Pilot Studies

(Tab H)

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Training Objectives

- Learn how to define a pilot study.
- Identify reasons for conducting pilot studies.
- Identify when and where pilot studies should be required.
- How to plan a pilot study.

Five Steps For Technology Assessments

- Step 1- Concept
- Step 2- Bench scale
- Step 3- Pilot scale
- Step 4- Demonstration (field scale)
- Step 5- Commercialization

Bench Scale

- Performed in a laboratory
- Requires relatively small volume of material
- Allows evaluation of a number of variables
- Conditions can be carefully controlled
- Usually batch mode
- Uses laboratory type equipment

Pilot Scale

Reasons for Pilot Studies

- Developing and testing adequacy of instruments
- Assessing the feasibility of a (full scale) piece of equipment or technique
- Designing an operations or monitoring protocol
- Assessing whether the operations or monitoring protocol is realistic and workable
- Establishing whether the sampling strategy and technique are effective

(Continued)

Reasons for Pilot Studies

- Assessing the likely success of proposed engineering and operational approaches
- Identifying logistical problems that might occur using proposed methods or protocols
- Estimating variability in outcomes to help determining sample sizes for monitoring
- Collecting data for design

(Continued)

Reasons for Pilot Studies

- Assessing the proposed data analysis techniques to uncover potential problems
- Determining what resources (people, time, money) are needed for the full scale project
- Training a project team in as many elements of the project processes as possible
- Convincing funding bodies that the project team is competent and knowledgeable

(Continued)

Reasons for Pilot Studies

- Convincing funding bodies that the project is feasible and worth funding
- Convincing other stakeholders (community) that the project is worth supporting
- Uncovering local politics that may affect the project acceptance and community outreach

(Completed)

Pilot-Scale

- Uses prototype equipment
- Minimizes physical and geometric effects of process equipment on equipment performance
- May include peripheral units
- Performed on-site

(Continued)

Pilot-Scale

- Dredges large volumes of material
- May be continuous process
- Provides improved data for design and cost estimation
- Addresses materials handling, resuspension and residual problems

4/20/2005 *Environmental Dredging Workshop*
Seattle, Washington 2005 (Completed)

Planning a Pilot Study

Major Tasks

- Define the goals and objectives for the pilot study including success criteria
- Identify and select the pilot study site
- Characterize the site both physically and chemically
- Design the pilot study
- Advertise and select the contractor

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Seattle, Washington 2005 (Continued)

Planning a Pilot Study

Major Tasks

- Execute the pilot study
- Monitor and evaluate the results
- Develop lessons learned
- Incorporate results into final project design

4/20/2005 *Environmental Dredging Workshop Seattle, Washington 2005* (Completed)

Example Work Plans

- Remedial Operations Pilot Study Plan
  - Mobilization and site preparation
  - Installation and maintenance of site containment systems
  - Debris removal
  - Dredging and transport of dredged material
  - Rehandling and processing dredged material
  - Transportation for disposal
  - Disposal method

4/20/2005 *Environmental Dredging Workshop Seattle, Washington 2005* (Continued)

Example Work Plans

- Contingency Plan
  - General preventive measures
  - Site specific prevention and response measures
  - Emergency response
  - Evacuation routes
  - Weather-related contingencies
  - High flow contingencies
  - Water quality compliance

(Continued)

Example Work Plans

- Site-specific Healthy and Safety Plan
- Storm Water Pollution Prevention Plan
- Management of Community Impacts Plan
  - Noise, trucks traffic, waterborne traffic, etc.
- Disposal Site Management Plan

(Completed)

Dredging Pilot Studies

- Calumet River – Matchbox, Bucket, Cutterhead and diffuser
- New Bedford-1 (Matchbox, Auger, Cutterhead) & New Bedford-2 (HPG)
- Buffalo River (open/enclosed bucket, submersible pump)
- Fox River SMU 56/57 (Dredging/Capping Residuals)
- Lake Okeechobee (Thin Layer Surgical Dredging)
- Currently Planned – Passaic River, Grasse River

Calumet River

New Bedford Pilot - 1

4/20/2005

Environmental Dredging Workshop
Seattle, Washington 2005

New Bedford Pilot - 2

4/20/2005

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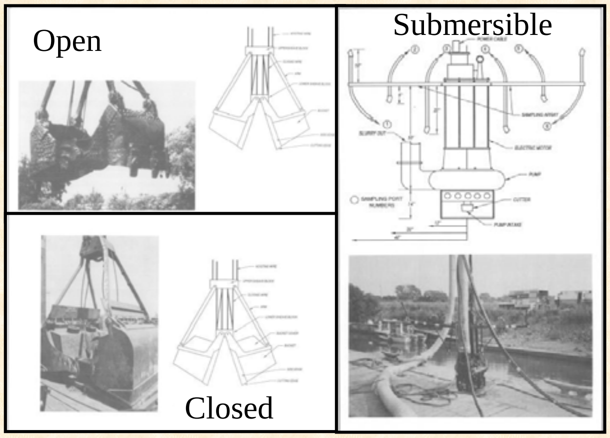
Buffalo River – ARCS Demo



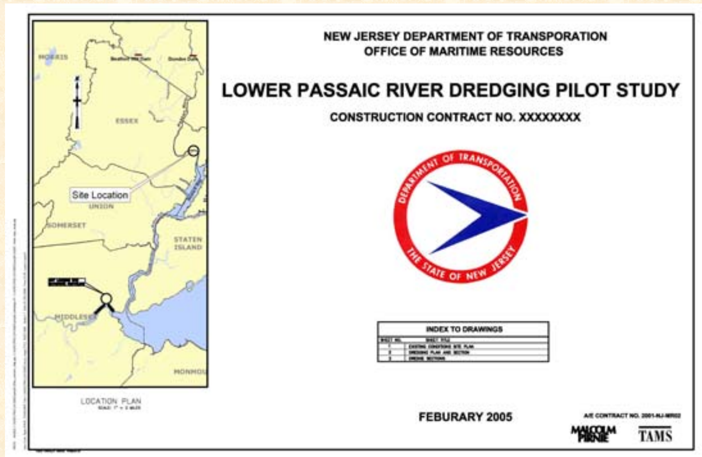
Passaic River Environmental Dredging Pilot Study

Dredging Design

Draft Plans

March 23, 2005

Pilot Study



General Design Philosophy

- Collect site-specific data regarding productivity, resuspension, and sediment decontamination (not dredging residuals).
- Dredging equipment will be used in normal operating mode to simulate effects of a full-scale dredging operation.
- No containment barriers employed to allow for study of resuspension.

Dredge Prism Design Parameters

- Volume: ~5000 CY, based on March 2004 survey. Some accumulation and sloughing expected.
- Depth: Shallow cuts (max. ~3.5') to avoid underlying contaminated materials
- Dredge Cells: Horizontal bottom cuts. All three rows of cells needed to maintain shallow cuts by mimicking topography.
- Slopes: Nominal 3H:1V slopes theoretically stable. Removal of sloughed material will be addressed by Dredging contractor.

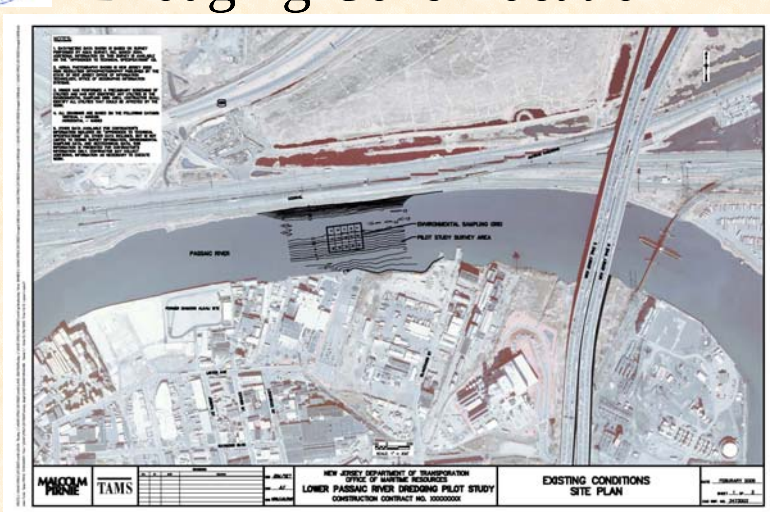
Operational Considerations

- Dredging contractor will decide to conduct debris removal in advance or during dredging. Monitoring by team during both.
- Dredging method not specified, but water treatment facilities to support Hydraulic Dredging do not exist near PSSA.
- Mechanical Dredging with state-of-the-art environmental buckets & DGPS positioning required.

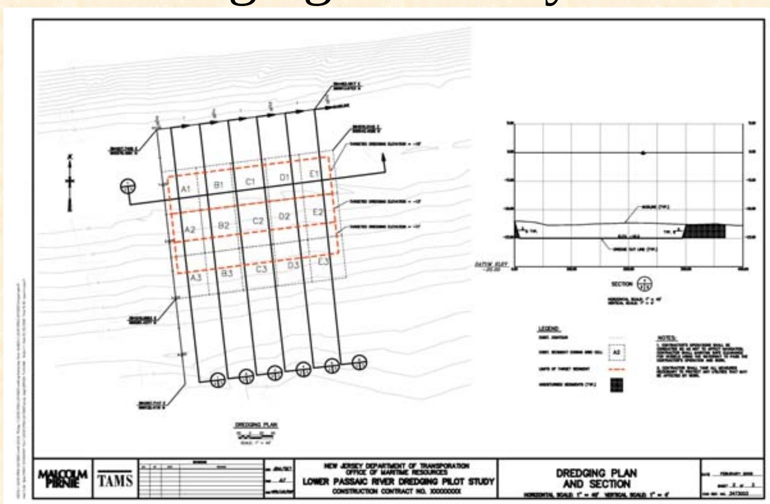
Operational Considerations

- Dredging contractor will transport dredged material to Bayshore Recycling for offloading and storage/processing (for sediment decontamination technology vendors).
- Team-subcontractor (ASI) will conduct pre- and post- dredging bathymetric surveys for payment. Dredging contractor may conduct own surveys.

Dredging Cells Location



Dredging Cells Layout



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Lake O Pilot Dredging

Dredge head mounted on the dredge plant

Close-up of dredge head

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Lake O
Selected Comments

- Specific and quantifiable success criteria
  - Residuals, water quality impacts from dredges and other ancillary equipment, production rates, operator goals, costs, etc.
- Dredging site selection criteria should be representative of full scale
- Disposal operations should be representative of full scale
- Provisions to "ready" or "shakedown" pilot dredging equipment are needed

Lake O
Selected Comments

- Provide more details on proposed pilot dredge's ability to operate in shallow water, long fetches, and coastal winds with high wave action.
- Safety must be top priority in pilot dredging operations – stability of working platform, obstacles to boaters, jet skis, etc.

Problems with Pilots

- Underestimating scale of problems being piloted due to funding limitations for the pilot.
- Making inaccurate predictions or assumptions on the basis of pilot data alone.
- Murphy is bound to happen at the larger scale.

Successful pilot studies don't always guarantee success in full-scale.

Project Managers Should:

- Consider conducting a site-specific assessment or pilot study of anticipated sediment resuspension, contaminant release and transport, and its potential ecological impacts, prior to full-scale dredging.
- Consider making realistic, site- and equipment-specific predictions of residual contamination based on pilot studies or comparable site.

In the Words of De Vaus:

"Do Not Take the Risk.
Pilot Test First."

QUESTIONS?

Thank You

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