Town of Orleans

MASSACHUSETTS

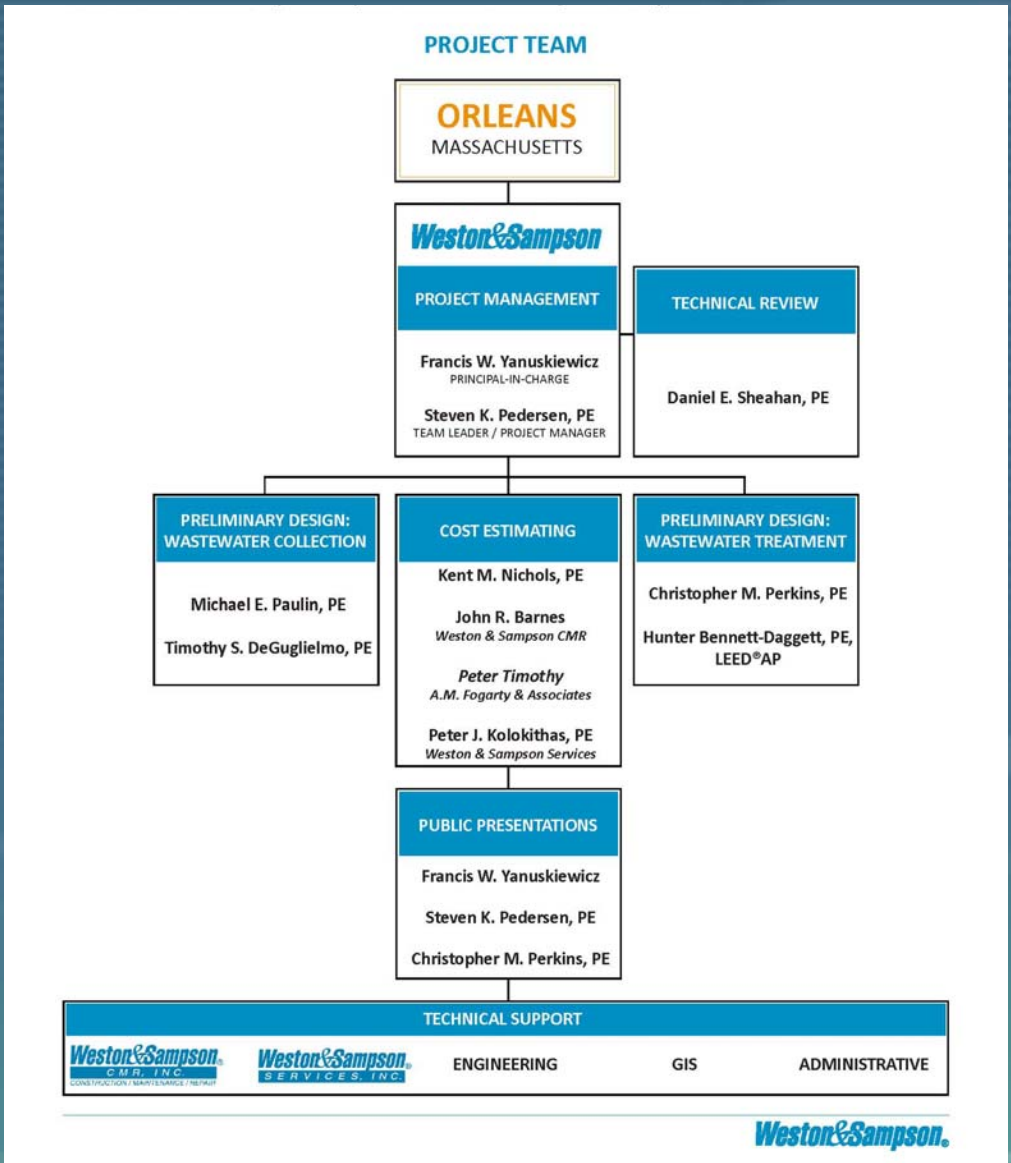
Technical Review and Cost Analysis of Comprehensive Wastewater Management Plan Options

Board of Selectmen's Meeting

November 16, 2011

Weston&Sampson

Key Personnel



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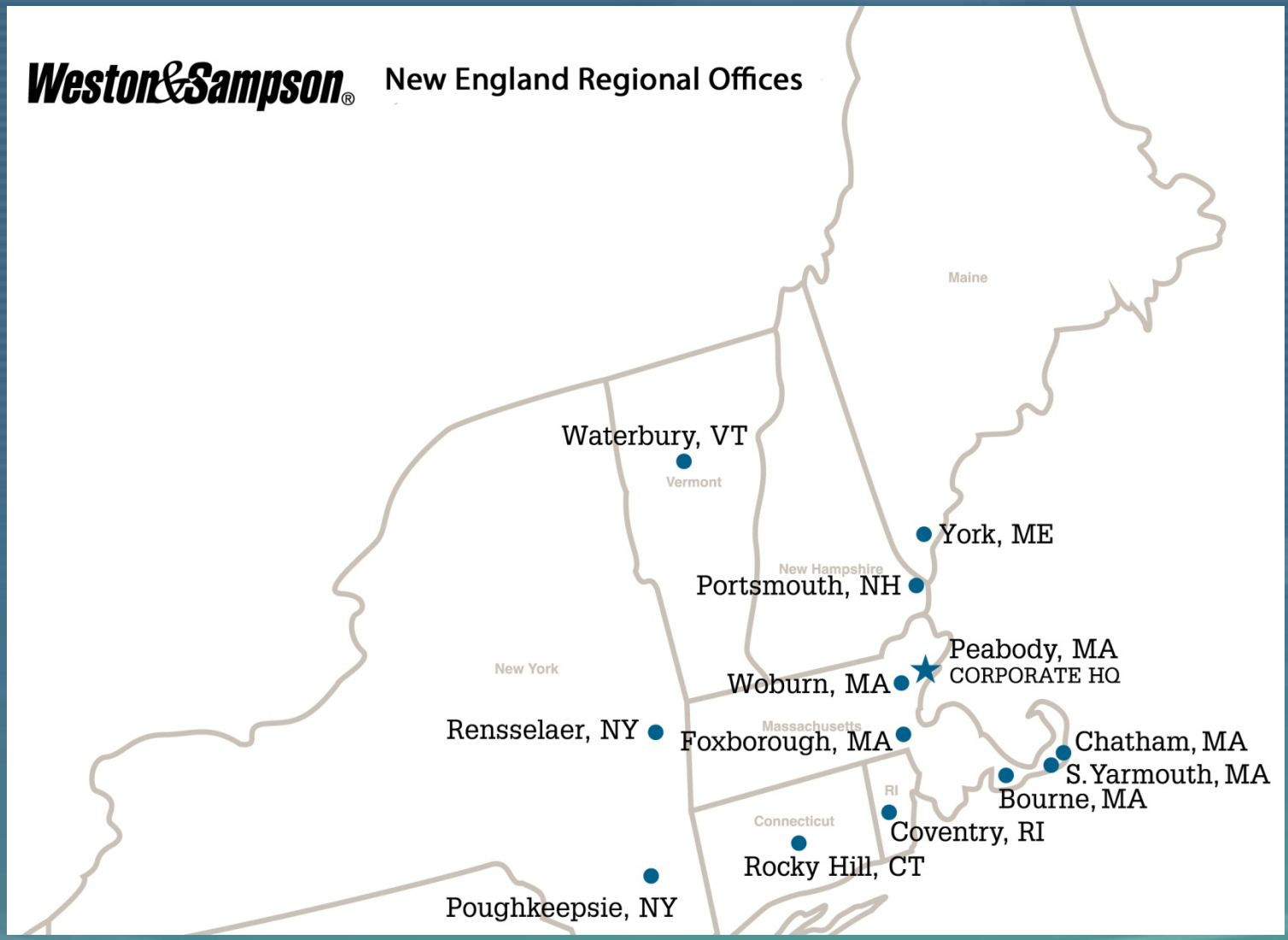
New England Offices



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Disciplines

- ***Wastewater***
- Water & Water Resources
- Stormwater
- Sustainable Design & Low Impact Development (LID)
- Transportation
- Landscape Architecture
- Solid Waste
- Site/Civil

- ***GIS/Mapping***
- Hazardous Waste / LSP Services
- Structural Engineering
- Geotechnical Engineering
- Hydrology & Hydrogeology
- Surveying
- Environmental Science & Permitting

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Weston & Sampson Companies

What are the Weston & Sampson Companies?

- Engineers
  - Science & Engineering
  - Planning & Architecture
- Weston & Sampson Services
  - Operation & Maintenance
  - Environmental Training
- Weston & Sampson CMR
  - Construction, Maintenance and Repair

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History of Innovative/Alternative Solutions

- First Large Scale Septic Tank Effluent Pumping (STEP) Sewer System in New England – Gloucester, Massachusetts
- First Large Scale Low Pressure Sewer System in New England – Amesbury, Massachusetts
- First Municipal 'Aquaculture' (Solar Aquatics) Wastewater Treatment Facility in New England – Ashfield, Massachusetts
- Variable Slope Septic Tank Effluent Gravity Sewer (STEG) – Monroe, Massachusetts
- STEP Collection System with Decentralized WWTF – Schodack Landing, New York

Conventional Experience

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(1) Some Construction Contracts yet to Commence
(2) Evaluations - Design/Construction Pending

Sewer & Pump Stations

Design & Construction
Within the Last Five Years

Municipality/Agency	Dates	Pipe (Feet)	No. of Pump Stations	No. of Const. Contracts
Bethel, ME	2001 - Present	6,500	1	1
Cape Cod Community College (1)	2000 - Present	2,500	2	1
Chelmsford, MA	1985 - Present	887,000	29	34
Coventry, RI	1985 - Present	52,000	1	6
Coventry, RI - Fast Track	2003 - 2005	21,000	1	3
Coventry Contract 4 & 5	2009 - Present	19,500	0	2
East Lyme, CT	1998 - Present	6,900	3	3
Essex, MA	2000 - Present	62,000	0	1
Falmouth, MA	2006 - 2007	9,100	2	1
Gloucester, MA	1987 - Present	230,000	15	12
Hamden, CT	2003 - Present	5,000	1	2
Lancaster Sewer District	2003 - Present	10,000	4	3
Ledyard, CT	2001 - Present	2,000	3	3
Littleton, MA	2007 - Present	2,300	0	1
Marlborough, CT	2004 - Present	25,000	3	4
MDC - W. Boylston/Holden	1995 - Present	423,300	25	12
Melrose, MA (1)	1997 - Present	9,000	1	1
Middleborough, MA	2002 - Present	10,000	0	1
Monroe, MA	1998 - Present	13,000	4	1
Nashoba Valley Tech H.S.	2003 - Present	6,100	0	1
Newburyport, MA	1999 - 2005	8,500	2	2

Municipality/Agency	Dates	Pipe (Feet)	No. of Pump Stations	No. of Const. Contracts
Newport, RI	2008 - Present	2,500	0	1
Newton, MA	1999 - 2003	88,000	0	1
North Reading, MA	2007	2,500	0	1
Quincy, MA	1995 - Present	24,500	1	3
Rockport, MA	2001 - 2003	6,300	1	1
Salisbury, MA	1996 - Present	48,000	6	5
Saugus, MA	2006 - Present	N/A	3	2
Scituate, MA	2001 - Present	70,000	5	2
South Windsor, CT	2004 - Present	N/A	8	2
Southbridge, MA	2008	4,000	2	1
Stockbridge, MA	2000 - Present	30,000	2	1
Stoughton, MA	1983 - Present	64,800	6	6
Stratford, CT	2004 - Present	N/A	3	1
Warwick, RI	1995 - Present	138,000	5	4
Waterbury (2)	2005 - Present	N/A	18	0
Webster	2007 - Present	21,500	2	1
Wellesley, MA	2003 - 2004	N/A	3	2
Westborough, MA	1998 - Present	N/A	1	1
Weymouth, MA (1)	1997 - Present	1,000	8	5
Wilbraham, MA	2006 - Present	27,700	2	1
Winthrop, MA	1998 - Present	N/A	4	1
York, ME	2001 - Present	22,000	0	2

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Relevant Experience

- Scituate
- Westford
- Bourne
- Chatham
- Monroe
- Chelmsford
- ***Falmouth***
- Gloucester
- ***Harvard***
- Newburyport
- Schodack Landing NY
- Rockport
- South Kingstown RI
- Sudbury
- Yarmouth
- Duxbury

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Project Goals

- Preliminary Engineering/Detailed Cost Analysis
  - Determine Most Cost Effective Way to Address Wastewater Management Needs
- Develop/Refine Centralized System from CWMP
- Develop Alternative System
  - Septic Tank Effluent (STE) Concepts
  - Cluster or Satellite Facilities
- Develop Comprehensive Cost Estimates to Move Plan Forward
  - Independent Professional Cost Estimator

Current Understanding

- Conceptual Design
  - Centralized Collection System
  - 66 Pump Stations
- Independent Review Performed
- Preliminary Research/Contacts
  - Authors of the CWMP
  - Pertinent Vendors

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TOWN OF ORLEANS
MASSACHUSETTS
WASTEWATER
MANAGEMENT
PLAN OPTIONS
323
Nauset
Harbor
Town
Cove
Atlantic
Ocean
322
321
241
112
111
BREWSTER
121
163
181
172
173
Pleasant Bay
N
2,000
0
2,000
Scale In Feet

Project Approach

- Complete Tasks 1 through 8 of RFQ
- Initial Public Presentation
- Preliminary Engineering Design
- Comprehensive Cost Estimates
- Letter Report
- Public Presentations at Project Milestones

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Kick-Off Meeting

- Establish Primary Lines of Communication
- Confirm Goals & Expectations of the Project
- Compile/Review Existing Information
- Identify Key Issues

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Key Issues

- Defined System Layouts
- Clear Basis of Cost Estimates
- Transparent Cost Evaluation
- ‘Apples to Apples’ Comparisons
  - TMDL Equivalence
  - Cost Analysis of Entire Systems (including Private Property)

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Preliminary Engineering Design

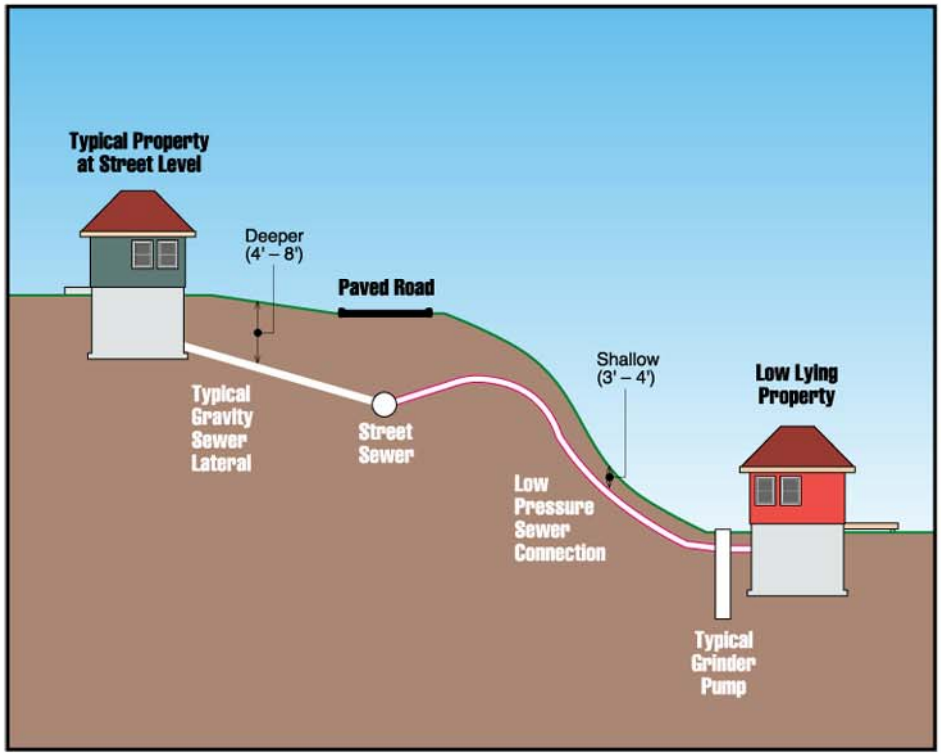
- Centralized Sewer System
  - Gravity with Pump Stations – Based on CWMP Layout
  - Hybrid System – Including Grinder Pumps and Low-Pressure Sewers
- Alternative System
  - STE Concepts
  - Cluster/Satellite Facilities, if and where appropriate

Hybrid System

- Enhancement of CWMP Recommended (Conventional) Design
- Maximize Gravity where Cost Effective
- Low-Pressure where Topography Warrants
- Reduce Capital Construction Costs

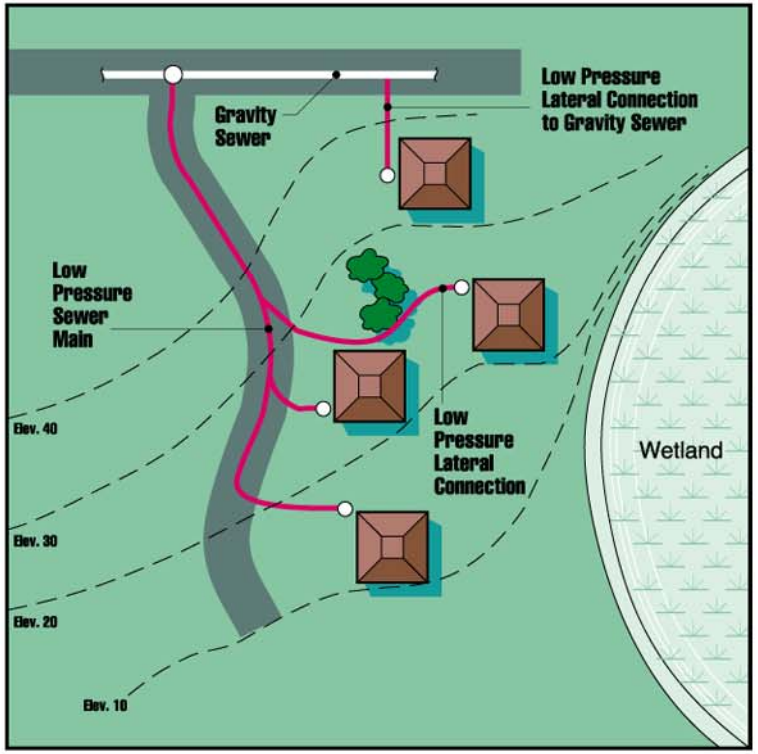
Circumstances that require the use of residential grinder pump units and/or low pressure sewers

1 Grinder pump and low pressure service connection to gravity sewer main



Required where properties are at elevations significantly lower than that of the street surface.

2 Low Pressure Sewer System



Required for roadways that fall off significantly in elevation.

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Septic Tank Effluent System

- Decentralized vs. Centralized
- Effluent Pumping (STEP) or Gravity (STEG) System
- Coordination with STEP Equipment Vendors
- Condition of Existing Septic Tanks
- O&M Responsibilities
  - Tank Pumping
  - SRF Eligibility

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Approach to Preliminary Engineering Design

- Base Map Preparation
- Field Reconnaissance
- Generate Selected Street Profiles
- System Layouts
- Conceptual Treatment Plant Design
- Design Memorandum on Final Proposed Layouts

Wastewater Treatment Facilities

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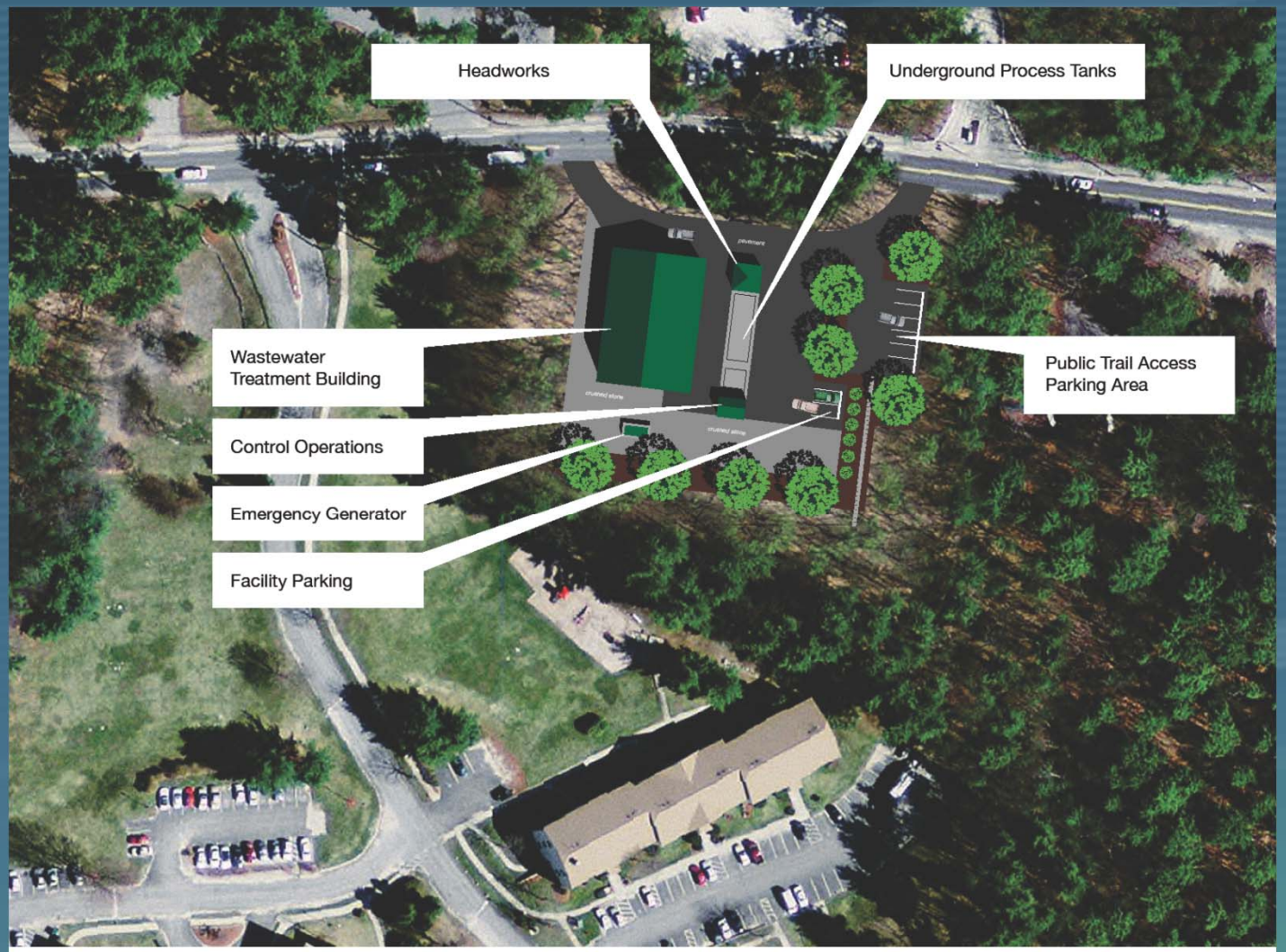
Decentralized Wastewater Treatment



DECENTRALIZED WASTEWATER TREATMENT FACILITY — CONCEPTUAL SITE PLAN

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Cost Estimates

- Develop Useful and Appropriate Cost Information
- Construction Costs
  - Extensive Design & Construction Estimates
  - Data From Publicly Bid Projects
  - Weston & Sampson CMR (Construction Bidding)
  - Professional Estimating - A.M. Fogarty
- Operation & Maintenance Costs
  - Weston & Sampson Services O&M
- Life Cycle Costs (Present Worth Analysis)
- Consider All Costs (Public & Private)

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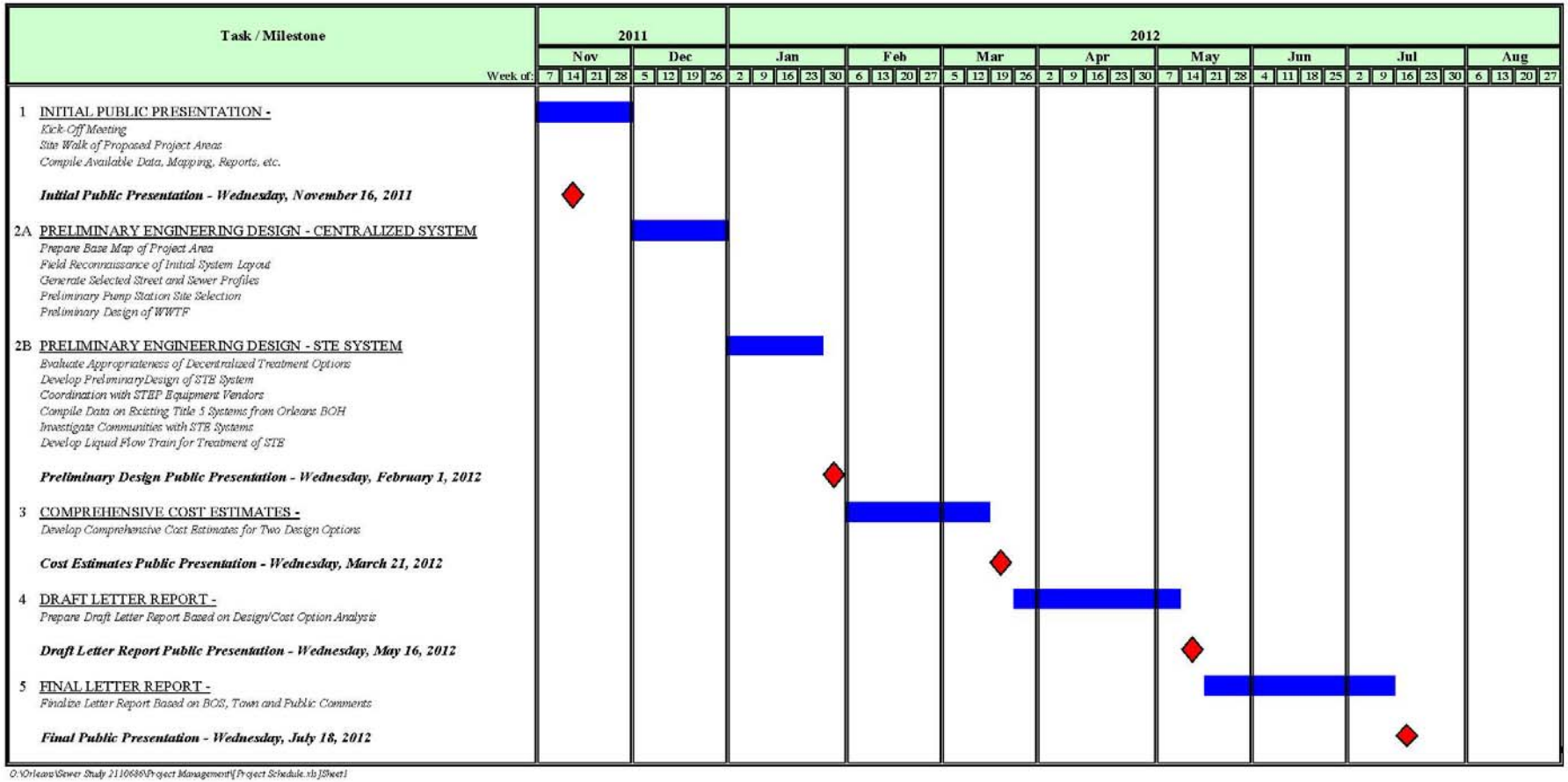
TECHNICAL REVIEW & COST ANALYSIS OF CWMP OPTIONS
TOWN OF ORLEANS, MASSACHUSETTS

PROPOSED PROJECT SCHEDULE



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Results for the Town

- Support the Public Decision Making Process
- Provide Answers to Key Questions
- Emphasize Public Understanding of Issues

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Questions & Discussion