Lower Duwamish River
Slip 4
Engineering Evaluation/Cost Analysis

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Presentation Summary

- My role is that of a technical advisor to the citizens – Duwamish River Clean Coalition
- Provide technical review of the EE/CA
- Summary of the document
- Explain issues
- Evaluate the alternatives
- Prepare comments for DRCC

Document Summary

- Engineering Evaluation/Cost Analysis
- Used for Early Action cleanup work to describe the nature and extent of the contamination and the options for cleaning up the contamination
- Prepared by the technical consultants to the responsible parties (City and County)
- Must be accepted by EPA and Ecology
- Public comment required- March 17th close

Engineering Evaluation/Cost Analysis

- Summarize the status of the site
- Determine the nature and extent of contamination
- Identify contaminants
- Describe possible methods of “cleanup” or other remedy
- Describe and rank the alternative approaches, including the cost of each alternative

Recommendation of the EE/CA

- Removing some of the contaminated sediment
- Inner part of Slip 4
- Leave a large volume of sediment
- Cover the remaining contamination – this is referred to as “capping” the sediment
- Modify the shoreline- improve habitat
- Cleanup Georgetown storm sewer

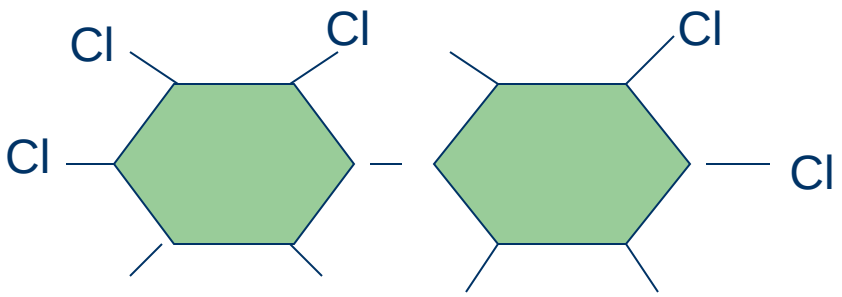

N
Seattle
Elliott Bay
Lake Washington
Spokane St. Bridge
RM 1
Duwamish Waterway
1st Ave. Bridge
Slip 4
RM 3
16th Ave. Bridge
Turning Basin No. 3
RM 5
E. Marginal Way Bridge
Tukwila
Burien

Contaminants

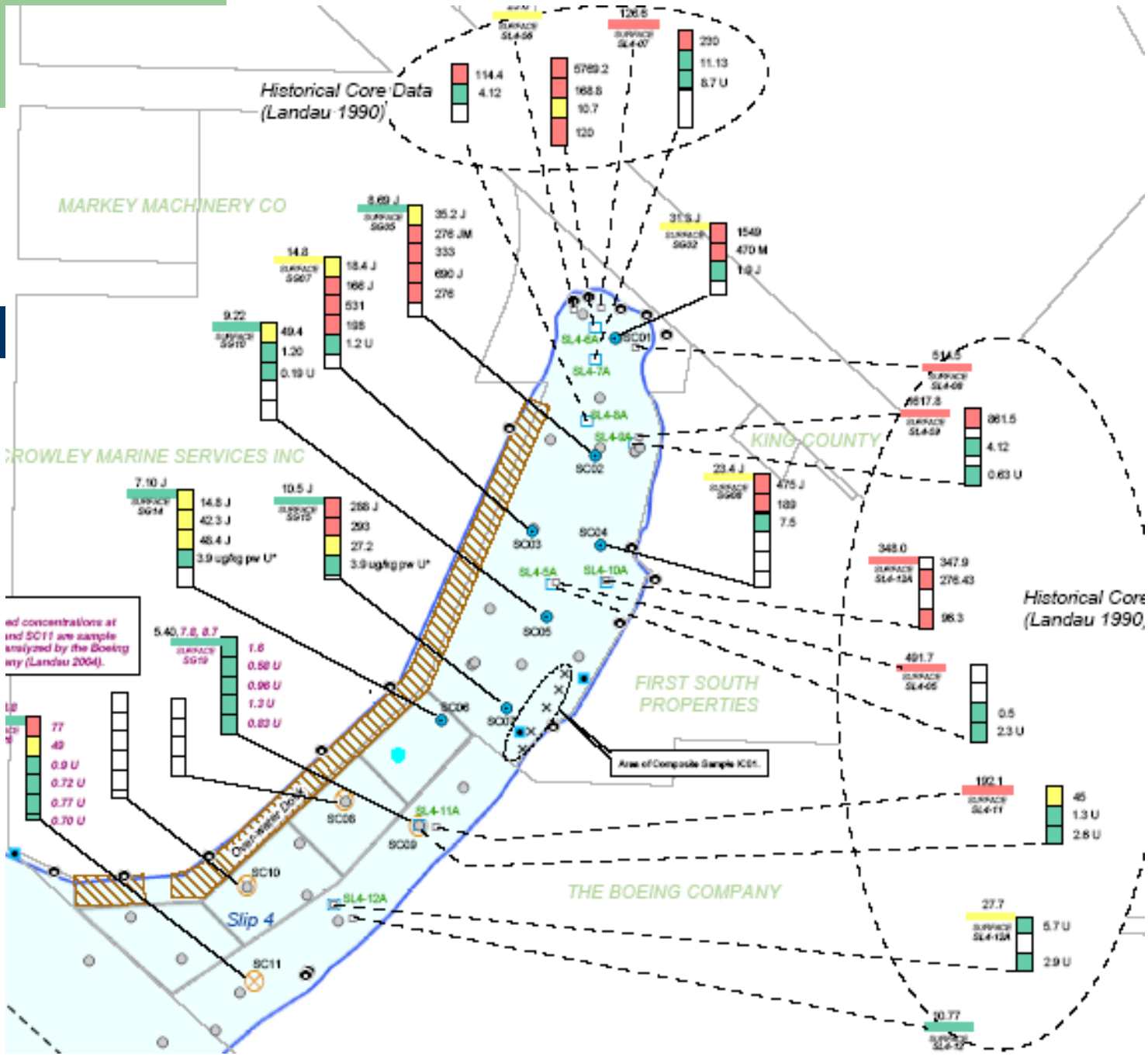
- PCB's – driving the process
- Phthalates
- PAH's
- Oil
- phenol
- Stormwater- lead, mercury, zinc, organics, arsenic
- Lead
- Zinc
- Arsenic
- Silver
- Cadmium
- Mercury

PCB's

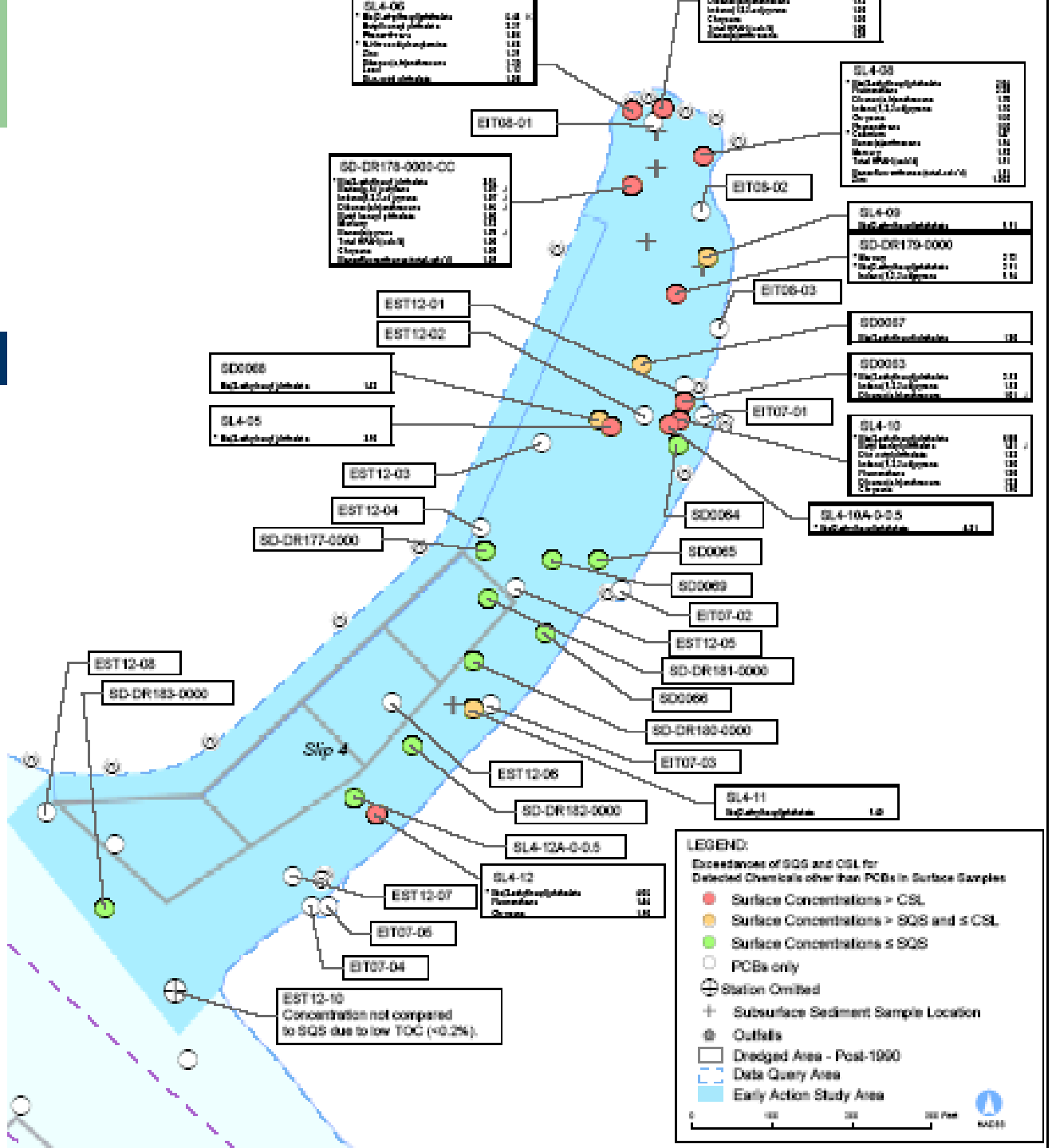
- Polychlorinated biphenyl's
- 209 different forms, varying number of chlorines
- Industrial oils used in heavy equipment, transformers
- Banned in 1976
- Cause cancer, reproductive and developmental impairments



PCB levels are high in the inner part of slip 4 in surface & deep mud



Other chemicals also contaminate the sediments in the inner part of slip 4. Red are the highest, then yellow

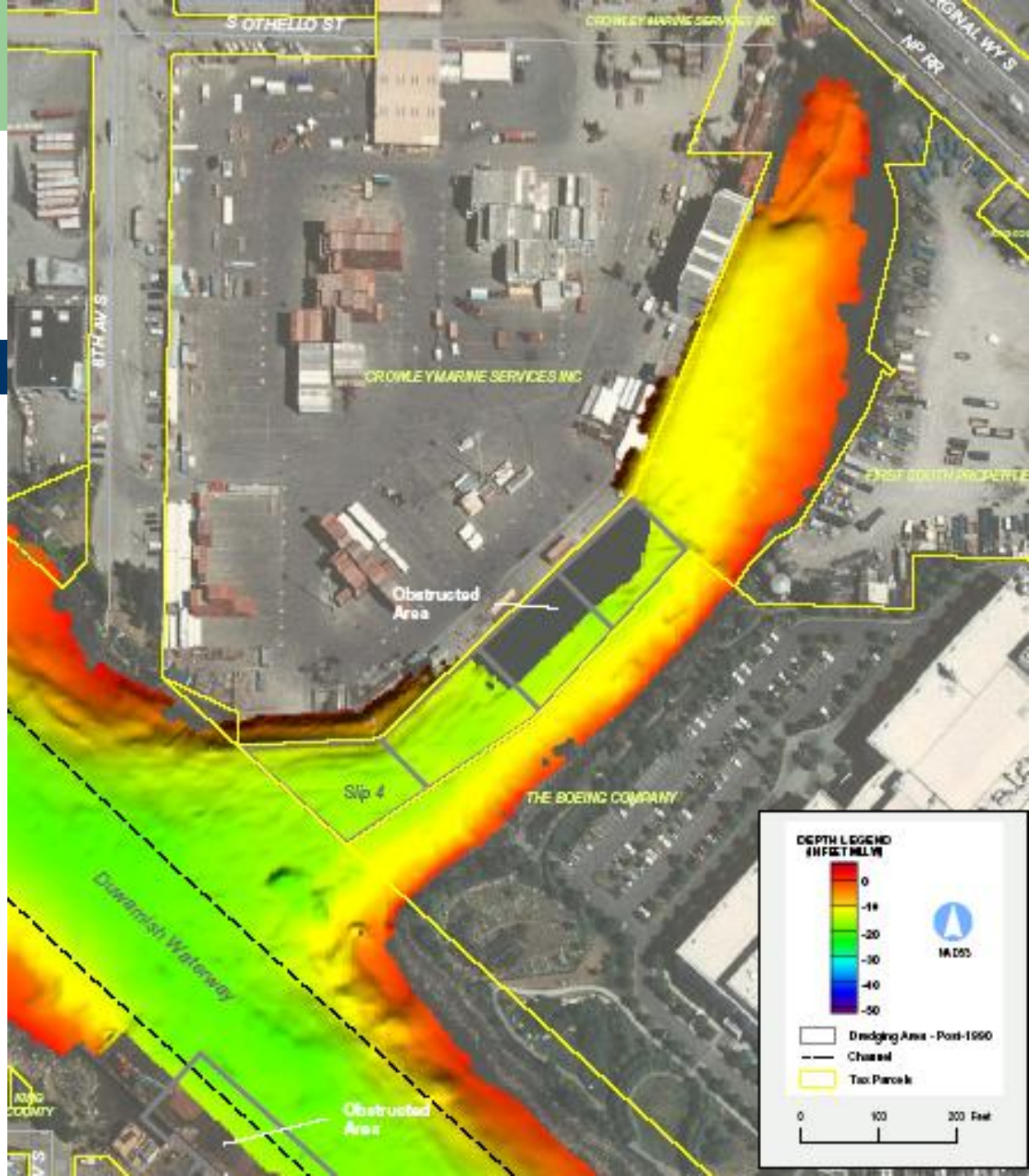


Addressing the Problem

- Usual goal is treat or remove contamination for a long term solution
- Slip 4: ship traffic, buried contamination, storm drains, shore contaminated
- The slip has accumulated silt that is now contaminated

Slip 4 has silted during the last 25

years and the end is shallow to the point of exposing mudflats at low tide. The red is shoreline with a water depth of 0 ft.



Alternatives

- No. 1: dredge the least at the head of Slip 4, shore removal; buy property
- No.2 dredge most of the highly contaminated; modify the shoreline to improve habitat; buy property
- No.3 dredge much more, least shore removal and replacement
- No. 4 dredge the most, some shore removal

Volumes of material in remedy

Cubic yards -except area

Action	1	2	3	4
Bank excavation	7300	9700	3200	4300
Dredging	700	4300	24000	36000
Capping	27000	27000	17000	26000
Area capped(acres)	3.6	3.6	2.5	0.73

Common features

- Dredging
- Capping
- Shoreline modification
- Monitoring for 30 years
- Georgetown flume cleanout
- Will have to protect the inner slip from scouring from storm drains

Major differences

- Alternatives 1&2 rely on capping with far less dredging than alternatives 3&4
- No. 2 will have the most shoreline modification
- No. 3 removes the least shoreline
- No. 4 removes the most sediment via dredging, adds “natural recovery”

Alternative 2 selected

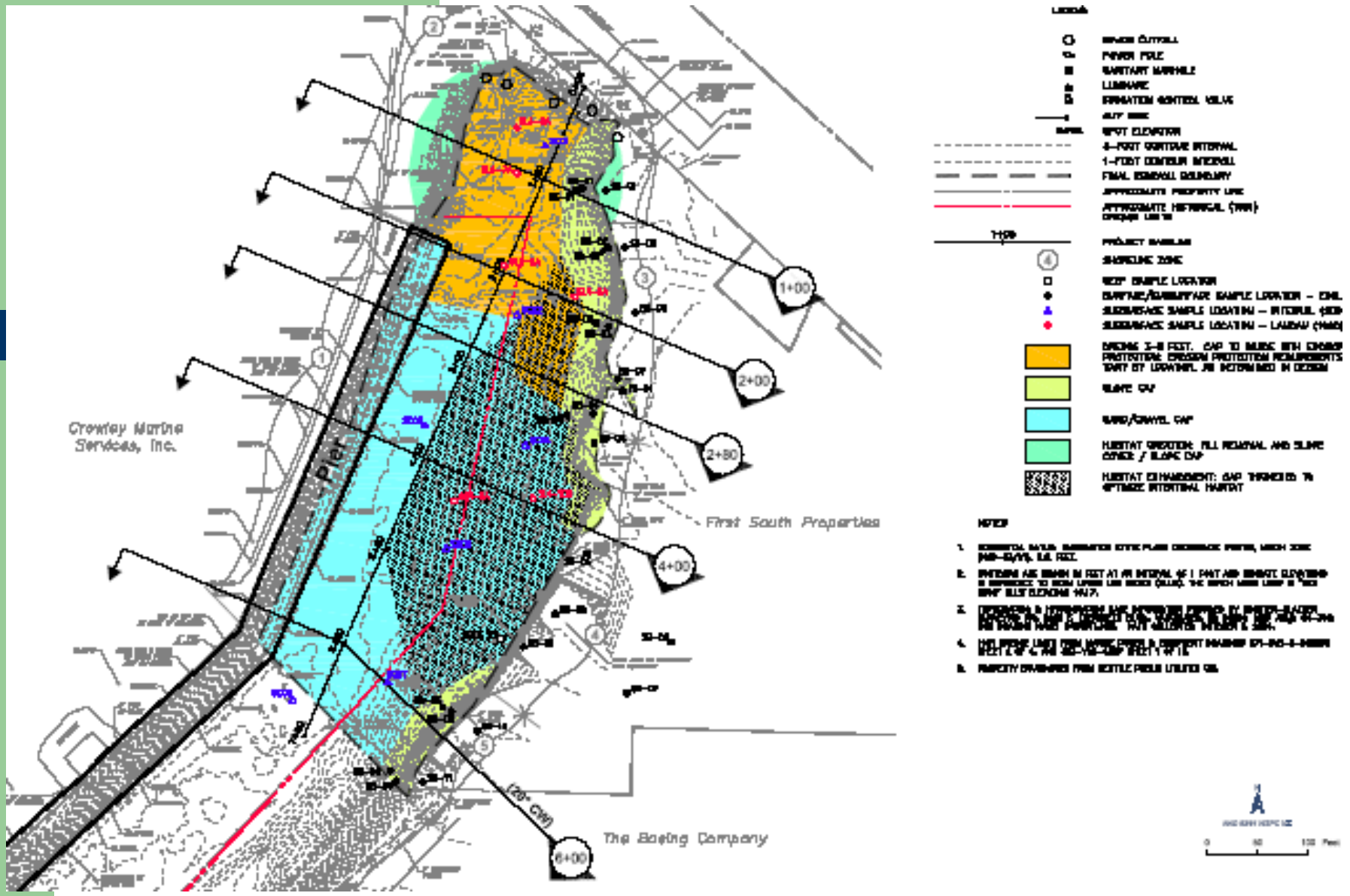
- Removes most of the most contaminated sediments at the surface
- Caps the rest of the inner slip
- Purchase the ground or rights and no ship traffic
- Rebuilds the shoreline
- Monitoring for 30 years

Shoreline Enhancement

- At the head of the slip
- Removes shore materials back from water, and down to water level
- Replaces shoreline with new materials
- New shoreline will have a more gradual slope of sand/gravel
- Creates a larger, improved shore habitat

This action will take place within

defined limits and the rest will have to await later work.



Dredging for Alternative 2 will be in the inner slip (shown in orange), and the cap will cover the rest of the area (blue)

Problems

- No thorough documentation of the effectiveness of capping
- No data on groundwater flow beneath the slip- cap integrity from flow
- Source control is incomplete- Boeing absent from inspections, but PCB’s in drains
- All options leave some contamination
- How to deal with scouring

Recommendations

- Must demonstrate the effectiveness of capping
- Must show that groundwater coming up beneath the bottom of slip 4 will not disturb the lower layers
- Dredge more of the most contaminated at SL4 10A
- Cap design has to be independently reviewed

Recommendations

- Publish a report on the capping success and failure rate in this region
- Monitoring before 5 years- needs to be 1,2,3, 5
- What happens with less than ideal results?
- Mark the end of navigation

Thank you

Questions?