



# Memo

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TO: Committee of the Whole  
FROM: Ed Andrews, PE Public Works Director  
DATE: May 11, 2018  
SUBJECT: Water Sewer Rate Study Selection Discussion

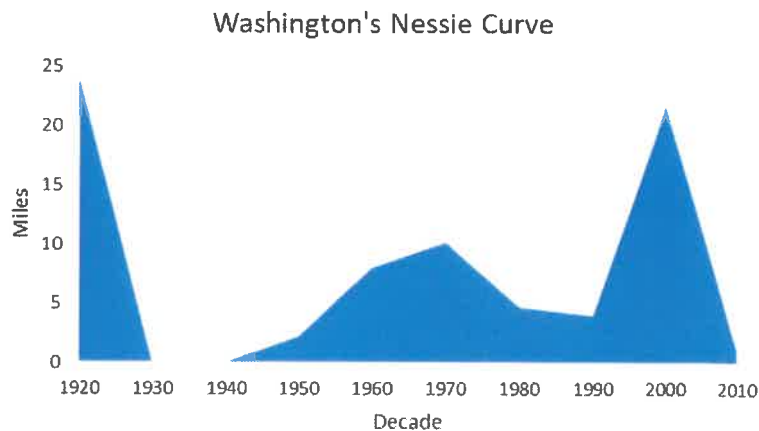
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On February 19, Chairmen of the Finance and Public Works Committees met with Staff to review the results of the Request for Qualifications (RFQ) / Proposals (RFP) for a budgeted rate study. Seven firms submitted on the project with three firms viewed as more favorable since they were, or had teamed with financial firms.

- Ehlers, proposed at \$39,000
- Municipal & Financial Services Group, proposed at \$36,840
- **Raftelis (w/ CMT), proposed at \$25,490**

The Raftelis submittal was deemed to be the more favorable of the submittals. Discussion with both committees was held in March of '18 prior to presenting to Committee of the Whole. The recommended proposal by Raftelis (w/ CMT) was 90% financial and 10% engineering support. It was felt that additional work could be conducted in-house to help advance the study. As such, staff has begun some of the preliminary undertaking of this effort, with current American Water Works Association (AWWA) publications.

In addition to annual day to day operating costs, AWWA recommends to prepare a full cost model of the system, factoring in useful life of the distribution system. This is started by preparing a "Nessie Curve" of when watermains were installed.



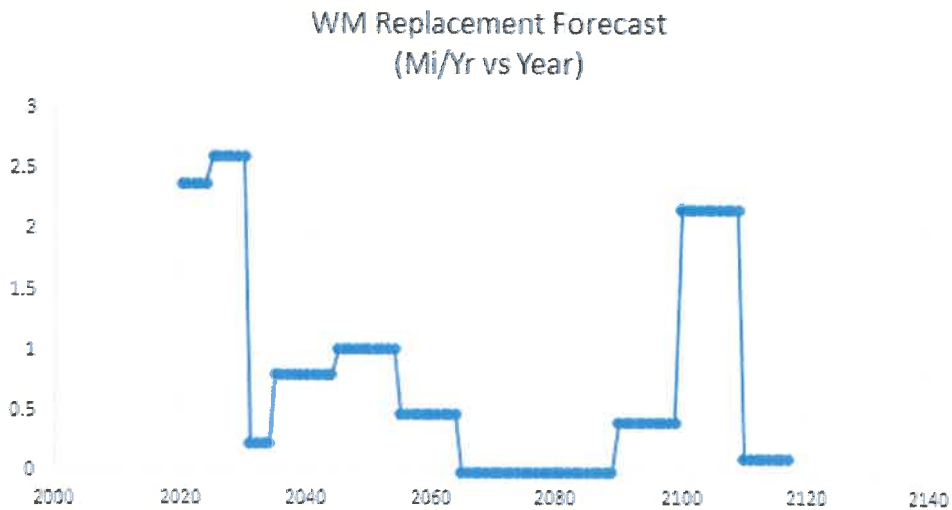
This curve is then used to forecast replacement needs using AWWA's findings:

*The oldest cast iron pipes—dating to the late 1800s—have an average useful life of about 120 years. This means that, as a group, these pipes will last anywhere from 90 to 150 years before they need to be replaced, but on average they need to be replaced after they have been in the ground about 120 years. Because manufacturing techniques and materials changed, the roaring '20s vintage of cast-iron pipes has an average life of about 100 years. And because techniques and materials continued to evolve, pipes laid down in the Post-World War II boom have an average life of 75 years, more or less. Using these average life estimates and counting the years since the original installations shows that these water utilities will face significant needs for pipe replacement over the next few decades.*

As such the following estimated life and replacement year was compiled by decade.

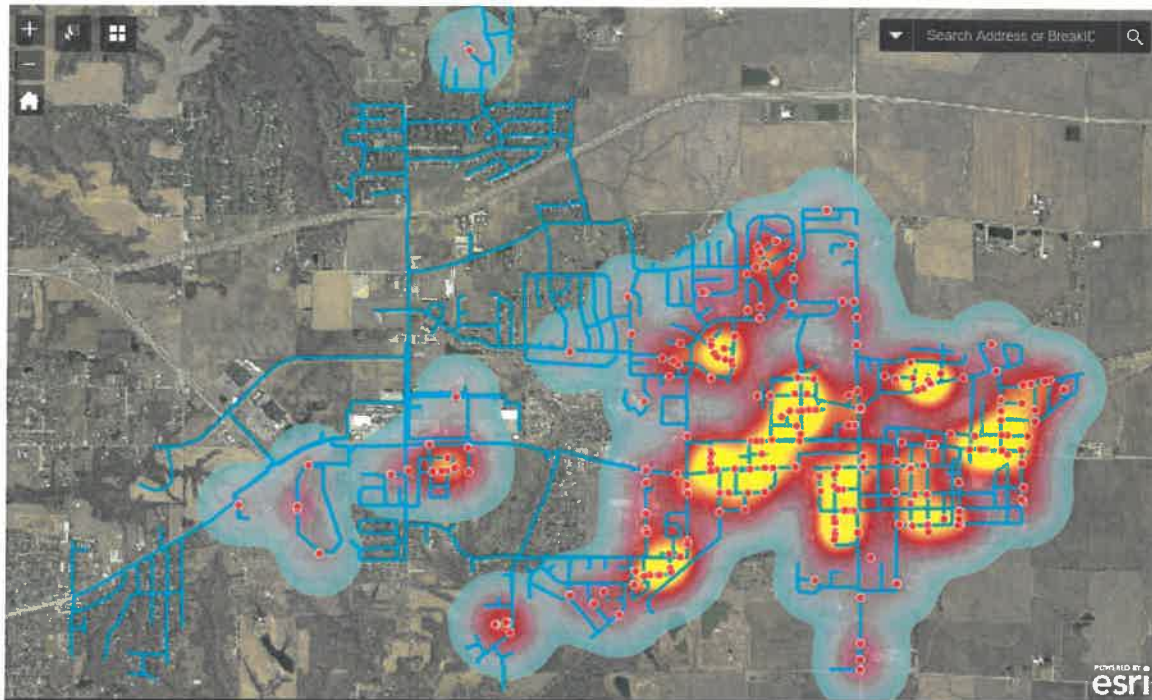
Decade	Miles	Est Life	Replc Yr	Mi/Yr
1920	23.8	100	2020	2.38
1930	0		1930	0
1940	0		1940	0
1950	2.3	75	2025	0.23
1960	8.1	75	2035	0.81
1970	10.2	75	2045	1.02
1980	4.8	75	2055	0.48
1990	4.1	100	2090	0.41
2000	21.6	100	2100	2.16
2010	1.1	100	2110	0.11

The following graph shows the overlap of 100-year life cast iron from the 1920s and 75-year ductile iron from the 1950s.



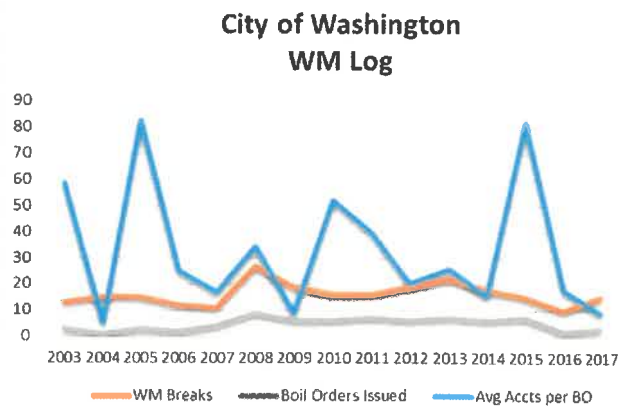
In general, watermain in the east end of the City is of smaller diameter 4" Cast Iron and was constructed with the original water works in the 1920s.

The AWWA forecasts appear to be manifesting in our watermain break logs:



Year	# of Breaks	Boil Orders Issued	Break to B.O. Rate	Avg # Accts per B.O.
2003	13	3	23%	59
2004	15	1	7%	5
2005	15	3	20%	83
2006	12	2	17%	25
2007	11	4	36%	17
2008	27	9	33%	35
2009	19	6	32%	9
2010	16	6	38%	52
2011	16	7	44%	40
2012	19	6	32%	20
2013	22	7	32%	26
2014	18	6	33%	15
2015	15	7	47%	82
2016	10	2	20%	18
2017	15	3	20%	9

Avg	17	5	30%	36
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The AWWA annual average for water main breaks is 0.25 breaks per mile, or for our system 21 breaks annually. However, this is an average of the entire system, when one drills down into the data it can be seen that there is a disproportionate number of breaks on the older cast iron water main.

	Cast Iron CI	Ductile Iron DI	Transite AC	Transite TRANS	PolyVinyl PVC	Service SERV	Copper CO	Unknown UNKWN
Totals	121	0	6	7	6	28	21	23
% of Tracked	57%	0%	3%	3%	3%	13%	10%	11%

While cast iron represents 23.8mi of the current 77mi (30% of the system) it accounts for nearly 2/3 of the breaks.

Using some inclusive planning numbers for the lineal foot cost of main replacement, it can be seen that there is a significant annual cost of replacement looming.

Year	Mi/Yr	Inflation	Dir Bore HDPE
		Factor 2%	2/3 - 8" @ \$150/Ft 1/3 - 6" @ \$125/Ft
2020	2.38		\$ 1,853,251
2021	2.38		\$ 1,890,316
2022	2.38		\$ 1,928,123
2023	2.38		\$ 1,966,685
2024	2.38		\$ 2,006,019
2025	2.61		\$ 2,243,875
2026	2.61		\$ 2,288,753
2027	2.61		\$ 2,334,528
2028	2.61		\$ 2,381,218
2029	2.61		\$ 2,428,843
2030	2.61		\$ 2,477,420
2031	0.23		\$ 222,683
2032	0.23		\$ 227,137
2033	0.23		\$ 231,679
2034	0.23		\$ 236,313
2035	0.81		\$ 848,877
2036	0.81		\$ 865,855
2037	0.81		\$ 883,172
2038	0.81		\$ 900,835
2039	0.81		\$ 918,852
2040	0.81		\$ 937,229
2041	0.81		\$ 955,974
2042	0.81		\$ 975,093
2043	0.81		\$ 994,595
2044	0.81		\$ 1,014,487
2045	1.02		\$ 1,303,052
2046	1.02		\$ 1,329,113
2047	1.02		\$ 1,355,695
2048	1.02		\$ 1,382,809
2049	1.02		\$ 1,410,466
2050	1.02		\$ 1,438,675

Adopting an equitable rate structure is a primary component of the Raftelis proposal which is critical in being able to fund not only the water main replacements outlined above, but a similar effort is anticipated with sanitary.

This effort can be viewed as similar to the 2006 Ehler's study that established the sewer connection fees used to help fund the sewer plant improvements.

cc: File