Tewksbury Water Distribution System

Distribution System Background

- Construction on the Water Distribution System began in 1951
- By 1953 approximately 60 miles of Asbestos Cement (AC) water main was installed
- Wrought Iron was used for additional piping on minor roadways
- The Town began using Cast Iron (CI) in 1953
- The Town transitioned to Cement Lined Ductile Iron (CLDI) pipe in the early 1980s
- The Total Distribution System network includes:
  - 160 miles of water main
  - Three storage tanks totaling 7 Million Gallons
  - Approx. 10,000 water services

Asbestos Cement (AC) Pipe

- AC pipe was the first water main pipe used in Tewksbury
- Between 1951 and 1953 approximately 60 miles of AC water main was installed
- The Life Expectancy of AC pipe is about 50-years, but installation conditions reduce the lifespan
- The joint between pipe sections are the weak point where we find most failures occur
- AC pipe experiences devastating failure without warning
- Currently there is 54.9 miles of AC pipe remaining in the system

Wrought Iron (WI) Pipe

- Wrought Iron was used for additional piping on minor roadways most notably in South Tewksbury
- This pipe is uncoated or has minimal galvanized lining that deteriorates quickly over time
- The pipe forms tuberculation that reduce capacity and create water quality issues
- Many roads in South Tewksbury have 2-inch WI water mains that are close to 70 years old
- There is approximately 3.9 miles of WI pipe in the system

Cast Iron (CI) Pipe

- Lined with cement to prevent tuberculation
- The Life Expectancy of CI pipe is 50-120 years
- Was superseded by Cement Lined Ductile Iron Pipe in the 1980s
- There is approximately 28.6 miles of CI pipe in the system

Cement Lined Ductile Iron (CLDI) Pipe

- Lined with cement to prevent tuberculation
- The Life Expectancy of CLDI pipe is 60-130 years
- There is approximately 68.2 miles of CLDI pipe in the system
- This is the current pipe type that the Town installs
- There are significant supply chain issues with CLDI (approx. 40 weeks)

Polyvinyl Chloride (PVC) C909 Pipe

- Life Expectancy of PVC Pipe is 100-150 years
- PVC Pipe material cost is approximately half that of CLDI
- Pipe availability has not been impacted as severely by supply chain issues
- Delivery times are 30-days or less
- The installation process is similar to CLDI pipe

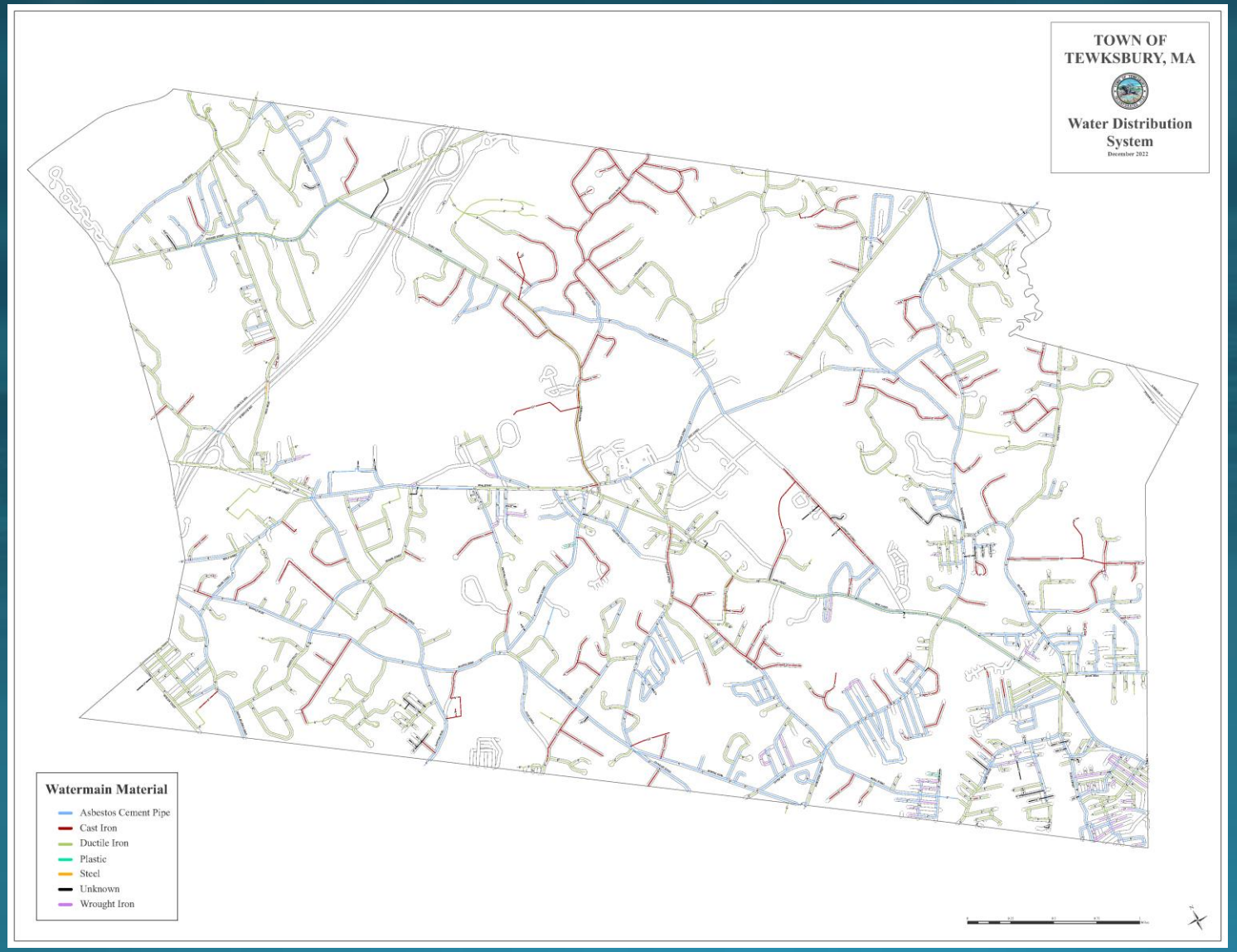
Life Expectancies of Pipe Materials

Pipe Material	100%	50%	10%
Asbestos Cement	50	75	100
Cast Iron	50	80	120
Ductile Iron	60	90	130
PVC	100	130	150

Source: Fisher, C. (2008, January/February). Choosing the Right Pipe. Underground Infrastructure Management, pp. 30-32

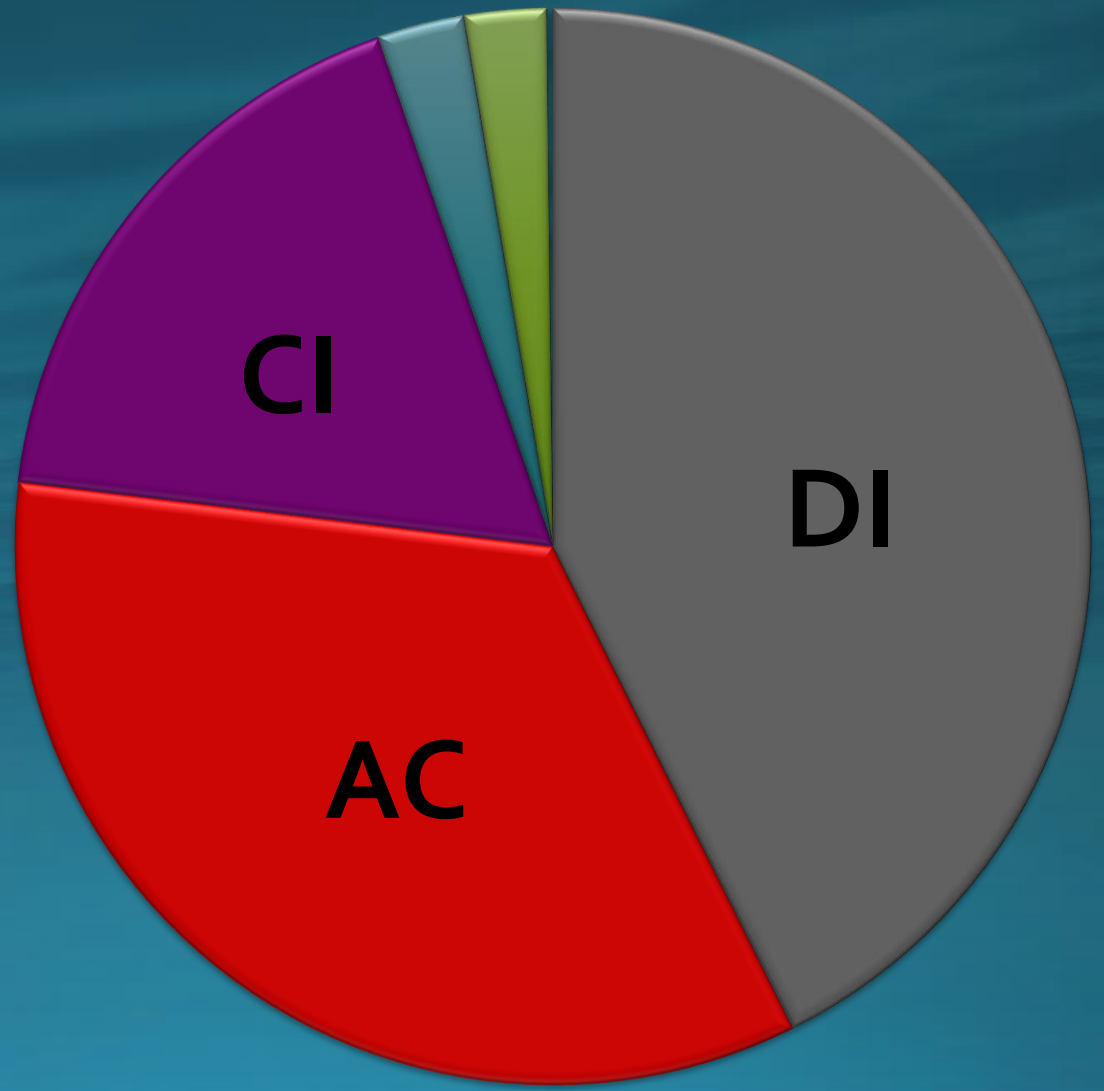
Actual life expectancy for Asbestos Cement and Cast Iron and can be highly variable depending on the quality and location of installation.

Water Mapping Project



Water System Pipe Material

PIPE MATERIAL	LENGTH (MILES)	PERCENTAGE
DI	68.21	42.6%
AC	54.87	34.3%
CI	28.55	17.8%
UNKNOWN	4.16	2.6%
WI	3.94	2.5%
STEEL	0.16	0.1%
PLASTIC	0.13	0.1%



Water Main Breaks and Service Leaks

Year	Service Leaks	Main Breaks	Total
2018	14	48	**62**
2019	10	39	**49**
2020	15	32	**47**
2021	18	32	**50**
2022	4*	34*	**38**
Total	**61**	**185**	**246**

*Through October 2022

Completed/Ongoing Water Projects

Project Name	Year	Length (ft.)	Total Cost
Contract 802797 Shawsheen St., Crest Rd., Main St., Clark Rd.	2015	4,449	$1,374,302
PW-16-14 East St., Clark Rd., Van Buren Rd., Adams Rd.	2016	3,420	$798,070
PW-17-02 Carter St., Cart Path Rd.	2017	3,251	$592,483
PW-18-17 Main St., South St., Salem Road	2018	3,384	$4,441,516
PW-18-18 North St. to Old Boston Rd.	2018	2,850	
PW-20-01 North St. to Victor Dr. & Old Boston Rd. to Marshall St.	2019	3,797	
PW-16-17 Woburn Street Area	2019	6,871	$1,774,787
PW-20-08 South Tewksbury Upgrades – Phase I	2021	4,900	$,941,544
PW-22-02 South Tewksbury Upgrades – Phase II	2021	5,950	$2,609,738
PW-22-27 School Street	2022	1,505	$399,468
PW-22-03 Pike St. and Astle St.	2022	2,860	$1,002,534
PW-21-11 Whipple Rd. - Lowell Line to Chandler St.	2022	16,260	$5,245,809
	Total	**59,497**	**$12,973,880**

Future Water Projects

Project Name	Year	Pipe Mat'l	Length (ft.)	Total Cost
Fiske Street	2024	AC	4,600	$1,400,000
Hood Road, Cleghorn Road, Trull Brook Lane, Guile Road	2024	AC/Cast	6,300	$1,900,000
Victor Drive	2024	Cast	1,650	$500,000
Beech Street Neighborhood	2024	AC	5,050	$1,550,000
South Tewksbury Phase III	2025	AC/WI	7,575	$2,300,000
Shawsheen Street, Foster Road, Beech Street, Patten Road	2026	AC	3,100	$1,000,000
Hill Street	2026	AC	2,000	$600,000
Main Street Tie-Over	2027	AC	9,000	$2,000,000
Pringle Street Neighborhood	2028	AC	6,900	$2,100,000
William G Drive Neighborhood	2029	Cast	5,200	$1,600,000
Cardigan Road Neighborhood	2030	Cast	5,050	$1,550,000
South Tewksbury Phase IV	2031	AC	7,575	$2,300,000
		Total	**64,000**	**$18,800,000**

Questions/Comments

References

Camp Dresser & McKee, Inc. (2004). *Town of Tewksbury, Massachusetts Water Distribution System Master Plan.* Cambridge: Camp Dresserr & McKee, Inc.

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Tutella Engineering Associates, Inc. (1989). *Water Distribution Study and Network Analysis.* Wilmington: Tutella Engineering Associates, Inc.

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