Implementing a Sediment Remediation Mega-Project at the Largest Deep-Sea Shipbuilding and Repair Facility on Canada's Pacific Coast – Challenges of Operational Coordination

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Presentation Overview

- Site Description and Background
- Project Phases of Work
- Facility Background
- Processes to Minimize Operational Impacts
- Key Operations Coordination Challenges During Construction
- Summary and Lessons Learned
Site Description and Background

Esquimalt Harbour

Constance Cove

EGD

DND Facilities

CFSA Marina

DND - Department of National Defense
EGD - Esquimalt Graving Dock
CFSA - Canadian Forces Sailing Association
Site Description and Background (cont.)

- Federal government owned and operated multi-user ship repair and maintenance facility
- EGD established in 1927; historic contamination since 1850s
- Contamination throughout EGD Waterlot including under the South Jetty
- South Jetty requires replacement; timeline undetermined
Project Phases of Work

- **Phase 1 remediation**
  - South Jetty sheetpile wall installation
  - Open-water dredging including buffer areas
  - Shoreline stabilization
  - Residuals Management Cover Material placement
  - Habitat compensation

- **Phase 2 remediation**
  - South Jetty under-pier remediation to be coordinated with future South Jetty redevelopment
Project Phases of Work (cont.)

Legend:
- Remediation Area
- Waterlot Boundary
- Phase 1 Remediation Area
- Phase 2 Remediation Area

Source: Google 2011
Phase 1A – Under-Pier Erosion Protection System

- Sheetpile wall contains contaminated sediment in under-pier area
- Constructed November 2012 to April 2013
- Significant coordination with EGD Operations required
Phase 1B – Open-Water Remediation

- Dredging and disposal
  - 145,600 m$^3$
- In-water slope armoring
  - 22,800 m$^3$
- Residuals management cover placement
  - 45,000 m$^3$
- Structure demolition/temporary relocations
- Construction June 2013 to March 2014
- Significant coordination with EGD Operations required
Facility Background

- Active shipyard/graving dock facility
Facility Background

- Vessel berthing space is limited
Processes to Minimize Operational Impacts

• Strategic elements in design
  - Sequencing of work in designated “Zones”
  - Modeling of vessel/equipment locations based on contractor schedule
  - Contractor Directed Moves and Standby Time
  - Use of vessel Booking List to reserve space for remediation

• Project-dedicated staff (PWGSC and EGD Operations)

• Stakeholder communication and coordination
Processes to Minimize Operational Impacts

- Progress monitoring and reporting
- Adaptive management
- Conflict resolution process

Photos courtesy of Heath Moffatt
Processes to Minimize Operational Impacts (cont.)
Processes to Minimize Operational Impacts (cont.)

July 08, 2013 [Divers in Zone 6]
Processes to Minimize Operational Impacts (cont.)

- Contractor Directed Moves
  - Unplanned dockings and vessel arrivals

- Standby Time
  - Vessel movements and EGD Operations requirements
  - Applicable only when no other work could be performed

- Other design elements
  - Requirement to maintain berthing space
  - Requirement to move equipment in set timeframe
Processes to Minimize Operational Impacts (cont.)

- Dedicated staff assigned to project
  - PWGSC Deputy Project Manager
  - EGD Operations primary point of contact
  - Key contact personnel assigned from each facility tenant

Photos courtesy of Heath Moffatt
Processes to Minimize Operational Impacts (cont.)

- Regular updates to PWGSC senior management
- Project-specific tenant coordination meetings at key points in project
- Weekly coordination meetings with key tenants
- Attend quarterly EGD Joint Users Safety and Environment Committee Meeting
- EGD facility supervisor attend Weekly Construction Progress Meetings
  - Dedicated EGD Operations agenda item
Processes to Minimize Operational Impacts (cont.)

- Coordination with DND for DND property needs
  - Naden floats and CFSA Marina
- Daily coordination with Queen’s Harbour Master (Esquimalt Harbour Authority)
- Public communication and outreach
  - Offloading facility location changes
  - Disposal Facilities
  - Trucking routes
- Design and construction oversight team communications
Processes to Minimize Operational Impacts (cont.)

- Adaptive management during implementation needs to be planned for in design
  - Conflicts will occur - be prepared before they happen

- Utilize intensive on-site construction management support
  - Track day-to-day construction activities
  - Identify potential conflicts before they occur
  - Communicate potential issues to key staff
Processes to Minimize Operational Impacts (cont.)

- Conflict resolution
  - Coordinate with EGD Operations, tenants, and tenant clients
  - Pre-construction development of Conflict Resolution Framework
  - Conflict decisions with financial impacts to tenants or EGD were made by EGD Management (client)
  - Some booking conflicts result in loss of business
Processes to Minimize Operational Impacts (cont.)

- Incorporate daily/weekly progress monitoring and reporting into inspection/management roles
  - Document daily construction activities
  - Monitor changes in schedule and communicate to facility operations staff
  - Notify remediation contractor in advance of changing operational needs
  - Track quantities of work completed to update progress and schedule for completion of the work
Processes to Minimize Operational Impacts (cont.)

Note: A total of 145,548 cubic metres of dredged material (payable and non-payable volume) has been removed from the EGD Work Site to date.
Key Operations Coordination Challenges During Construction

- Evolving EGD booking schedule overlap with remediation schedule
- Contingency re-dredging
- Residuals management implementation
- Meeting RAOs and operational requirements

Photos courtesy of Heath Moffatt
Key Operations Coordination Challenges During Construction (cont.)

Complete dredging to meet permit requirements.

Complete dredging and slope material placement to meet adjacent property owner timeline.

Complete all dredging and slope material placement by October 31, 2013, to meet facility operations requirements.

Complete dredging to meet operational berthing requirements.

Complete dredging to meet permit requirements.
Key Operations Coordination Challenges During Construction (cont.)

Complete dredging and slope material placement to meet adjacent property owner timeline.

Complete all dredging and slope material placement by July 31, 2013, to meet facility operations requirements.

Complete dredging to meet operational berthing requirements.

Complete dredging to meet permit requirements.

Complete all dredging and slope material placement by October 31, 2013, to meet facility operations requirements.
Key Operations Coordination Challenges During Construction (cont.)

• Contingency re-dredging was required in many Zones
  - Affects construction schedule and operational use of the facility
  - Required to meet remediation objectives

• Minimize time to collect samples and make re-dredge decisions
  - Remediation schedule dictated these activities
  - Limited lead time for re-dredge decisions
Key Operations Coordination Challenges During Construction (cont.)
Key Operations Coordination Challenges During Construction (cont.)

- Dredge residuals management
  - Placement of clean sand material (where required) in areas where dredging had been completed to ensure RAOs were achieved
  - Placement areas dependent on post-dredge sampling/testing
  - Need to re-visit areas where remediation had been performed and vessels were now moored
  - RMC placed in nearly 100% of the open-water areas of the EGD Waterlot; even where not required to ensure RAOs were achieved
Summary and Lessons Learned

- Operational requirements of the project site will govern cleanup
  - Acknowledge that change will occur and plan for it

- Critical ongoing support from EGD Director and site owner was key to success in coordination of work
  - Financial decisions made in consideration of remediation requirements

- Advance planning for schedule coordination critical to project success
Summary and Lessons Learned

- Dedicated project team member for EGD Operations coordination
  - Consistent/frequent coordination with tenants and EGD Operations

- Adaptive management principles are essential
  - Provide sufficient level of on-site construction management
  - Observe daily activities and prepare for change before it occurs
Summary and Lessons Learned

- Recognize where potential claims may occur due to operational issues
  - Address with contingency planning in design
  - Recognize that claims can also come from facility tenants if business is adversely impacted
  - Keep facility operations involved throughout completion of cleanup project to inform decisions
Questions?

Photo courtesy of Heath Moffatt