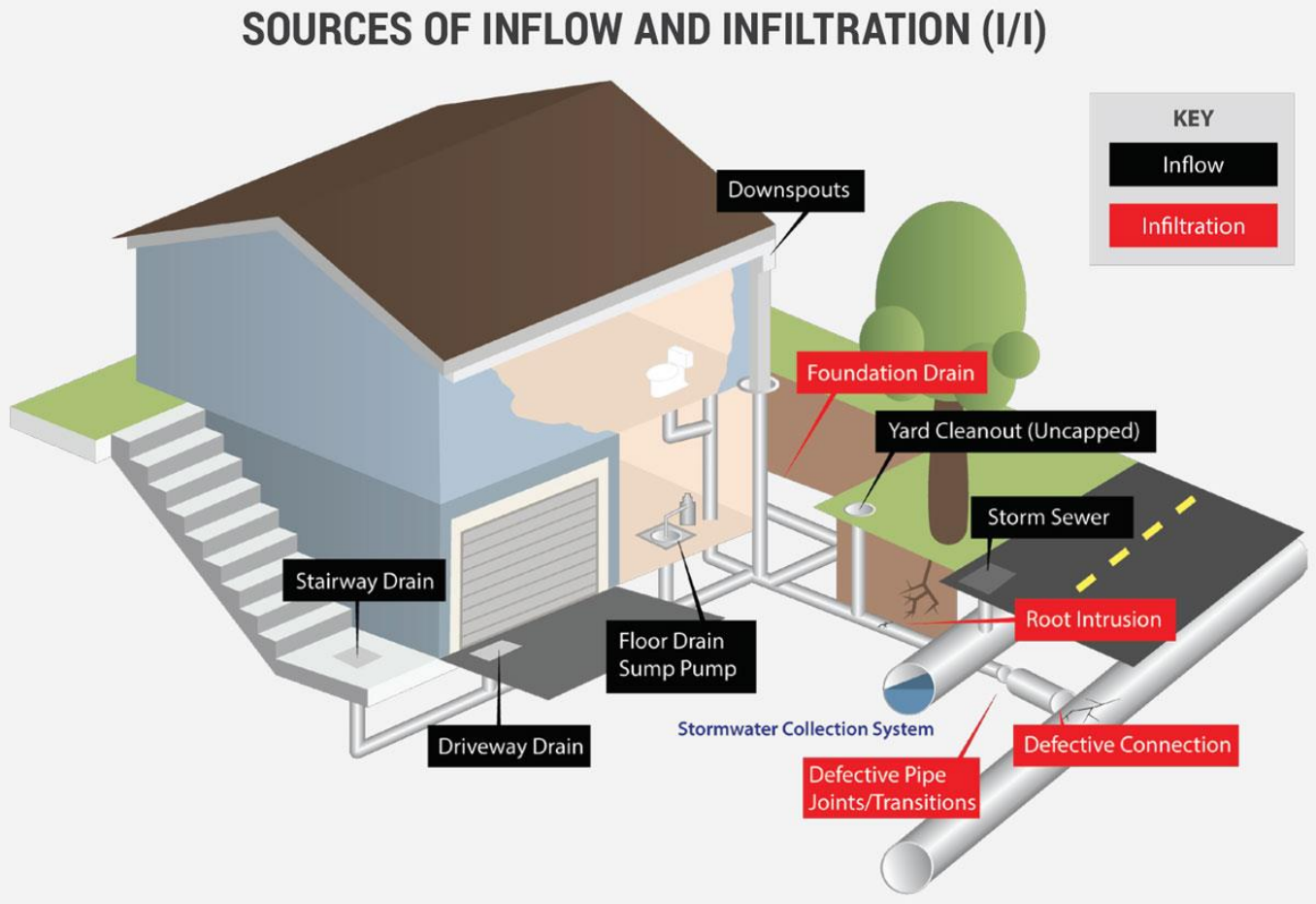
Department of Engineering
Town of Dedham
April 2019

Private Infiltration Removal Policy

WHAT IS INFLOW & INFILTRATION (I/I)??



INFLOW - Is rain water that enters the sewer pipes at points of direct connections to the system.

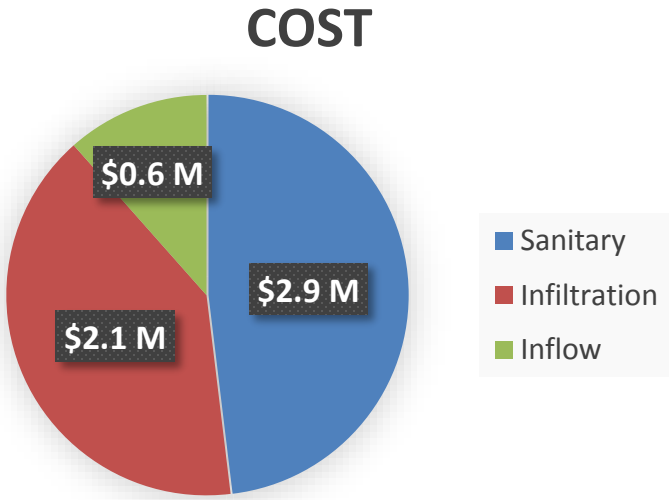
INFILTRATION - Is clean water from below the ground (groundwater) that enters sewer pipes through cracks.

DID YOU KNOW???

In the Town of Dedham, property owners own the operation and maintenance of their particular sewer services from their building all the way to and including its connection to the Town's sewer main.

HOW DOES I/I AFFECT ME??

- The biggest reason is …… **$$$$$$$**
- In FY2019, Dedham transported approx. 3.5 MGD of wastewater to the MWRA for treatment. This wastewater consisted of Sanitary flow, Infiltration and Inflow. Based upon the data collected by the MWRA the flow breakdown was estimated as:
  - Sanitary Flow = 1.8 MGD (52%)
  - **Infiltration = 1.3 MGD (37%)**
  - Inflow = 0.4 MGD (11%)
- Dedham's MWRA assessment for FY2019 was $5.6 Million. Using the flow breakdown from above we can clearly see how much it costs our customers to transport & treat I/I.
  - Sanitary Flow = $2.9 M (52%)
  - **Infiltration = $2.1 M (37%)**
  - Inflow = $0.6 M (11%)



WHAT HAS THE TOWN DONE TO REDUCE I/I ??

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

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

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

- 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.

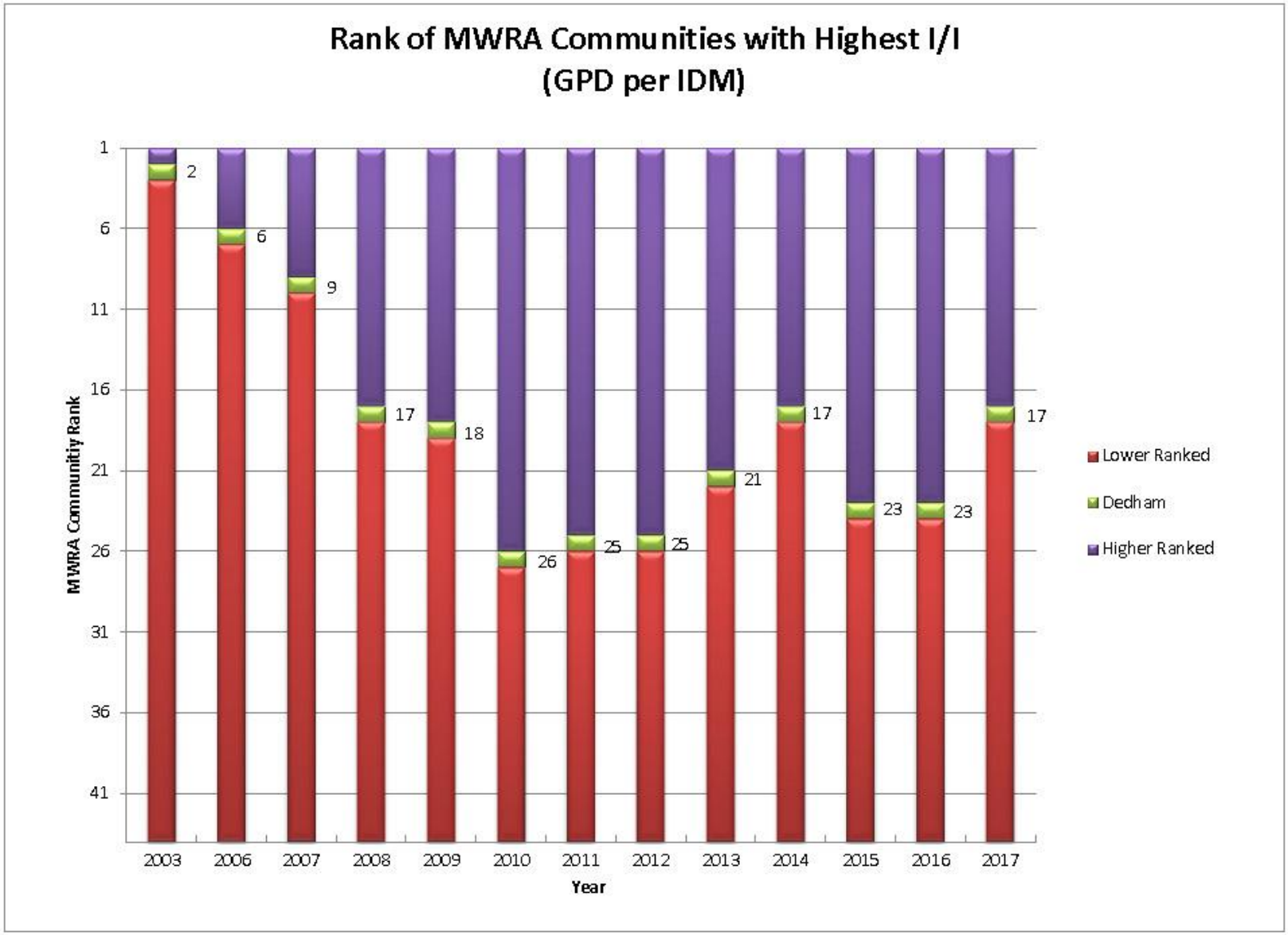
WHAT HAS THE TOWN DONE TO REDUCE I/I ??

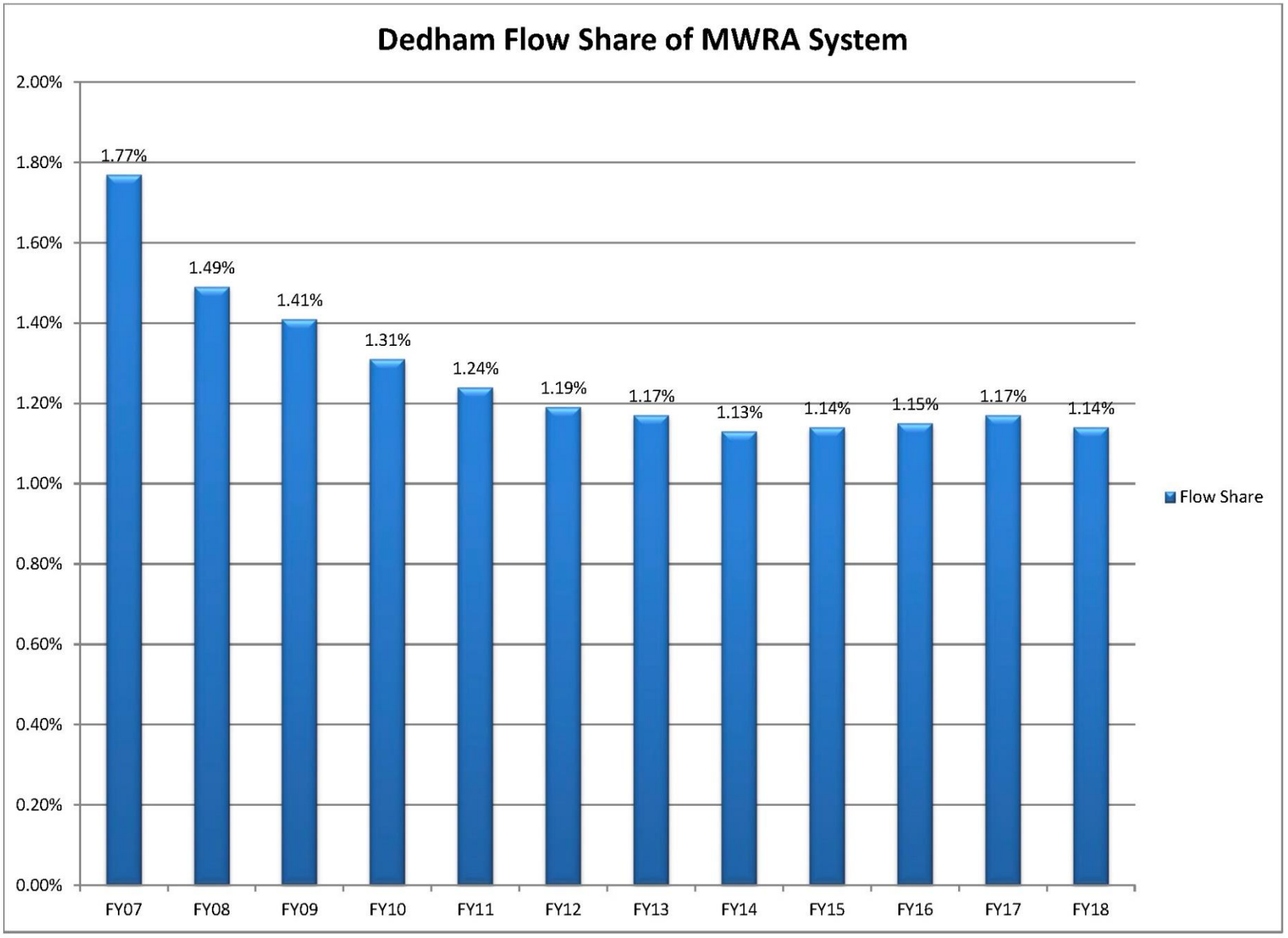
- Since 2007, we have removed approximately 700,000 MGD of peak infiltration and 1.2 MGD of peak design storm inflow for our public sewer system.

- 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.

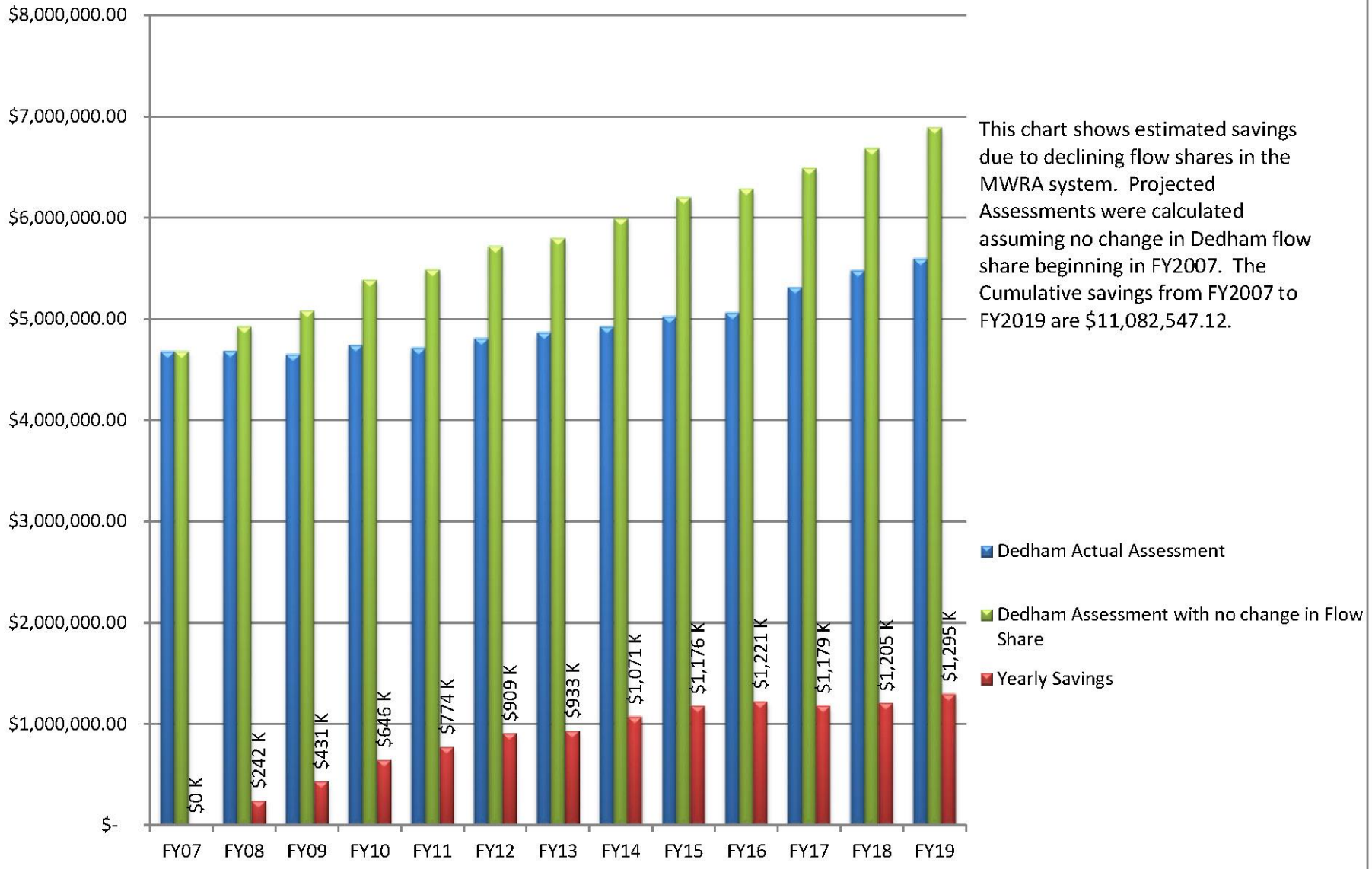
- Assuming a “No Change” in flow share scenario, it is estimated that the Town has cumulatively saved $11 million in MWRA assessments since 2007.

- **Dedham Sewer Use Rate has remained unchanged since FY2008.**


Rank of MWRA Communities with Highest I/I
(GPD per IDM)
MWRA Community Rank
1
6
11
16
21
26
31
36
41
2
6
9
17
18
26
25
25
21
17
23
23
17
2003
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Lower Ranked
Dedham
Higher Ranked


Dedham Flow Share of MWRA System
2.00%
1.80%
1.60%
1.40%
1.20%
1.00%
0.80%
0.60%
0.40%
0.20%
0.00%
1.77%
1.49%
1.41%
1.31%
1.24%
1.19%
1.17%
1.13%
1.14%
1.15%
1.17%
1.14%
FY07
FY08
FY09
FY10
FY11
FY12
FY13
FY14
FY15
FY16
FY17
FY18
Flow Share

MWRA Actual Assessment vs MWRA Projected Assessment with No Change in Flow Share



- 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.

- Infiltration in the sewer system is not only a public problem, but it is also a private problem.

- We must begin to collect data to get a better understanding how much infiltration is attributed to the private portion of the sewer system.

Private Infiltration Data Collection

- 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.
- 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 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.

- 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 of the private service connections were confirmed to have infiltration
    - 26 of the private service connections 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 to determine if the flow was actually infiltration.
    - 16 of the private service connections 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 of the private service connections 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 of the private services connections originally flagged for flow typical of infiltration were determined to not be infiltration but possible inflow from a sump pump.

Private Infiltration Results

- 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.

- Based upon the data supplied by the MWRA, it costs our sewer customers approximately $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 for a year equal to $1.62.

- The 140,000 GPD of infiltration observed from this current round of inspections of private sewer connections cost customers about $1.62 x 140,000 GPD = **$226,800** in FY2018 in MWRA assessments. The Town has about 8,000 customers, so that is roughly **$28** per customer for the year.

- The Town inspected approximately 20% of the entire Town's Public system in 2018. If we extrapolate the data for the remaining 80% of the Town, there is a potential that there are approximately 300 private sewer services contributing approximately 700,000 GPD of infiltration into the Town's sewer system costing customers about **$1,134,000** in FY2018 or about **$142** per customer for the year.

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 Goes Into A Private Infiltration Removal Policy?

- **Identification of Private Infiltration Sources -**
  - The Town will continue to inspect private sewer services on a yearly basis during our annual wet weather inspections of our public sewer mains. We will flag and then inspect any private sewer services that show indications of infiltration.
- **Notification of Infiltration Source** –
  - The Town will notify the property owner when their private sewer service has been identified as having infiltration.
- **Removal of the Infiltration Source** –
  - There are a couple of ways that infiltration can be removed from an existing sewer service. Some private sewer services may require a combination of both.

1. Cured-In-Place-Pipe

2. Dig & Replace

What Goes Into A Private Infiltration Removal Policy?

The first few components of the policy are pretty straight forward. These other components are more critical.

- **Who is responsible for paying for the removal of the infiltration from the private sewer service?**
  - Based upon the current version of the Town of Dedham Sewer Regulations, the property owner would be responsible for the entire cost of the removal.
- **Are there other ways that this could be paid for?**
  - The Town, through its Sewer Enterprise Account, could establish a reimbursement program that would enable a property owner to seek reimbursement from the Town upon successfully removing the infiltration from their service and an improved inspection by the Town. The reimbursement could be set anywhere from 1% to 100% or have a maximum cap value.
  - The Town, through its Sewer Enterprise Account, could pay for and do the work under its yearly rehabilitation contract.
  - Should the property owner be solely responsible financially to remove the infiltration from their private sewer service, it may be possible for the Town to set up a low interest loan for property owners that cannot afford to pay for the work. This option would require a Special Act of Legislation.

What Goes Into A Private Infiltration Removal Policy?

If the property owner is solely responsible to pay for the removal of infiltration from their service these things need to be considered:

- How much would it cost to remove the infiltration using either method? The average cost estimate range for either approach could be $5,000 to $20,000. This assumes a distance of 50’ from the Town’s sewer to 10’ outside the building.
- Once notified by the Town, how long should the property owner have to complete the work? 60 days, 90 days, 120 days, 150 days, more?
- Should the property have to sign and return an acknowledgement form that they have received the notice and will comply within the specified time frame? Should there be a penalty for not returning the acknowledgement form within 30 days from receiving the notice?
- Should the property owner not perform the work within the required timeframe, should there be a penalty assessed to their sewer bill until the work is complete? Should it be $25, $50, $75, $100 or more per quarterly bill?
- Would the property owner be able to select their own contractor or have to use an approved contractor by the Town? The Town would allow either option, however if the contractor selected by the property owner is not currently Town approved, the Town would have to review their qualifications and provide approval through the Town’s Drainlayers License process.

What Goes Into A Private Infiltration Removal Policy?

- If the Town, through its Sewer Enterprise Account, was to pay for and perform the work associated with the removal of infiltration from a private sewer service, should the property owner be assessed a penalty on their quarterly sewer bill if they deny the Town access onto their property or the ability to perform the work on their private service? What should the value of that penalty be?

- What is an Enterprise Fund?

  An Enterprise Fund is a government function that recovers all or a significant portion of its cost through user fees.

Who will the Private Infiltration Removal Policy Affect??

- Any property owner that has a sewer service connection from their building to the Town's sewer system.

- Only those property owners that have been identified to have infiltration will be subject to this policy. Based upon our first round of inspections only 7% of the private services (113 of 1,600 services) presented signs of infiltration and would have been potentially subject to this policy.

- Not all property owners that have been identified to have infiltration in their private sewer service will be required to remove it. Each service will be reviewed by the Town to determine the approximate rate of infiltration (in GPD) that is entering the system through their private service. Those private sewer services that exhibit a rate of infiltration where the cost to transport and treat the infiltration is greater than or close to the cost to remove the infiltration will be targeted.

What's Next??

- The Town will be coordinating a focus group meeting to dig deeper into the critical questions that were discussed earlier in the meeting. We would like to get about 20 to 30 participants from those in attendance at this evening's meeting. If you are interested in participating, please come up to the front of the auditorium at the completion of this meeting and provide your contact information on our signup sheet. Focus meeting should hopefully be before school summer vacation.

- Once the focus group has met we will take all of the feedback from these 2 meetings and develop the Private Infiltration Removal Policy.

- The Policy will then be presented to the Board of Selectmen for their support. Hopefully before the end of 2019.

- Should the BOS support the policy, they may request that it be presented at Town Meeting for approval by the Town Meeting Representatives. The BOS could also support the policy without Town Meeting approval.

- Should the policy go to Town Meeting and be approved, it would then become part of the Town's Sewer Use Regulations and become effective thereafter. Could be presented at either the Spring or Fall Town Meeting in 2020.

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QUESTIONS??