

WATER LEAKS & REPAIRS IN OUR SYSTEM



**POTENTIAL
CAUSES &
PERCEPTIONS**

**TYPES OF
LEAKS**

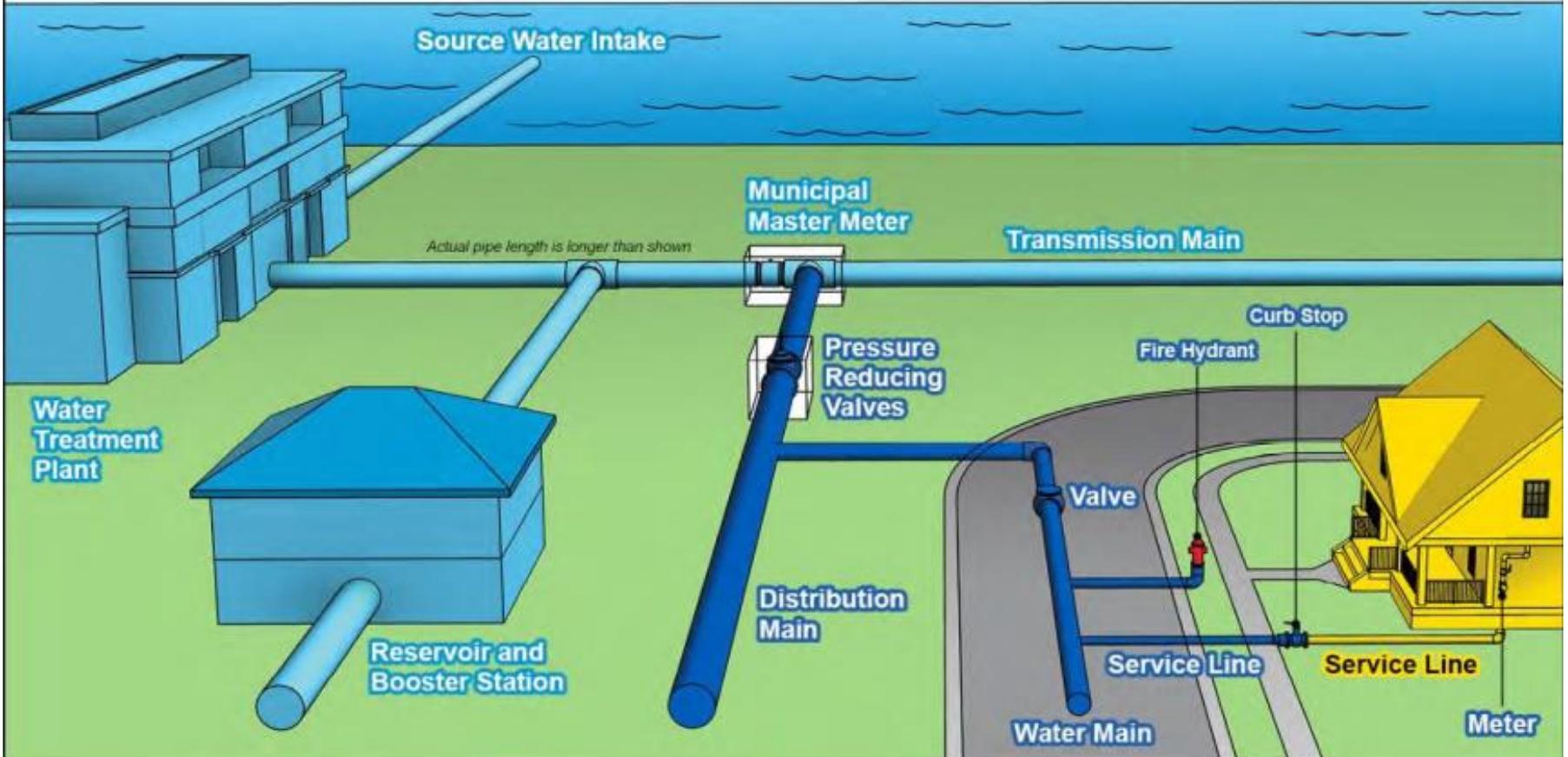
HISTORY

**FUTURE
PLANS**

JULY 2025



What makes up our water system?



Failures in the distribution system, whether mains, services, hydrants and/or gate valves are part of operating a water system. The WRWS maintains over 200 miles of pipeline, 12,500 service connections, 1,250 fire hydrants and over 3,000 gate valves.

Cities and towns across America are all dealing with water infrastructure issues due to age, material type, and in some areas weather. The average number of annual water main breaks per 100 miles of pipe is 11-27. In New England that number is higher as changes in the weather have an impact on our underground assets.

Our improved communications protocol is contributing to the perception that the number of water main breaks has increased over time. Utilizing our notify system, Facebook, websites, other media outlets and additional social media platforms, is getting the needed information to our customers immediately, but also reaching customers that are not in the effected break area. In the past, these customer may have never have been aware of these situations.

Discolored water is often a result of water main breaks, service leaks and, on occasion, planned system maintenance. Ongoing, effective system maintenance is key in reducing the extent of discolored water during breaks and leaks. When we have a break, this discoloration can reach beyond the affected area.



Changes in Temperature
Thermal Expansion
Freezing and Thawing



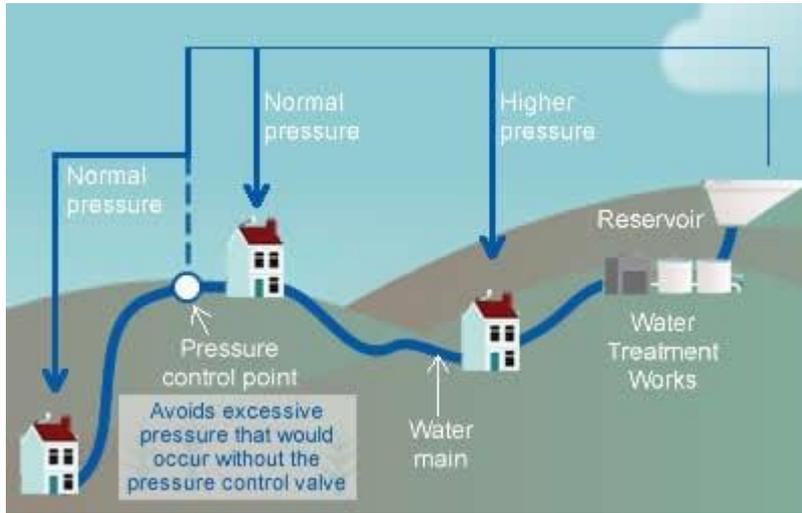
Ground Movement / Settling
Vibration from Construction
Soil Erosion / Destabilization



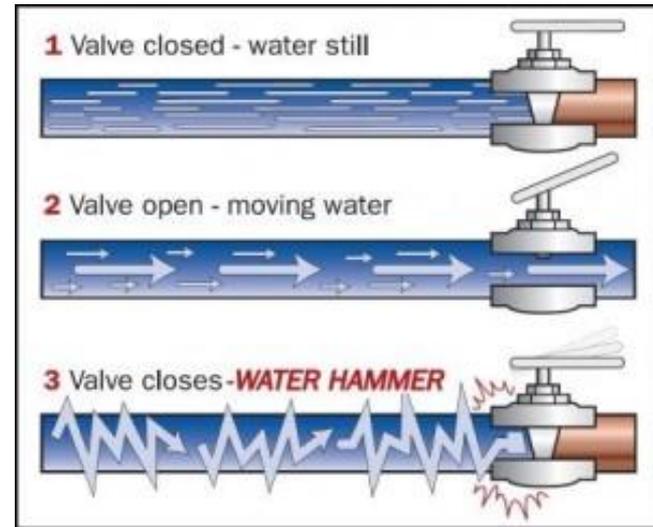
System Age
Pipe Material
Corrosion



Pressure Changes



Water Hammer



**High Water
Demand**



Types of Leaks



← **Mains**

Services →



Mains: These are the larger diameter pipes in our water system typically $>2''$ or larger and are used as transmission lines to distribute water throughout the system and provide fire protection.

Services: These are typically smaller pipes in our system $\leq 2''$ and provide water to individual residences and businesses. Services can vary in relation to the size of the property being serviced, but typically are less than or equal to $2''$ in diameter.



← **Fire
Hydrants**

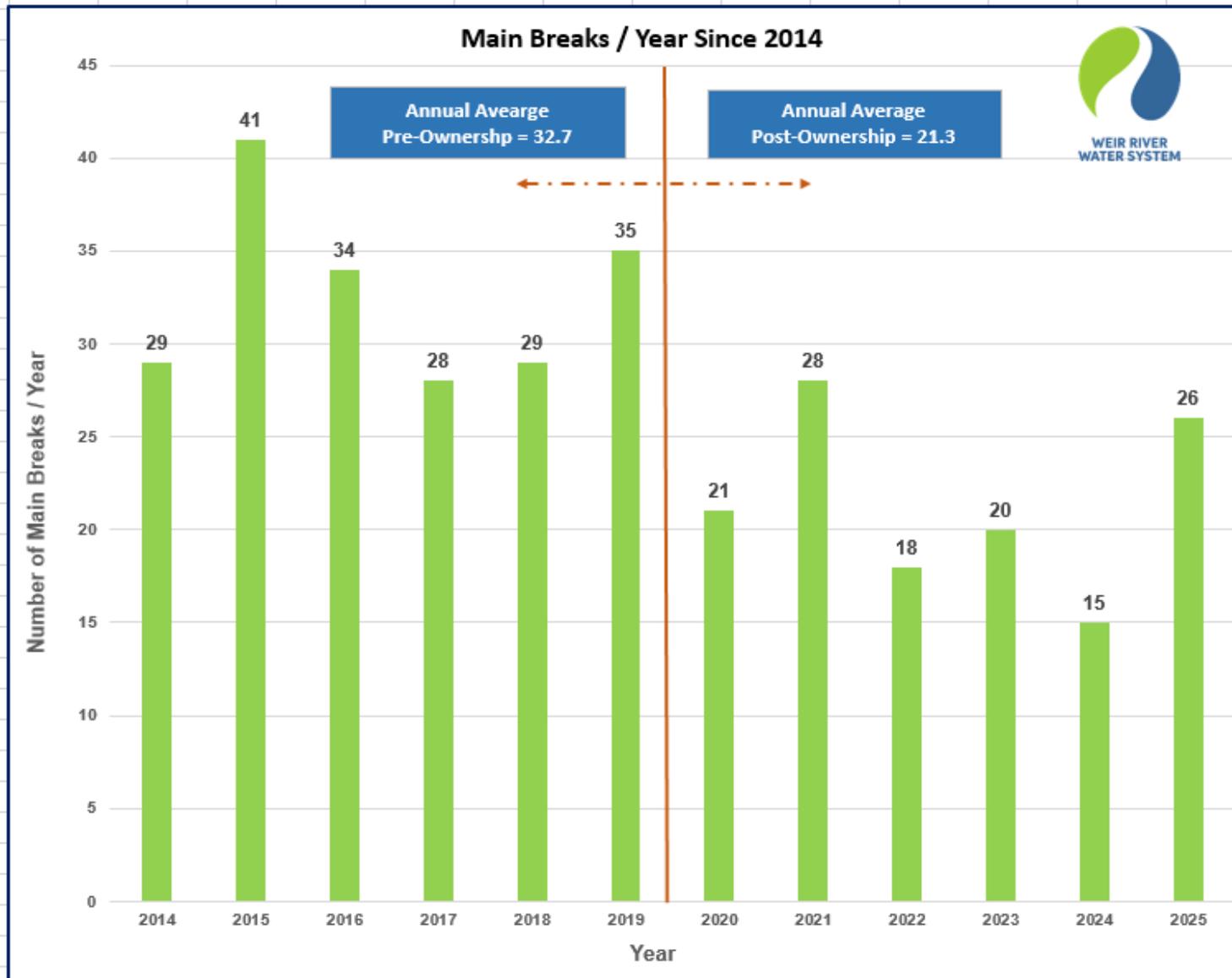
**Gate
Valves** →



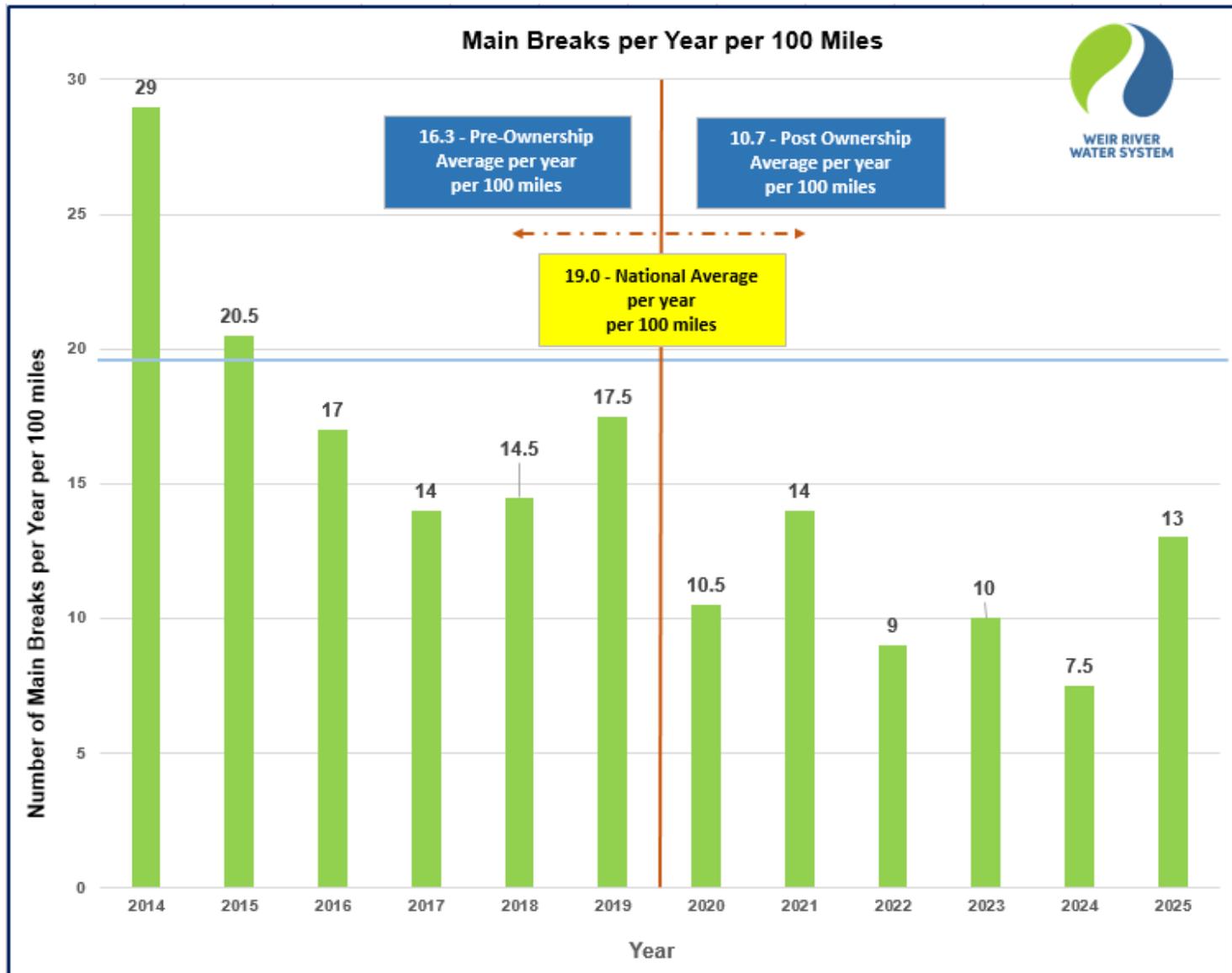
Fire Hydrant: The main function is for fire protection but they are also used for system maintenance such as flushing and bleeding off pressure and discolored water after a water leak and repair.

Gate Valves: These are used to control the flow of water throughout the system and isolate sections of the system during a water leak and repair.

Main Breaks per Year Since 2014

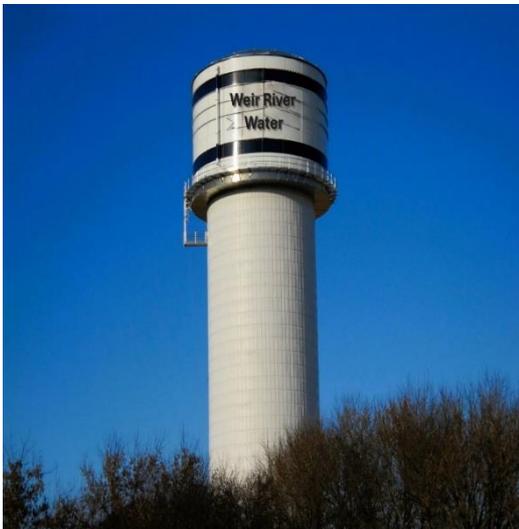


Main Breaks per Year per 100 Miles



Capital Plan Main Replacement Program / Road Reconstruction

During the past four years we have completed capital work that included replacing 23,500 LF of water main, 12,745 LF which were recommendations from our master plan, added 6,000 LF to create loops and additional service, installed 84 additional hydrants, and added 18 additional gate valves.



**New Storage Tank
Strawberry Hill**

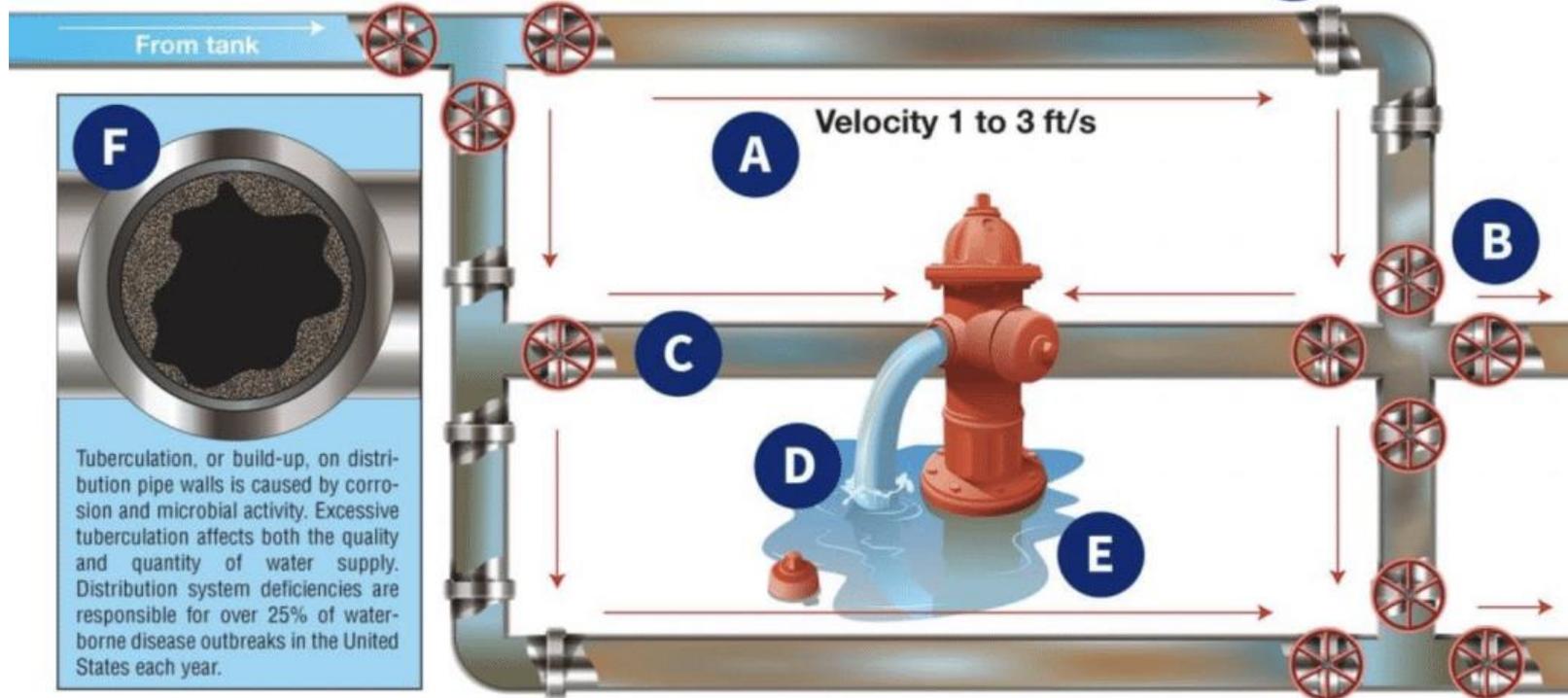
**Pressure
Stabilization**

**Additional Storage
for High Demand**





Conventional Flushing

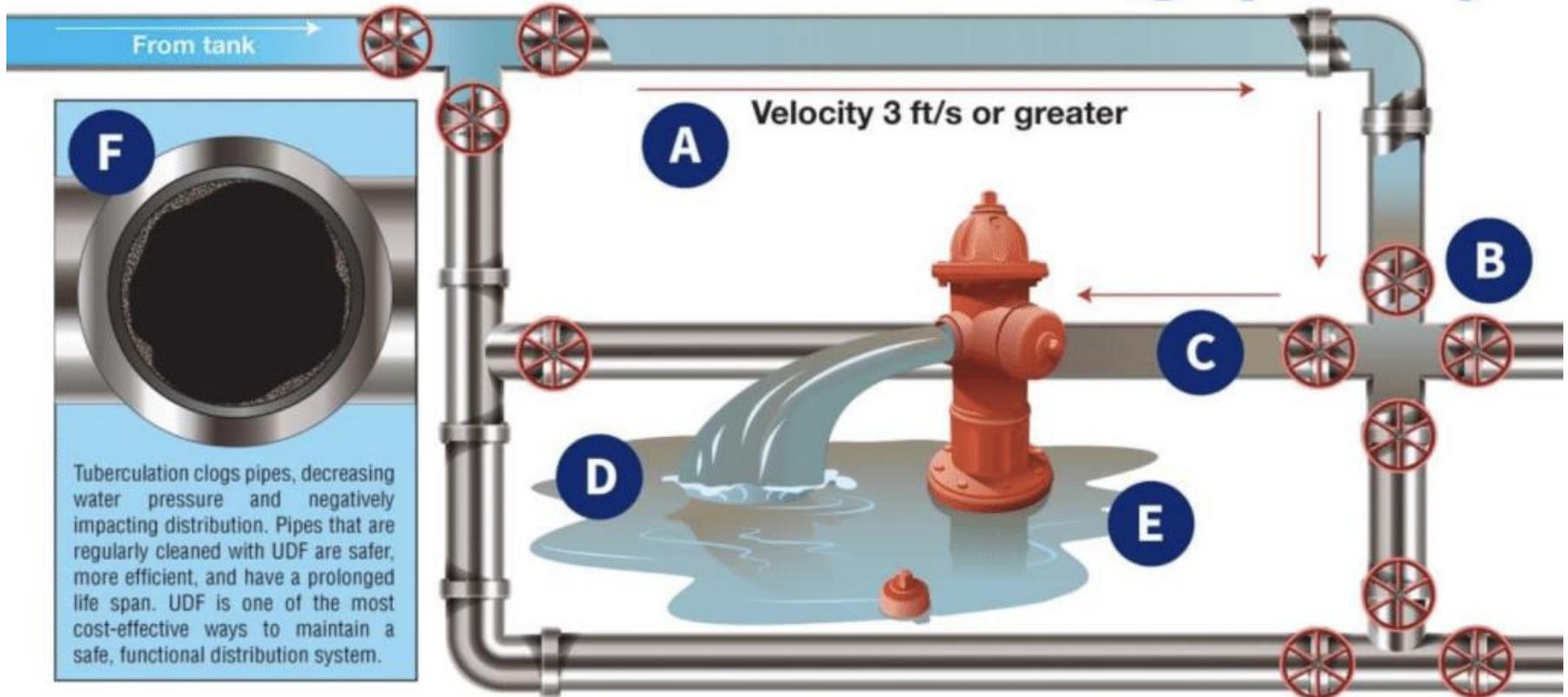


F Tuberculation, or build-up, on distribution pipe walls is caused by corrosion and microbial activity. Excessive tuberculation affects both the quality and quantity of water supply. Distribution system deficiencies are responsible for over 25% of water-borne disease outbreaks in the United States each year.

- A** Velocity of water is significantly higher in UDF than in traditional flushing, providing far better pipe scouring.
- B** Valves are opened and closed during UDF, enabling water systems to locate broken or closed valves and to learn critical information about the system. Exercising hydrants and valves in this way also prolongs their useful life.
- C** During conventional flushing, dirty water is recirculated throughout the system, whereas UDF forces water in one direction, from a clean source through a dirty pipe, providing for superior pipe wall cleaning.
- D** Sediment, corrosion, and biofilm are forcefully flushed out during UDF, whereas they remain circulating in the system in conventional flushing.
- E** UDF actually uses up to 40% less water than conventional flushing.
- F** Conventional flushing does not produce a high enough velocity to adequately scour pipe walls, whereas the increased velocity in UDF removes a significant amount of tuberculation from pipe walls. Regularly scheduled UDF is an invaluable part of a system's asset management program.

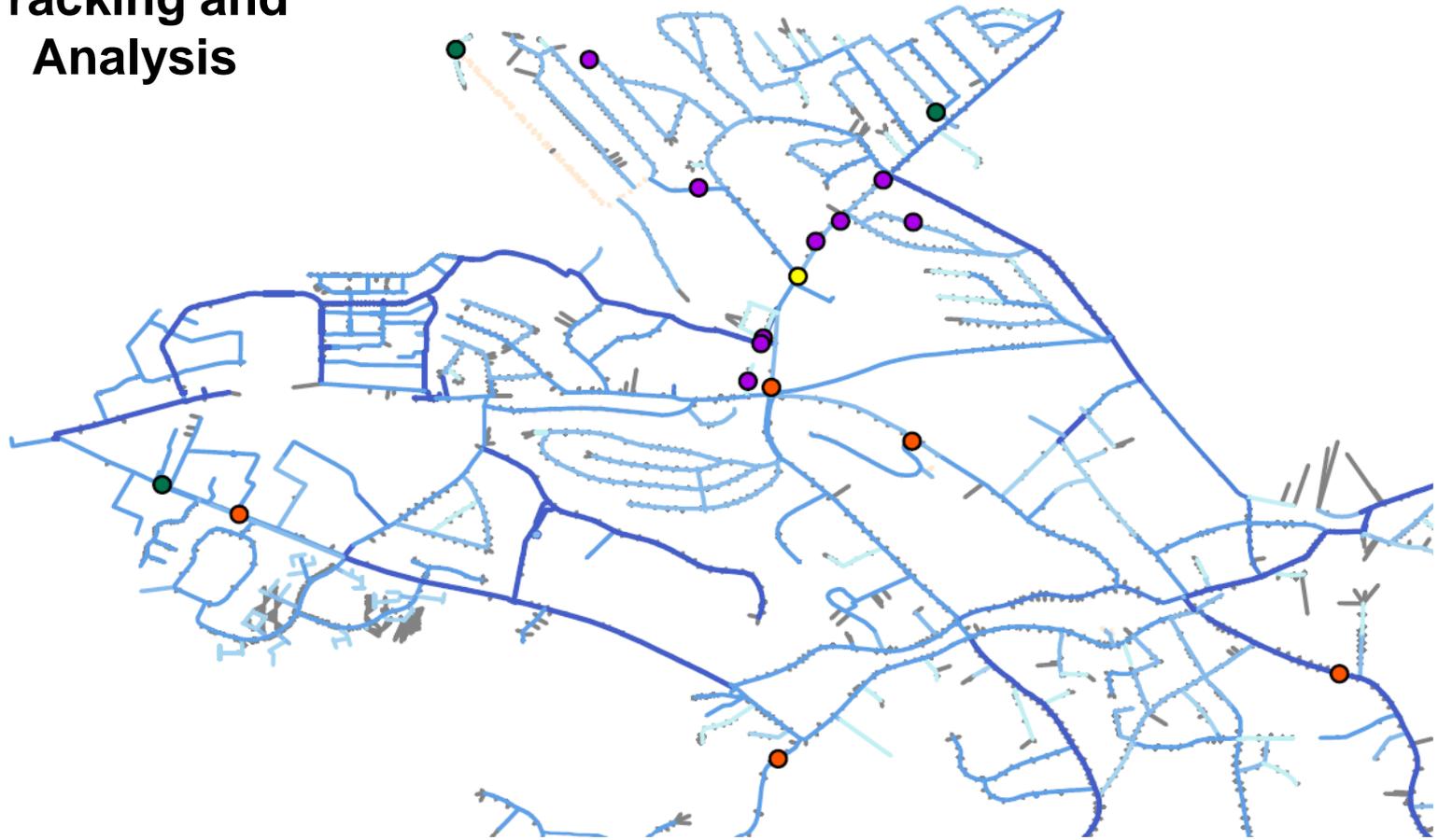


Unidirectional Flushing (UDF)





Main Break Tracking and Analysis





**Pressure
Recording
Vaults**

**Pressure Data
Loggers**





THANK YOU FOR YOUR TIME



EVERY DROP COUNTS

Russell E. Tierney
Managing Director / Superintendent
tierneyr@hingham-ma.gov
781-804-2304