



Permitting and Design of Sediment Cleanup for the Rhine Channel in Newport Beach, California

Presented by
Michael Whelan, P.E.

October 29, 2010

The Rhine Channel, Lower Newport Bay



History of the Rhine Channel

- Historical uses
 - 1940 to 1950 - Mine sweepers, sub chasers and rescue boats
 - Newport Plating Facility
 - Cannery
 - Boatyards

The Rhine Channel in 1966



The Cannery in 1966



The Rhine Channel Today

- Current uses
 - Residential
 - Private boating
 - Commercial/restaurants
 - Remaining boatyards



Sediments

- In 1996, Newport Bay was included as an impaired water body on the Clean Water Act 303(d) list.
- The Rhine Channel has been identified as a contributor to Bay-wide contamination.
 - Metals, pesticides, PAHs, PCBs

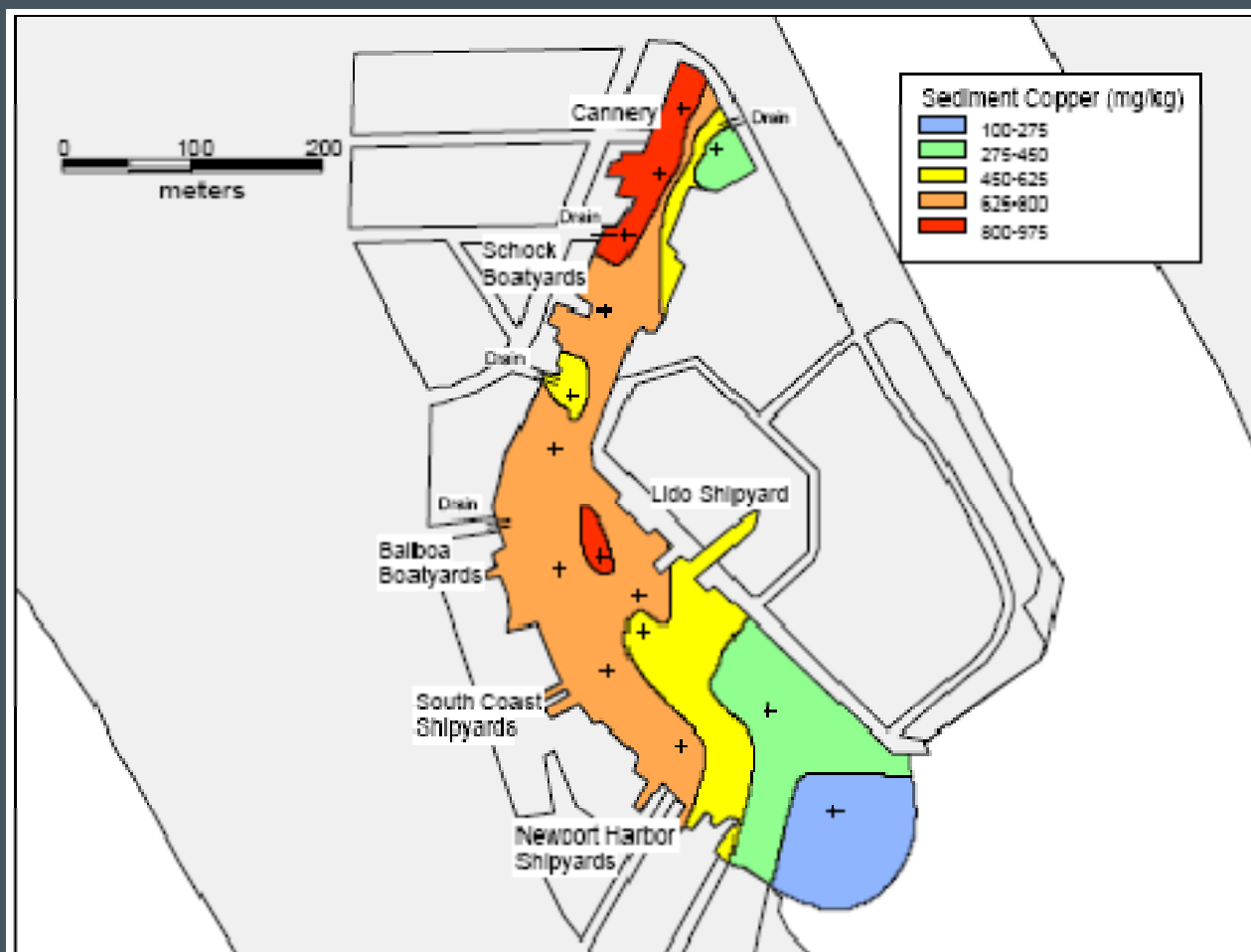
Sediments

- The Rhine Channel has been targeted as a priority for cleanup by the Regional Water Quality Control Board (RWQCB).
- Without action by the City of Newport Beach, the RWQCB would issue a Cleanup and Abatement Order (CAO).

Sediment Characterization

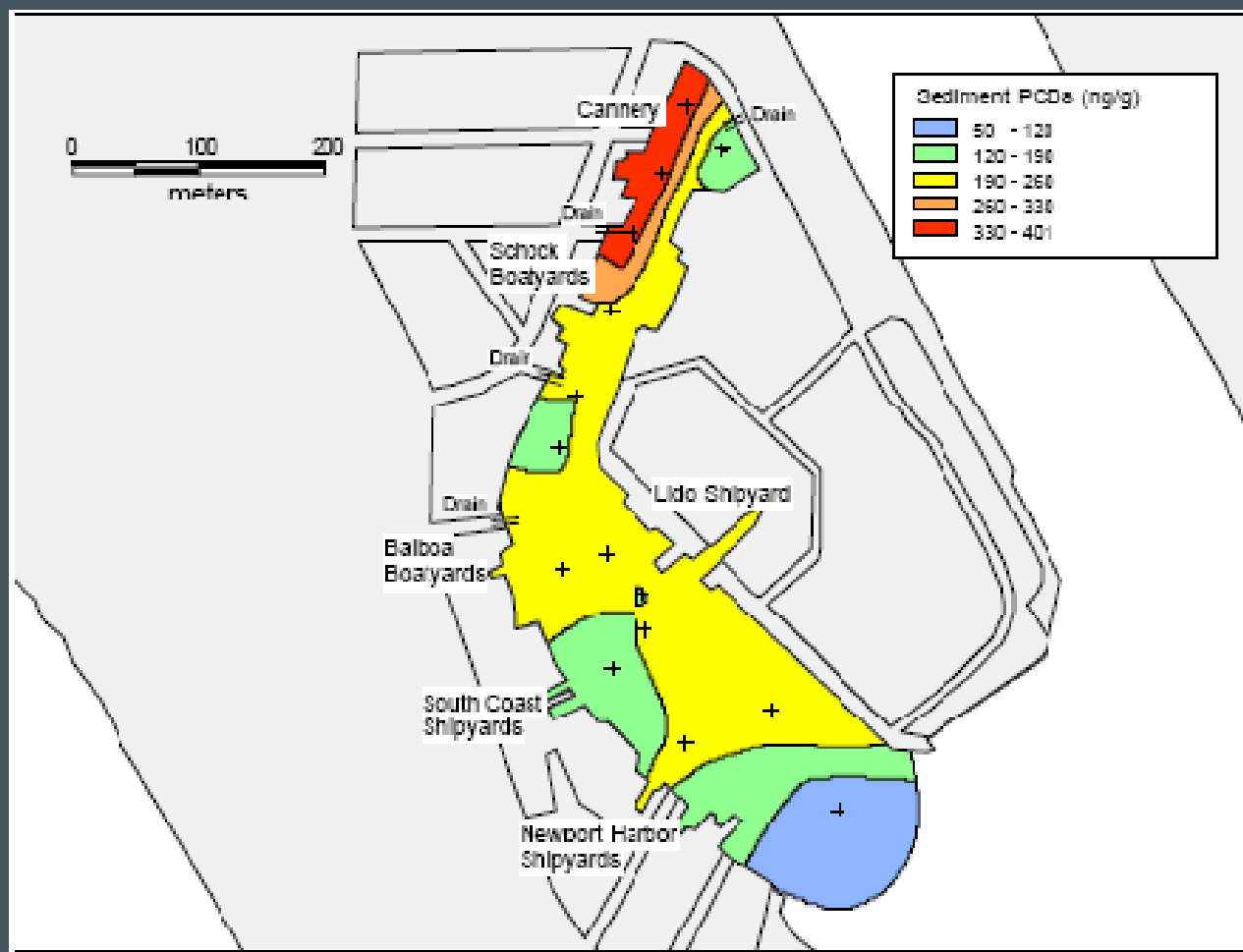


Spatial Distribution of Copper



Pattern of Surface Copper Concentration in the Rhine Channel

Spatial Distribution of PCBs



Pattern of Surface PCB concentration in the Rhine Channel

Alternatives Selected for Final Consideration

- Feasibility study undertaken by Orange County Coastkeeper in 2005
- Capping not feasible
- Lack of suitable or cost-effective sediment disposal options
 - Alternative 1: No action (baseline only)
 - Alternative 2: Dredging/landfill disposal
 - Alternative 3: Dredging/offsite confined disposal facility (CDF)
 - Alternative 4: Dredging/confined aquatic disposal (CAD)

An Opportunity Arises

Potential Location for Sediment Placement

- Middle Harbor, Port of Long Beach (POLB)



Application for Placement of Material in Middle Harbor Fill Site

- POLB requested applications in May 2010
- Project conditionally approved for placement in Layer 1 of the fill
- Rhine Channel material tentatively scheduled to be placed between May and August 2011

Project Planning and Design Begins

Permitting Steps

- Concurrent with design to meet required POLB Middle Harbor project approval timelines
- City of Newport Beach completed California Environmental Quality Act (CEQA) process on July 27, 2010
 - Mitigated Negative Declaration
 - Air quality impacts mitigated to avoid need for environmental impact report (EIR)

Permitting Steps

- Coordination of multiple permit processes
 - RWQCB 401 water quality certification (issued 9/10)
 - U.S. Army Corps of Engineers (USACE) standard individual permit (expected 12/10)
 - California Coastal Commission (CCC) coastal development permit (expected 12/10)

Dredging Design

- What thickness of sediment needs to be removed?
- How much contaminated material can be removed without adversely affecting adjoining docks, seawalls, etc.?
- How can dredging be accomplished around or beneath floating structures?

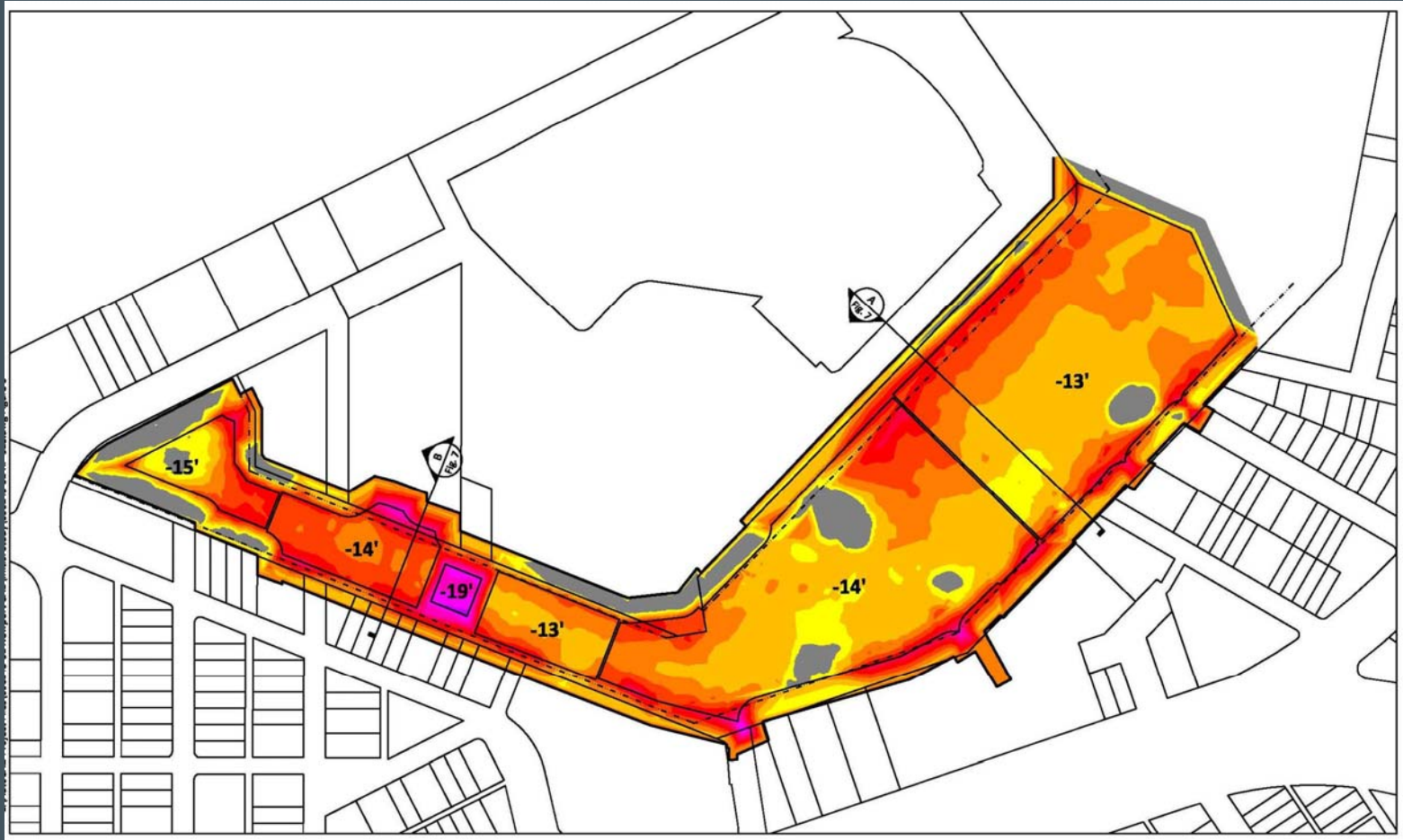
Evaluating Existing Conditions

- Sediment probes
- Compilation of previously existing data and as-built information
- Geotechnical explorations (in-water borings, on-land cone penetrometer tests [CPTs])
- Probing of seawall embedment depths
- Impact-echo testing of guide piles
- Reconnaissance of dock and guide pile conditions

Geotechnical Explorations



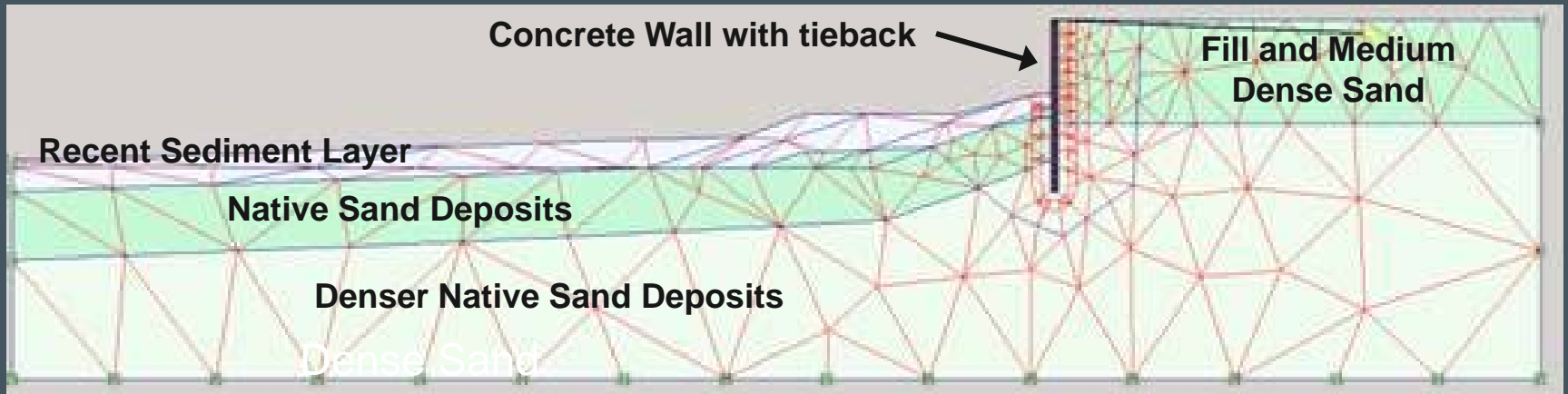
Depth of Dredging



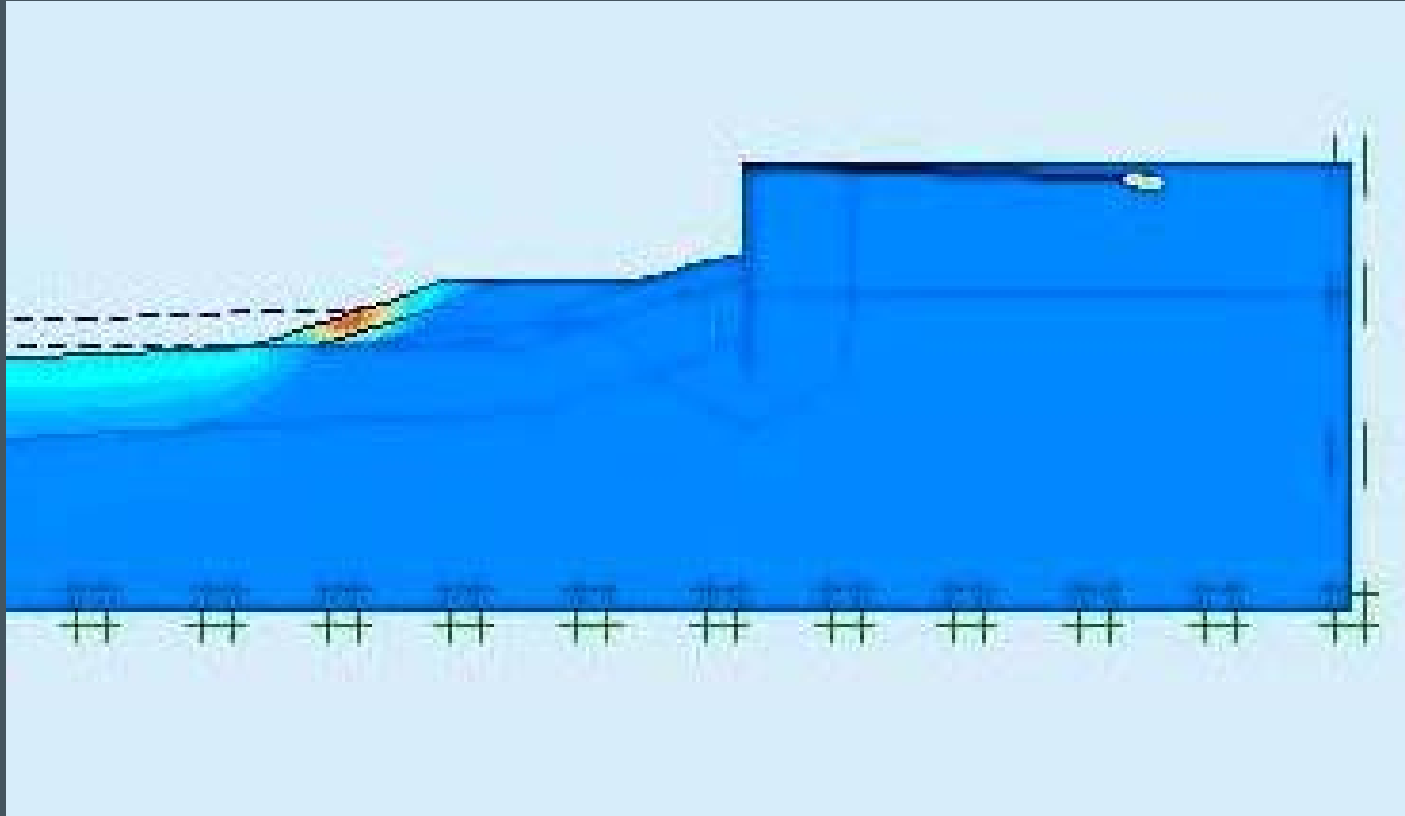
Analyzing Dredging Setback Distance

- Anticipate side slopes 3H:1V to 4H:1V
- Rough evaluation indicated 25 to 30 foot offset from seawall
- Force-balance equilibrium/factors of safety
- Finite element modeling (PLAXIS) code used to compare results of different offsets

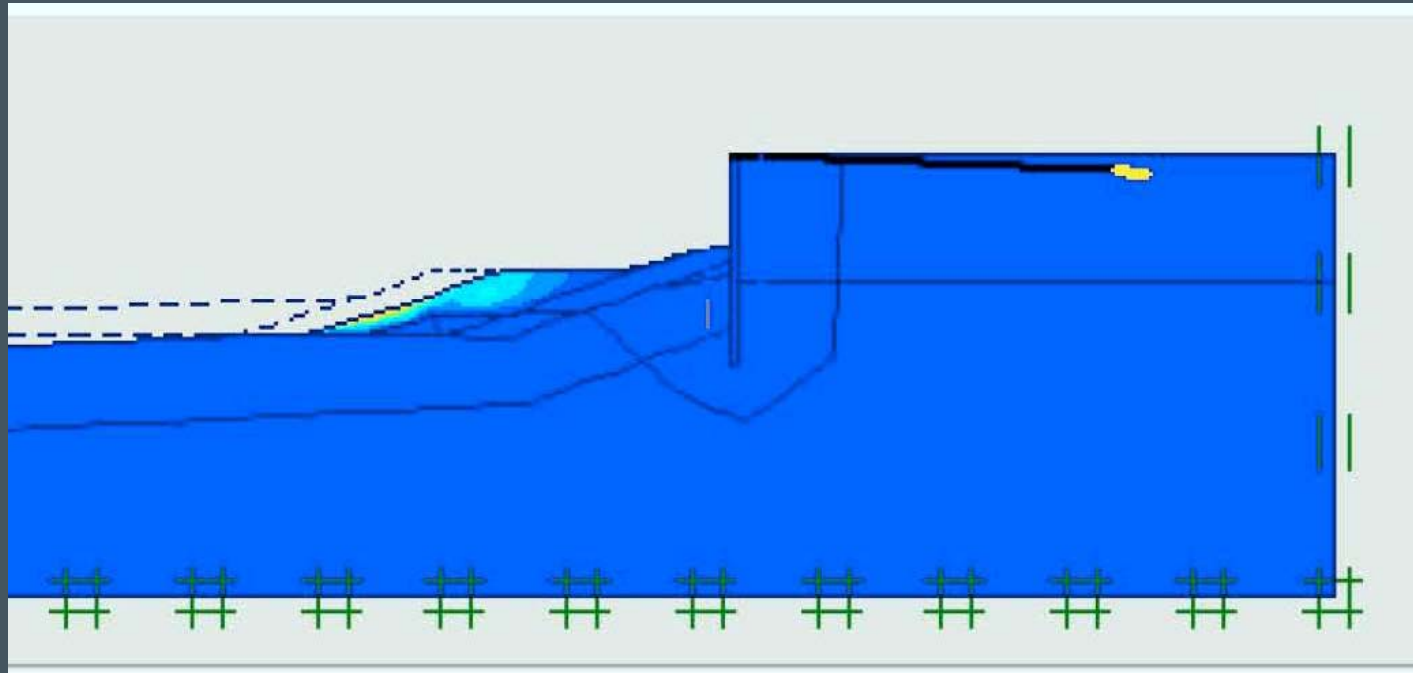
Finite Element Modeling – Grid Set-Up



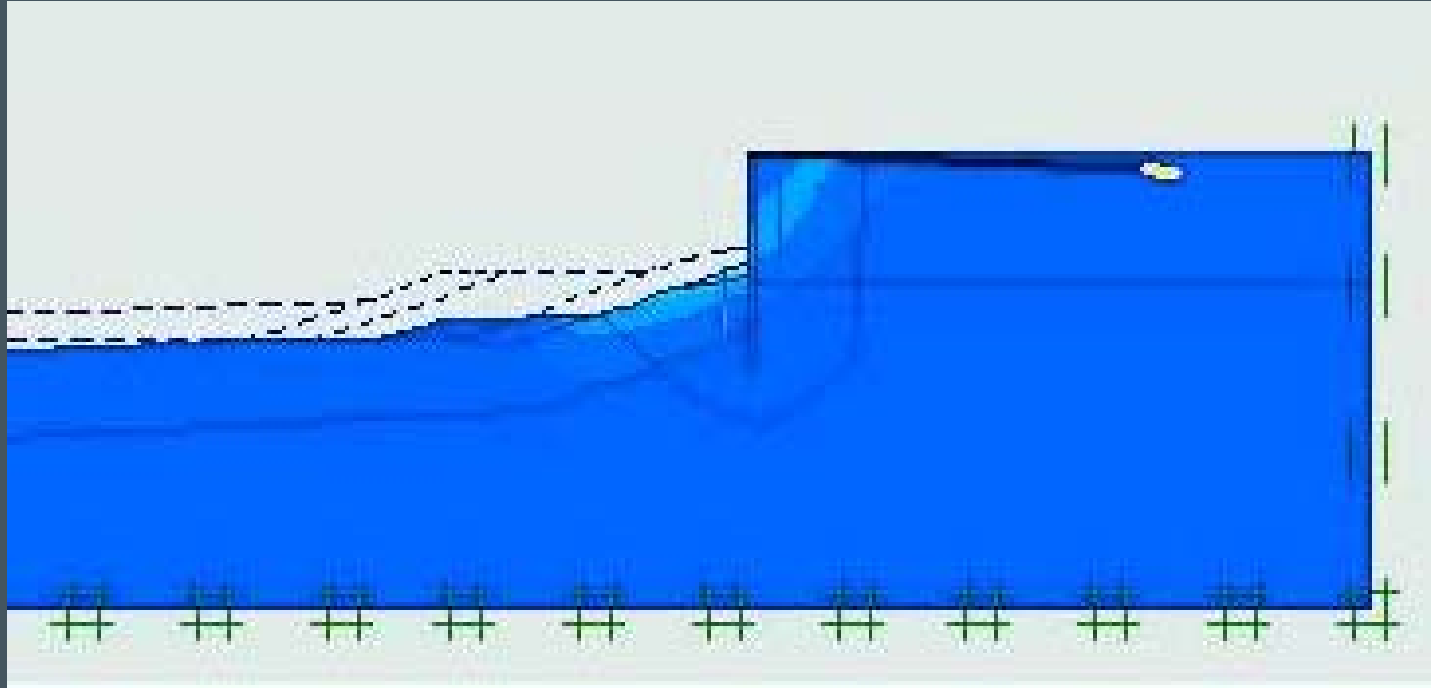
Example Results – Varying Dredging Distance From Wall



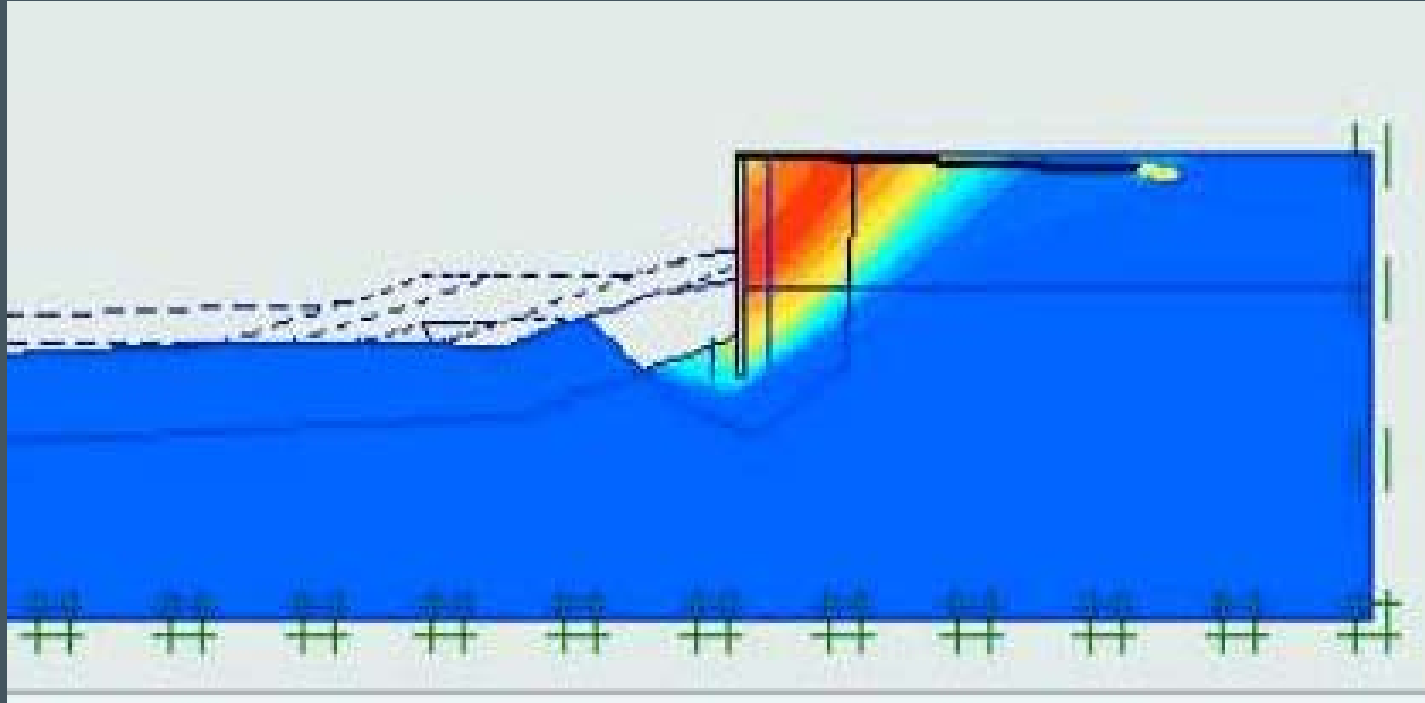
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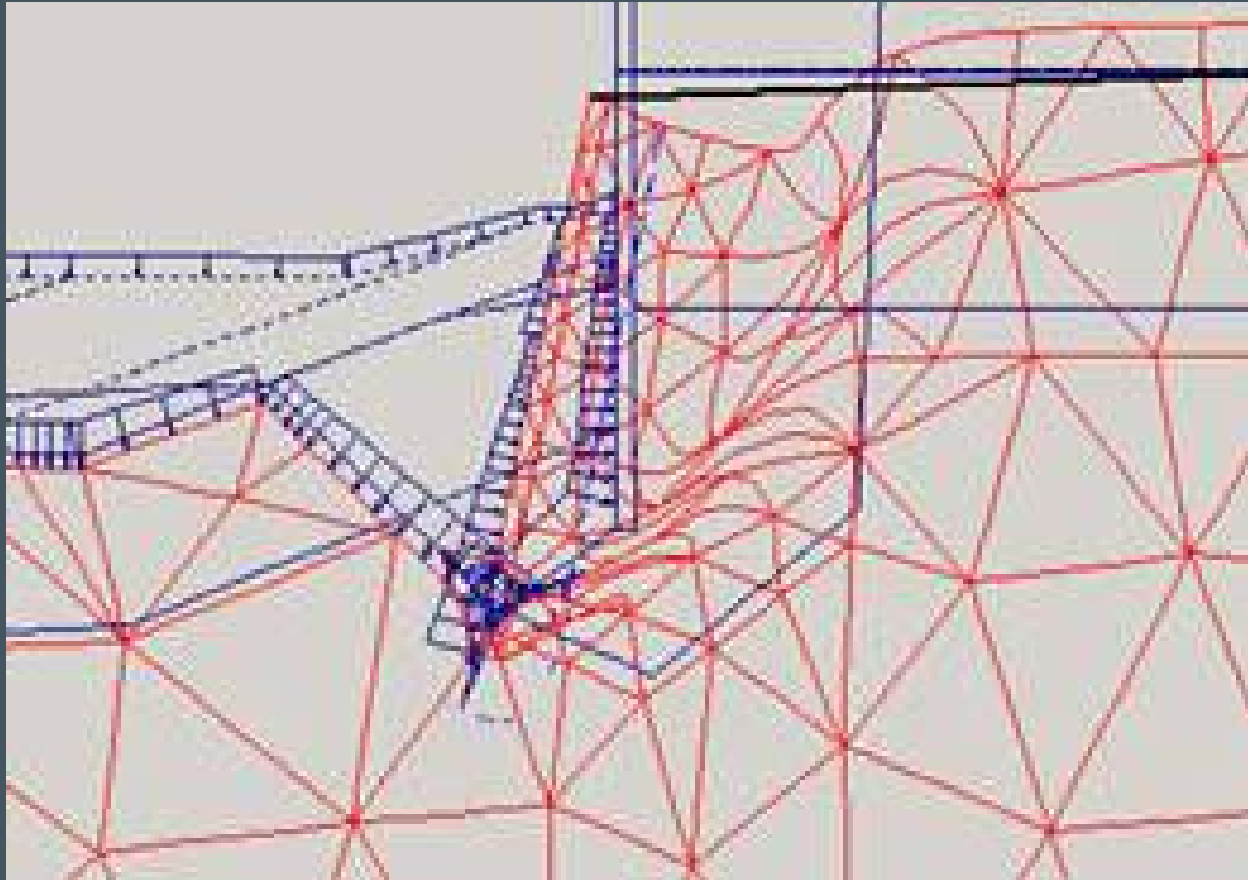
Example Results – Varying Dredging Distance From Wall



Example Results – Varying Dredging Distance From Wall



Deflected Mesh when Dredging Close to Wall



Existing Guide Piles and Docks



Conclusions and Discussion

