Five-Year Review Briefing

Harbor Island Superfund Site, Seattle, WA

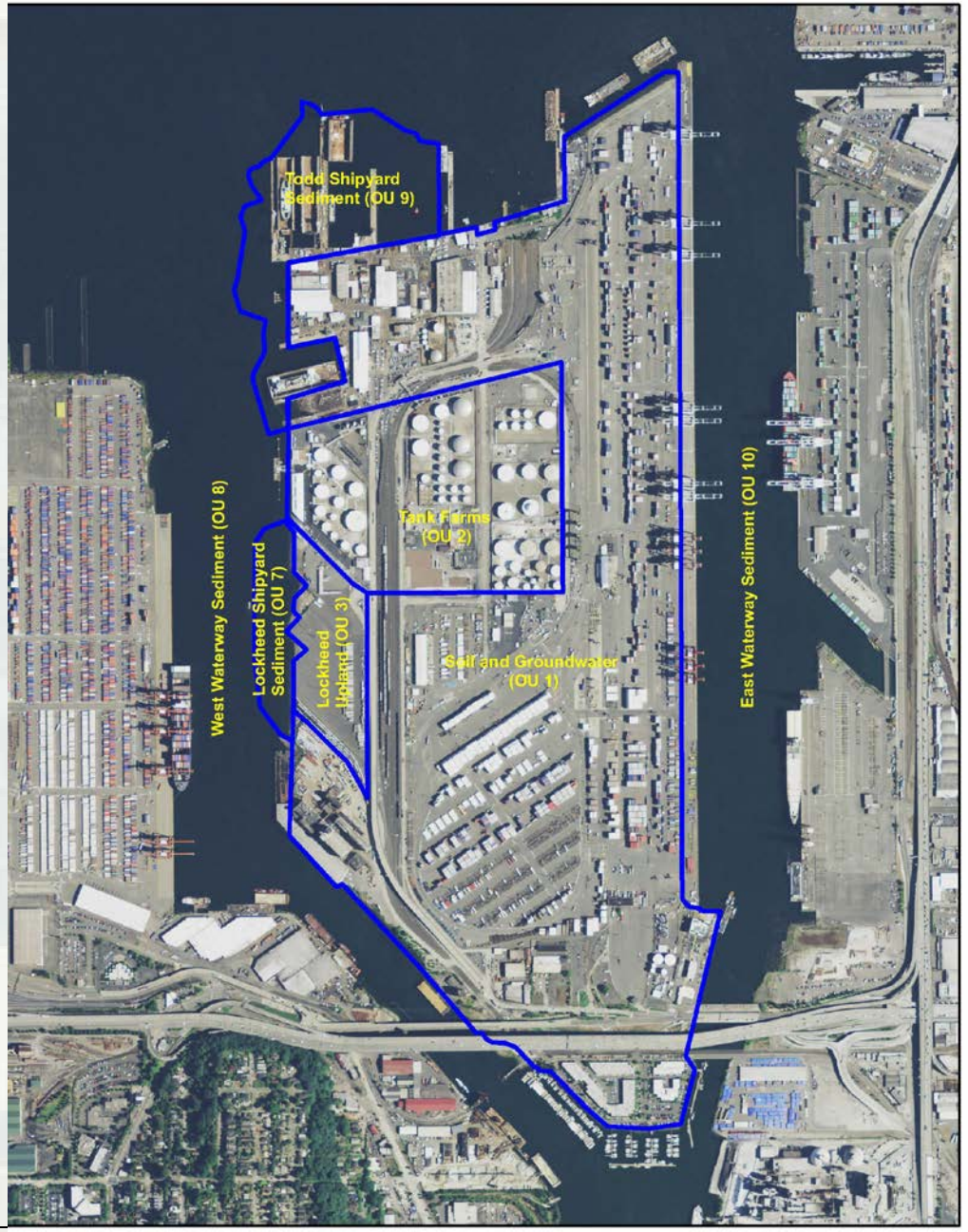
Presented by USACE Seattle District

1 July 2015

US Army Corps of Engineers
BUILDING STRONG®

Operable Units (OUs)

- Soil and Groundwater OU-1
- Tank Farms OU-2
- Lockheed Upland OU-3
- Lockheed Shipyard Sediment OU-7
- West Waterway Sediments OU-8
- Todd Shipyard Sediments OU-9
- East Waterway Sediments OU-10



Remedial Actions

- Soil and Groundwater OU-1
  - ▶ 1993 ROD
  - ▶ 1996 Consent Decree, lists Settling Defendants
  - ▶ Remedy
    - Excavation of Hot Spot Soils
    - Capping of remaining soil contaminants
    - Removal and treatment of product at Todd Shipyards
    - Long-term groundwater monitoring
    - Institutional Controls

Remedial Actions cont.

- Tank Farms OU-2
  - State Lead
  - Three facilities: BP, Kinder Morgan, Shell
  - 1999, 2000 Cleanup Action Plans and Consent Decrees
  - Remedy
    - Excavation of lead and arsenic in shallow soil
    - Excavation of TPH Hot Spot Soils
    - *In-situ* remedial systems
    - Natural Attenuation
    - Long-term groundwater monitoring
    - Institutional Controls

Remedial Actions cont.

- Lockheed Upland OU-3
  - 1994 ROD
  - 1994 Consent Decree
  - Remedy
    - Excavation of Hot Spot Soils
    - Capping of remaining soil contaminations
    - Long-term groundwater monitoring
    - Institutional Controls

Remedial Actions cont.

- Lockheed Shipyard Sediments OU-7
  - ▶1996 Shipyard ROD
  - ▶1997 AOC
  - ▶Remedy
    - Demolition of pier and removal of piles
    - Dredging in the open channel
    - Capping in the nearshore area
    - Creation of a riparian buffer and habitat friendly substrate on capped areas

Remedial Actions cont.

- West Waterway OU-8
  - 2003 No Action ROD
  - EPA to conduct discretionary reviews

Remedial Actions cont.

- Todd Shipyard Sediments OU-9
  - 1996 Shipyard ROD
  - 2000 AOC
  - Remedy
    - Demolition of piers
    - Dredging in the open channel
    - Capping contaminated sediments under existing piers
    - Creation of a habitat bench on the capped areas

Remedial Actions cont.

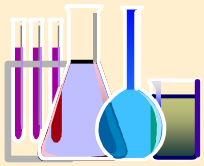
- East Waterway OU-10
  - ROD pending
  - RI/FS in progress

Five-Year Review Process

Question A: Is the remedy functioning as intended by the decision documents?

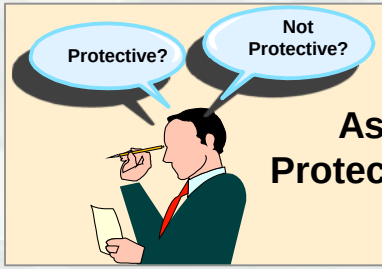
Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection still valid?

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?



Data Review

Community Involvement and Notification



Assess Protectiveness

Five-Year Review Report

Document Review

Interviews

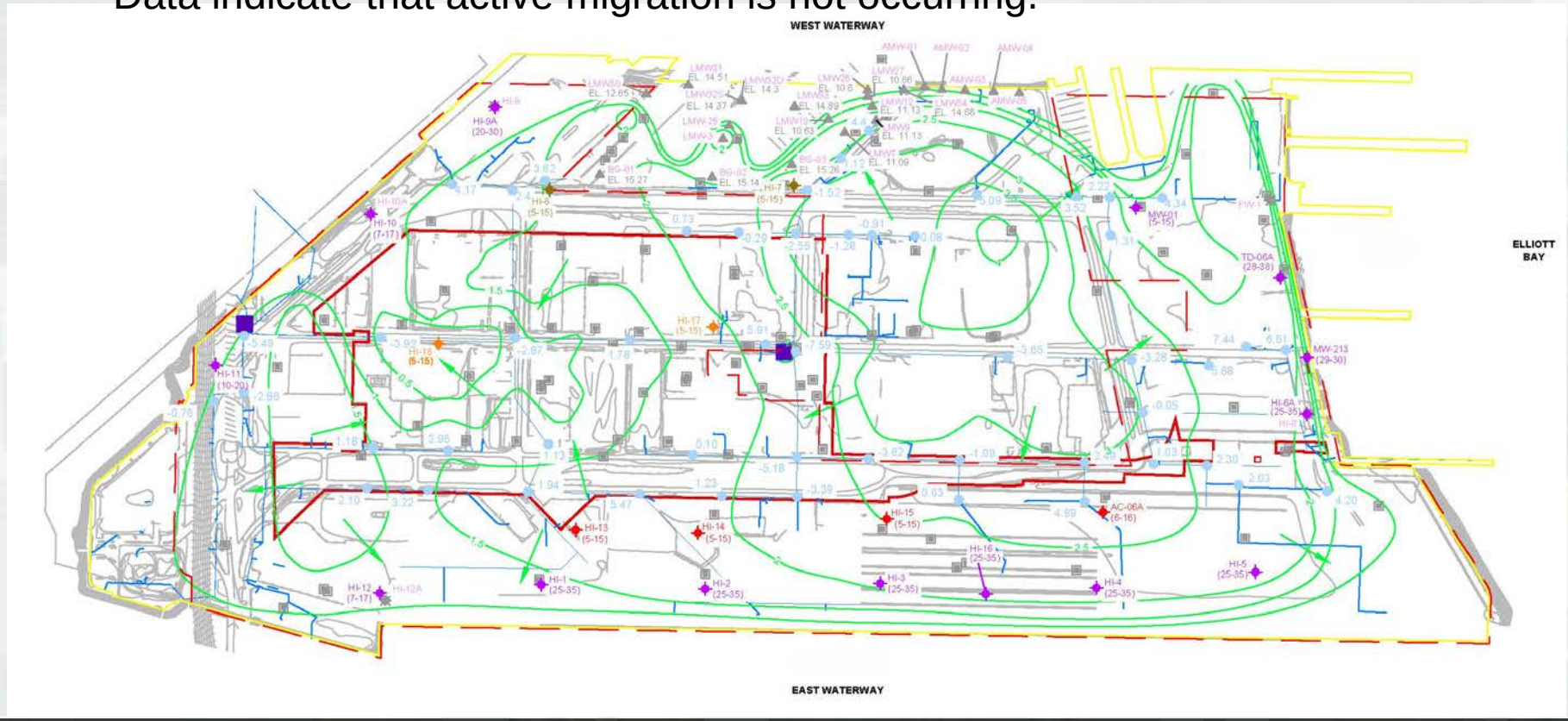
Site Visit

Data Reviewed

- Groundwater monitoring data
- Upland cap inspections and maintenance
- LNAPL extraction data (Todd)
- Sediment cap O&M reports
- Sediment data (LSS-OU7)
- Tank Farms data review by Ecology

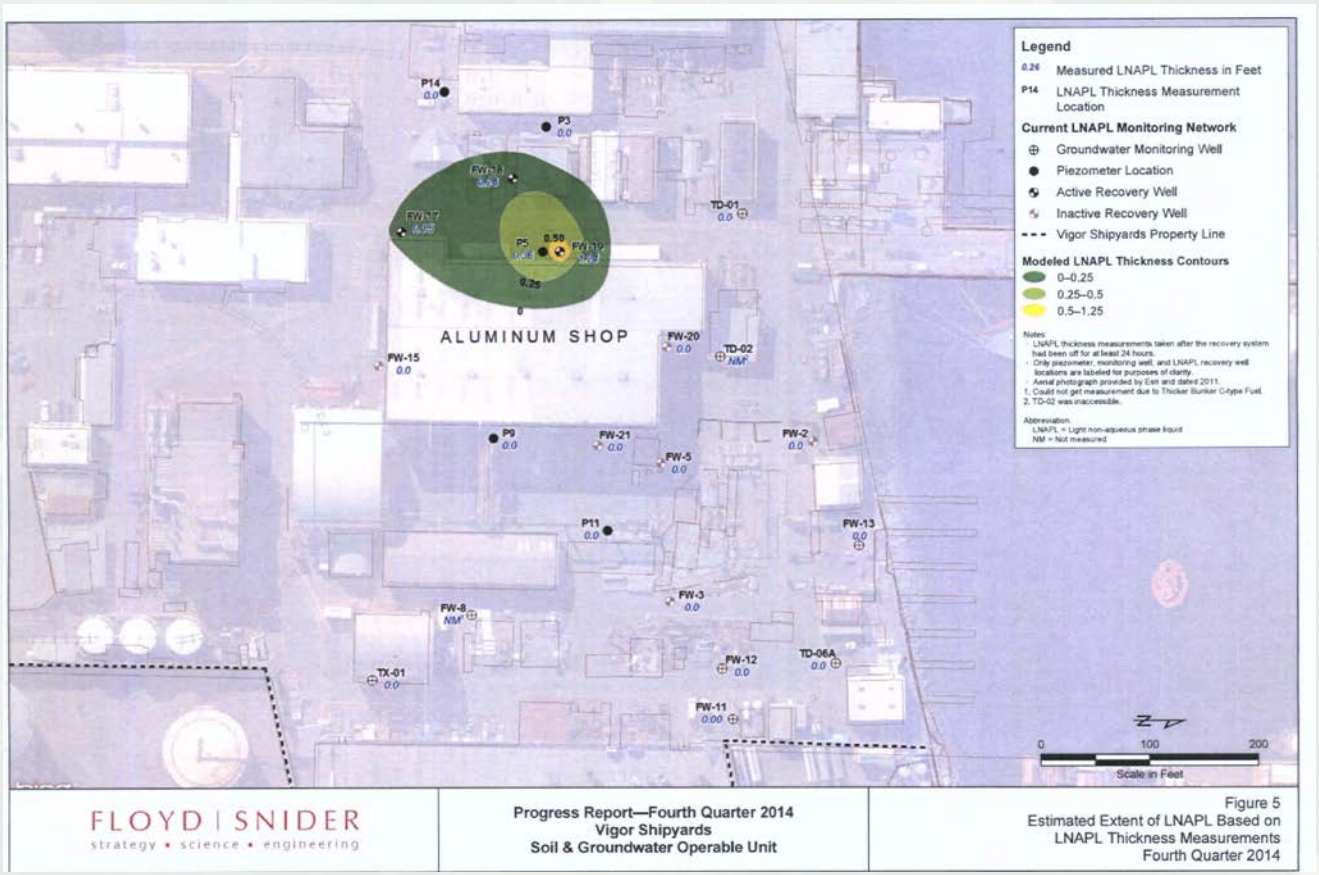
Data Review Summary
Soil & Groundwater OU-1

- Submitted cap inspections indicate cap is appropriately maintained
- Exceedences of ROD cleanup levels in last 5 years of arsenic, cadmium, copper, lead, mercury, nickel, zinc and cyanide.
- Highest concentrations observed at inland well HI-17
- No spatial or temporal data trends
- Data indicate that active migration is not occurring.



Data Review Summary
Soil & Groundwater OU-1 (Todd)

- Remaining soil Hot Spot removed in 2011
- LNAPL removal currently at West Shed wells only



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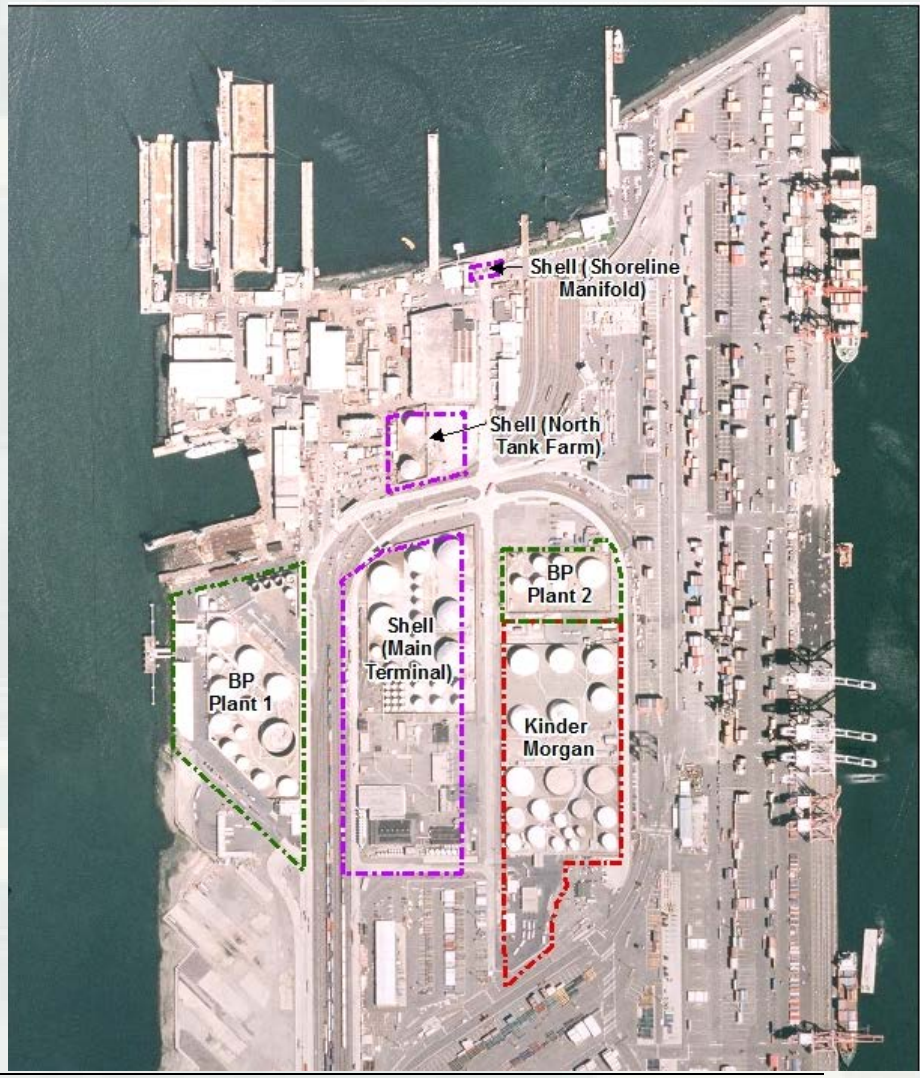
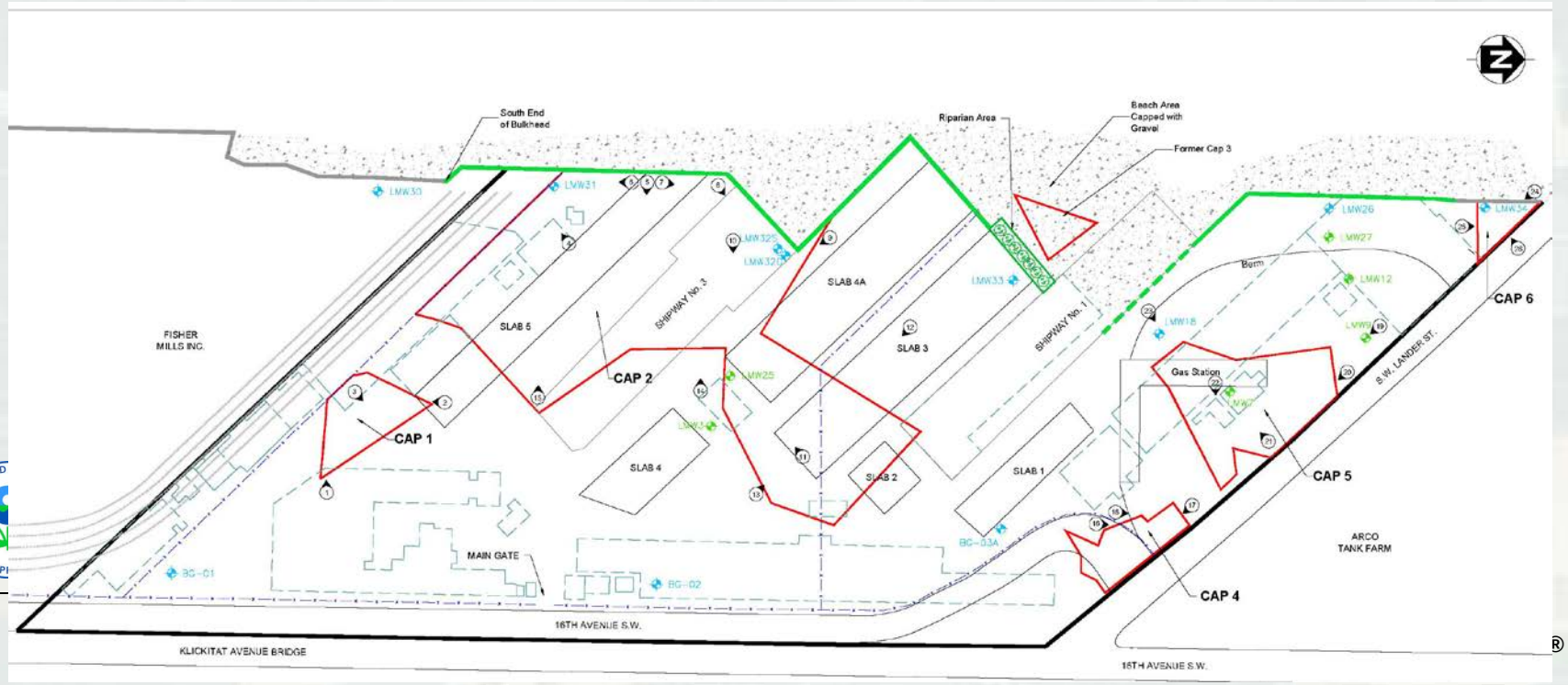
Data Review Summary
Tank Farms OU-2

- BP Plant 1:
  - Active recovery system along shoreline
  - COCs along shoreline below cleanup levels
  - Installing new seawall in 2015, design calls for sheet piles driven to 70 feet
- Kinder Morgan:
  - Using sulfate land applications to treat remaining contaminants
  - Area along 13th Ave W investigated and shows contamination is contained and concentrations are decreasing
- Shell:
  - Elevated COCs at north end of Main Terminal
  - Pilot testing completed and full-scale remediation is being evaluated.



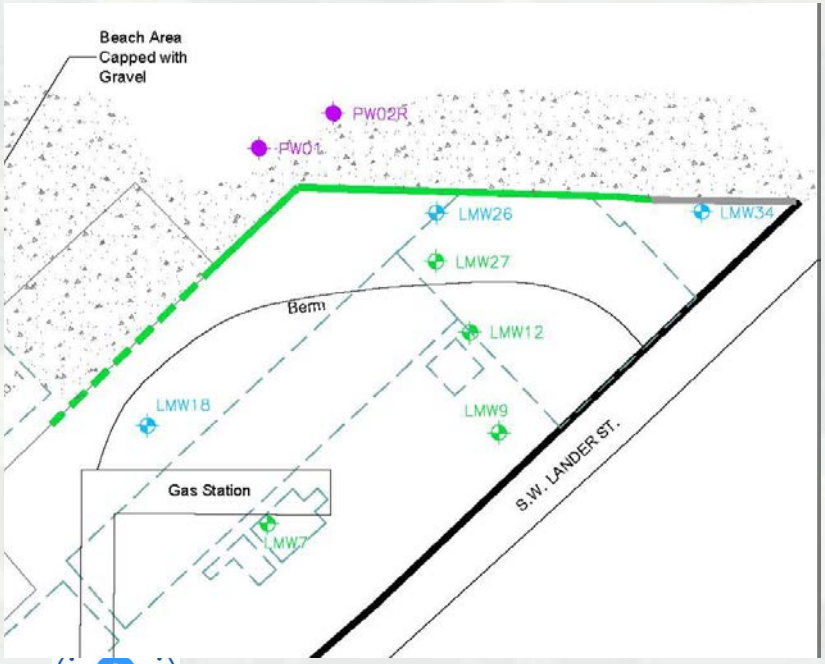
Data Review Summary
Lockheed Uplands OU-3

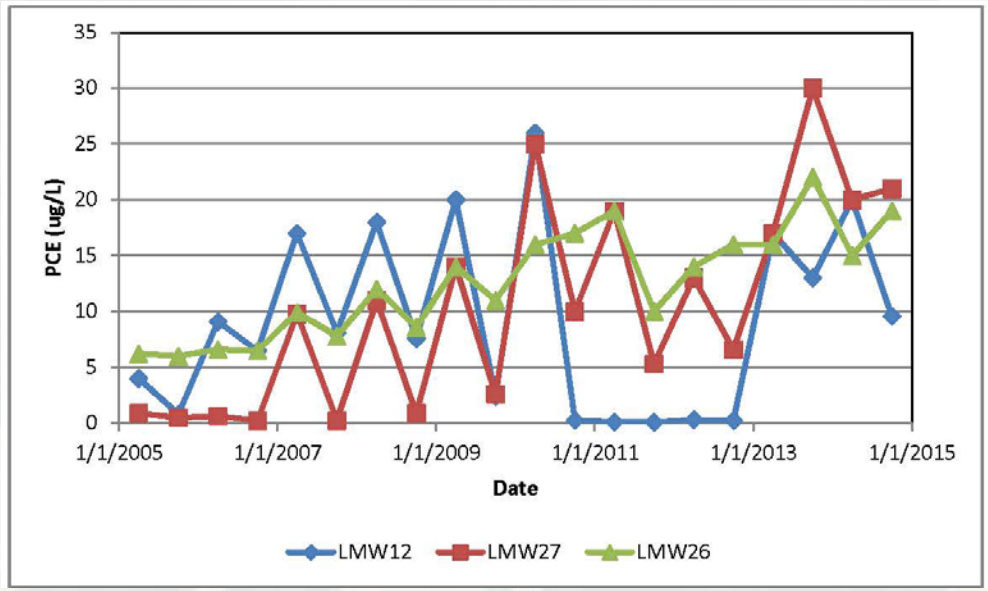
- Port of Seattle redeveloped site in 2011, re-grading removed ponding issues on the cap
- Exceedences of ROD cleanup levels in last 5 years of PCE, copper, zinc
- PCE concentrations show increasing trends
- Copper and zinc detections are sporadic or localized occurrences



Data Review Summary
Lockheed Uplands OU-3

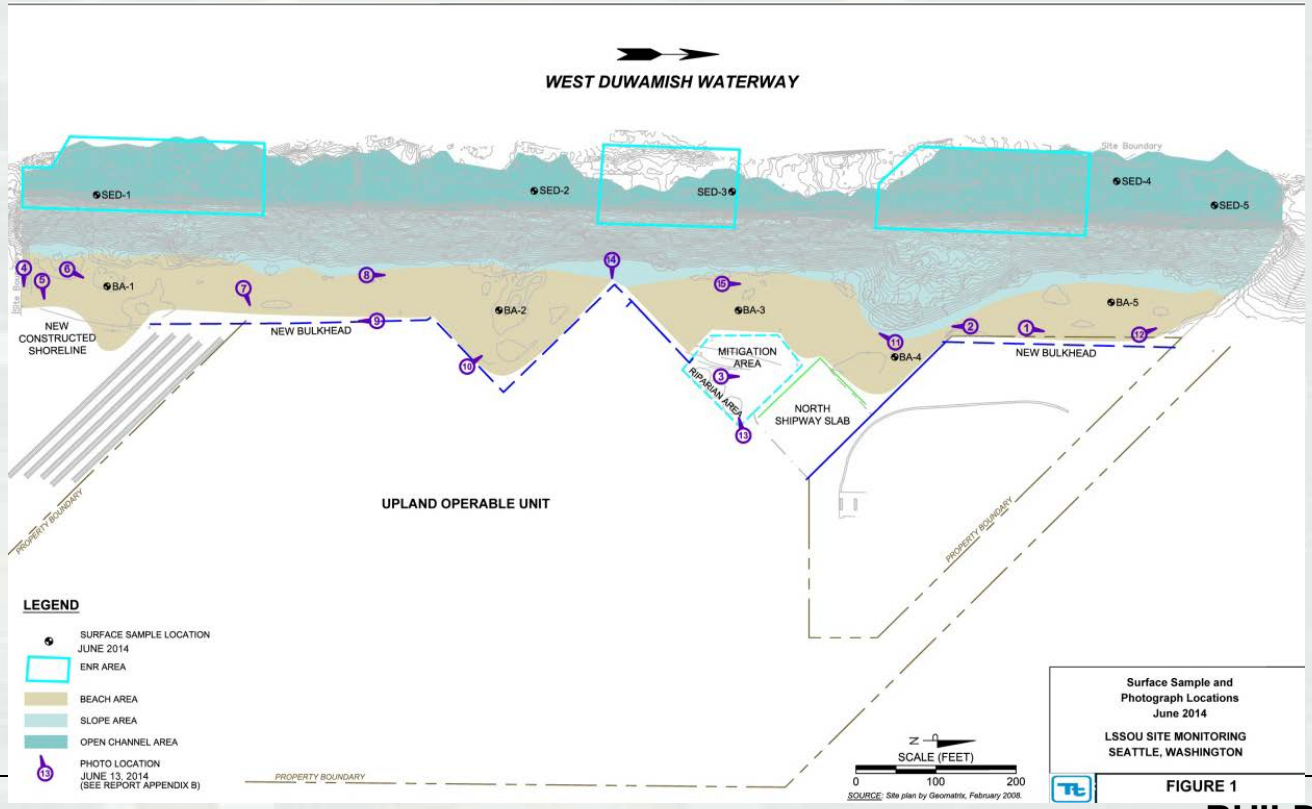
- Tidal study in 2011 showed groundwater flow directions varied from northerly to westerly (inland)
- Pore water samples collected in 2014 did not detect PCE
- PCE does not appear to be impacting the waterway





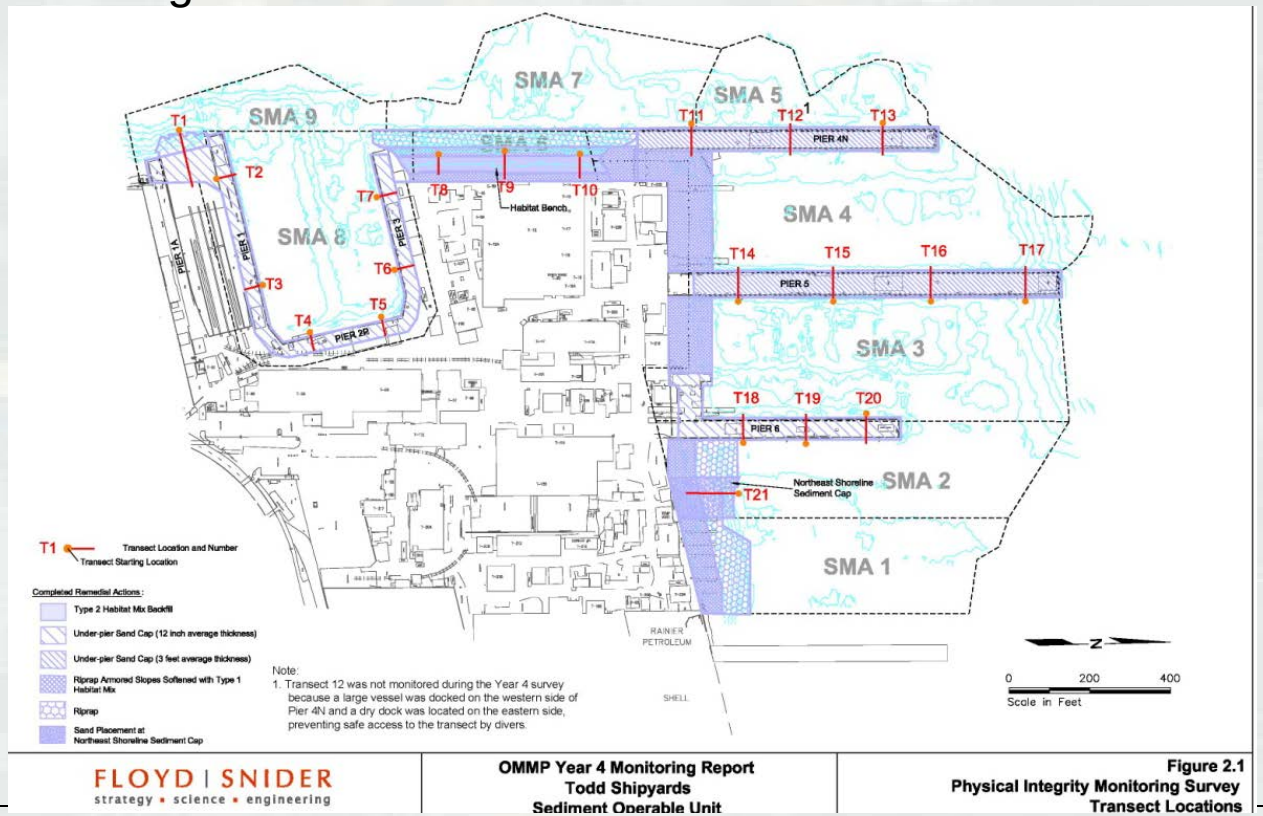
Data Review Summary
Lockheed Shipyard Sediments OU-7

- In 2013 and 2014, mercury and zinc in stormwater solids > SCOs
- In 2014, mercury in SED-2 and SED-3 and total PCBs in SED-3 > SCOs; increase in fine-grained sediments; possible top-down contamination
- Hydrographic survey: localized erosion near BP pier in open channel (not part of cap)
- Topographic and visual surveys: little to no change since remedy implementation



Data Review Summary
Todd Shipyard Sediments OU-9

- Physical integrity monitoring performed by divers in 2011
- Early action warning level: observation of complete erosion
- Complete erosion not observed, so no contingency actions are warranted
- Next monitoring event is scheduled for Fall 2016



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FYR Issues

OU#	Issue
1 & 3	Appropriate restrictive covenants are not in place for all required properties.
1	Cap inspection and maintenance reporting is inconsistent.
2	Elevated COC concentrations and a lack of decreasing trends indicate that MNA may not be able to reach cleanup levels in the TX-03A area.
7 & 9	Long Term Sediment Monitoring Data requires further evaluation with respect to potential human health risks
7	Zinc and mercury have been detected above SCO criteria in solids in stormwater treatment effluent that discharges to the LSS-OU7 cap.

FYR Issues cont.

OU#	Issue
7	Fine-grained sediments collected during the most recent sampling event in the open-channel area have mercury and total PCB concentrations greater than their respective SCOs. A general increase in total fines has been observed over the last five years. It is possible that there is a fine top layer of sediment that has deposited on the open-channel surface from sources outside the LSS-OU7, which may be indicative of sediment from outside sources deposited from suspension onto the cover.
9	Institutional Controls Study needs to be completed.