Increasing Cost Certainty in Sediment Remedy Selection.

WEDA / Midwest Meeting
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Agenda – Key Points

1. Value of a Project Specific Cost Module Tool
2. Three Steps to Remedial Action Cost Certainty
3. Proactive Risk Management
4. QUESTIONS?

Value of a Project Specific Cost Module Tool

Developing Greater Cost Certainty During the Project Lifecycle

Greater cost certainty can be developed early in the project lifecycle by creating "bottom-up" cost inputs and then developing a modular cost evaluation tool for the Site.

What is a modular cost evaluation tool?

The modular cost tool is a means to evaluate projected remediation costs in real-time, with changes to input variables (e.g., equipment type, production rates, debris, etc.) and changes to remediation techniques (e.g., dredging, capping, etc.), using bottom-up estimated unit costs. Answers the questions regarding "what if" scenarios.

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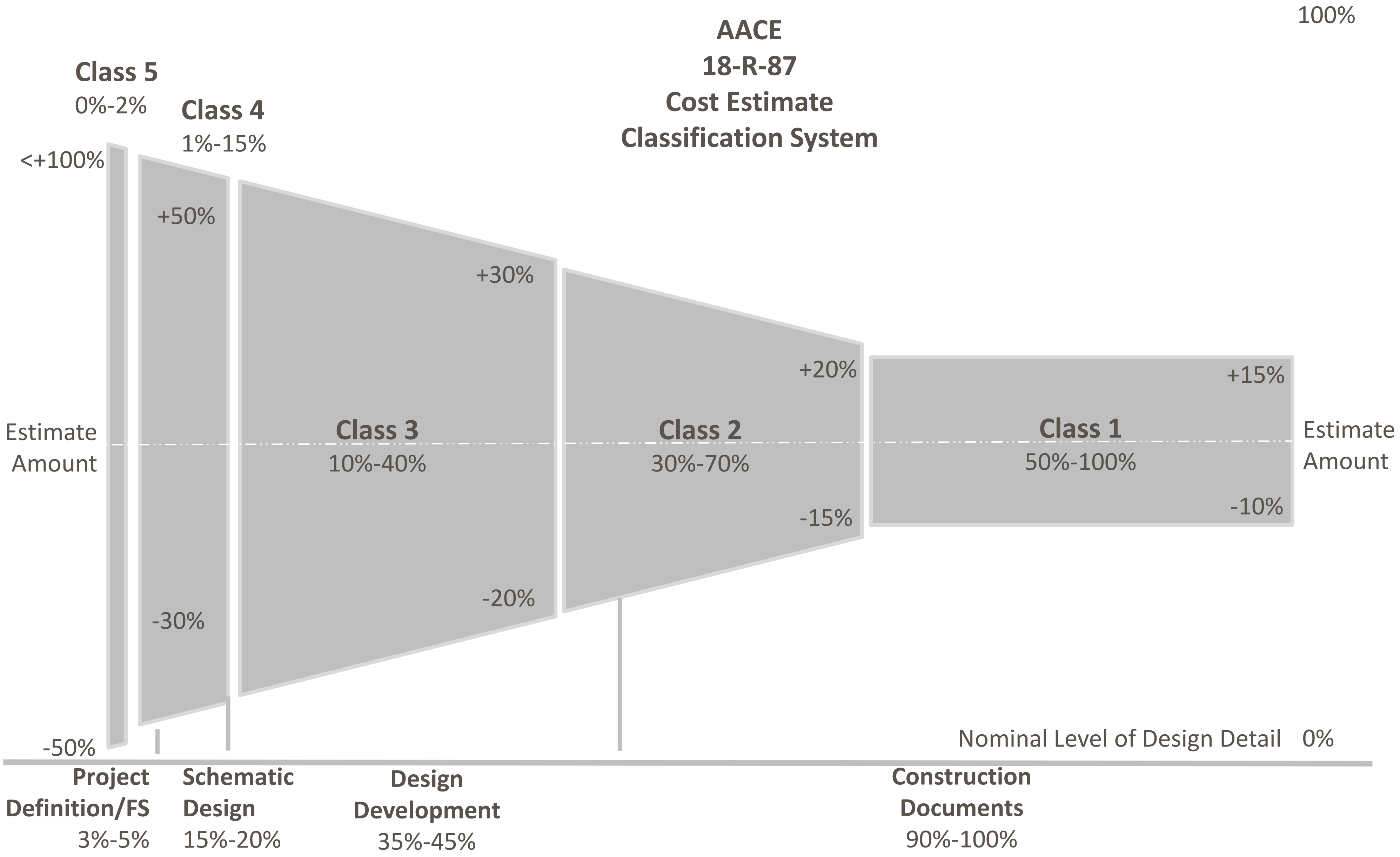

Construction Cost Estimate Accuracy Ranges

AACE Classification Standard	ANSI Standard Z94.0
Class 5	Order of Magnitude Estimate -30/+50
Class 4	Budget Estimate -15/+30
Class 3	
Class 2	Definitive Estimate -5/+15
Class 1	

Cost Certainty During the Design Phase (prior to procurement)

Site Characterization and Conceptual Site Model (CSM)

Risk Investigation and Feasibility Study

Preliminary Comparative Costs

Remedial Action Plan and Basis of Design

***Basis of Design Costs**

Remedial Design

***Bottoms Up Cost Estimate**

Procurement Documents

**Recommend developing a "bottom-up" cost modular tool during these phases, at a minimum.*

Developing the Basis for the Modular Cost Evaluation Tool During Feasibility Study Phase

- Unit costs for equipment and labor are based on data from a nearby Sediment Remediation Project.
- Volumes represent the dredge (and cap) prisms reflected in latest iterations of Feasibility Studies Alternates.
- Production rates are conservative, and adjusted with changes in water depth, anticipated debris, and bucket size.
- Rates and crew sizes for Feasibility Study Alternatives
- Overlap in schedule has been adjusted to make sure removal operations stay far enough ahead of capping operations to allow for settling of any resuspension.

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Example Cost Module Input (Mechanical Dredging Assumptions)

Dredging Assumptions – Determines Various Production Rates:

- Dredge rates and # of dredges based on assumptions for each alternative
- In situ density = 1.25 tons/yd3
- Specific Gravity of solids = 2.5
- Bucket efficiency = 70% (i.e., 30% of each grab is water)
- 10% PC for stabilization
- Dewatered material is 60% solids
- Determining barge sizes : 10 CY dredge = 1,500 yd3; 5 & 3 CY dredge = 800 yd3

Input Variables (examples):

- Processing capacities: for stabilization and dewatering
- Maximum capacity: tons/transportation per day at processing facility
- Unit costs for equipment and labor
- Volumes of the dredge (and cap) prisms reflected in latest iterations of alternatives
- Production rates are conservative, and adjusted with changes in water depth, anticipated debris, and bucket size
- Crew sizes for each alternative

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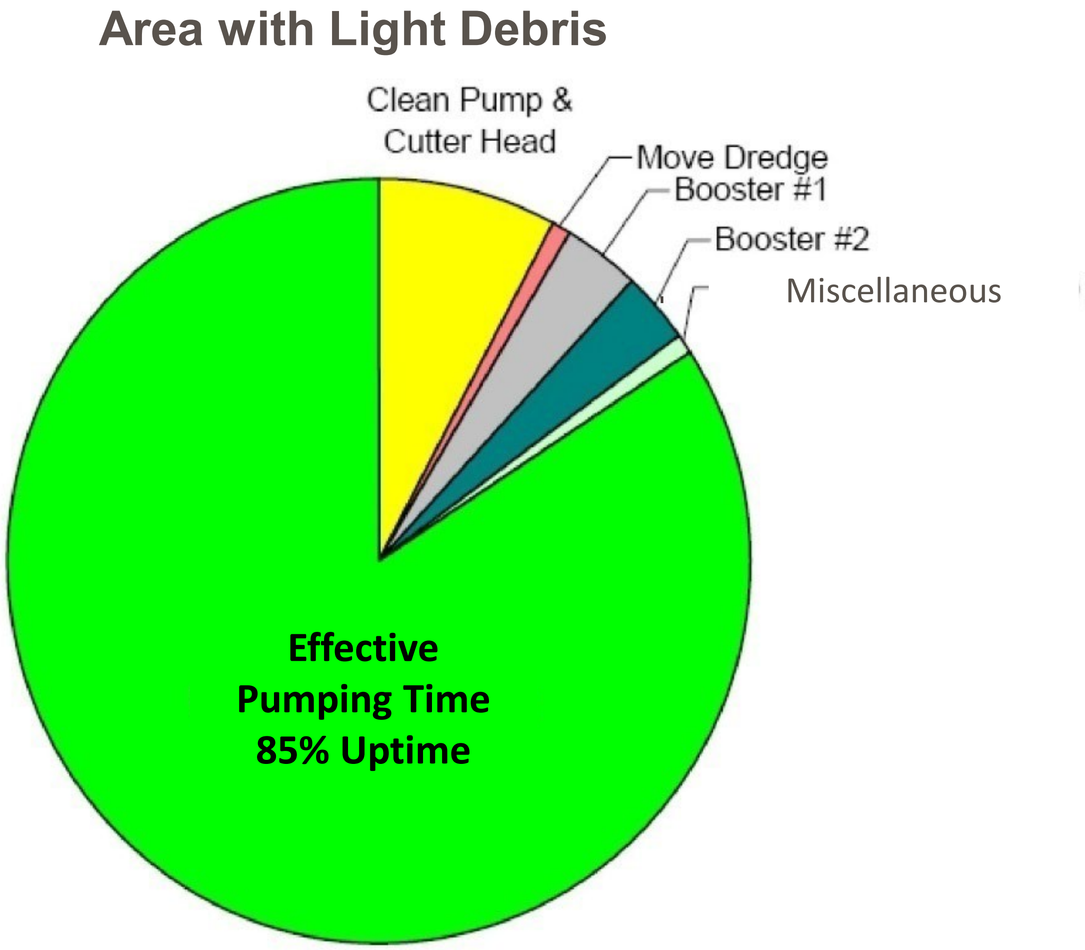
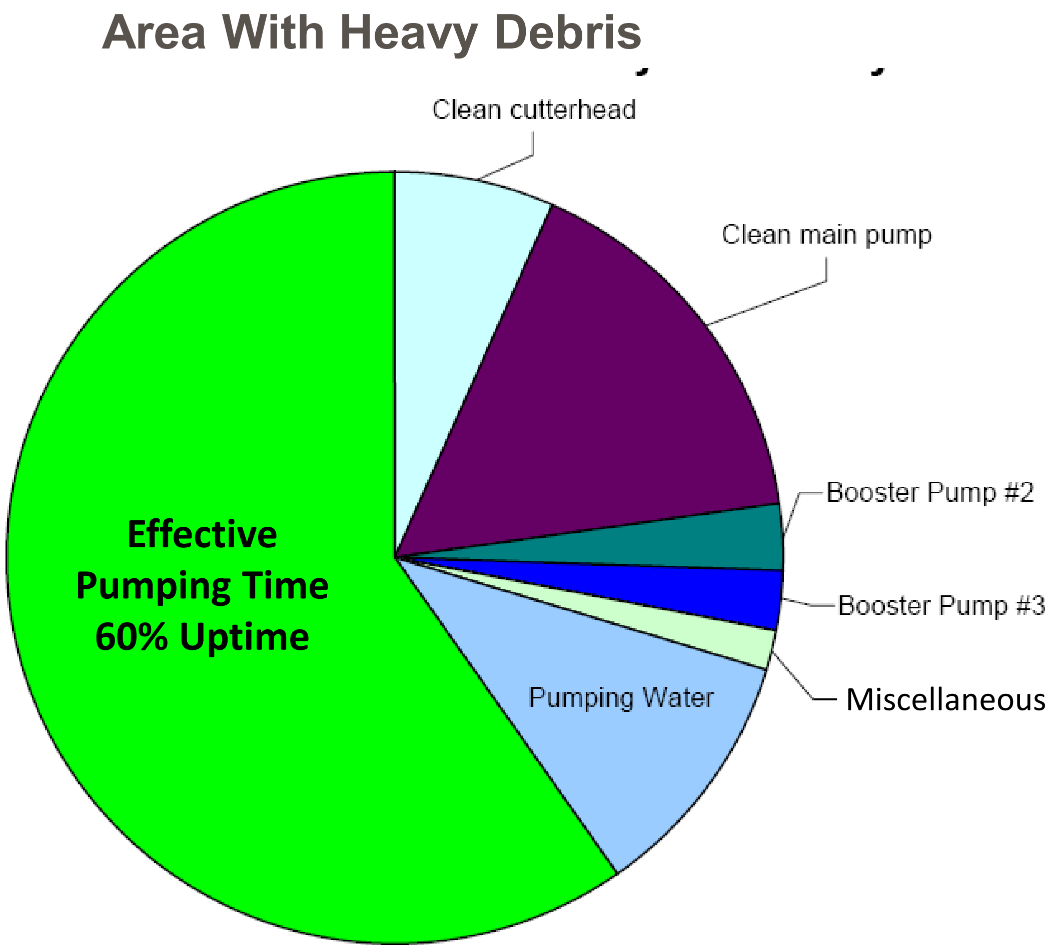
When Selecting Dredging, Capping and Dewatering Inputs - Evaluate Total Project Costs!

- Administrative—cost, schedule, work plans, regulatory interface
- Mobilization and demobilization
- Shore facilities—docks, roads, storage, processing
- Silt containment and turbidity mitigation
- Water treatment and air pollution control
- Solid waste treatment and disposal
- Sampling, monitoring, and regulatory compliance
- Health and safety
- Permit requirements
- Debris handling and Disposal

Quick Example – Impact of Debris on Total Costs





Assume $17/cy dredging cost at 85% uptime

At 60% uptime, dredging costs go to $24.10/cy

Value of the Modular Cost Evaluation Tool

- Can vary production rates and equipment sizing, to determine the effects on project duration and total costs.
- A means to evaluate costs in real-time; quickly cycling through "what if" scenarios.
- Allows evaluation for both "best" and "worst" case scenarios (e.g., multiple mobilizations/demobilizations for weather events or "fish windows", impacts of debris, availability of specialty equipment, etc.)
- Identifies the pinch points with the various remedial alternatives to identify risks and develop mitigation efforts.
- Helps to determine the maximum efficiency in sequencing the Work.
- Ability to determine maximum remediation efforts with available cash flow.

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Three Steps to Remedial Action Cost Certainty

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Developing Increased Cost Certainty Early in the Lifecycle

1. Owner goals and priorities are understood and embraced by all
   - ✓ Owner creates an end vision for the success of the remedial action specific to management goals
   - ✓ Owner clearly communicates the end vision to all stakeholders (from upper management to remediation contractor)
2. Mutual understanding of work to be completed
   - ✓ Work required is understood by owner, consultants and contractor
   - ✓ Site conditions are understood by owner, consultant and contractor
   - ✓ Contractor is experienced and understands how to complete the work
3. No unexpected work required – Proactive Risk Management
   - ✓ Design will achieve remedial goals; and remedial goals are achievable (right remedy was selected)
   - ✓ Site conditions are understood
   - ✓ No external influences during project execution (supply-chain issues, regulatory, public, property owner)
   - ✓ Proactive risk awareness and risk mitigation

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Proactive Risk Management

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No Unexpected Work is Required

- Will remedy reliably achieve remedial goals?
  - Limitations to remedy and inherent risk (consider performance attributes of ISCO vs ISS)
  - Is the Conceptual Site Model (CSM) based on robust data (i.e., are there assumptions baked into the CSM?)
  - Build in risk mitigation planning here!
- Is site characterization thorough?
  - Will inherent uncertainty impact effectiveness or impact cost beyond client success criteria?
  - Utilities are infrastructure (utility located vs. potholed and surveyed)
  - Investigation methods need to be appropriate (test pits vs. borings)

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No Unexpected Work is Required

- Risk Mitigation Planning –**Use of a Risk Register**
  - Our primary tool for identifying and mitigating risks
  - Complete a robust work session – early in the remedy selection phase! – to identify risks, and relative impact based on owner's criteria for success, and those with unacceptable risk, develop mitigation plan
  - Determine risk mitigation strategies
    - Fill data gaps
    - Build contingency/back up plans
  - Owner needs to take responsibility for some risks
  - Be transparent! Share risks with contractors…get them bought into risk mitigation
  - Keep Risk Register Current
    - Re-visit & update at key project milestones

Summary of Key Takeaways

- Start with a modular cost evaluation tool to evaluate projected remediation costs to determine the most efficient remediation techniques
- Collaboration and mutual success
  - ✓BMP: Set a clear vision for success early in the process and share with all project stakeholders
- Make it easy for contractors to understand site challenges
  - ✓BMP: Perform a specific “Biddability Review” typically no later than at 60% Design
- Risk planning and mitigation
  - ✓BMP: Use a Risk Register to identify and mitigate risks, and determine potential cost impacts

QUESTIONS?