

**To the Mayor and Members of the City Council**

**September 7, 2023**

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**SUBJECT: CAST IRON PIPE REPLACEMENT**

In response to City Councilmember questions during the budget workshop, this Budget Response outlines the Water Utility’s process for prioritizing pay-go funds used for water and sewer line rehabilitation projects, which include cast iron water main replacements.

The utility has made a concerted effort over the last 10 years to increase the amount of funding budgeted for cash-funded capital projects. In FY2014, \$52.1 million was budgeted for pay-go capital. The recommended level for the FY2024 budget is \$84.5 million, a 62% increase from 2014. The table below illustrates the projected pay-go funding levels for the next five years. The largest portion of pay-go is used for water and sewer line replacements and the associated road repairs, though funding is also allocated for facility capital maintenance-related items.

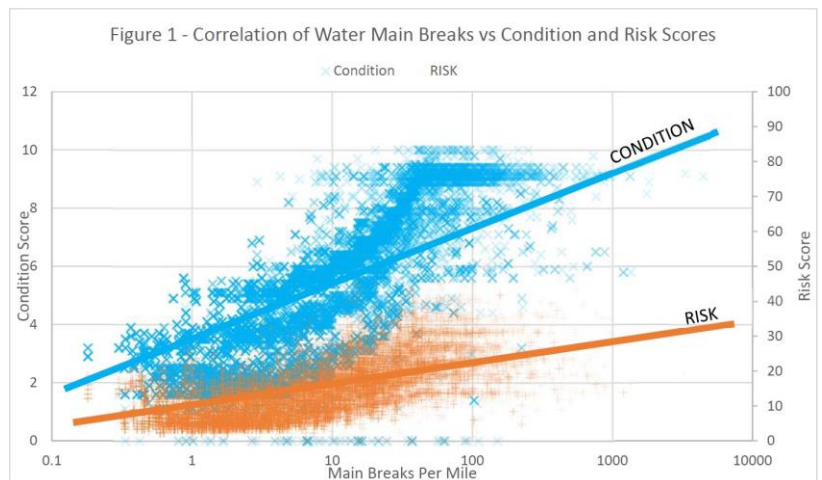
	FY24	FY25	FY26	FY27	FY28	Total
<b>Cash-funded CIP (pay-go)</b>	<b>\$84.5M</b>	<b>\$84.4M</b>	<b>\$90.4M</b>	<b>\$98.5M</b>	<b>\$106.2M</b>	<b>\$464M</b>

Pipeline replacements are prioritized considering many factors, including condition and risk scores. Through the utility’s asset management initiative, staff reviewed and assigned both condition and risk scores to every segment of pipe in the system. Cast iron and unknown material water pipe generally have the worst risk and condition scores. The table below illustrates the scoring for cast iron and unknown material water mains by pipe size.

Pipe Diameter	Miles (2021 data)	Miles by Condition Score (0=best; 10=worst)					Miles by Risk Score (1= lowest; 5=highest)				
		0-2	2-4	4-6	6-8	8-10	1	2	3	4	5
< 6"	39.3	0	0	21.5	9.3	8.5	4	25.3	8.3	1.7	0.1
6" - 8"	561.9	0	1.4	223.3	165.7	171.4	48	345.1	144	22.2	2.5
10" - 12"	149.3	0	0.1	76.2	42.7	30.3	2.1	98	40.2	8.2	0.9
14" - 16"	25.6	0	0	15.4	7.2	3	0	13.6	10.7	1.4	0
18" - 24"	32.6	0	0	13.7	17.4	1.5	0	1.8	21	8.8	1
> 24"	6.5	0	0.3	2.6	3.4	0.2	0	0	2.2	2.5	1.8

As actual main breaks are compared to the above condition and risk scores, the data indicates the condition score is a better indicator of a failure than the risk score. However, the larger the pipe size, the higher the consequences of failure. This was recently witnessed by the 30-inch main break at West Lancaster Avenue and Collier Street.

The majority of the 100 miles of cast iron water pipe replacement currently in design is for smaller diameter sizes. Because of the higher consequence of failure, the utility is prioritizing construction of the larger diameter



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lines, especially those that also have poor condition scores. For projects to replace small-diameter water and sewer lines (pipes sizes less than 16 inches), staff is grouping lines within a defined area into one project. This approach saves on construction contractor mobilization costs and inconveniences the neighborhood once instead of multiple times. Not all pipes in the area may have the same level of condition and risk scores, but it is the most efficient way to perform the replacements.

Replacement projects are also prioritized based on streets in the bond program. The utility does not want to leave aging water and sewer lines beneath a new street. Furthermore, the utility just recently finalized the replacement of the lead service lines within the water system, which was a high priority for pay-go-funded replacement projects.

There are 805 miles of cast iron and unknown material water lines in the system. The unknown is almost always cast-iron pipe. The estimated cost to replace all the cast iron pipe in the system (including unknowns) is more than \$1.6 billion dollars.

Since the winter storm in February 2021, the utility has an internal goal of replacing 20 miles of cast iron pipe a year. Ramping up to that takes time because the engineering design and easement acquisition must be completed before going to construction. We may reach that 20-mile mark this calendar year.

Miles in System (Current)			Replacement Cost		Total Replacement Costs of Inventory
Diameter	CI	Unknown	per linear foot	per mile	
< 6"	27.85	10.40	\$350	\$1,848,000	\$70,701,567
6" - 8"	471.80	80.00	\$350	\$1,848,000	\$1,019,721,525
10" - 12"	131.25	17.03	\$400	\$2,112,000	\$313,180,731
14" - 16"	21.87	3.50	\$500	\$2,640,000	\$66,993,497
18" - 24"	28.80	6.25	\$650	\$3,432,000	\$120,275,191
> 24"	4.18	2.13	\$900	\$4,752,000	\$29,977,114
<b>Total System Replacement Costs</b>					<b>\$1,620,849,624</b>
<b>Average replacement cost per mile</b>					<b>\$2,013,303</b>

The utility analyzed what the rate impact would be to add another \$10 or \$20 million for cast iron pipe replacement in FY 24. How many miles of actual pipe replacement that would fund depends on the size of the pipe being replaced. The average cost per mile to replace water pipe is \$2 million, but it costs over 2.5 times more to replace the largest size pipes as compared to the smallest size pipes. Adding another \$10 million to pay-go funding would be a rate increase of 7.8% in FY2024 for the water system compared to the current recommended increase of 3.5%. To fund an additional \$20 million of replacements would be a 12.2% increase.

The monthly bill impact for the average residential customer would be an increase of \$3.48, rather than the recommended \$2.18 with an additional \$10 million added to pay-go funding. For an additional \$20 million, the increase would be \$5.24 per month. To prepare for additional projects, the utility recommends we include any Council desired increases in pay-go funding starting next year in the FY2025 budget.

Should you have any questions about the cast iron pipe replacements, please contact Chris Harder, Water Director, at 817-392-5020.

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City Manager