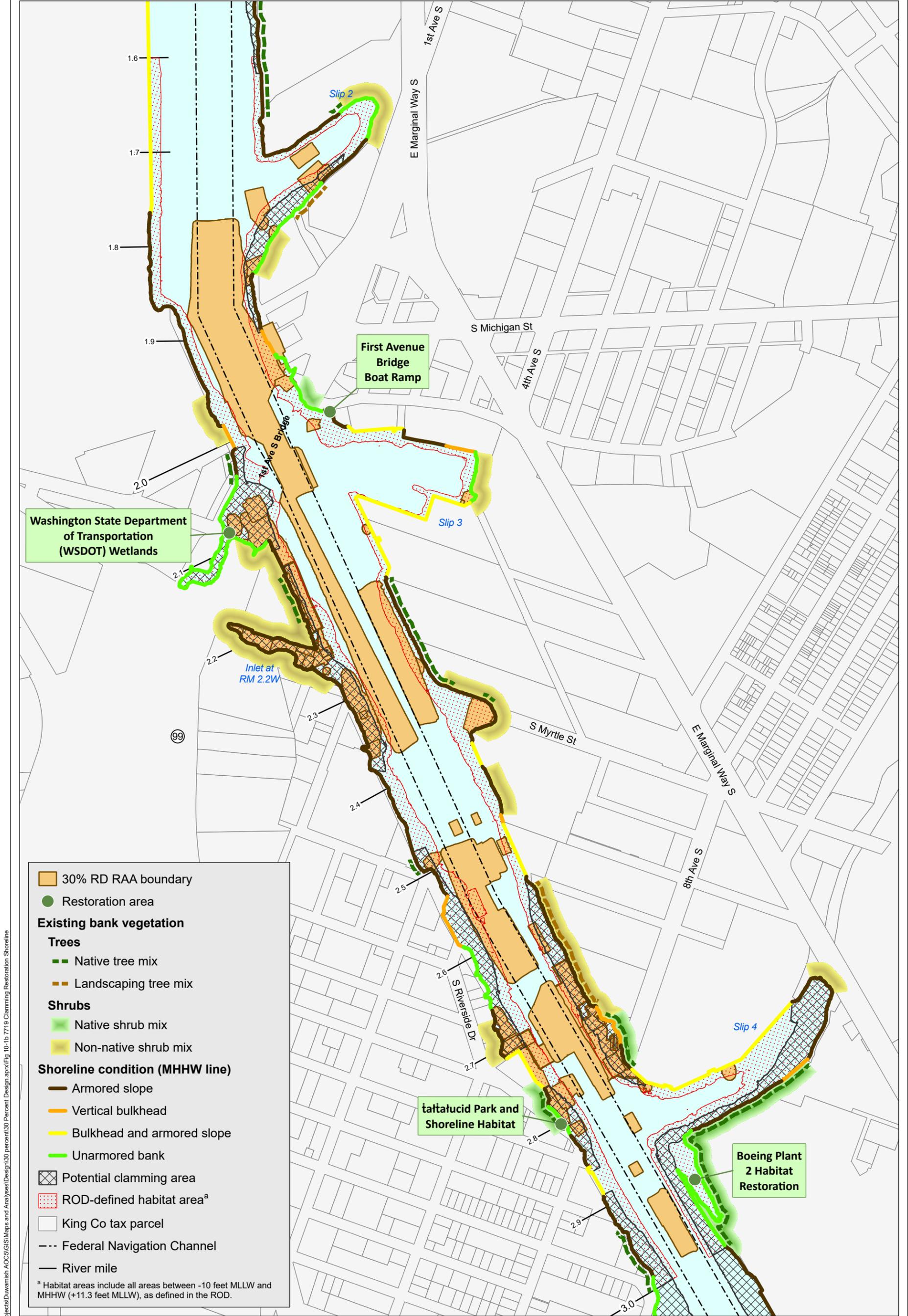
--- Federal Navigation Channel

— River mile

<sup>a</sup> Habitat areas include all areas between -10 feet MLLW and MHHW (+11.3 feet MLLW), as defined in the ROD.

Prepared by craigh, 10/24/2025, W:\Projects\Duwamish\_AOC\GIS\Maps\_and\_Analyses\Design\30\_Percent\Design.aprx\Fig 10-1a 7719 Habitat Types





Prepared by craigh, 10/24/2025, W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\Design\30\_Percent\_Design.aprx Fig 10-1b 7719 Clamming Restoration Shoreline

**30% RD RAA boundary**

**Restoration area**

**Existing bank vegetation**

**Trees**

- Native tree mix
- Landscaping tree mix

**Shrubs**

- Native shrub mix
- Non-native shrub mix

**Shoreline condition (MHHW line)**

- Armored slope
- Vertical bulkhead
- Bulkhead and armored slope
- Unarmored bank

**Potential clamming area**

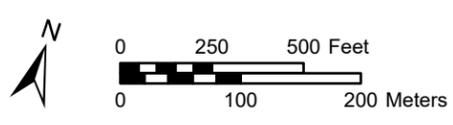
**ROD-defined habitat area<sup>a</sup>**

**King Co tax parcel**

**Federal Navigation Channel**

**River mile**

<sup>a</sup> Habitat areas include all areas between -10 feet MLLW and MHHW (+11.3 feet MLLW), as defined in the ROD.



**Figure 10-1b. Potential Clamming Areas and Shoreline Conditions that Overlap with RAAs**

30% REMEDIAL DESIGN BASIS OF DESIGN REPORT FOR THE LDW MIDDLE REACH

OCTOBER 27, 2025