

City of Haverhill



Department of Public Works Wastewater Division

City Council Meeting
February 2, 2016



Assessment and Control of Odors at the Haverhill Wastewater Treatment Plant

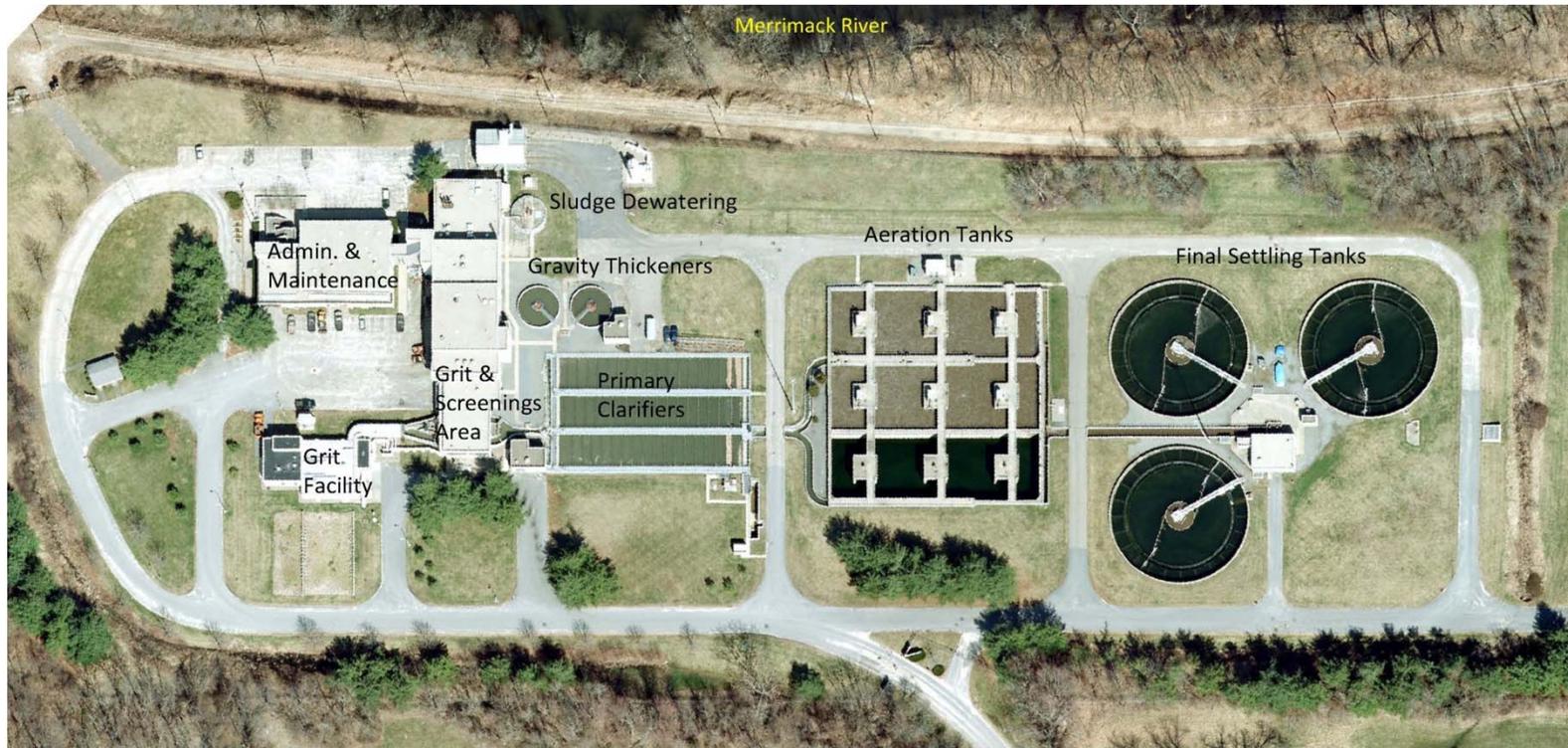
Woodard & Curran, Inc.
Bowker & Associates, Inc.

Tonight

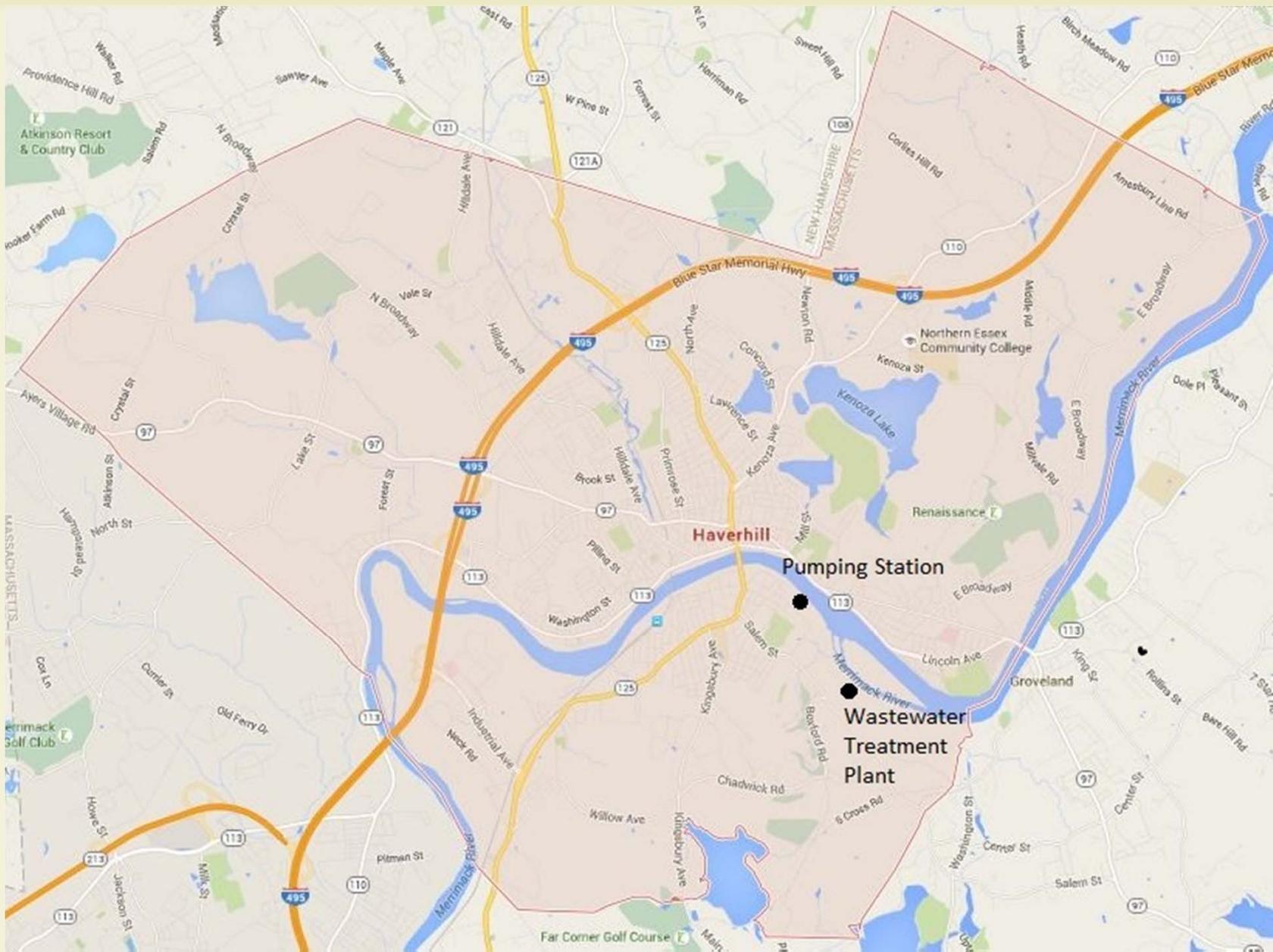


- Odor control study
- Recommended Odor Control Program
- Loan Order for \$2.2 million for Phase I

Background



- Built in 1970's
- Little to no odor control



Current Odor Control



--- Areas with odor control

Odor Study



1. Sampling program
2. Computer modeling
3. Evaluation of odor control strategies
4. Recommendations for odor control systems

Study - Sampling Program



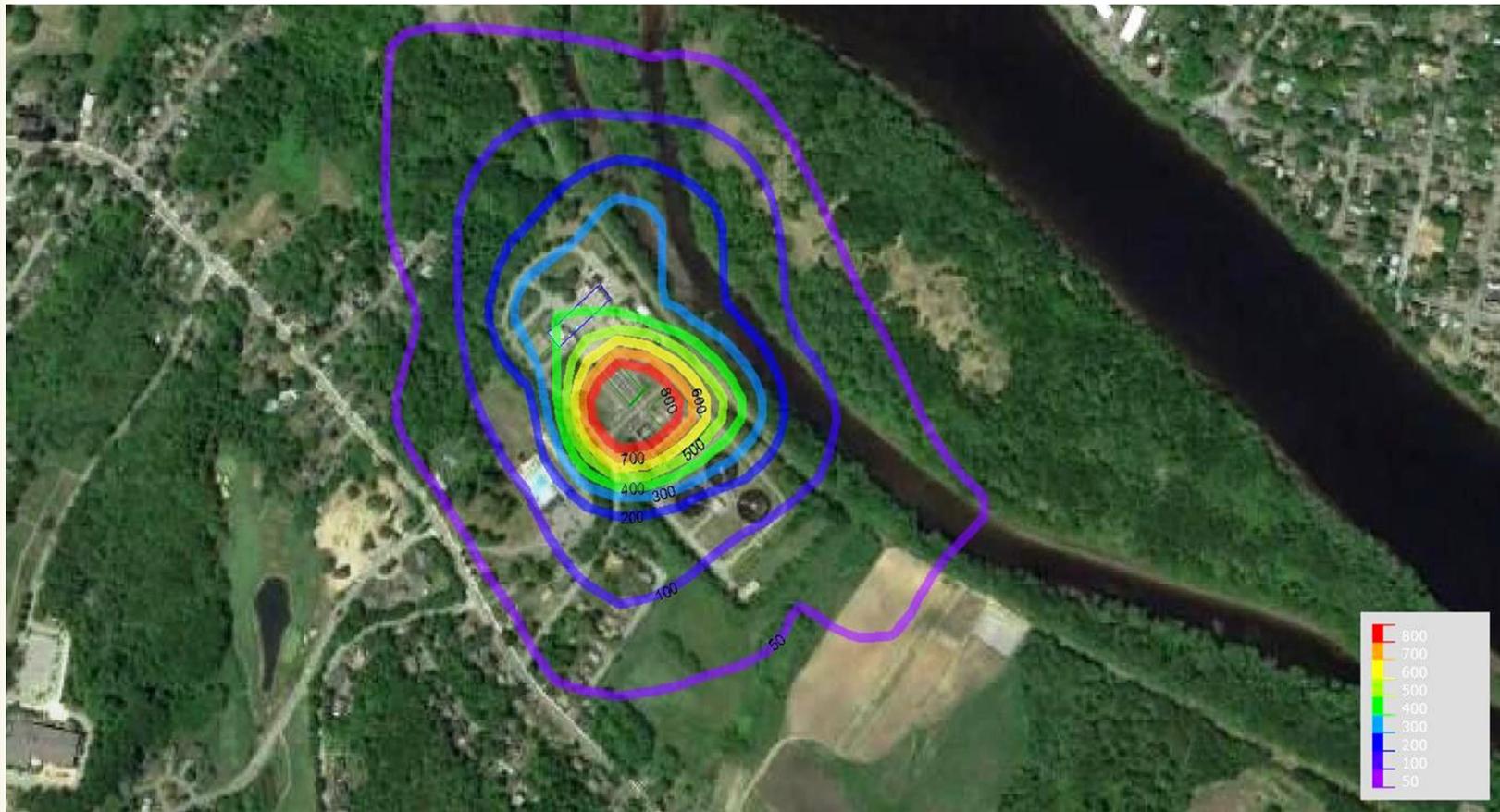
- Characterize and quantify odorous emissions
- 15 locations
- Samples and Continuous monitoring
- Measured strength of odor, concentration of odorous reduced sulfur compounds and hydrogen sulfide

Study - Odor Dispersion Modeling



- Predicts odor impact on surrounding neighborhoods
- Uses meteorological data and terrain data to predict worst case conditions
- Assess the effect of odor control strategies
- Target – 7 dilutions to threshold (D/T)

Modeling Results



Predicted frequency of odor level exceeding target threshold (hrs/yr)
With proposed Phase II odor control program

Modeling Conclusions



- **Odors in adjacent neighborhoods**
- **Terrain around the plant does not allow for good dispersion of the odors**
- **Even with comprehensive odor control measures, off-site odors may still be occasionally detectable under worst case meteorological conditions**
- **Controlling the main odor sources will reduce predicted odor detection frequency by approximately 80 percent**
- **The modeling did not show a significant benefit of fully covering the primary clarifiers vs. only the effluent channel.**
- **The Main Pumping Station is predicted to have a moderate impact on the adjacent area**

Study - Proposed Areas for Odor Control



----- Recommended areas for odor control
Controlling these areas – 80% reduction

Evaluation of Odor Control Strategies



- Evaluated control strategies by odor source
- Existing biofilter is very effective
 - low cost and low maintenance
- Majority of cost is in the heating and ventilating equipment and covers.

Odor Study Recommendations



- Construct a central biofilter to treat odorous air from the screen room, grit room, primary clarifier influent and effluent channels, and sludge holding/dewatering processes.
- Install covers on the influent channel, the influent and effluent channels of the primary clarifiers and on the two gravity thickeners.
- Extract air from below the covers at approximately 1 cfm per square foot of covered surface area.
- Install new exhaust fans in screen room and grit room and exhaust to central biofilter at 12 air changes per hour (13,500 cfm).
- Extract approximately 1,600 cfm from the primary influent channels and 2,400 cfm from the primary effluent channels and convey to biofilter.
- Extract approximately 1,500 cfm from each gravity thickeners and convey to biofilter.
- Extract approximately 500 cfm from the existing sludge holding tank and 700 cfm from the centrate sump and cake conveyors, and direct this air to the central biofilter treatment.
- Re-direct 5,300 cfm of air from the sludge cake garage to the central biofilter. Reuse existing activated carbon absorber at main pump station.
- Conduct follow-up sampling in the summer of 2016 to confirm design data for main pumping station, primary clarifiers, and process exhausts.

Odor Control Program – Two Phases



Phase I – 6 months

- Near Term Improvements
- Engineering for Long Term Improvements
- \$2.2 million

Phase II – 12 to 18 months

- Long Term
- Preliminary estimate - \$6.2 million
- 80% reduction in predicted odor detection frequency

Near Term – Phase I



- Chemical addition system for dewatering system
- Extending hypochlorite piping
- Cover the influent channel
- Improvements to the screenings and grit areas
- Evaluate chemical addition to pumping station

Long Term – Phase II



- Cover primary clarifier influent and effluent channels
- Cover gravity thickener tanks
- New ductwork to capture odors from sludge blend tank, centrifuges, sludge garage and centrate sump
- New central biofilter
- Carbon system for main pumping station

Reduces predicted odor detection frequency by 80%

Loan Order Tonight – Phase I



- \$2.2 million
- Funds Near Term improvements and engineering for long term improvements
- Funding for construction of Long Term measures will be a separate loan order

Future Phases ???



- Additional sampling and monitoring
- Included as part of Comprehensive Plant Evaluation
- Additional measures?



Questions