NHDES & RD Funding Opportunities
Equipment Pre-Procurement

New England Water Environment Association
2019 Small Community Specialty Conference

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Presentation Overview

- What is Pre-Procurement
- Why Use Pre-Procurement
- Common Misconceptions
- Walkthrough of Project Examples
- Notable Successes
- Lessons Learned
- Question & Answers

What Is Pre-Procurement?

- Purchase Goods & Special Services In Advance
  - Items Normally Purchased By Contractor
- Step #1 = Pre-Procurement
  - Evaluated “Public Bid” Process
  - Up-Front Cost & Life Cycle Cost Typically Used
- Step #2 = Detailed Design
  - Drawings & Specifications
- Step #3 = Bid & Assignment Of Contract
  - Assignment Of Pre-Procured (Goods & Special Services) To General Contractor
- Step #4 = Build

Why Pre-Procurement?

- Unique Process Equipment
  - Difficult To Design Around Multiple Vendors
- Full Control Over Vendor Equipment
  - Dictate Supporting Equipment & Level of Quality
- Fast-Track Design Requirements
  - Submittal Review Concurrent With Final Design + Bidding
- Easier Collaboration & Detail From Vendor
  - Greatly Assists With Detailed Design

Why Pre-Procurement?

- Staff – Want Certain Type & Piece of Equipment
  - I want XXXX for Sludge Dewatering
  - I want XXXX for Tertiary Filtration
  - I want XXXX for Membrane Bioreactors
  - I want XXXX for Package Wastewater Treatment
- Funding Agencies
  - Must Allow Free & Open Competition
  - Must Allow "Or Equal" Equipment
    - Allows Decision in GC's Hands – Up Front Cost Only
    - Low Cost Not Always Best Value for Owner
    - Low Up-Front Cost – Not Always Long-Term Low Cost
- Cost Savings
  - Competitive Pricing Up Front

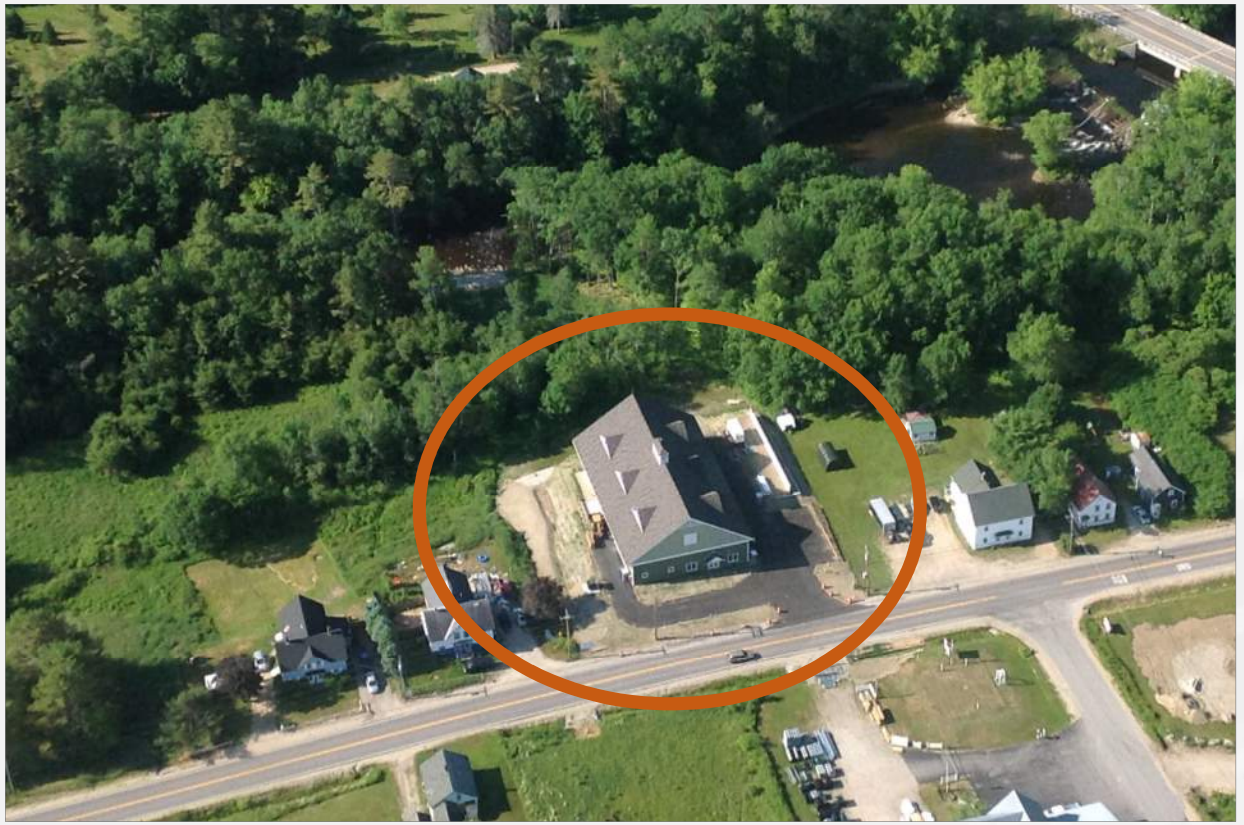
Common Misconceptions

- Takes More Time & Engineering Costs
  - Actual - Typically a Reduction in Time
  - Actual - Typically Less Engineering Time
    - Know Who Designing Around – Streamlines Design
    - Building & Supporting Systems Streamlined
- Funding Agencies Won't Allow It
  - They Will
  - EJCDC Front End – Procurement
  - Implementation With USDA RD & State SRF
  - Require Open Public Bidding
    - Evaluated Bid Process Typically Used – High Weight on LCC & Up-Front Cost

Project Example #1:
Oxford, ME Wastewater System

- **Pre-Procurement of MBR Treatment Equipment**
- Larger Overall Project - New WWTF
- New Sanitary Collection System
  - 9.2 Miles of Gravity Sewer
  - 4.8 Miles of Force Main
  - 7 Collection System Pump Stations
  - 3 Collection System Bridge Crossings
- Total Project Cost: **$28,500,000**
- Funded By USDA Rural Development
  - 45% Grant & 55% Loan

Oxford WWTF



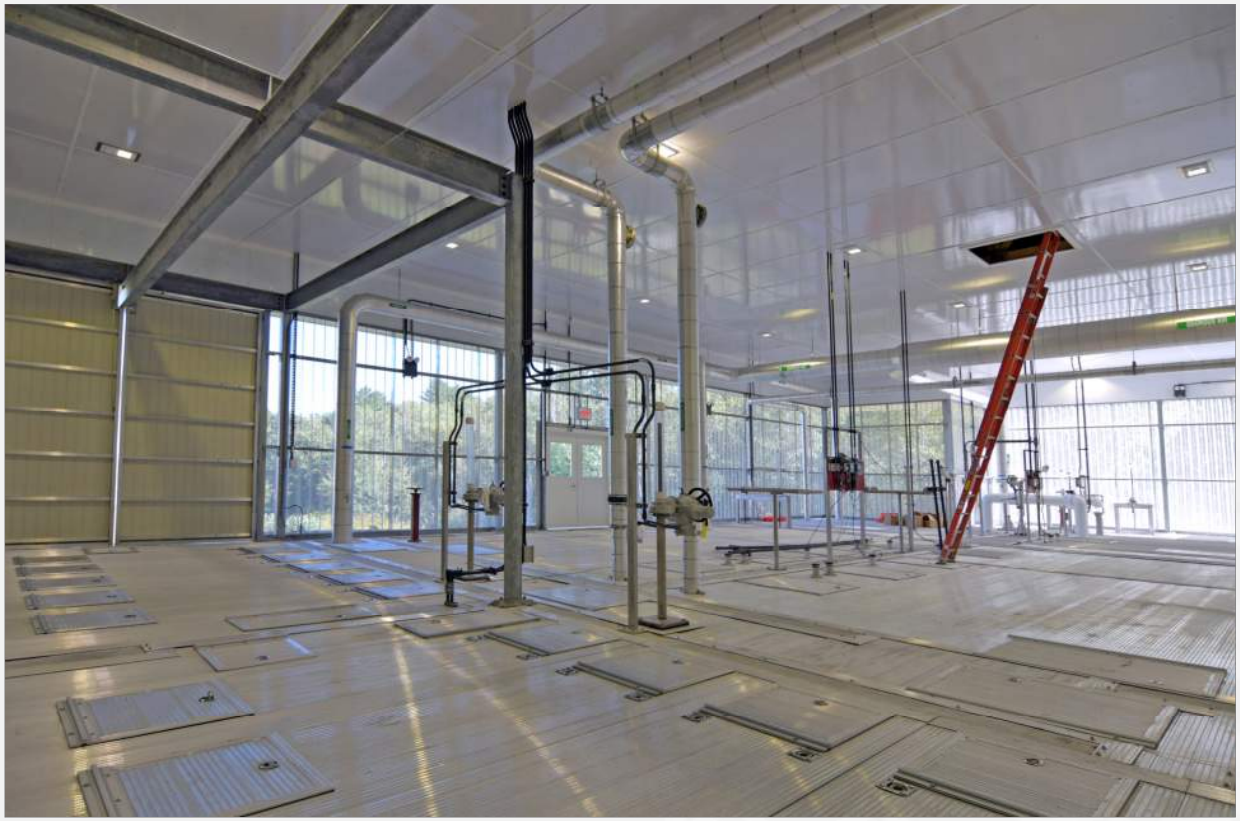
Oxford WWTF

Pre-Procurement Contract Structure

Evaluation Criteria Number	Evaluation Criteria	Weight (Points)
1	Total System Cost	20
2	Net Present Value Life Cycle Cost	40
3	System Operability & Reliability	10
4	Warranty	10
5	Technical Support Capabilities	10
6	Experience & Qualifications	10
	Total Points	**100**

Pre-Procurement Bidding

- Three Bidders
  - Vendor A
  - Vendor B
  - Vendor C

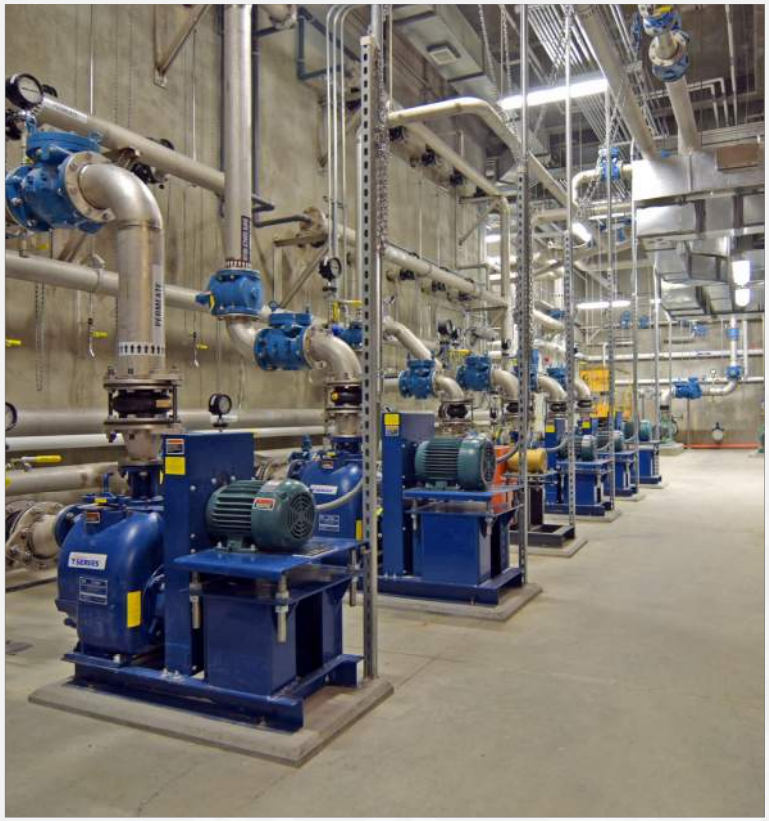


Criteria #1 – Capital Cost

- Cost of Initial Up-Front Equipment Purchase
- Defined Scope & Matching Bid Form
  - Item A: Fine Screening Equipment
  - Item B: Aeration Blowers
  - Item C: Fine Bubble Aeration Equipment
  - Item D: Anoxic Zone Mixers
  - Item E: Membrane Filtration Equipment
  - Item F: Air Scour Blowers
  - Item G: Permeate Pumps
  - Item H: Return Sludge Pumps
  - Item I: Membrane Chemical Cleaning Systems
  - Item J: EQ Aeration Blower
  - Item K: EQ Coarse Bubble Aeration
  - Item L: EQ Transfer Pumps
  - Item M: Instrumentation – MBR System
  - Item N: Integration & Controls – MBR System
  - Item O: Engineering & Drawings
  - Item P: Startup, Testing & Commissioning
  - Item Q: Membrane Equipment Warranty
  - Item R: Process Performance Warranty

Criteria #1 – Capita Cost Scoring

- Capital Cost Scoring Breakdown
  - Most Cost-Effective System: 20 Points
  - Second: 15 Points
  - Third: 10 Points



Criteria #1-Bid Results & Scoring

- Initial Capital Cost Bids
  - Vendor A = $1,208,763
  - Vendor C =$1,281,950
  - Vendor B = $1,317,250
- Close Range of Capital Costs
- Final Capital Cost Scoring
  - Vendor A = 20 Points
  - Vendor C = 15 Points
  - Vendor B = 10 Points
- Savings of **$200,000** compared to initial cost evaluation
  - Competitive Bidding Environment

Criteria #2 – Total NPV LCC

- Bid Evaluation Criteria Forms & Tables
- Evaluation Tables
  - Category #1: Tankage Space & Cost
  - Category #2: Building Space & Cost
  - Category #3: Operational Costs
    - (Power & Chemicals)
  - Category #4: Short-Lived Assets
    - (Membrane Replacement & Lift Span)
- Takeaway – Ensure Long-Term Low Cost

Criteria #2 – Total NPV LCC

- Example O&M Table
  - Table 3-J: Chemical Use Cost Estimate
  - Real Town Chemical Costs

Item	Process Use	Chemical	Strength	Specific Gravity	Annual Volume (gallons)	Chemical Unit Cost ($/Unit)	Annual Cost ($)
1-J	Membrane Cleaning (Organic Fouling)	Sodium Hypochlorite	12.5%	1.3		$2.60/gal	
2-J	Membrane Cleaning (Inorganic Fouling)	Citric Acid (Liquid)	50%	1.24		$0.95/lb	
						Total Annual Chemical Cost (1J) + (2J)	

- Electrical Power Also Included
  - Pumps & Blowers

Criteria #2 – Total NPV LCC

- Example Short-Lived Asset Table
  - Table 3-K: Membrane Replacement Costs

Item	Parameter	Value	Units	Notes
1-K	Total SMU		Units (SMU)	Total SMU Quantity
2-K	SMU Cost		$/SMU	Cost Per SMU
3-K	Replacement Interval		Years	Average @ ADF & Loads
4-K	**Replacement Cost**		**$/year**	(1K)*(2K)/(3K)

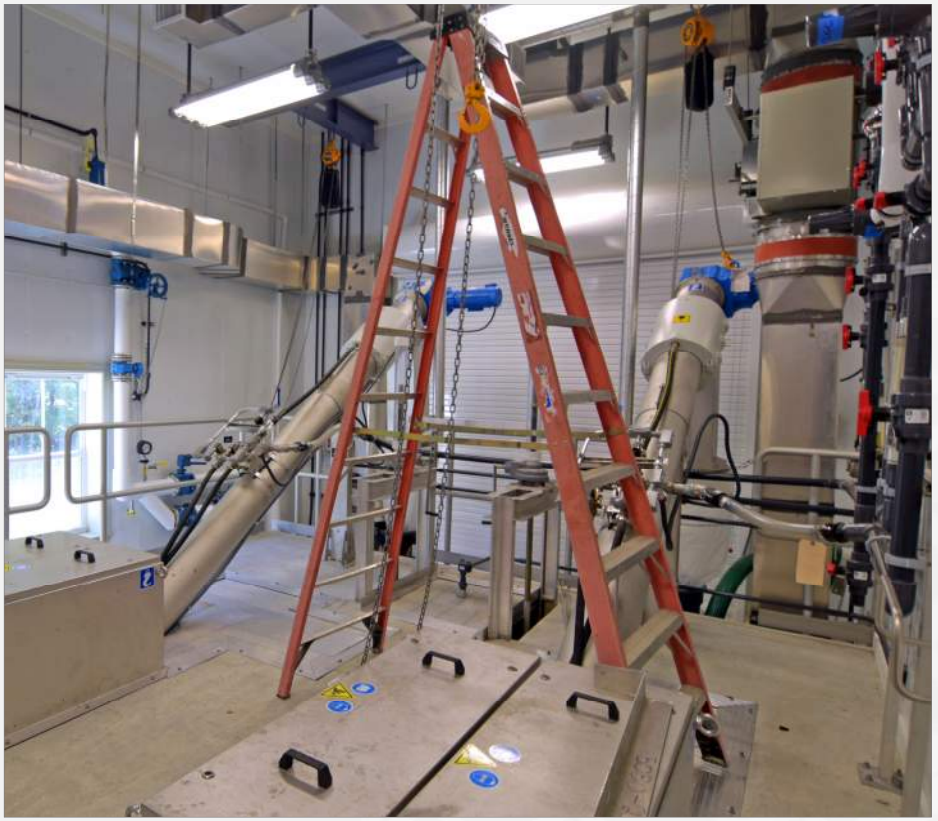
- Required Minimum of Ten Facility Examples
  - Substantiate Claims of Membrane Life
  - Verified By Project Team Prior To Award
- Goal – Capture Hidden Future Costs
  - Ensure Long-Term Cost-Effective Solutions

Criteria #2 – Total NPV LCC Summary

Bid Item	Description	Units	Vendor A	Vendor B
TABLE 3-1 TANK & BUILDING COST SUMMARY (PUMPED PERMEATE)				
A	Membrane Tanks	LS	$ 251,950	$ 94,272
B	Aeration Tanks	LS	$ 360,000	$ 360,000
C	Influent Splitter Box & Deoxygenation Zone	LS	$ 110,897	$ 92,184
D	Equalization Tanks	LS	$ 152,483	$ 129,885
E	Anoxic Tanks	LS	$ 134,973	$ 71,826
F	External Membrane Cleaning Tanks	LS	$ -	$ -
G	Blower Building Area	LS	$ 86,000	$ 90,150
H	Pump Gallery Area (Pumped Permeate)	LS	$ 71,650	$ 70,000
	TOTAL TANKAGE & BUILDING COSTS	**LS**	**$ 1,167,953**	**$ 908,317**
TABLE 3-2 ANNUALIZED OPERATION & MAINTENANCE COSTS (PUMPED PERMEATE)				
I	Screenings Handling & Disposal	$/Year	$ 638	$ 638
J	Chemical Use	$/Year	$ 1,069	$ 4,490
K	Membrane Replacement	$/Year	$ 25,600	$ 28,560
L	Permeate Power (Pumped System)	$/Year	$ 392	$ 445
M	Membrane Air Scour	$/Year	$ 4,759	$ 2,493
N	Biological Aeration	$/Year	$ 5,139	$ 8,647
O	Equalization Aeration	$/Year	$ 15	$ 7
P	RAS & Nitrate Recycle Pumping	$/Year	$ 748	$ 959
Q	Back-Pulse Pumping	$/Year	$ -	$ 5.4
R	Equalization Transfer Pumping	$/Year	$ 50	$ 34
	TOTAL OPERATIONAL COSTS	**$/Year**	**$ 38,500**	**$ 46,300**
TABLE 3-3 PRESENT WORTH ESTIMATION (PUMPED PERMEATE)				
1	**Building & Tank Costs**	**LS**	**$ 1,167,953**	**$ 908,317**
2	Annual O&M Costs (A)	$/Year	$ 38,500	$ 46,300
3	Discount Rate (i)	----	4.375	4.375
4	Life Cycle Period (n)	Years	20	20
5	**Present Worth O&M Costs (P)** - *See Note #1*	**$**	**$ 506,275**	**$ 608,845**
6	Total Present Worth (Pumped Permeate) - O&M, Tank & Building Costs *(Item 1 + Item 5)*	$	$ 1,674,228	$ 1,517,162
7	**Corrected Initial Equipment Capital Cost** *(Removed Out of Scope Items)*	$	**$ 1,208,763**	**$ 1,317,250**
Total NPV LCC (PUMPED PERMEATE) - (Item 1 + Item 5 + Item 7)		$	**$ 2,880,000**	**$ 2,840,000**

Criteria #2 – NPV LCC Scoring

- NPV LCC Scoring
  - Most Cost Effective: 40 Points
  - Second: 30 Points
  - Third: 20 Points



Criteria #2-Bid Results & Scoring

- NPV LCC Bid Results
  - Vendor B = $2,840,000
  - Vendor A = $2,880,000
  - Vendor C = $3,542,786 – Was Lower Up-Front Cost
- NPV LCC Scoring
  - Vendor B = 40 Points
  - Vendor A = 40 Points
  - Vendor C = 30 Points
- Vendor B & Vendor A
  - Equivalent & Within Margins of Error Of Planning Level Comparison

Criteria #3 – Operability & Reliability

- Lowest System Complexity = 5 Points
  - Less Automated Valves
  - Less I/O, Etc.
- Lowest Chemical Cleaning = 5 Points
  - Less Number of Required Cleanings
  - Confirmed by Design Team Investigations

Criteria #3 – Operability & Reliability Bid Tables

- Table 4-A1: Membrane System Complexity

Parameter	Quantity
Control Panels	
Equipment HOA Switches	
Electrically Operated Valve HOA Switches	
Electrically Operated Cycling Valves	
Quantity of Analog Inputs	
Quantity of Analog Outputs	
Quantity of Discrete Inputs	
Quantity of Discrete Outputs	

- Table 4-A2: Membrane Cleaning Procedures

Parameter	Units	Quantity
Frequency of Maintenance Cleans	#/year	
Duration of Standard Maintenance Cleans	hours/MBR basin	
Frequency of Recovery Cleans	#/year	
Duration of Recovery Cleans	hours/MBR basin	

Criteria #3 – Operability & Reliability Scoring

- Membrane System Complexity Bid Results
  - Vendor A = 3 Points
  - Vendor B = 2 Points **– Most Complex**
  - Vendor C = 5 Points **– Least Complex**
- Membrane Cleaning Bid Results
  - Vendor A = 5 Points **– Lowest Cleaning**
  - Vendor B = 3 Points
  - Vendor C = 2 Points **– Highest Cleaning (Daily)**
- Total Points
  - Vendor A = 8 Points
  - Vendor B = 5 Points
  - Vendor C = 7 Points

Criteria #4 – Membrane Warranty

- Lowest Cost Warranty
- Pro-Rated or Not?
- Most Inclusive
- Criteria #4 Scoring Breakdown
  - Most Inclusive & Cost Effective: 10 Points
  - Second: 6 Points
  - Third: 4 Points

Criteria #4-Warranty Scoring

- Criteria #4 Warranty Summary Table

Number	Description	Vendor A	Vendor B	Vendor C
1	Warranty of Ancillary Supporting Equipment	1 Year	1 Year	1 Year
2	Standard Warranty for Membranes & Cassettes	5 Year (Non-Prorated)	5 Year Prorated (2 Year Full)	5 Year Prorated (2 Year Cliff)
3	One Year Process & Performance Guarantee	$ -	$11,825	$5,000
4	Cost of Full 5 Year Membrane Warranty	$ -	$83,214	$5,000
5	Cost of Full 10 Year Membrane Warranty ($/Year)	$ -	Not Available 10 Year Pro-Rated (5 Year Full)	$25,000
	POINTS SCORING	**10**	**4**	**6**

- Vendor A – Most Cost Effective & Inclusive Warranty

Criteria #5 – Technical Support

- Lowest Cost
- Most Inclusive
- Extended Support Costs
- Criteria #5 Scoring Results
  - Most Inclusive & Cost Effective: Vendor B = 10 Points
  - Second: Vendor A = 6 Points
  - Third: Vendor C = 4 Points

Criteria #6 – Experience & Qualifications

- U.S. Based Installations of Similar Size

Parameter	Experience Category	Maximum Points Available
Location	Number of U.S. Facilities > 100 Number Facilities Worldwide > 500	2 1
Capacity Facilities (Average Annual Design)	> 25 Facilities of 0.2 MGD or Greater > 50 Facilities of 0.05 MGD or Greater	1 1
Years of Service	Average of 10 Reference Plants > 5 years Average of 10 Reference Plants > 3 years Average of 10 Reference Plants > 1 year	2 2 1
	Total	10

- Scoring Breakdown
  - Vendor A = 10 Points
  - Vendor B = 10 Points
  - Vendor C = 8 Points

Final Pre-Procurement Scoring

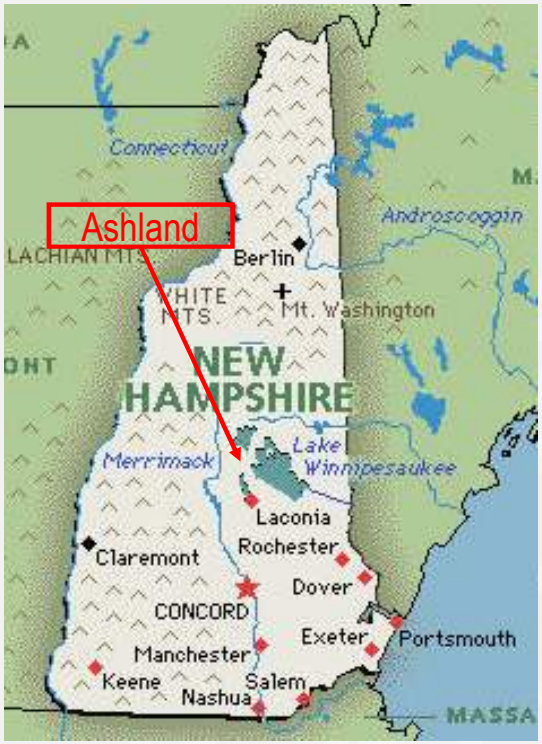
- Summary Table Of Final Scoring

Criteria Number	Evaluation Criteria	Weight (Points)	Vendor A	Vendor B	Vendor C
1	Total System Capital Cost	20	20	10	15
2	Net Present Value Life Cycle Cost	40	40	40	30
3	System Operability & Reliability	10	8	5	7
4	Warranty	10	10	4	6
5	Technical Support Capabilities	10	6	10	4
6	Experience & Qualifications	10	10	10	8
		TOTAL SCORING	94	79	70

- Vendor A & B - Close Scoring
- Each Held 1 Hour Presentation To Town
- Vendor A - Awarded Pre-Procurement Contract
  - Town Concurrence On Award

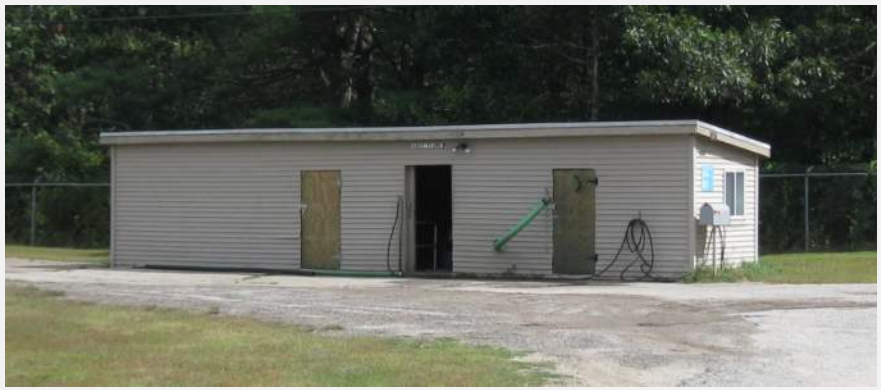
Project Example #2: Town of Ashland, NH

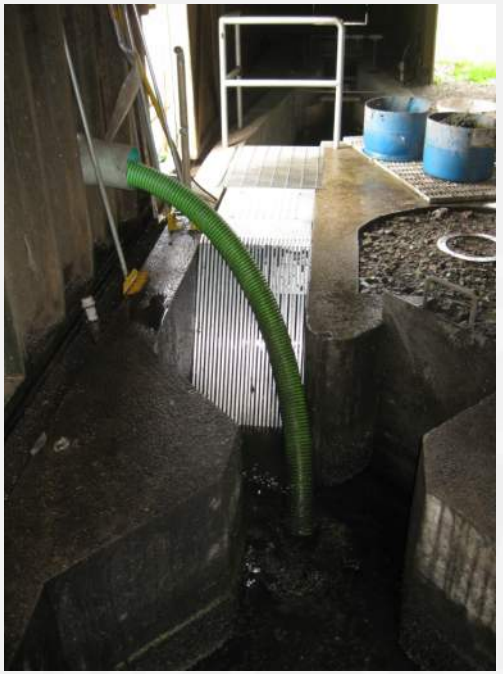
- Lakes Region
- Population ~2,100
- Ashland Wastewater System
  - Town Owns & Operates WWTP
    - 0.17 MGD Permitted Flow
    - Aerated Lagoon System



Town of Ashland Headworks & Septage Receiving Project

- Need & Driver
  - No Formal Septage Receiving or Headworks
    - Labor Intensive Process
    - Reduced Lagoon Capacity
    - Septage Supports Sewer Budget





Town of Ashland Headworks & Septage Receiving Project

- Project
  - Combined Headworks & Septage Receiving Facility
  - Pre-Procurement of Metal Building
    - Pre-Engineered Building (Design + Materials)
    - Erection Services
  - Pre-Procurement of Septage Receiving Equipment
  - Pre-Procurement of Headworks Equipment
    - Mechanical Screen
    - Grit Removal
- Funded by Northern Borders & NH DES

Town of Ashland Headworks & Septage Receiving Project

- Septage Receiving Evaluation
  - (1) Unit With (2) Truck Connections
  - Drum Capacity of 880 gpm and 53 cf/hr
  - Integral Wash Press
  - Screw Conveyor
- Up-Front Cost
  - Startup & Performance Testing Costs
  - Unit Pricing Per Day

Town of Ashland Headworks & Septage Receiving Project

- Headworks Equipment Evaluation
  - (1) Stationary Basket Screen
    - 2'-0" Wide Channel
  - (1) Vortex Grit Removal Unit
    - 7'-0" Chamber Diameter
    - Includes Suction Lift Pump and Paddle Mixer
  - (1) Grit Washer
  - Bid Alternate Item for Stainless Steel Grit Chamber
- Up-Front Cost
  - Startup & Performance Testing Costs
  - Unit Pricing Per Day

Town of Ashland Headworks & Septage Receiving Project

- All Equipment In One Bid Package
  - Allowed Vendors to Bid on Multiple Components
- Capital Cost Results
  - Did Not Award Bid Alternate

Description	Vendor A	Vendor B	Vendor C	Vendor D
Screening Equipment	N/A	N/A	$68,000	$67,589
Septage Receiving Equipment	$229,294	N/A	$324,650	N/A
Grit Removal Equipment	N/A	$213,318	$199,850	$154,298
Bid Alternate: Stainless Steel Grit Chamber	N/A	$66,000	N/A	$48,105

- Conclusions
  - Reduced Project Schedule and Cost

Town of Ashland Headworks & Septage Receiving Project

Notable Successes

- Full Control Over Key Equipment
- Submittal Reviews Expedited
  - Completed Prior To Award of Construction Contract
- Far Easier Detailed Design
  - Real Equipment Drawings & CAD Blocks
- Assignment Of Equipment Contract
  - Very Smooth Vendor to Construction Contractor
- Bidder Feedback
  - “Fair Evaluations – Highlight Our Total Costs”
- Project Time Savings – At Least 6-8 Months

Lessons Learned

- Equipment Delivery & Submittal Language
  - Engineer Control of Timing Vs. *"Within XX Days of Contract Award"*
- Bid Period
  - Lengthen Bid Period - 21 Day Minimum Is Too Short
- Use Locked & Embedded Excel Files For Bid Evaluation Tables For Bidders

Lessons Learned

- SRF AIS Requirements
- Startup & Testing Unit Pricing
  - Cost per Day on Site
  - Established Cost if Added Days Needed

Questions? Thank you for your time!!