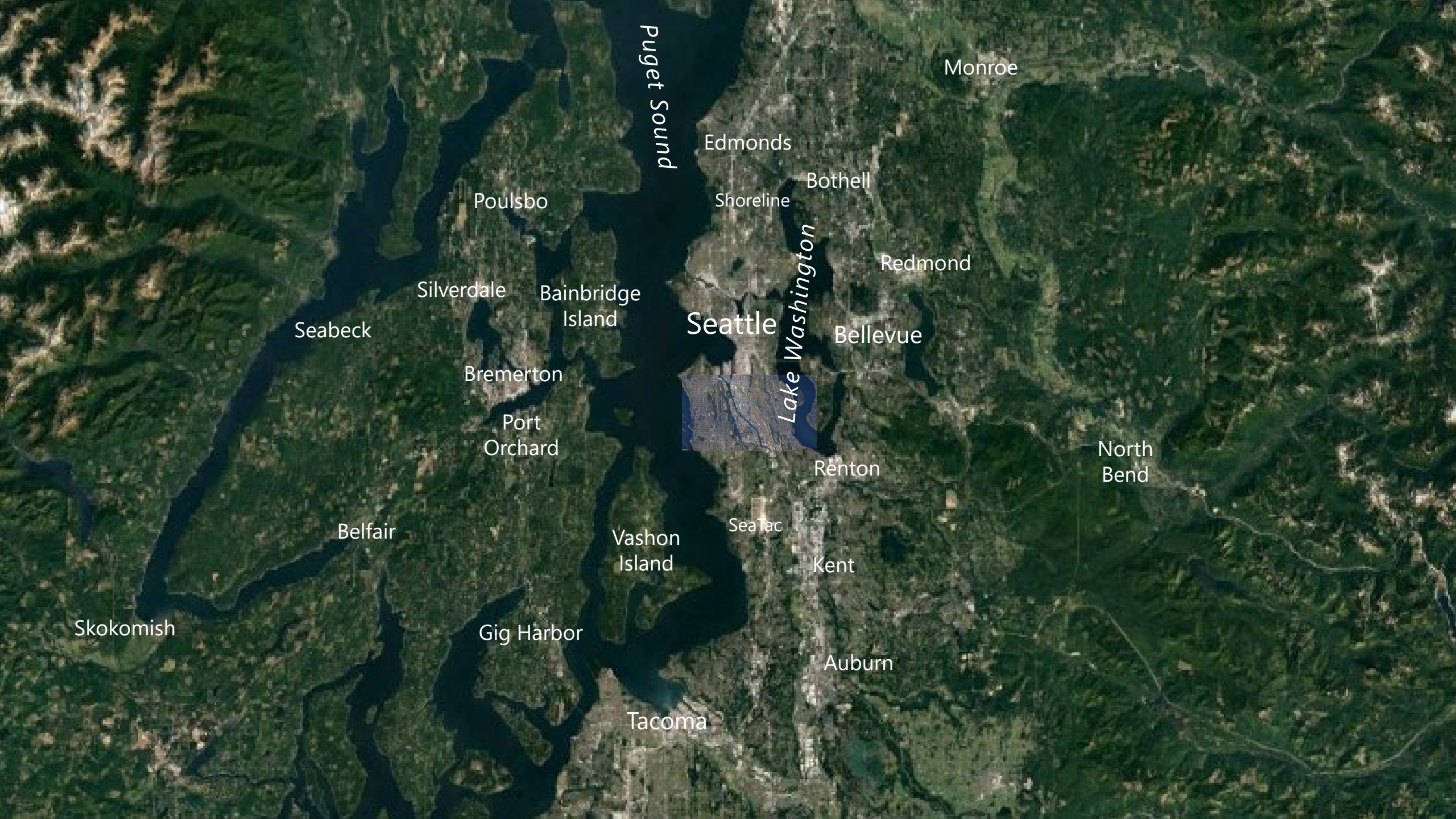
From Data to Design

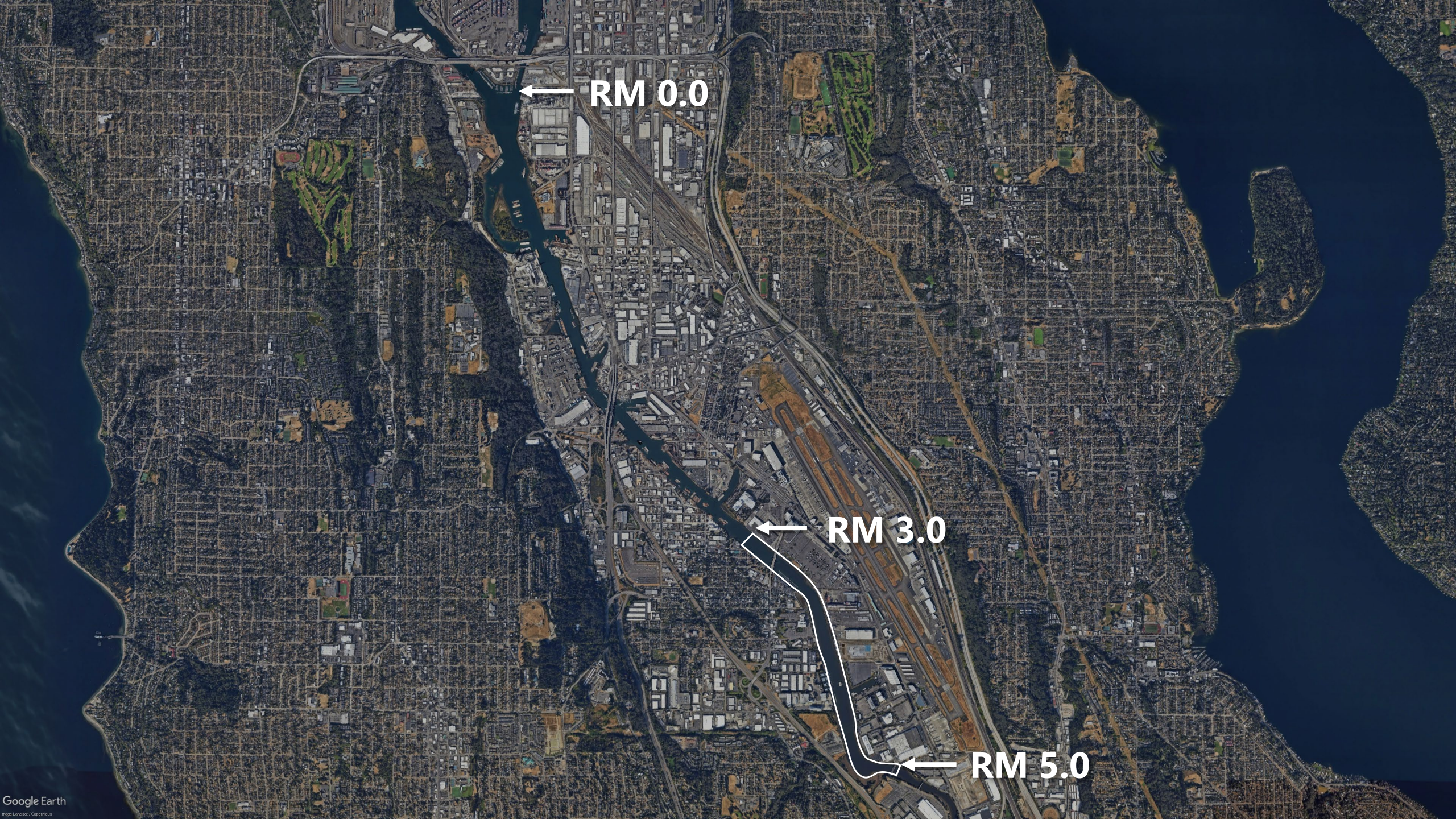
Lower Duwamish Waterway Upper Reach

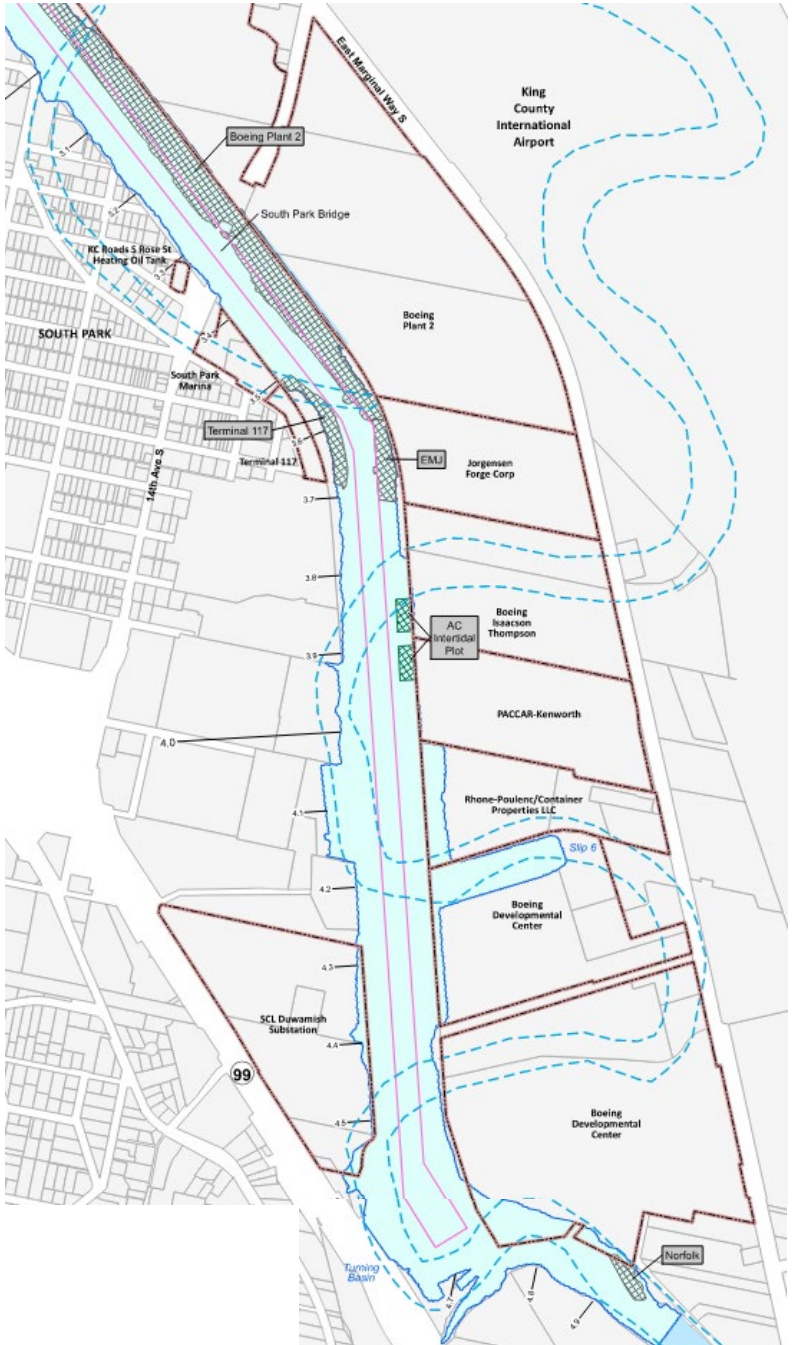
Presented by

Katy Gross, PE
Anchor QEA


Lower Duwamish Waterway Upper Reach
Seattle
Tacoma
WASHINGTON
Google Earth


Puget Sound
Monroe
Edmonds
Bothell
Shoreline
Poulsbo
Lake Washington
Redmond
Silverdale
Bainbridge Island
Seattle
Bellevue
Seabeck
Bremerton
Port Orchard
North Bend
Renton
SeaTac
Belfair
Vashon Island
Kent
Skokomish
Gig Harbor
Auburn
Tacoma


RM 0.0
RM 3.0
RM 5.0
Google Earth
Image Landsat / Copernicus



UPLAND CLEANUP SITES

EARLY ACTION AREAS

TIMELINE

Remedial Investigation

2010

Feasibility Study

2012

Record of Decision

2014

Engineering Design (upper reach)

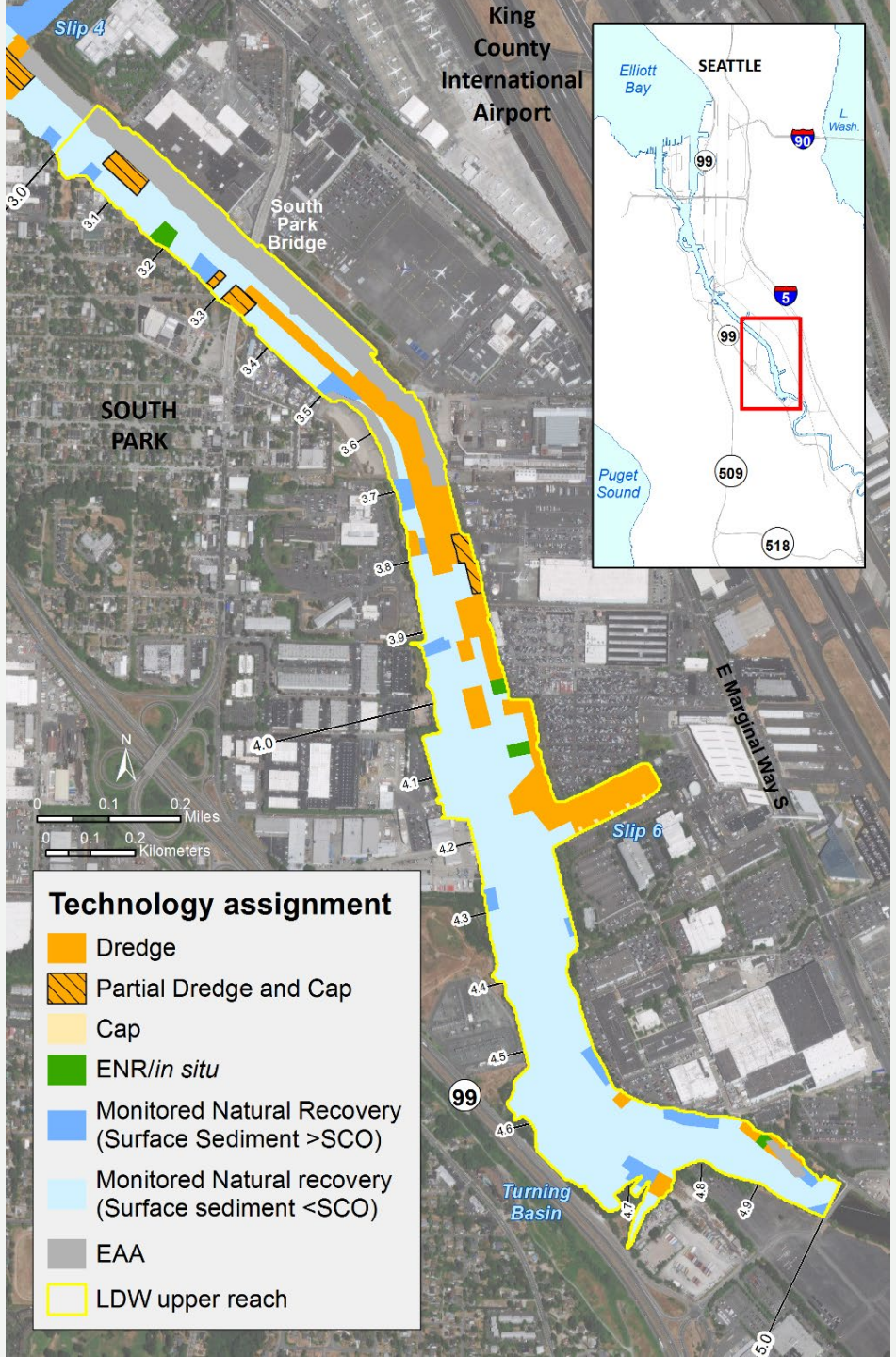
2019–2023

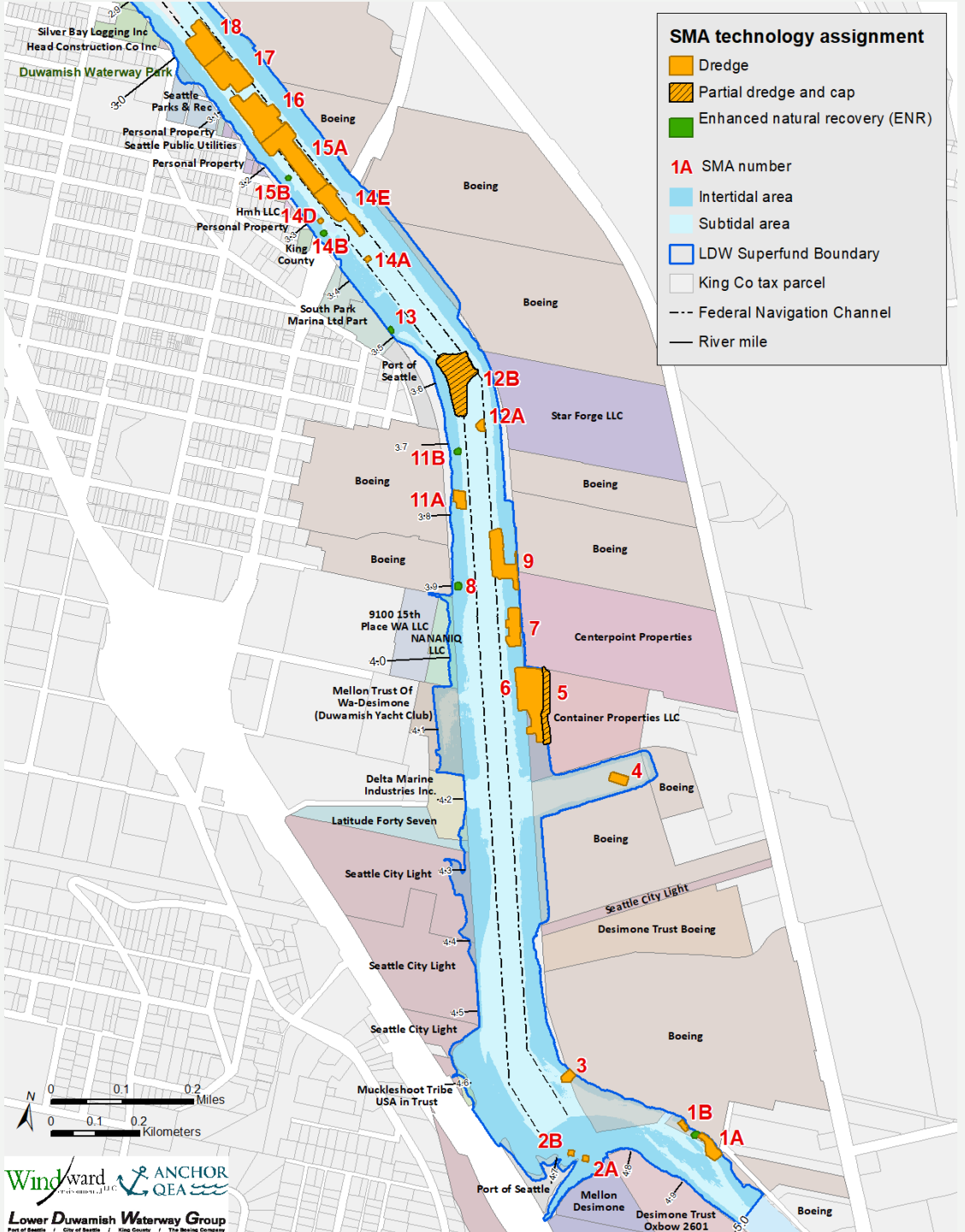
Construction (upper reach)

2024–2027

CONTAMINANTS

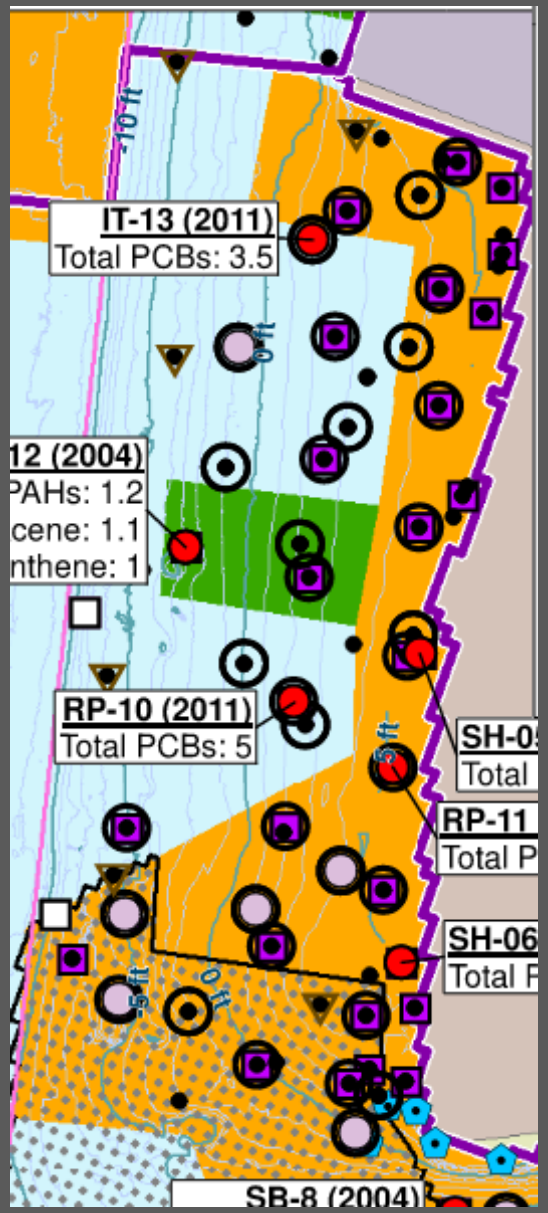
- PCBs
- Arsenic
- Dioxins/ Furans
- PAHs
- Others

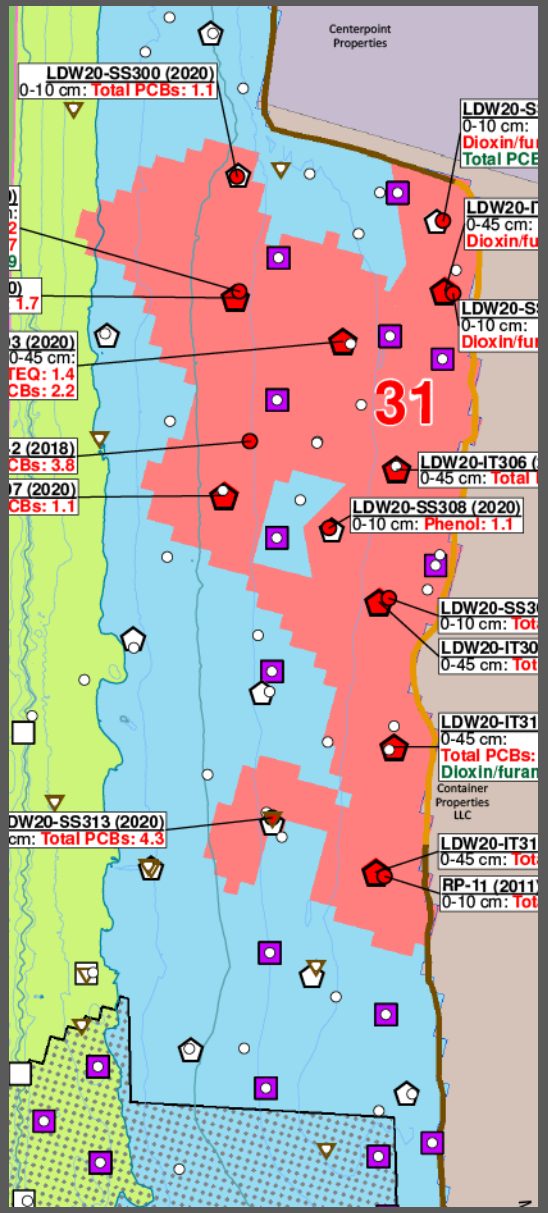

Slip 4
King County International Airport
South Park Bridge
SOUTH PARK
E Marginal Way S
Slip 6
Turning Basin
Elliott Bay
SEATTLE
L Wash.
Puget Sound
90
99
5
509
518
3.0
3.1
3.2
3.3
3.4
3.5
3.6
3.7
3.8
3.9
4.0
4.1
4.2
4.3
4.4
4.5
4.6
4.7
4.8
4.9
5.0
N
0 0.1 0.2 Miles
0 0.1 0.2 Kilometers
Technology assignment
Dredge
Partial Dredge and Cap
Cap
ENR/in situ
Monitored Natural Recovery (Surface Sediment >SCO)
Monitored Natural recovery (Surface sediment <SCO)
EAA
LDW upper reach


SMA technology assignment
Dredge
Partial dredge and cap
Enhanced natural recovery (ENR)
1A SMA number
Intertidal area
Subtidal area
LDW Superfund Boundary
King Co tax parcel
Federal Navigation Channel
River mile
18
17
16
15A
15B
14D
14E
14B
14A
13
12B
12A
11B
11A
9
8
7
6
5
4
3
2B
2A
1B
1A
Silver Bay Logging Inc
Head Construction Co Inc
Duwamish Waterway Park
Seattle Parks & Rec
Personal Property
Seattle Public Utilities
Hmh LLC
King County
South Park Marina Ltd Part
Port of Seattle
Boeing
Star Forge LLC
9100 15th Place WA LLC
NANAIQ LLC
Centerpoint Properties
Mellon Trust Of Wa-Desimone (Duwamish Yacht Club)
Container Properties LLC
Delta Marine Industries Inc.
Latitude Forty Seven
Seattle City Light
Desimone Trust Boeing
Muckleshoot Tribe USA in Trust
Mellon Desimone
Desimone Trust Oxbow 2601
N
0 0.1 0.2 Miles
0 0.1 0.2 Kilometers
Windward Environmental LLC
ANCHOR QEA
Lower Duwamish Waterway Group

3 Phases of Pre-Design Investigations

- **Phase I**
  - **Define horizontal extents**
- Phase II
  - Refine horizontal extents
  - Vertical data collection
  - Collection of other engineering data (e.g., geotechnical data)
  - Used for 30% and 60% RD
- Phase III
  - Address data gaps identified during 30% and 60% RD
  - Final remedial action level (RAL) exceedance areas for 90% and 100% RD





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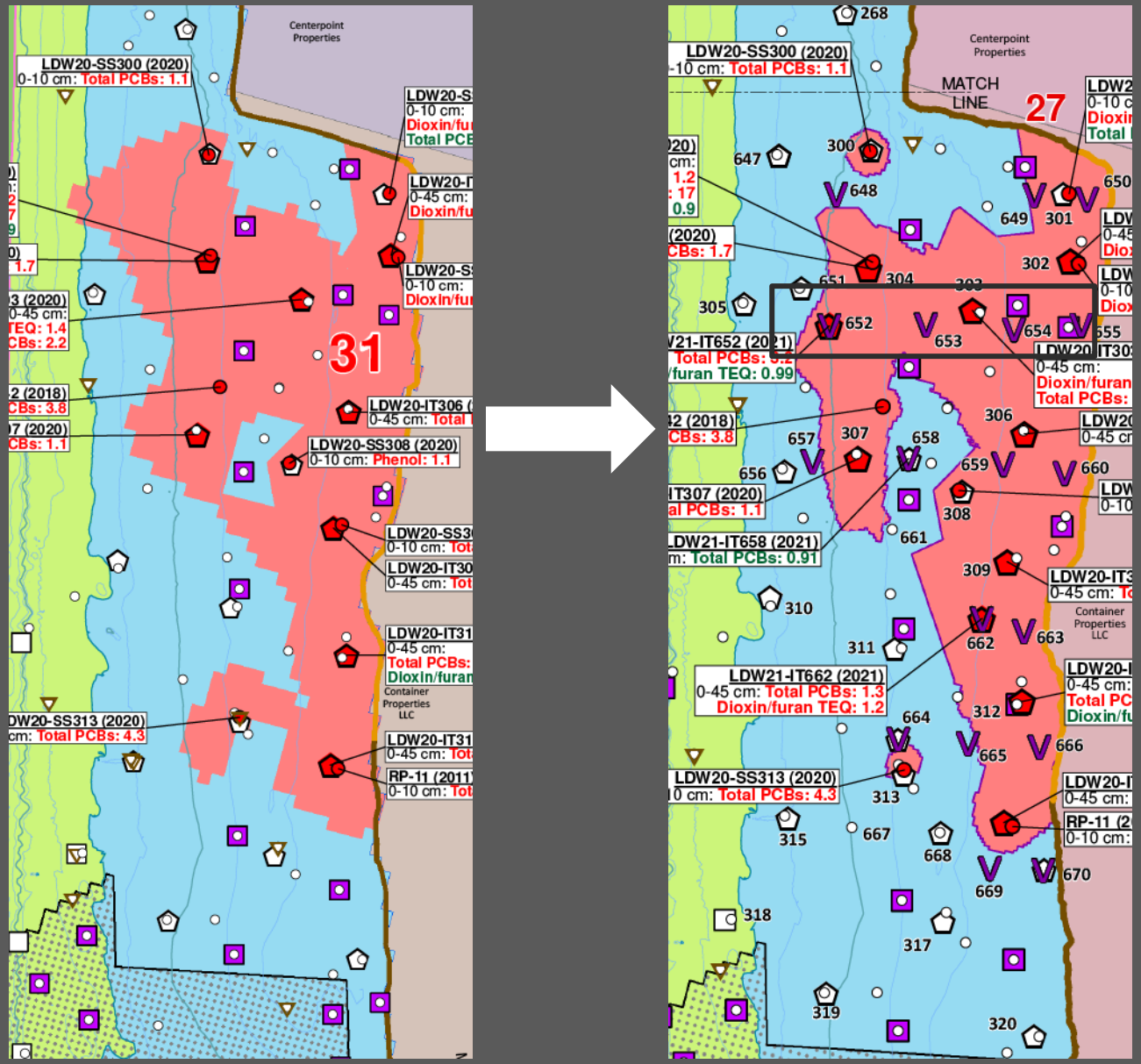

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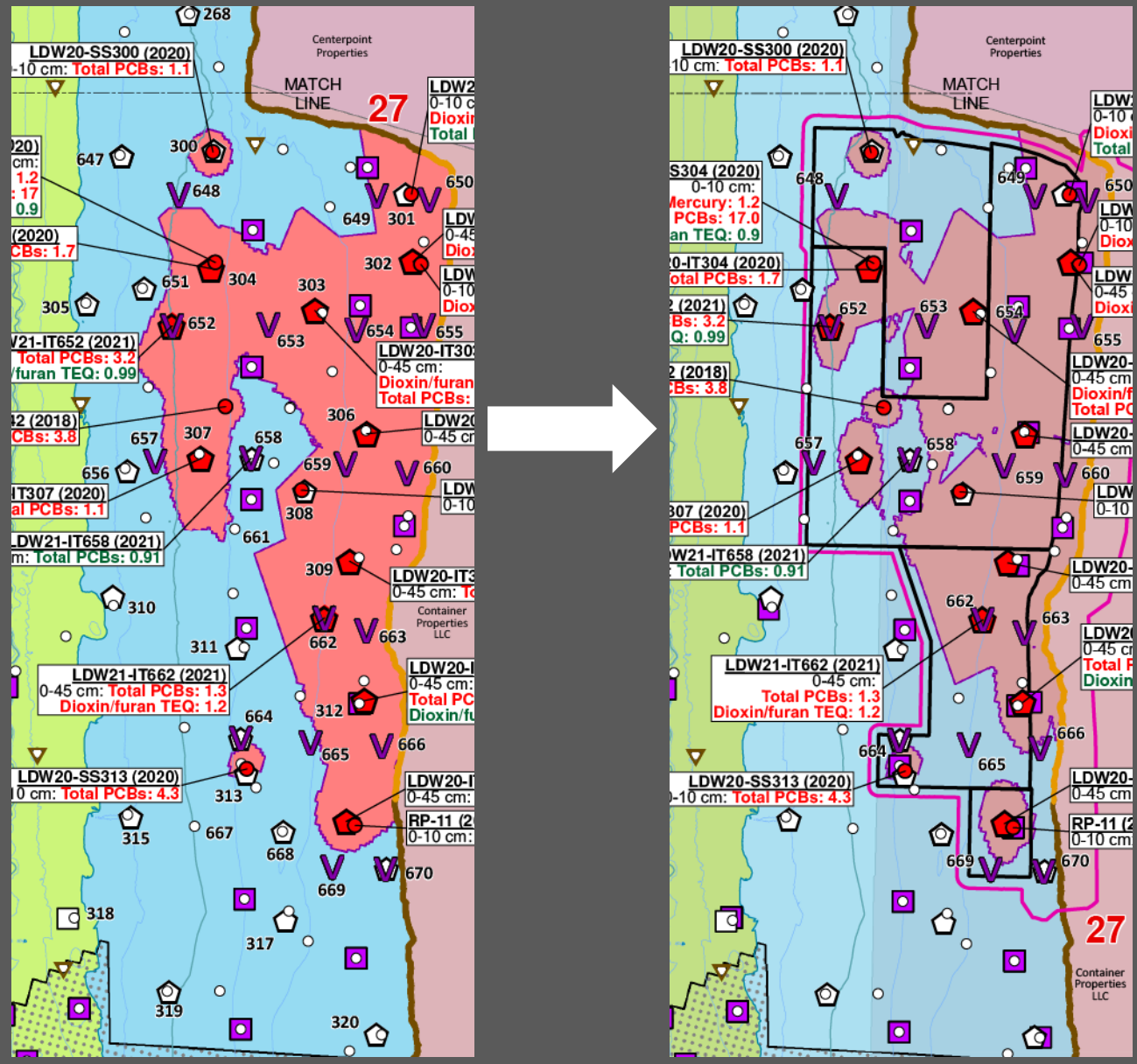
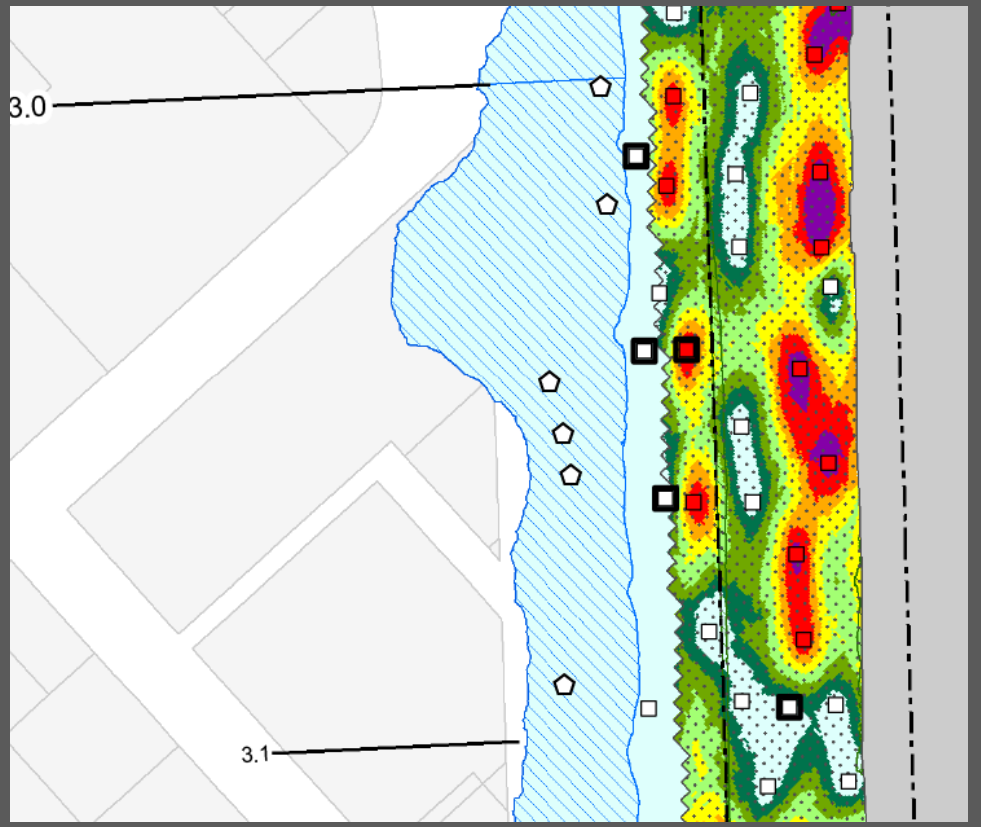


Data Interpolation

- Indicator kriging for PCBs
  - Geostatistical interpolation method
  - Maps probability of remedial action level (RAL) exceedances
- Thiessen polygons for all other contaminants
- Merged to create RAL exceedance areas



PCB indicator kriging probability of RAL exceedance in subsurface sediment

- 20%–30%
- 30%–40%
- 40%–50%
- 50%–60%
- 60%–70%
- 70%–80%
- >80%

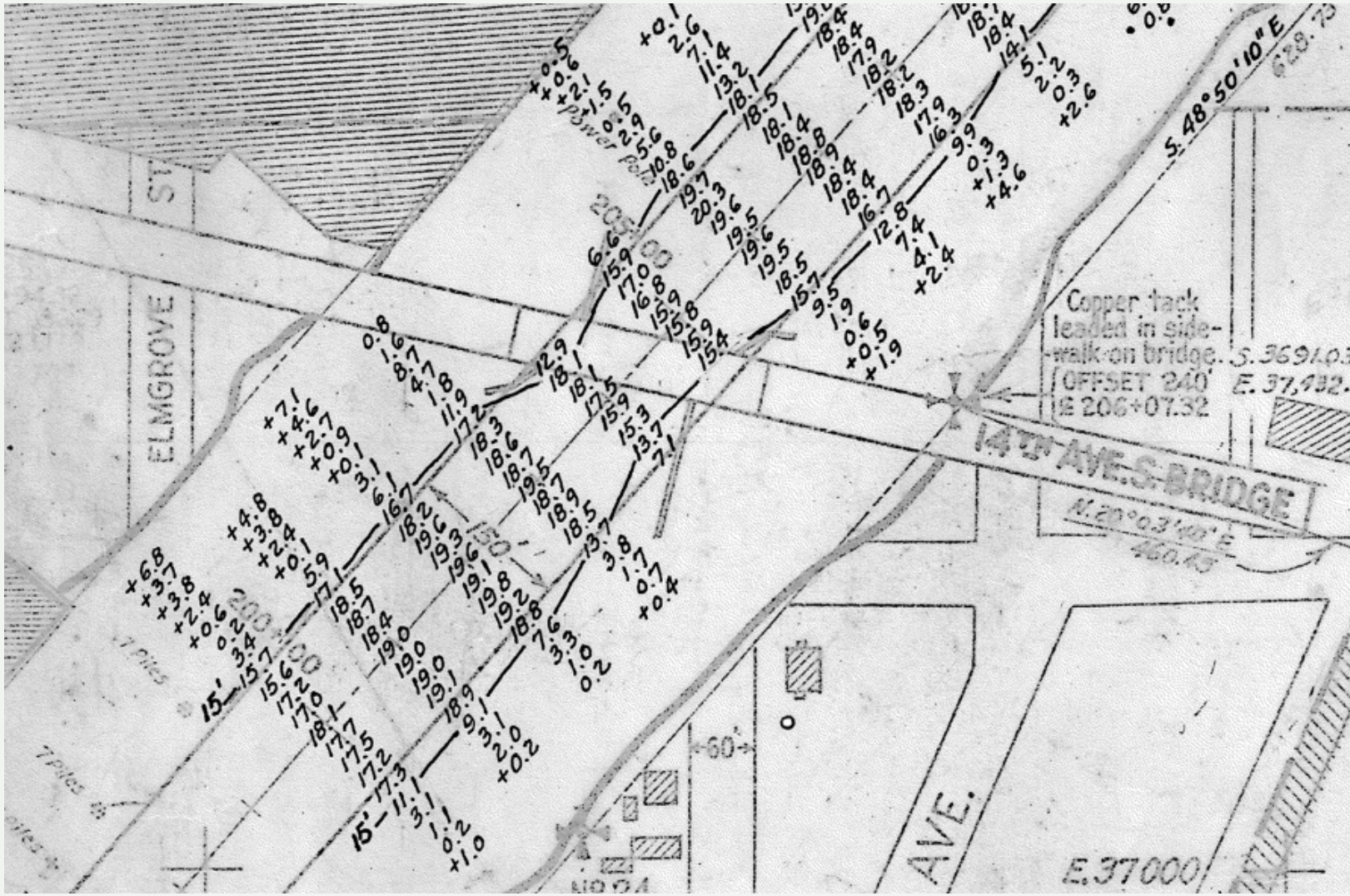
Engineering Considerations

Engineering Considerations for Remedial Action Area Boundaries

- Geometry
- Site conditions
- Operational and administrative
- Review of data interpolation uncertainty
- Constructability and minimizing risk of recontamination

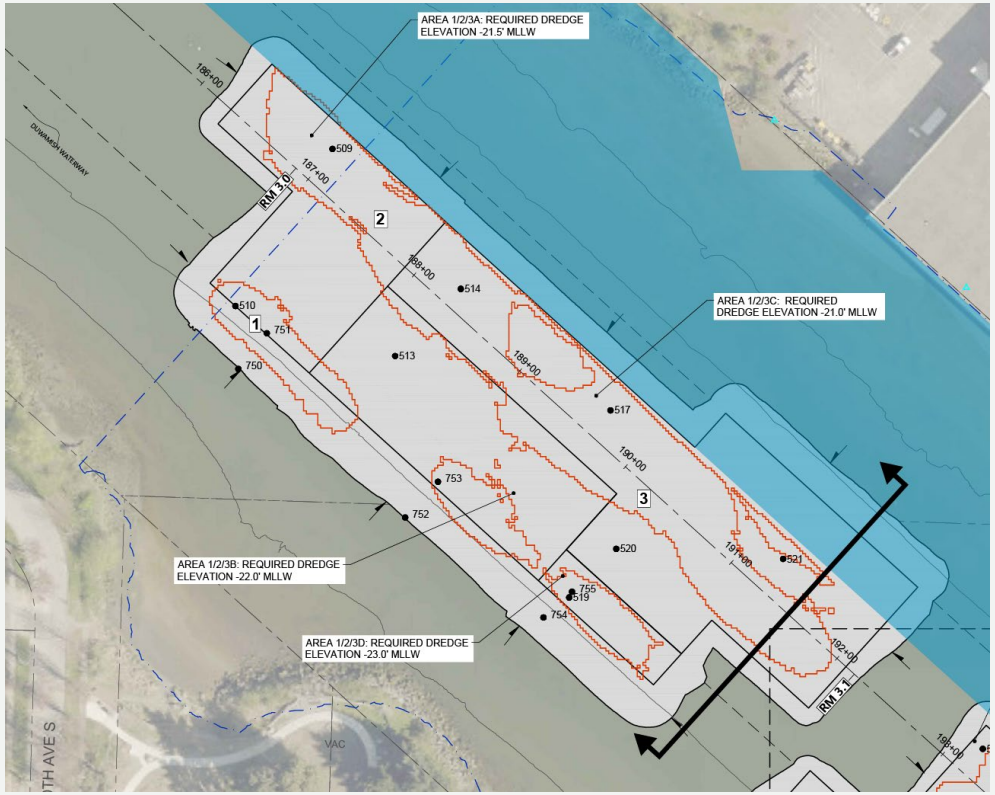
Engineering Considerations: Site Conditions

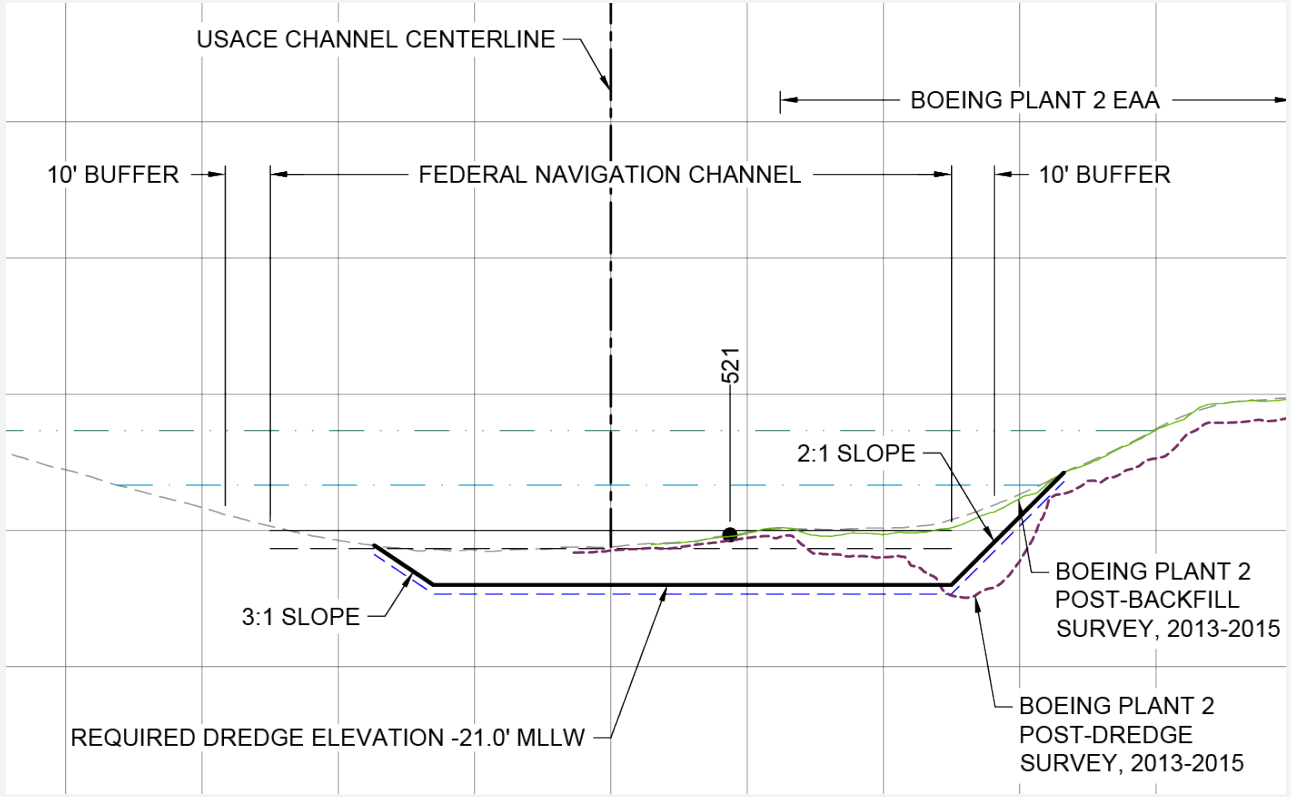
- Geotechnical stability
- Offsets from structures and utilities
- Historical dredging



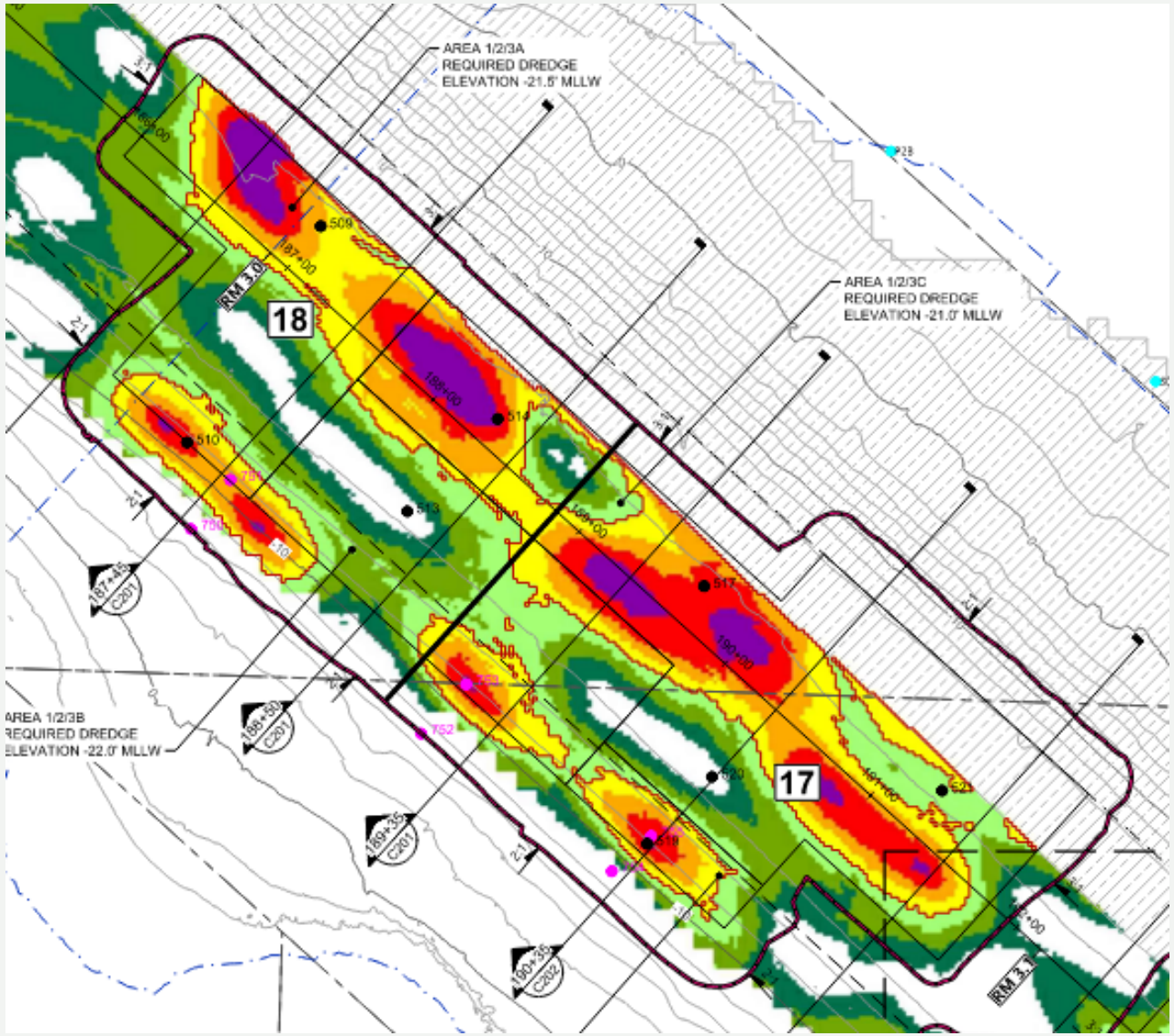
Engineering Considerations: Operational/Administrative

Early action areas, Ecology-led upland cleanups, habitat areas, ROD requirements

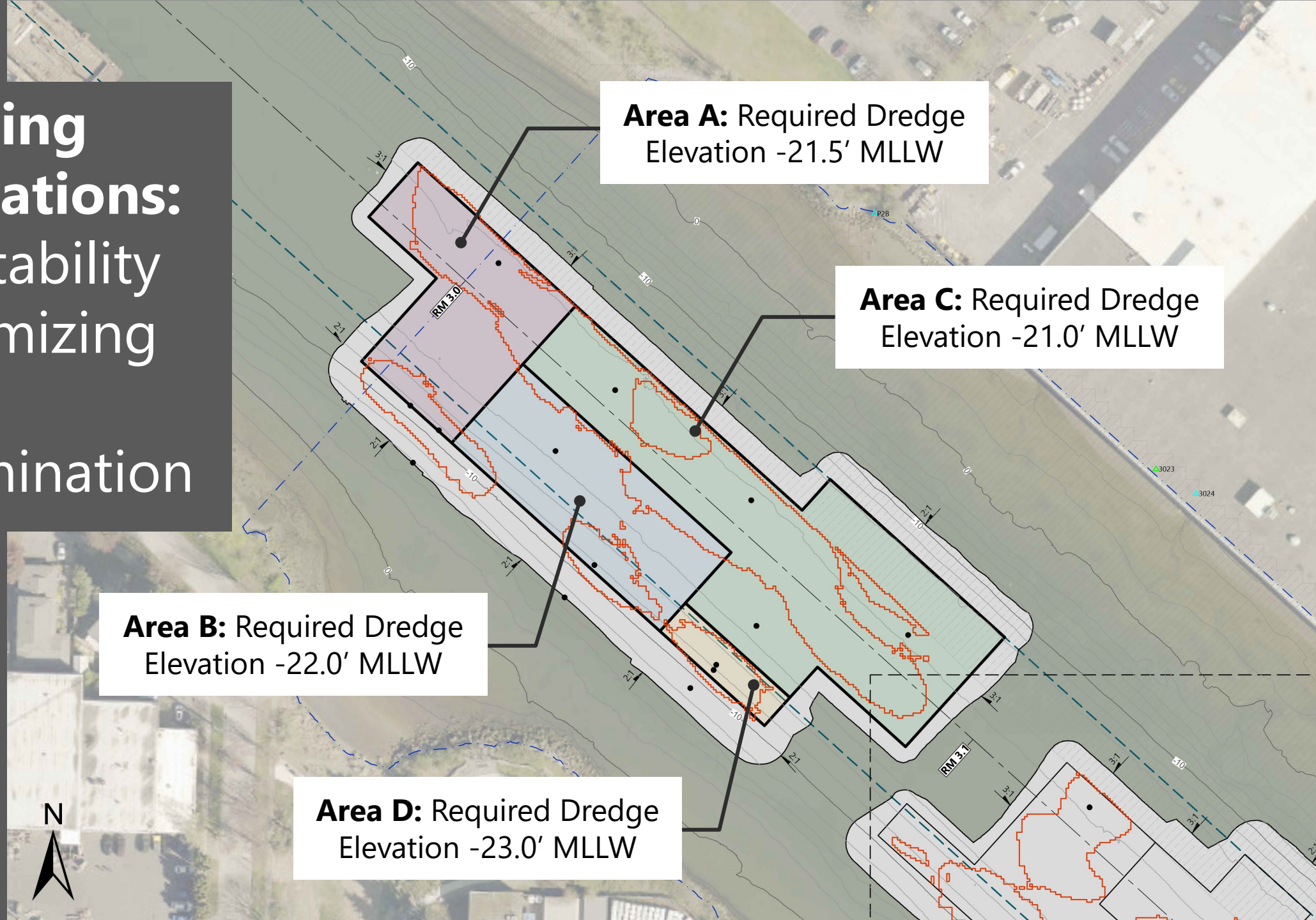




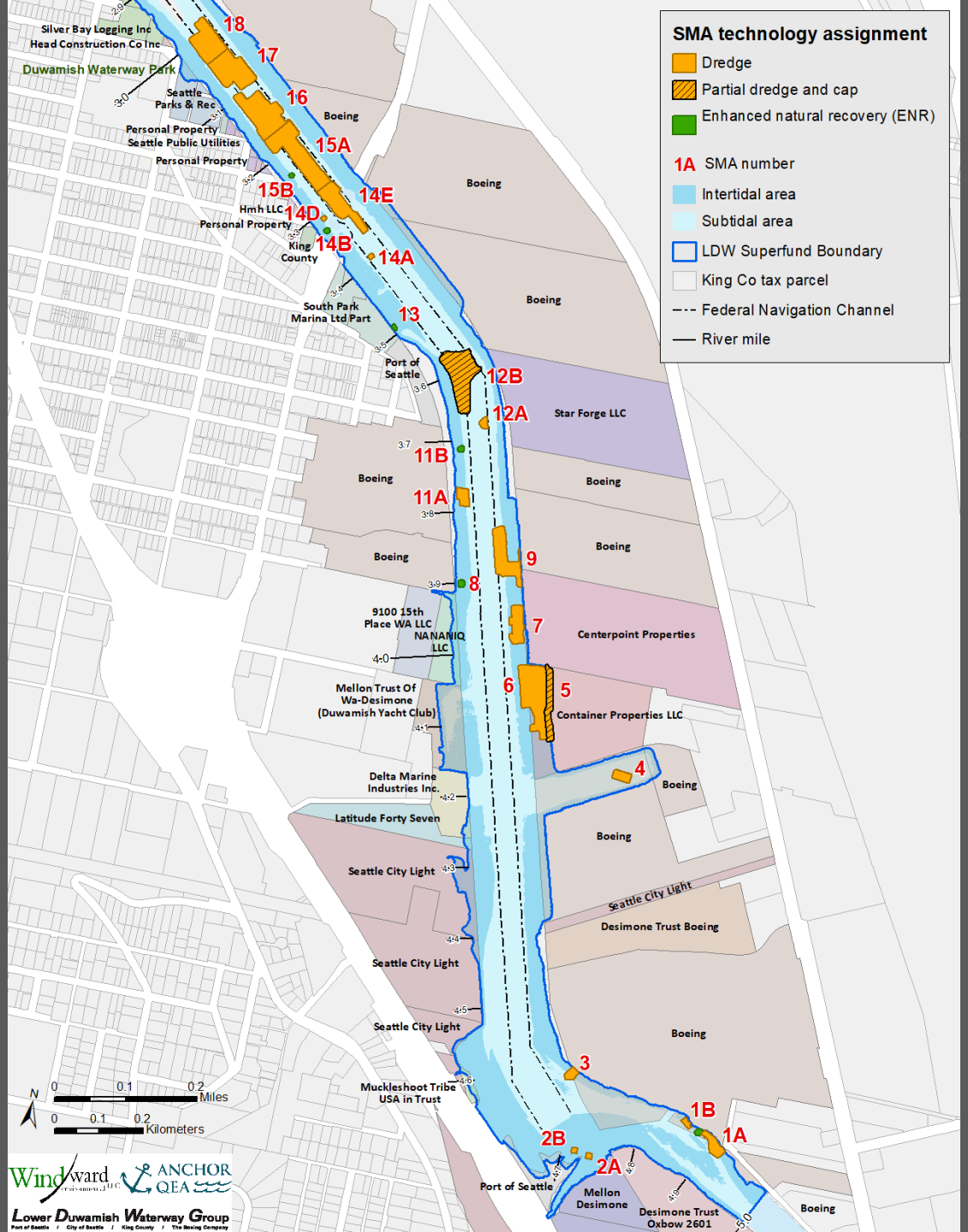
Engineering Considerations: Review of Data Interpolation Uncertainty



Engineering Considerations: Constructability and Minimizing Risk of Recontamination



- Completing 100% design now
- Bid advertisement in January 2024
- Construction to begin October 2024
- Three in-water work seasons



Lower Duwamish Waterway Group

City of Seattle King County BOEING

What questions do you have?