PEO Groundwater SCM

Oregon Source Control Conference

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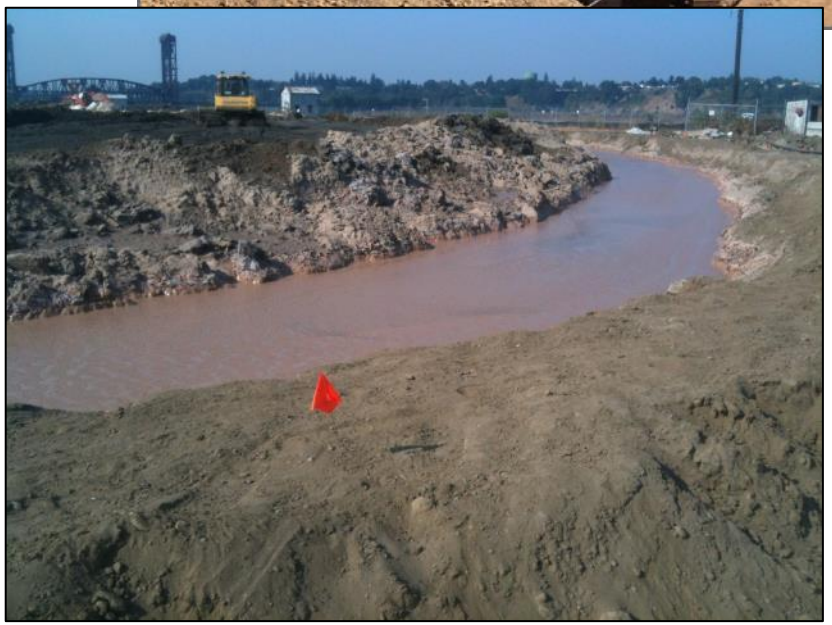


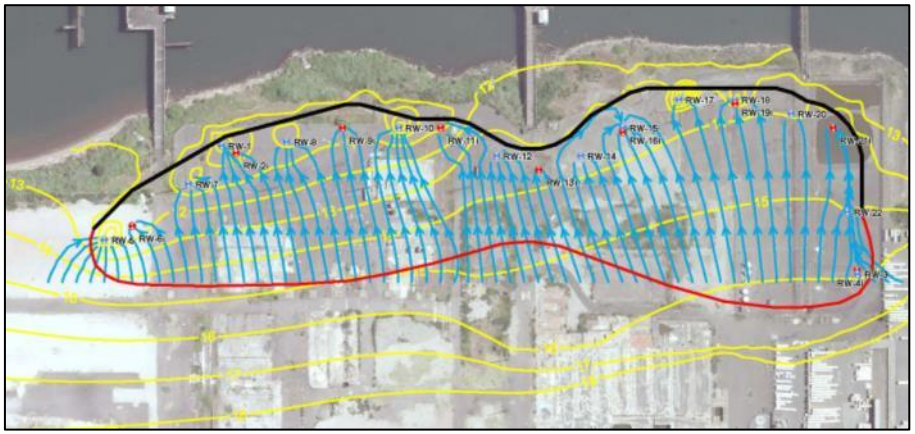
What is a Hydraulic Barrier?

Hydraulic Barriers

- Physical structure in the subsurface
- Affect groundwater hydraulics
  - Low permeability barrier walls
- Affect groundwater chemistry
  - Reactive barrier walls

Why use a barrier wall?

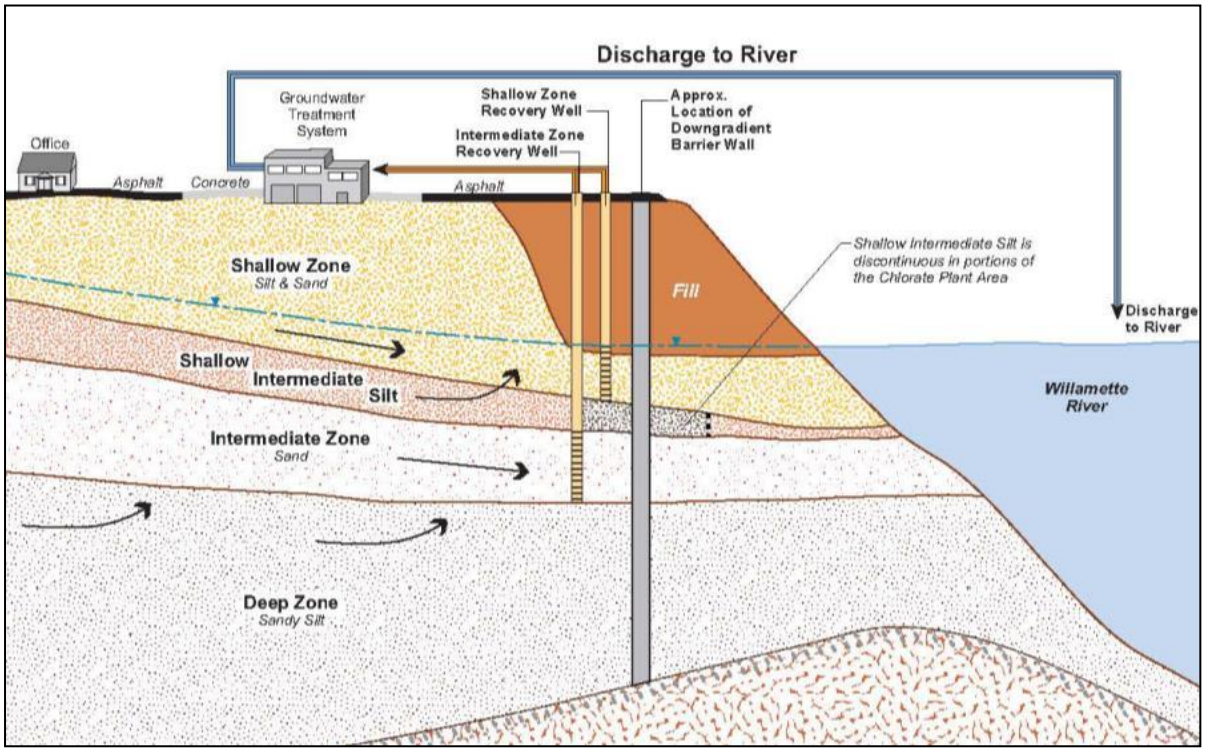
- Control flow of groundwater across an area
  - Deep excavations
  - Levees
  - Control of contaminant flux
- Established technology
- Control of construction location
  - Horizontal
  - Vertical



Groundwater Barrier Walls

Prevent Transport

- Low permeability barrier
  - Dissolved phase
  - Non-aqueous phase liquids
- Combination
  - Pumping and physical barriers
    - Chemical treatment of discharge



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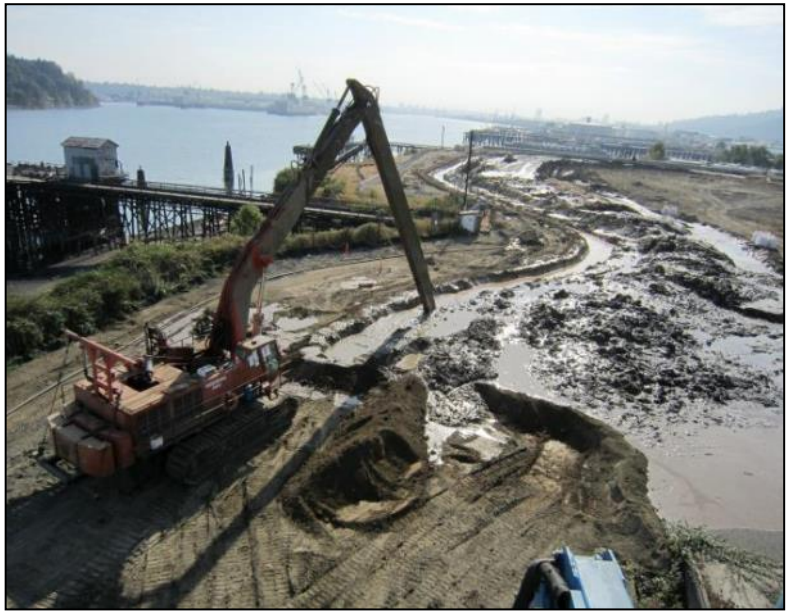
Types of Barrier Walls

Low Permeability Barriers

- Sheet pile
  - Wood
  - Steel
  - Membrane
- Soil mixture
  - Slurry trench backfill
  - Vibrated beam
  - Grouting
  - In-situ mixing technologies



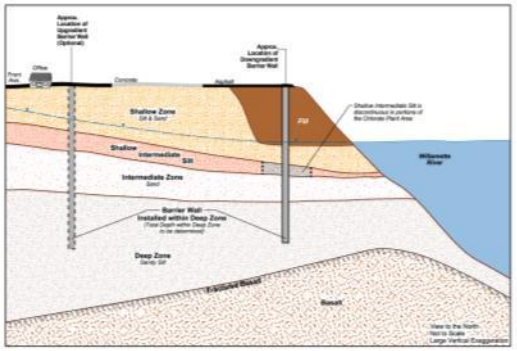
Barrier Wall Design Considerations

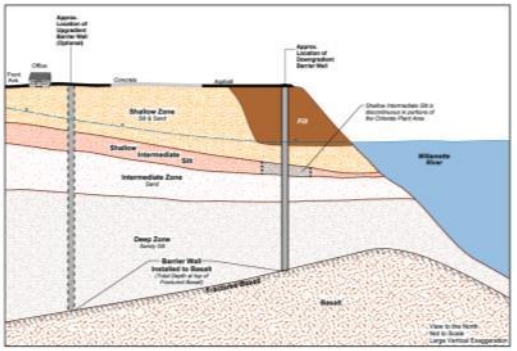
Design

- Depth
- Alignment
- Material
- Equipment access
- Subsurface obstructions
- Permitting requirements
  - Local, State, Federal

Expedited Design Process

- Conceptual Design – May 2015
- Preliminary Basis of Design – July 2015
- Final Basis of Design – September 2015





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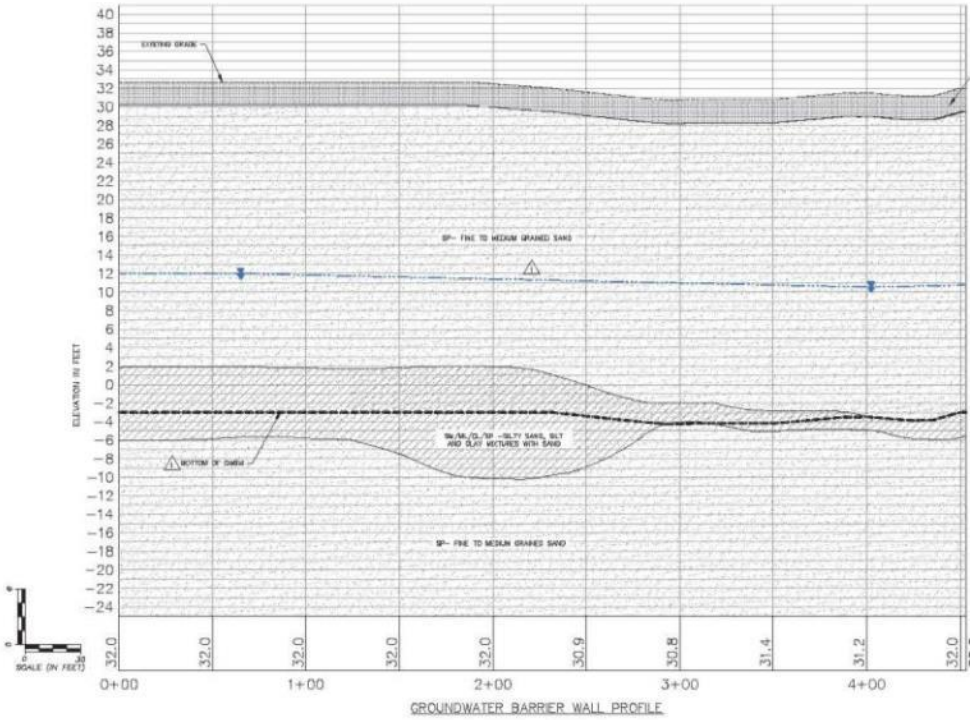
PEO Conceptual Design



Conceptual Design

- Objective is LNAPL containment and mitigation of dissolved phase impacts
- Downgradient alignment
  - Turn radius
- Partially penetrating depth
- Soil-Bentonite backfill

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Design Process

Basis of Design

- Slope stability analysis
  - Setback from top of bank
- Material compatibility testing program
  - Soil sample testing – July 2015
  - Final results October 2015
- Barrier wall specifications
  - Permeability 1 x 10^{-6} cm/s
  - Performance based construction specifications
    - Contractor responsible for mix design
  - Construction QA/QC
    - Frequent slurry mix sampling
    - Post-construction coring

Barrier Wall Construction

Construction

- Pre-trenching
- Soil mixing
- QAQC
- Capping

Implementation Challenges

- Tree protection/removal
- Existing Monitoring wells
- QAQC
  - Real time indicator parameters
  - Performance verification data schedule
- Water supply
- Health and Safety
- Weather
  - Final cap construction

Next Steps

- Air Sparge System
  - Pilot Test – June 2017
  - Design - Summer 2017
  - Implementation – Fall 2017?
- Performance Monitoring
  - Baseline – May 2017
  - LTM – Fall 2017

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Questions?

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