

Falmouth Case Study

Traditional Engineering Solutions Become the Cornerstone of Adaptive Management Strategy

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Outline

- Background and history
- Little Pond Service Area Improvements Project
- Grinder pump solutions / processes
- Next steps



Setting

- Falmouth is located in southwest Massachusetts on Cape Cod
- Coastline along Buzzards Bay, Vineyard Sound and Nantucket Sound
- The Town contains 15 coastal embayments / watersheds



CWMP challenges and strategy

Town Challenges

- Scale of nutrient problem
- Cost of sewerage solution
- Interest in alternative / non-traditional solutions

Town Strategy

- Move forward with sewers in one of most impacted watersheds
- Simultaneously pilot and gather data on alternative strategies
- Incorporate results into adaptive management solution for all watersheds

Alternative nutrient management solutions

Water Quality Management Committee – Leadership Role in piloting, collecting data and evaluating these strategies

- Shellfish aquaculture
- Fertilizer management
- Inlet widening
- Permeable reactive barriers
- Improved stormwater management
- Eco-Toilets
- Enhanced I/A systems for non-sewered properties

Traditional nutrient management solutions



Little Pond watershed

- One of the most nitrogen-impaired estuaries in Falmouth
- One of the most densely developed parts of Town that was not already sewerred
- A part of Falmouth that the Town has been talking about sewerred “next” for > 30 years



Character

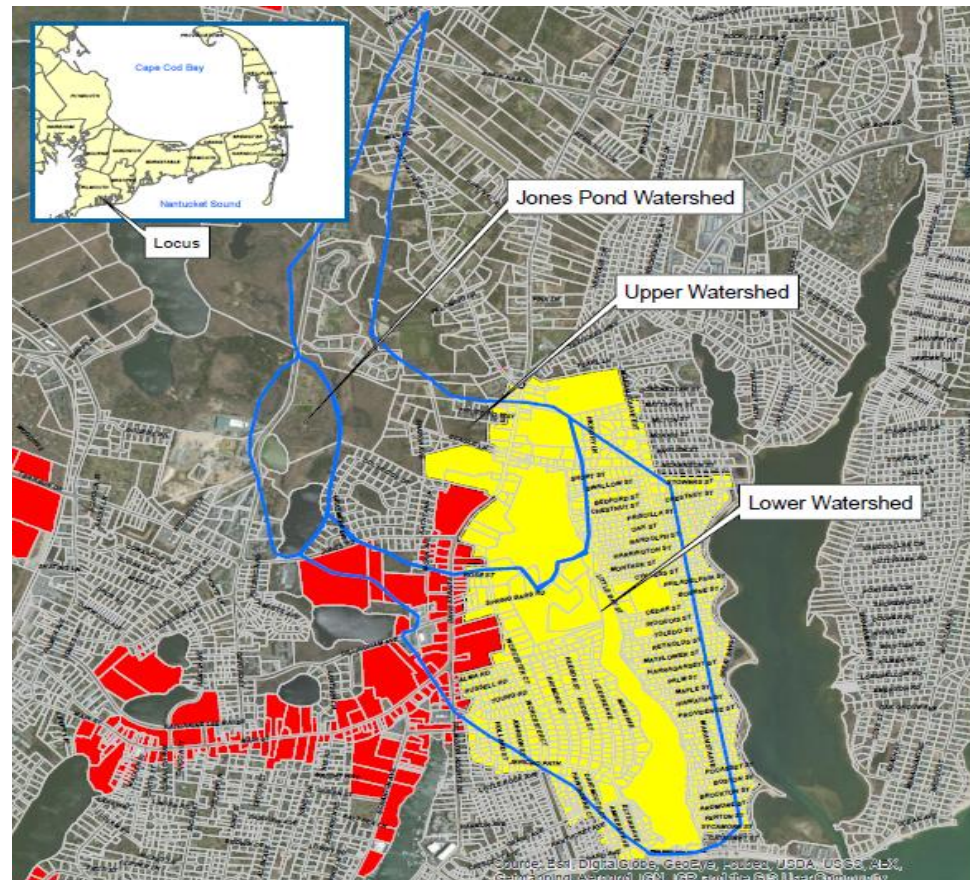
- Little Pond watershed is a residential community
- Seasonal residences
- Hotels and commercial establishments



Little Pond watershed and sewer area

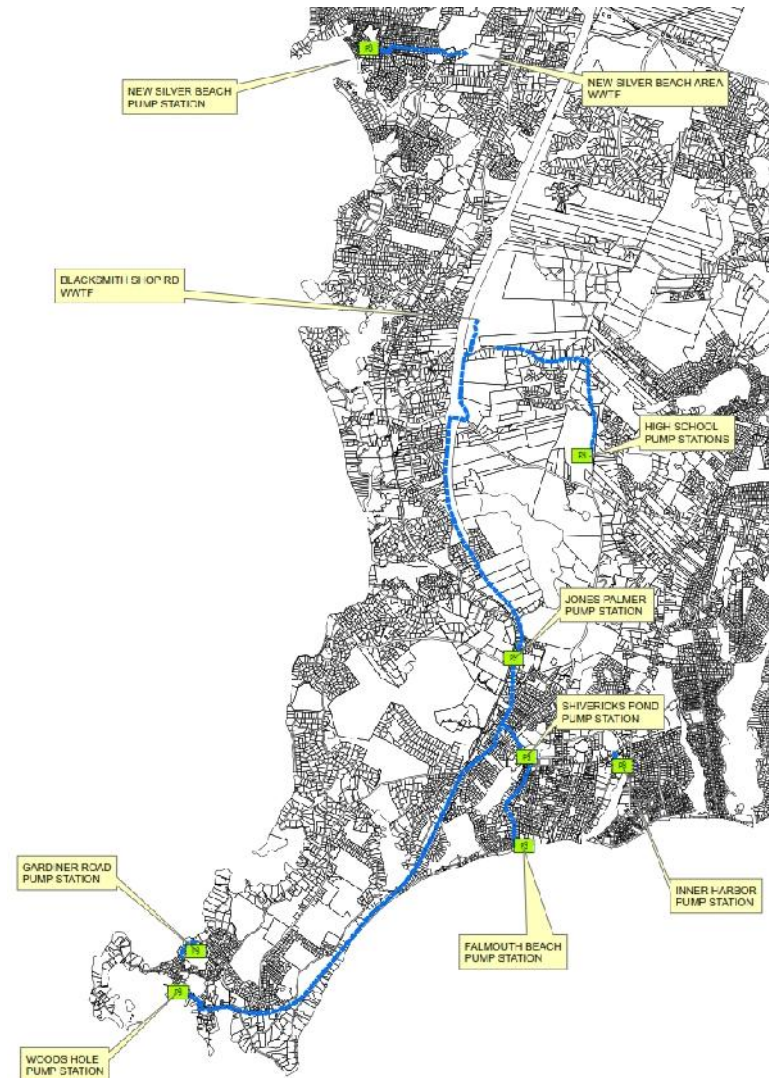
Sewer area delineation determined by:

- Watershed boundaries
- Logic of existing street layouts



Pre-Existing collection and treatment system

- Centralized wastewater system
- Seven miles gravity collection pipe
- Eight municipal lift stations
- Nine miles of force main
- Main WWTF
- Service Area
 - Woods Hole
 - Main Street
 - Falmouth Beach
 - Davis Straits / Inner Harbor
- Satellite New Silver Beach system

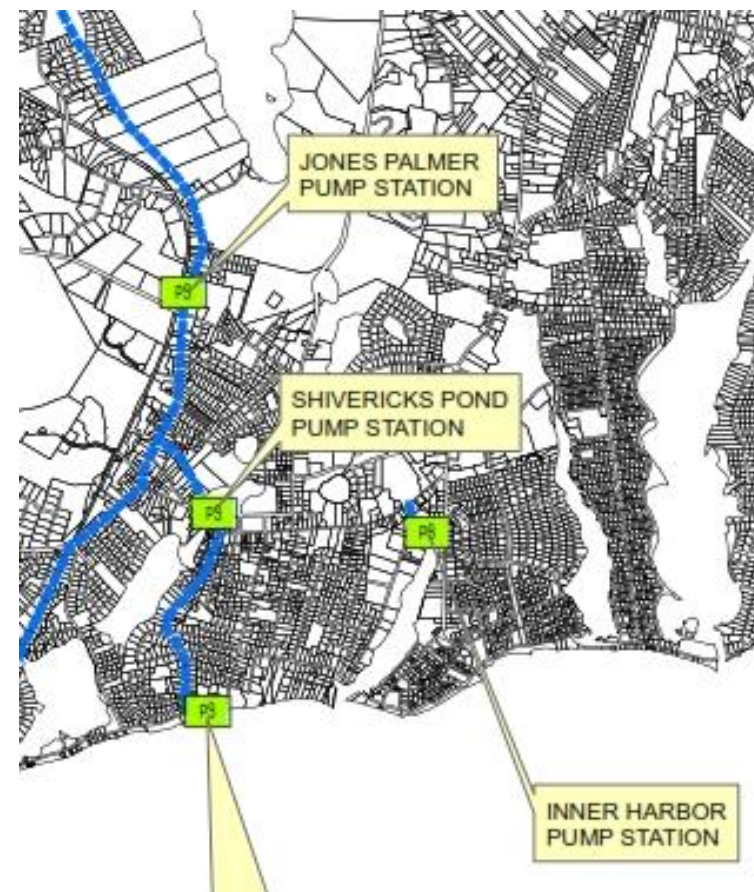


Impacts to existing system - piping

- Gravity system fed at two locations
- Force mains used to convey additional wastewater to WWTF
- Hydraulic analysis - no modifications required to existing piping systems

Impacts to existing system – lift stations

- Three lift stations impacted
- Mechanical and electrical rehabilitations



Inner Harbor lift station



Shivericks Pond lift station



Jones-Palmer lift station



Wastewater treatment facility



Recharge beds 14 and 15



New collection system alternatives

- Traditional gravity sewers with lift stations
- Pressure sewers with grinder pumps
- Septic tank effluent sewers
- Septic Tank Effluent Pump (STEP) System
- Septic Tank Effluent Gravity (STEG) System
- Vacuum sewers
- Combination of technologies



Selected: Combination of Gravity Sewers, Lift Stations, and Low Pressure Sewers with Grinder Pumps

Little Pond collection system



Little Pond collection system



Little Pond collection system

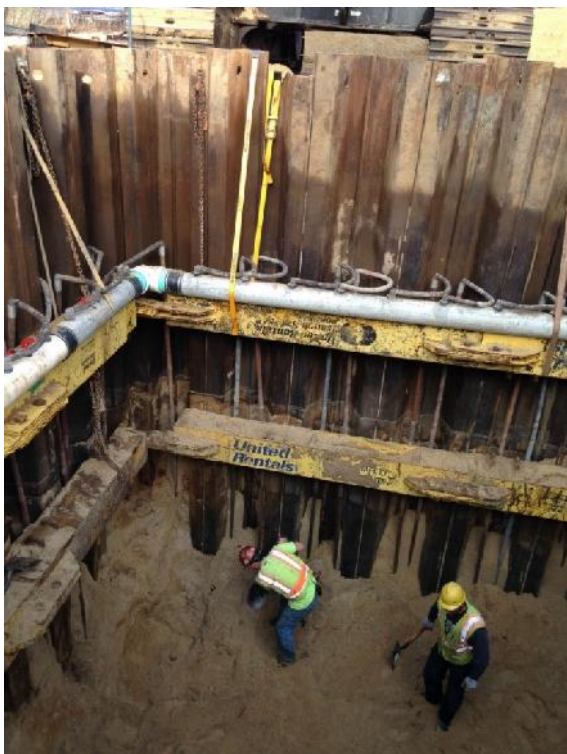
- Two new lift stations
- On-site packaged grinder pump stations with low pressure system for low areas
- Gravity flow where new lift stations and original system can accommodate



Little Pond collection system and associated improvements



Little Pond collection system and associated improvements



Little Pond collection system and associated improvements

- 16 miles of underground piping
 - Gravity sewers
 - Force main
 - Low pressure sewers
- Two new submersible lift stations
- 700 package grinder pump stations
- Improved roads
- Selected stormwater improvements



Financing

- State Revolving Fund Loans - Zero % interest
- 30% Town borrowing - Replacing existing debt
- 70% Betterments - Assessed of property owners



Project construction costs – SRF loans

- Little Pond Service Area Improvements - \$32.9
 - Linear work and two new lift stations
 - Recharge beds 14 and 15
 - Existing lift station improvements
- WWTF improvements - \$4.4 million



Property owner costs

- Betterment
- Connection costs
- Septic system abandonment costs
- Sewer rate after connection



Grinder pump procurement process

- Town issued Request for Bids for procurement of package grinder pump stations
 - Economy of scale with purchase of 700+ units
 - Consistency within system
 - All package stations meet Town's quality and performance standards
 - 5 year Warranty required
- E-One provided winning bid



Grinder Pump ownership and management options

- Property Owner Responsible Purchases and Maintains
- Town Purchases and Maintains
- Town Purchases and Owner Maintains
- Owner Purchases and Town Maintains

Board of selectmen grinder pump policy summary – single family residential

- Town will purchase pumps and transfer ownership to property owners
- Town will provide a one-time partial reimbursement for grinder pump installation cost (value to be determined),
- Town will provide for maintenance of the pumps.
 - 5 year warranty service through Manufacturer's Representative.
 - Contract for maintenance afterwards
 - Maintenance required due to improper use/abuse of pump unit will be charged back to the property owner.
- Town will provide emergency pump-out service during temporary power outage
- Town will replace the pumps (if no evidence of abuse/improper use) when they reach the end of their useful service life.

Little Pond service area improvements status

- Construction Award May of 2015
- Falmouth Heights Sewer Available June 2016
- Remainder of Sewers Available April 2017
- Final Completion Summer 2017
- Of about 1400 service area parcels:
 - About 380 sewer connection permits approved
 - About 286 sewer connections completed



Success factors

- Water Quality Management Committee - community involvement in planning
- Town Manager / Board of Selectmen - response to community input
- Public Works - public information during construction
- Cost and schedule control
- Concern for property owners during construction
- Installer training
- Permitting and inspection processes

Next steps

- Complete sewer connections by mid-2018
- Continue Implementation of Bourne Pond Inlet Widening
- Continue to monitor water quality to gage improvement over time
- Incorporate data from pilot projects and Little Pond Sewer System project into next phases of planning



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Questions?

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