Department of Engineering
Town of Dedham
February 2019

Private Infiltration

History

- Inflow & Infiltration (I/I) Program started in FY2007

- In 2007:
  - Dedham's Flow Share = 1.77%
  - Dedham's Average Daily Flow = 5.2 MGD
  - FY07 MWRA Assessment = $4,681,204

- In 2018:
  - Dedham's Flow Share = 1.20%
  - Dedham's Average Daily Flow = 3.7 MGD
  - FY19 MWRA Assessment = $5,597,434

- Assuming a "No Change" in flow share scenario, it is estimated that the Town has cumulatively saved $11 million in MWRA assessments since 2007.

- Dedham's Average Daily Flow for the years from 2010 through 2017 is approximately 3.5 MGD.

- Dedham Sewer Use Rate has remained unchanged since FY2008.

Current I/I Data

- The MWRA shared data with Dedham for the calendar years 2010 through 2017.

- This data allowed the Town to determine from the Average Daily Flow of 3.5 MGD; the average sanitary flow, infiltration and inflow being sent to the MWRA for treatment over these 8 years:
  - Estimated Sanitary Flow = 1.8 MGD (52%)
  - **Estimated Infiltration = 1.3 MGD (37%)**
  - Estimated Inflow = 0.4 MGD (11%)

- In terms of our FY19 MWRA assessment of $5.6 M, the cost breakdown is:
  - Cost to transport & treat Sanitary Flow = $2.9 Million (52%)
  - **Cost to transport & treat Infiltration = $2.1 Million (37%)**
  - Cost to transport & treat Inflow = $0.6 Million (11%)

I/I Facts

- The money collected from our customers sewer bills is used to pay our annual MWRA assessments.

- More and more MWRA communities are starting to implement I/I programs.

- If Dedham does not remain aggressive in the continued reduction of I/I, our flow share will likely rise as will our assessment which in turn will be passed onto our customers through increased sewer rates.

- I/I is just not a public system issue, but is also a private system issue (i.e. sump pumps, leaking sewer laterals, driveway drains, downspouts, etc.)

I/I Facts (con't)

- As the previous cost breakdowns show in FY19 alone, our customers are paying $2.7 M to the MWRA to transport and treat our infiltration and inflow. This is clean water that should not be in our sanitary system and is not required to be treated by the MWRA's wastewater treatment plant.

- Of that $2.7 M, infiltration is our major problem accounting for $2.1 M (78%) of the total I/I.

- Based upon the most recent data, it costs rate payers $0.0044 to transport and treat 1 gallon of infiltration per day which equates to the cost to transport and treat 1 gallon of infiltration each day over the period of a year equal to $1.62.

- Since infiltration is more prominent throughout the year and makes up a significant portion of our assessment, its continued removal should be paramount in an attempt to control our future MWRA assessments.

Ongoing Public Infiltration Removal

- The Town of Dedham has approximately 98 miles of public sewer mains and 2,600 manholes. We TV-inspect all of our mains and manually inspect all of our manholes over a 5 year period during the wet season when groundwater levels are high to locate the mains and manholes in our public system that have infiltration issues.

- Since 2007, we have installed liners in approximately 34 miles (35%) of our public sewer mains and grouted & cementitiously lined approximately 1,070 (41%) of our public manholes . We started with the mains and manholes that had the highest infiltration rates.

Ongoing Public Infiltration Removal

- Dedham continues to work on the backlog of our public sewer mains and manholes that have been determined to have infiltration from our yearly TV and manual inspection program. Each year with available funding, we select the public sewer mains and manholes with the highest infiltration rates and install liners or grout & cementitiously line them to remove the infiltration entering our system.

- Over the past 12 years the Engineering Dept. has achieved a fairly good understanding of the infiltration problems that exist within our public sewer system. Knowing that infiltration is a also a private problem as much as a public problem, now is a great time to start getting a better understanding of the infiltration problems associated with the private system.

Private Infiltration Assessment

- As part of our 2018 on-call sewer contract, we carried an item in the contract to complete up to 125 private sewer lateral inspections. Inspections would be conducted starting at our sewer main to a distance of 100 feet or to within 10 feet of the foundation, which ever came first.

- The private sewer lateral inspections were performed in conjunction with our annual wet weather TV inspections of our public sewer mains when groundwater is at its highest.

- For the sewer sub-areas that were TV-inspected in 2018, we estimated that we would go by at least 1,600 private sewer connections. As we were inspecting our public sewer mains, we would flag any of private sewer connections that were discharging flow into the system that appeared to be infiltration related.

- Once a days worth of TV inspections of the private sewer connections were flagged, the contractor spent a day to just perform TV inspections of the flagged sewer connections.

Private Infiltration Assessment (con't)

- The TV inspections for the private sewer connections follows a similar method as to how we inspect our public sewer mains. A camera is sent up the private service connection from the public main on a motorized tracked camera system. The camera records and notes any infiltration observed within the connection and the amount of infiltration observed.

- Since the work is being performed from our public sewer mains, the TV inspections of the private sewer connections can be accomplished without inconveniencing the property owners by needing them to stop using their using their water or entering their home for access.

- The major indicator of the presence of infiltration is a steady & constant flow of clear water. Typical wastewater indicators are inconsistent flow, cloudy appearance, suds, steam (from hot water) and/or contains actual waste.

Private Infiltration Results

- Of the approximate 1,600 private service connections we went by during our annual wet weather TV inspections of our public sewer mains, 113 service connections (7%) were flagged due to indications of infiltration.

Private Infiltration Results (con't)

- The contractor performed TV inspection of the 113 private service connections. The TV inspections were reviewed by our department and the following information was determined:
    - 62 were confirmed to have infiltration
    - 26 showed signs of infiltration during TV inspection, but due to defects or obstructions within the service the camera could not inspect the complete length of the service
    - 16 had no flow at the time of TV inspection. The original flow could have been misinterpreted as infiltration or the groundwater level could have dropped below the elevation of the connection removing the presence of infiltration.
    - 6 did not show clear evidence of infiltration within the lateral up to about 10' of the foundation, but possible infiltration could have been entering the service from the plumbing located below the house.
    - 3 were determined to not be infiltration but possible inflow from a sump pump.

Private Infiltration Results (con't)

- Of the 62 private services connections confirmed to have infiltration, the cumulative amount of infiltration observed was approximately 140,000 GPD. The flows per connection ranged from approximately 25 GPD to 15,210 GPD with an overall average of about 2,250 GPD per connection.

- We inspect approximately 20% of the Town's entire public sewer system each year. Therefore, the 140,000 GPD of private infiltration observed came from approximately 20% of the private connections. If we were to extrapolate that out for the remaining 80% of the private connections, we could possibly have about 700,000 GPD of private infiltration. This amount of private infiltration would be costing the rate payers about $1.1 Million in MWRA assessments each year which is about 20% of our total assessment ($5.6 Million) for 2018.

Inspection showing minor infiltration = 0.5 GPM = **720 GPD**
Cost To Treat Per Year = 720 GPD * $1.62 = **$1,166**

Inspection showing major infiltration = 10.5 GPM = **15,120 GPD**
Cost To Treat Per Year = 15,120 GPD * $1.62 = **$24,494**

What's Next?

- We will continue to inspect private sewer connections over the next two years of our existing Sewer On-Call Service Contract to collect additional data during the wet weather months.

- We are starting to work with Town Counsel and our consultant, Weston & Sampson to develop a Private Infiltration Removal Policy.

- We have a Town-Wide Public Meeting set for April 1 at 7:00 PM at the Dedham Middle School to provide a recap of our I/I removal efforts since 2007 and also start the discussion of what goes into the development of a Private Infiltration Removal Policy.

- The meeting will allow us to start getting feedback on some of the parts of the policy that could directly impact the customers that are identified to have infiltration. The biggest question being who should pay for the removal?

What's Next? (con't)

- At the conclusion of the meeting, we will invite anyone in attendance to sign up for a future focus meeting where we will continue the discussion of the policy in greater detail to get final feedback to be analyzed and potentially incorporated into the policy.

- Come back to the BOS to present a draft of the Private Infiltration Removal Policy after collaboration with customers and residents at the public meeting and focus group. We will work with the BOS to get support for the policy to then be presented for approval at either the Spring or Fall Town Meeting in 2020.

- If approved at Town Meeting, we would hope to begin implementation of the policy in 2021 as part of or next Sewer On-Call Services Contract.

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Town of Dedham
January 2019

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