Briefing Note

Update: September 20, 2021 **Environmental Services Department**

For Information ONLY

Subject Title: Water Assets Capital Reinvestment Comparison

Purpose: To inform the Council members and senior management on Markham's Water Assets Capital Reinvestment

Background:

- At the June 14, 2020 GC meeting, staff was asked to compare Markham's Water Assets Capital Reinvestment to other municipalities, since Markham has a low number of watermain breaks per 100km compared to other municipalities.
- City of Markham owns, operates and maintains watermain distribution network and water meters. The Markham water distribution network consists of watermains sized from 100mm diameter to 450mm diameter, made of various materials such as polyvinyl chloride cast iron, ductile iron, steel, concrete, asbestos cement and high density poly ethylene.
- Watermain distribution network inventory as of January 2021:

Pipe Material	Inventory	% of Inventory	Avg. Age as of 2021
PVC	759 km	69.7%	23 years
Ductile Iron	243 km	22.3%	47 years
Cast Iron	57 km	5.2%	55 years
Concrete	22 km	2.0%	31 years
Asbestos Cement	3.0 km	0.3%	61 years
HDPE	5.0 km	0.5%	17 years
Total	**1089 km**	**100.0%**	**29 years**

- Watermain breaks and leakages are the two major problems in water distribution network. When this happens, it interrupts water service, compromises water quality, causes water loss and leads to expensive repair costs.

Discussion

(A) Water Assets Capital Reinvestment:

Definitions:

Capital Reinvestment:

- Investment to maintain the water system in operable condition (excludes expansion of system to handle growth and upgrading to a higher level of service)

Replacement Value:

- Investment amount required to replace all of the existing drinking water infrastructure

Reinvestment Percentage:

- Reinvestment % = $\frac{\text{Capital Reinvestment Value}}{\text{Current Replacement Value of the Drinking Water System}}$

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Data Reported to National Water Wastewater Benchmarking Initiative	Markham	Cambridge	Barrie	Halton Region	Thunder Bay	Sudbury	Windsor
Watermain Inventory (2020)	1089 km	530 km	644 km	2300 km	726 km	1000 km	1100 km
No. of Watermain Breaks (2020)	12	25	23	73	77	71	85
No. of Watermain Breaks per 100 km (2020)	1.1	4.7	3.6	3.2	10.6	7.1	7.8
Avg. Age	29 years	No data	28 years	26 years	48 years	55 yrs	40 yrs
% of Capital Reinvestment*	0.71%	0.86%	1.12%	1.00%	1.75%	0.78%	1.35%

**% of Capital Reinvestment = Capital Reinvestment $ / Current Replacement Value of the Drinking Water System*

$$\text{Reinvestment \%} = \frac{\$12.7\text{ M}}{\$1{,}794\text{ M}} = 0.71\%$$

- 2020 Asset Management Plan includes:
  - Water Assets Replacement Value - $1,794 M (18.6%)
  - Wastewater - $2,461 M (25.6%)
  - Total City Assets - $9,630 M

Observations

- Markham's Water Assets Capital Reinvestment % is comparable to other municipalities reporting their capital reinvestment data to National Water Wastewater Benchmarking Initiative (NWWBI). Markham's capital reinvestment is also comparable to NWWBI's recommendation of renewing 1% of water system assets annually as a best management practice.
- The municipalities identified in the table were selected for comparison because they have similar watermain average age or total watermain inventory as Markham.

Conclusion

- Markham's water assets capital renewals are planned based on the age of infrastructure, location, number of breaks, other capital projects, etc. and are not accelerated by the increase in watermain breaks.
  - Capital re-investments are not directly correlated with watermain breaks, but the cumulative effects of investments makes a difference.
- Markham replaces the cast iron watermain, which are almost at the end of service life in the areas where Flood control programs are implemented in order minimize disruption to the community twice, by planning both upgrades at the same time.

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Attachments:

None

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