Contaminated Sediments Dredging and Design Constraints Under A Marginal Wharf

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NAS Alameda—IR Site 24
Challenges

- Bathymetric survey under the wharf
- Sampling under the wharf and between pilings
- Design of dredge prism
- Debris
- Hydraulic dredging under the wharf
- Dewatering and water treatment
IR Site 24 Survey Site

- IR Site 24 includes a large area under the wharf, extending approximately 90 feet back from open water.

- Single beam echosounders can only measure below the boat and if the boat goes under the dock, there’s no ready way to get good position data.
Common Hydrographic Sonar Survey Methods

**Single Beam**
- **Pro:** Lowest cost if sparse coverage is acceptable
- **Con:** Easy to miss significant features

**Sweep Single Beam**
- **Pro:** Provides full bottom coverage, w/moderate resolution, in shallow water
- **Con:** Much lower resolution than multibeam, less efficient in > 6 m depth

**Multibeam**
- **Pro:** Provides full bottom coverage, w/much higher resolution, all depths
- **Con:** Decreased efficiency in less than 3 to 4 m depth

**Dual Multibeam**
- **Pro:** Adds ability to survey banks and structures below water
- **Con:** Limited benefit in project areas without banks/structures
Vessel-Mounted LiDAR

- Riegel LMS-Q120 Laser scanner and digital cameras
- 100% coverage with bathymetric and aerial LiDAR data
Bathymetry Map of IR Site 24
Under-Wharf Sampling
Design of Dredge Prism
Debris Removal

- Prior to sediment removal, visible debris was removed in preparation for dredging.
- Debris removal was accomplished with personnel in waders and with a crane.
- During the open water dredging and later under the pier, large amounts of debris was encountered that interrupted dredging.
Open Water Dredging

- Open water dredging began in early January 2011 using a material handler mounted on a deck barge.
- Materials removed were placed into heavy articulated trucks for transport to the dewatering pad.
- Debris was continuously separated at the dewatering pad.
Open Water Dredging

- A second round of focused dredging was performed by the DB Mink.
- Sediments were trucked to the dewatering Pad
Under Pier Dredging

- For the under pier dredging a specially designed low profile hydraulic dredge with a powered cutter head was deployed.
- Work was performed with the tides to allow access under the pier.
- Effectiveness of the dredge was reduced due to the embedded debris encountered.
Diver-Assisted Focus Dredging

• Due to access difficulty and debris issues, it was decided to accomplish the focused dredging under the pier using divers.
• Dive plans and other submittals in accordance with EM-385-1-1 were submitted on an expedited schedule.
• Initial dives were overseen by the Navy Dive Master for SWFAC.
• Dredging interferences – high amounts of oil, debris continued.
• Completed in May 2012.
Environmental Monitoring

Turbidity monitoring was maintained throughout all dredging operations with a monitor inside the turbidity curtain and a second “background” monitor outside. All alarms were due to wave action during the dredging.
Dewatering and Water Treatment
Thank You