Town of Orleans Massachusetts

Joint Meeting of the Board of Selectmen and Finance Committee

Water Quality and Wastewater Planning Project Cost Estimate

September 14, 2016

Agenda

- Program Costs
- Wastewater Collection System
- Downtown Area Flow Schematic and Preliminary Layout
- Meetinghouse Pond Area Flow Schematic and Preliminary Layout
- Assumptions / Considerations
- Present Value Comparison
- Estimated Project Costs
- "Best Case" Project Cost Estimate
- Recommendations

Program Costs

Elements of the Program

- Collection/Treatment/Disposal
- Non-Traditional Technologies
- Adaptive Management

Major Cost Components

- Project (Capital)
- Annual Operation and Maintenance
- Replacement
- Monitoring

Wastewater Collection System

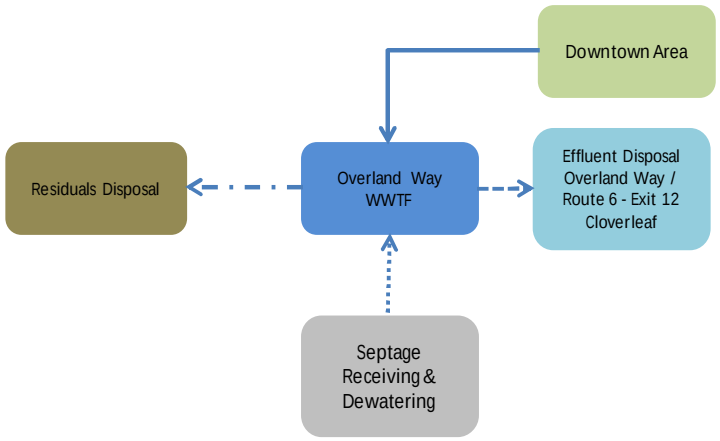
Collection System Types

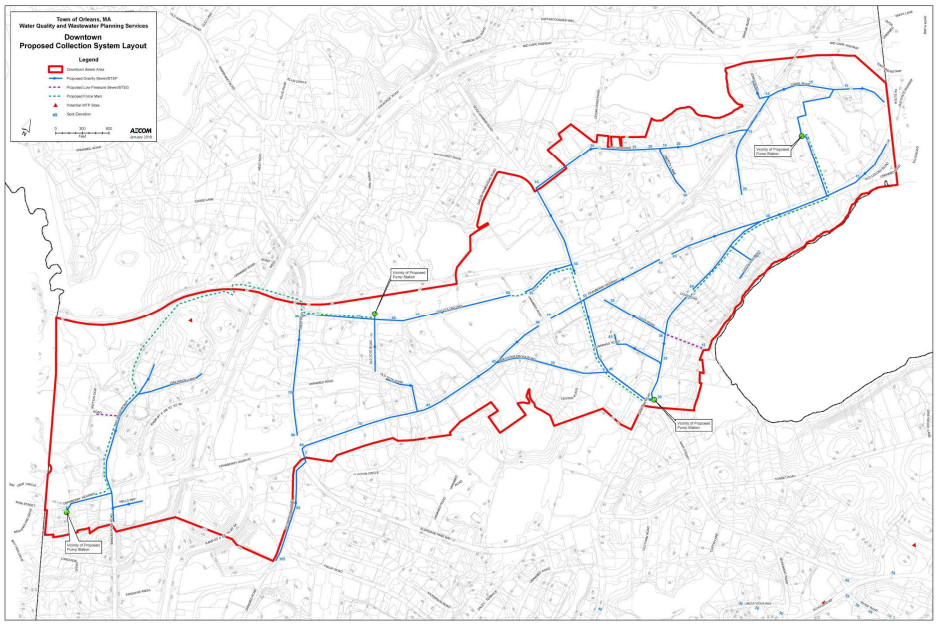
- Gravity Sewers (GS)
- Low Pressure Sewers (LPS)
- Septic Tank Effluent Pumping (STEP)
- Septic Tank Effluent Gravity (STEG)
- Vacuum Sewers (VS)
- Hybrid

Cost Evaluation

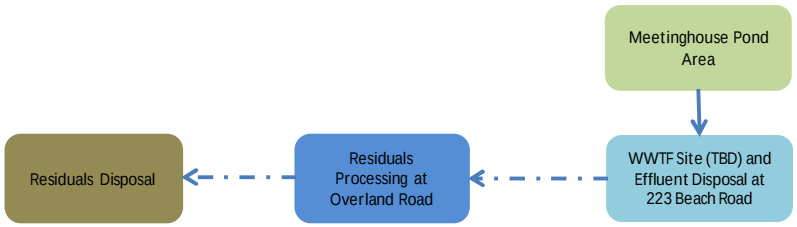
- Prepared Preliminary System Layouts
- Developed Quantities
- Developed Unit Prices
  - Project (Capital)
  - Operation and Maintenance
  - Replacement
  - Monitoring
- Prepared Life-Cycle Cost Analysis

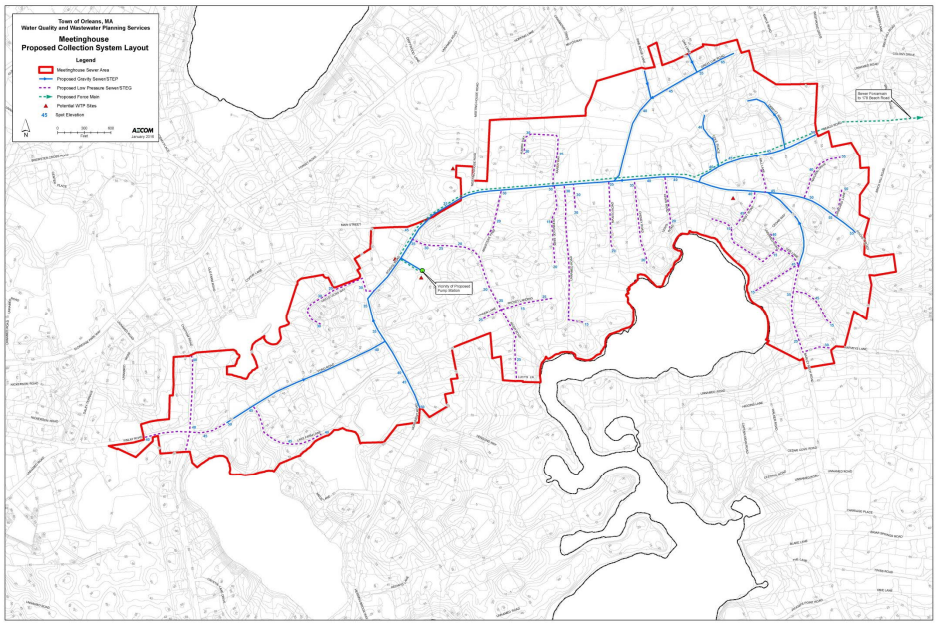
Wastewater Collection System (cont.)
Downtown Area Flow Schematic





Wastewater Collection System (cont.)
Meetinghouse Pond Area Flow Schematic





Wastewater Collection System (cont.)
Assumptions / Considerations

- Conventional and Alternative Construction
  - Off Season Construction
  - Full Roadway Restoration
  - No Topographic Survey or Geotechnical Investigations Available Yet
- Compared with 100% of Each Collection System Type
- Present Value
  - 20 Years
  - 3% Inflation Rate
  - 3% Value of Money

Wastewater Collection System (cont.)
Assumptions / Considerations

- Investigation of Capital Costs
  - Communities and Vendor Information
  - AECOM's Project Experiences
- Costs Adjusted to New England Market
  - Material Costs
  - Wage Rates
  - Local Conditions
- Land Purchase at $200,000 per Acre
- Design-Bid-Construct Format

Wastewater Collection System (cont.)
Assumptions / Considerations

Project (Capital)

- Public Property
  - Pipes
  - Pump Stations
  - Force Mains
- Private Property
  - Service Pipes
  - Replace Septic Tanks
  - Pump/Valve Units, as Applicable
  - Abandonment of On-Site Systems, as Applicable

Operation and Maintenance

- 1 Full Time Employee Plus 260 Hours Per Pump Station
- Utilities, Chemicals, etc.
- Clean and TV 25% of Gravity Sewers per Year
- Clean 100% of Pressure Pipes per Year
- Private Property Components
- Pump-out Septic Tanks Every 3 Years, as Applicable

Wastewater Collection System (cont.)
Assumptions / Considerations

Replacement

- Pump Stations at 1% of Capital Cost per Year
- Private Property Pumps/Valves at 5% of Total Number Installed

Monitoring

- Pump Stations at $2,500 per Year
- Private Property Pumps/Valves at 8 Hours Per Connection

Wastewater Collection System (cont.)
Present Value Comparison

Downtown Area						
	Gravity Sewers	Septic Tank Effluent Gravity	Low Pressure Sewers	Vacuum Sewers	Septic Tank Effluent Pumping	Hybrid (GS and LPS)
Capital	$ 26.82	$ 28.52	$ 18.71	$ 28.30	$ 19.46	$ 24.18
O&M	$ 0.82	$ 0.85	$ 0.67	$ 1.01	$ 0.70	$ 0.62
PV	$ 38.89	$ 41.10	$ 28.63	$ 43.33	$ 29.90	$ 33.36

Note: Costs in Million of Dollars

Wastewater Collection System (cont.)
Present Value Comparison

Meetinghouse Pond Area						
	Gravity Sewers	Septic Tank Effluent Gravity	Low Pressure Sewers	Vacuum Sewers	Septic Tank Effluent Pumping	Hybrid (GS and LPS)
Capital	$ 32.35	$ 34.16	$ 21.92	$ 29.83	$ 22.73	$ 21.20
O&M	$ 1.33	$ 1.37	$ 0.74	$ 1.05	$ 0.77	$ 0.55
PV	$ 52.18	$ 54.55	$ 32.85	$ 45.40	$ 34.21	$ 29.40

Note: Costs in Million of Dollars

Wastewater Collection System (cont.)
Estimated Project Costs

Description	Preliminary Project Cost	Preliminary Annual Costs			
		O&M	Replacement	Monitoring	Total
Downtown Area					
Collection	$ 26.82	$ 28.52	$ 18.71	$ 28.30	$ 19.46
WWTF/Disposal	$ 0.82	$ 0.85	$ 0.67	$ 1.01	$ 0.70
Total	$ 38.89	$ 41.10	$ 28.63	$ 43.33	$ 29.90
Meetinghouse Pond Area					
Collection	$ 26.82	$ 28.52	$ 18.71	$ 28.30	$ 19.46
WWTF/ Disposal	$ 0.82	$ 0.85	$ 0.67	$ 1.01	$ 0.70
Total	$ 38.89	$ 41.10	$ 28.63	$ 43.33	$ 29.90

Note: These are updated best estimates at this time and are subject to change as updated information becomes available.

Wastewater Collection System (cont.)
"Best Case" Project Cost Estimate

- Develop a "Best Case" Project Cost Estimate Assuming Favorable Considerations
- Considerations
  - Construction Contingency Reduced from 25% to 10%
  - Project Cost Reduced by a 25% Grant
  - Project Capital Cost Reduced by 21% for Design-Build Procurement
  - Project Cost Reduced by 20% Local Tax Revenue Option

Wastewater Collection System (cont.)
"Best Case" Project Cost Estimate

Capital Cost (Collection, WWTF and Effluent Disposal Facility)	**$43,621,900**
Capital Cost (Not Including Replacement Cost)	$29,226,673
Capital Cost Contingency Reduction of 15%	$24,842,672
Project Services (Town Administration and Engineering Services)	$14,395,227
Subtotal	**$39,237,899**
Grant at 25%	$29,428,424
Design-Build Procurement Reduction of Capital Cost at 21%	$23,248,455
Local Tax Option Revenue Reduction at 20%	$18,598,764
Replacement Cost Present Worth	$2,216,500
"Best Case" Cost Estimate	**$20,815,264**

Wastewater Collection System (cont.)
Preliminary Design Report

Goals

- Update Wastewater Flow, Infiltration Allowance, Septage Quantity, Process Equipment Quantity and Sizing, etc.
- Ability to Handle Future Service Area Changes
- Consider Other System Components Impacts (ie. corrosion, treatability, odors, etc.)

Components

- Topographic Survey, Subsurface Investigation and Cultural Resource Evaluation
- Update Collection System Type Evaluation and Preliminary System Configuration (Plan and Profiles)
- Update WWTF Process Selection
- Develop Design Data
- Summarize Existing Utilities
- Permit Requirements
- Update Program Cost Estimate

Town of Orleans Massachusetts

Thank You