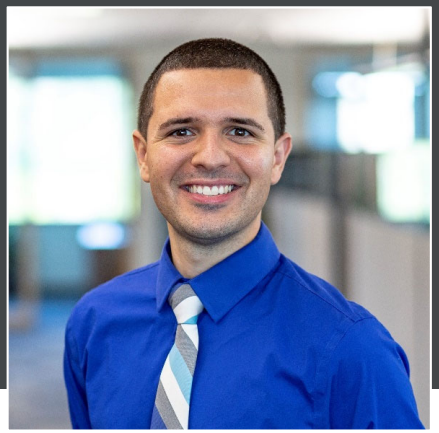
ADDRESSING A GROWING FOG ISSUE

Designing Treatment Improvements to Address Residential FOG Issues in the City of Gloucester, Massachusetts

ENVIRONMENTAL PARTNERS

SPEAKERS



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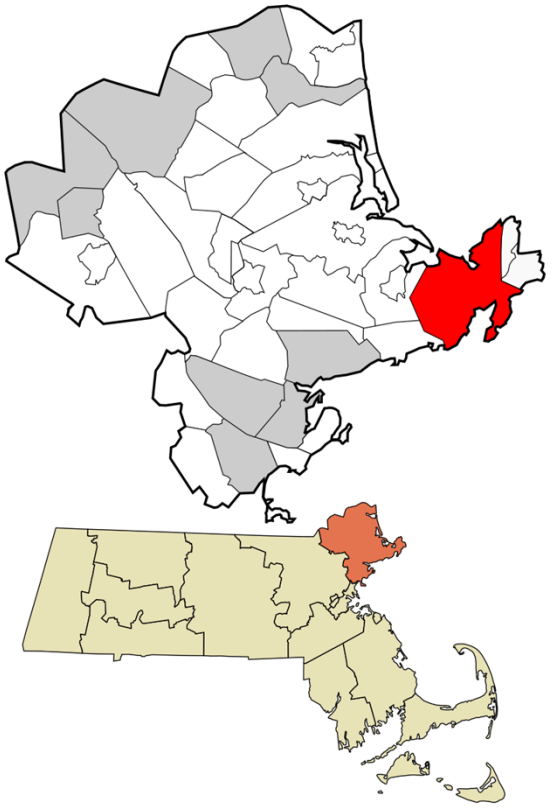
PRESENTATION OVERVIEW

- Background & Project Area
- Overview of FOG
- Preliminary Design Considerations
- Pilot Testing
- Final Design & Permitting Considerations
- Construction & Startup Schedule
- FOG System Start-Up
- Conclusion & Findings

BACKGROUND & PROJECT AREA

- City of Gloucester's sewer collection system consists of WPCF, 29 sewer pumping stations, and combination of gravity/pressure sewer piping
  - 30,430 residents (2019 Census)
  - Operated / maintained by Veolia North America
- Project area focused on three small sewer pump stations:
  - Finch Lane Pump Station
  - Corliss Avenue Pump Station
  - Thurston Point Road Pump Station
- ADF generally less than 100 gpm (mostly residential flow)



FOG ISSUES

- City implemented aggressive FOG program in 2012 for industrial / commercial users
- Included comprehensive educational program for residential users
- Despite efforts, City is plagued with FOG related issues that require frequent maintenance visits
  - Clean pump floats
  - Break-up FOG mats
  - Vactor out wet well
- Three pump stations in particular (Finch, Corliss, Thurston) particularly susceptible to high levels of FOG

PUMP STATION LOCATIONS

FOG: FATS, OILS & GREASE

- Includes animal fat, vegetable fat and oil used to cook and prepare food
- FOG causes blockages as it coagulates, which can result in SSO events that pollute the environment and damage properties
- EPA reports that FOG is leading cause (47%) of blockages leading to SSO events

PRELIMINARY DESIGN CONSIDERATIONS

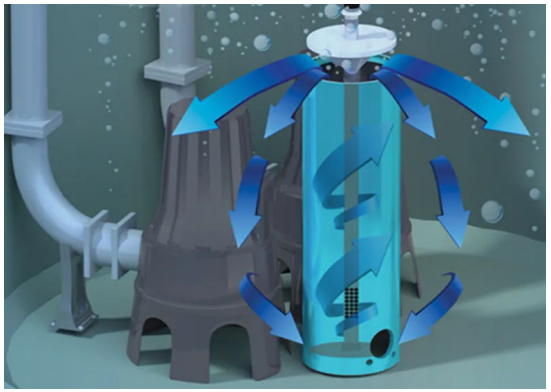
- EP retained by City of Gloucester to design, permit and oversee construction of FOG improvements at three City-owned pump stations (Finch, Corliss, Thurston)
- EP reviewed three FOG mitigation alternatives for pump stations:
  - Aeration Systems
    - Mixing and Mixing/Aeration
  - Biological Systems
  - Mechanical Systems
    - Grinder Pumps
    - Mix Flush Valves

FOG MITIGATION TECHNOLOGIES SUMMARY TABLE

Category	Improvements	Advantages	Disadvantages
Aeration	Pulsair Mixer (Aeration)	• Control of mixing speed and frequency • Minimal maintenance	• Highest capital cost • External enclosure • Sound mitigation
	Titus Twister (Aeration)	• Combination of mixing and aeration • Promotes aerobic conditions for treatment	• External enclosure • More maintenance within wet well • Space requirements / controls in wet well
Biological	MicroBlock (Biological)	• Lowest cost • No external enclosure needed	• Potentially limited efficacy
Mechanical	Anue Grinder Pump (Mechanical)	• High level of mixing • Cheaper than aeration	• External panel • More maintenance within wet well • Space requirements / controls in wet well
	Mix Flush Valves (Mechanical)	• Low cost • Can include on new pumps or retrofit existing pumps (Finch PS only) • No external enclosure or wiring needed	• Only Finch PS can be retrofitted with mix flush valves • No biological or aerobic treatment • Limited benefit due to infrequent pump starts

PROPOSED SELECTION: TITUS TWISTER

- Titus Twister selected based on ability to mechanically combat FOG (no chemicals needed)
- Combination of mixing and aeration to promote aerobic conditions for treatment
- No impacts to pump operations or wet well size
- Pilot testing performed at Finch Lane PS in October 2019 to verify performance prior to full-scale install



OCTOBER 2019 PILOT TESTING

OCTOBER 2019 PILOT TESTING

FINAL DESIGN & PERMITTING CONSIDERATIONS

- EP used Titus Twister as Basis of Design for proposed FOG improvements at Finch, Corliss, and Thurston pump stations
- Project also included new mechanical, structural, electrical and instrumentation upgrades to each station
  - Replacement of aging equipment (>30 yr old)
  - Standardization of I&C controls
  - Work within existing site constraints (tight footprint)
  - Adjacent to nearby residential areas (odor concerns)
- Permitting for Project:
  - RDA – City of Gloucester Wetland Protection Regulations
  - CWSRF – Construction Stage Loan Application

CONSTRUCTION & STARTUP SCHEDULE

- Project issued for bid in March 2020
- Awarded to N. Granese & Sons in April 2020
- Construction began in June 2020
- FOG Equipment started up in March 2021
- Substantially Completed in March 2021
- Final Completion projected to be completed by June 2021

FOG SYSTEM START-UP

FOG SYSTEM START-UP

CONCLUSION & FINDINGS

- Treatment is only part of the solution; goal to eliminate FOG at the source
- FOG equipment mechanically breaks up and aerates FOG within wet well before being pumped downstream toward WPCF
- Reduced maintenance needed at pump stations, but not 100% eliminated
- Does not eliminate inorganic materials (i.e., rags, wipes) that are typically more buoyant than FOG

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  - Patrick Cusick, Pump Station Project Manager
- N. Granese & Sons
  - Steven Granese, President
  - Bryan Granese, Project Manager
- MassDEP
  - Kelly Taylor, SRF Project Engineer

Q&A

THANK YOU

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