PROTECT OUR WATER
PROTECT OUR FUTURE

Stormwater Infrastructure Funding Study

Public Education Session

May 27, 2015

7:00 – 9:00 pm

City Hall, Multi-Purpose Room Level 100

VAUGHAN

What is the Stormwater Infrastructure funding study?

- Purpose of the Stormwater Infrastructure Funding Study
  - Develop a comprehensive stormwater program
  - Decide how we are going to fund it

Stormwater Management 101

What is stormwater?

- Stormwater is rainwater and melted snow that runs off lawns, streets and other land surfaces. Hard surfaces such as pavement and roofs prevent precipitation from naturally soaking into the ground and increase run off.

Why do we need to "manage" it?

- Stormwater runoff if not treated or managed before discharging into local water bodies can result in flooding of roads, homes and businesses; can contribute to stream and creek erosion; can carry pollutants to local water bodies.

Stormwater Management 101

A Paradigm Shift in Stormwater Management over the past decade

Past:	Now:
• Stormwater is a nuisance – flood control through rapid discharge	• Focus on protecting infrastructure assets: Aging systems require maintenance and replacement/retrofits
• Transportation safety – ditches, ponds and road drainage	• More emphasis on source controls and retaining on-site
• Separate – do not overload the wastewater plant	• Climate change requires hazard mitigation – increased design standards and adaptation planning
• Protect my property – upstream stormwater quantity controls (ponds)	• Stream restoration and habitat protection more of a priority

Stormwater Management 101
Challenges

- Aging Infrastructure and Growing Community
- Legislated and Functional (proactive) Maintenance Needs
- Flood Safety and Mitigation
- Regulatory Requirements
- Water Quality Protection

New catchbasin installation

Erosion causing failure of a stormwater outfall

Stormwater Management 101

Stormwater management pond dredging to remove captured sediment

Stormwater inlet safety grate cleaning after runoff event

Maintenance Needs

Stormwater Management 101

Intersection flooding, Rivermede Road and Bowes Road
September 2, 2012

Partially blocked curb/gutter drain reducing stormwater capture efficiency

Flood Mitigation

Stormwater Management 101

Street sweeping improves water quality of downstream receivers

Receiving waterbodies may be susceptible to nutrient loading

Water Quality Impacts

Vaughan's Existing Stormwater System

- The public portions of the City's stormwater system include:
  - Over 1,000 km of pipes
  - Approx. 12,000 manholes
  - Over 18,000 catch basins
  - 555 storm sewer outfalls
  - Over 2,500 culverts
  - 143 stormwater ponds
  - 28 km of drainage ditches

- Value of existing stormwater system is approximately $1.3B

Costs of Stormwater Maintenance

Stormwater Maintenance	2015	2016	2025
	(constant 2015 $)		
Operating and maintenance costs for urban stormwater management (collection, conveyance, storage, treatment, outlet) per kilometre of drainage system (e.g. storm sewers)	$5,326	$6,069	$7,704

Source: 2015-2025 Operating Cost Projections

Maintenance Activities

Capital Investment Program Coordinator	Flushing & Cleaning	Sample/Contamination Inspection
Capital Program Project Management	Inlet/ Outlet Inspections, Cleaning & Repairs	Service Investigations
Catch Basin Inspections, Cleaning & Repairs	Lateral Repairs	Spills and Cleanup
Contractor Oversight	Manage & Update Asset Database	Storm Sewer Inspections, Repairs & Cleaning
Cross Connection Investigation	Manhole Inspections & Repairs	Street Sweeping/Litter Control
Culvert installation/maintenance	Material Disposal	Subsurface Drain Repairs
Curb & Gutter Repair	New Development Inspection	System Inspections and Investigations
Ditch/Watercourse Inspections, Cleaning & Repairs	Pond Management, Maintenance & Monitoring	Washout repairs
Drainage Channel Inspections, Cleaning & Repairs	Roadside Vegetative Maintenance	Winter drainage

Program Goal

Stormwater Management Program goal is to
protect public health and safety,
property and the environment

Current Program Gap Assessment

Program Area	Current Program	Potential Risks
Stormwater Operations and Maintenance	• Routine maintenance plus a reactive plan (complaint driven) • Not always able to stay ahead of the storms, keep all systems clear of debris	• Without increasing capabilities the priority work will not get done in time – continued risk of flooding, erosion, water quality impairment
Capital Improvements	• Limited staff to manage the numerous (> 50) projects identified, or manage external assistance • Only able to initiate 2 or 3 projects per year	• Potentially significant property damage, increase in risk to public health, safety, and loss of system performance
Asset Management	• Limited information on stormwater pond and sewer conditions • CCTV underway for underground system; limited pond stormwater monitoring	• Aging infrastructure left unrepaired may deteriorate to point that costly replacement required • Inefficient use of resources, inability to focus resources on areas where maintenance needed the most

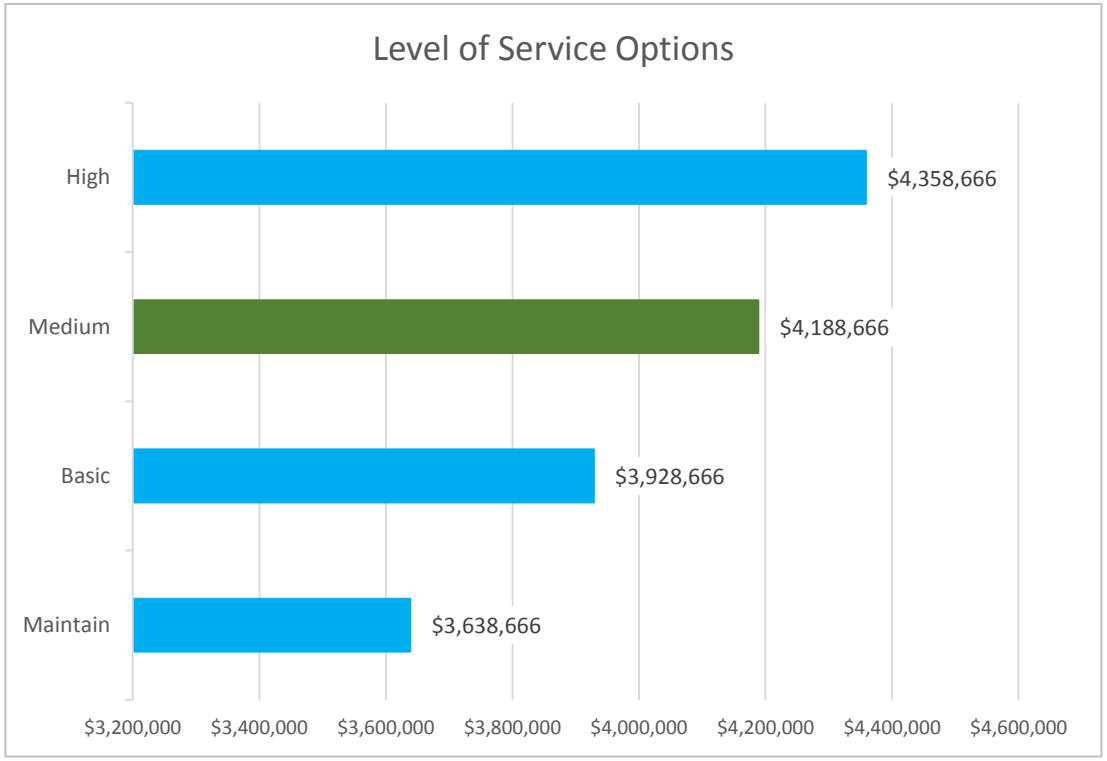
Address Gaps in Current Program

A strategy for change was evaluated for each gap:

- **Maintain:** continue with the current program
- **Basic:** refocus of existing resources or add funds as a first step in enhancement to respond to service needs
- **Medium:** addition of staff/contractor/materials to increase capability to address service needs in a moderate approach
- **High:** addition of staff/contractor/materials to address service needs as the highest priority in an aggressive approach

Operations and Maintenance

Risk: Deterioration of infrastructure increases performance failures resulting in flooding, poor water quality, and increased costs over time

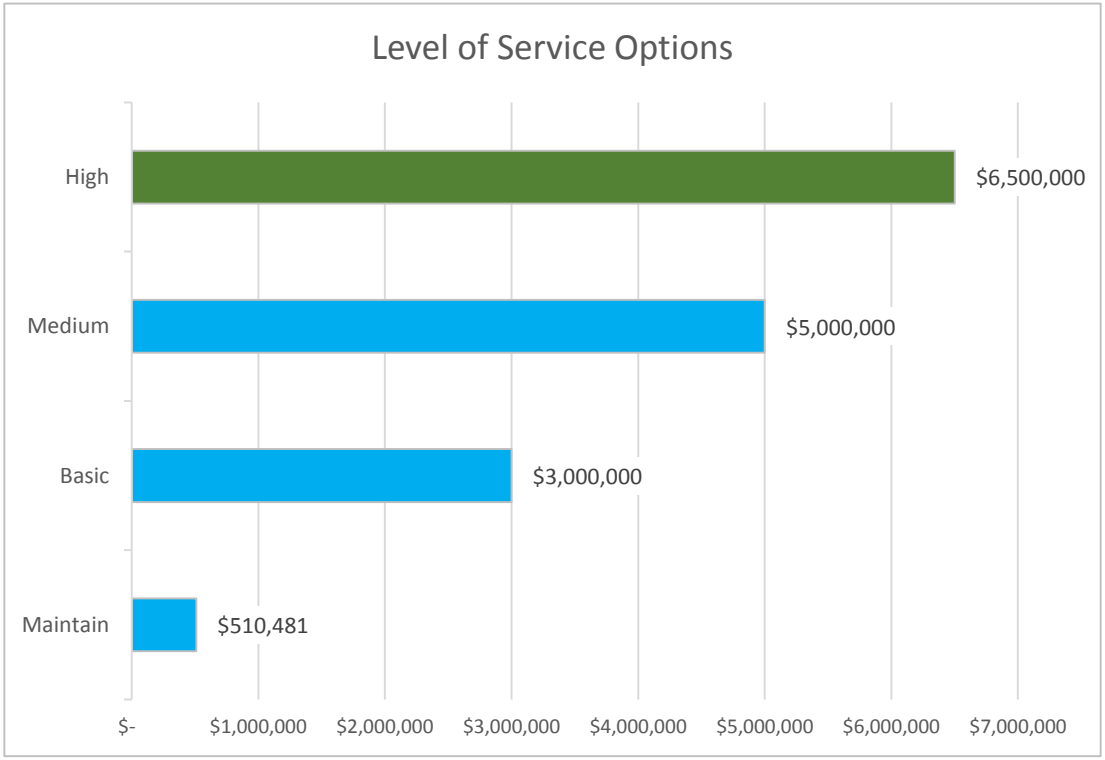


Outcomes

- **High**
  - **Add 1 field crew, plus equipment and larger increase maintenance budget**
  - **0.34% of asset value**
- **Medium**
  - **Add 1 field crew, plus equipment and larger increase maintenance budget**
  - **0.32% of asset value**
- **Basic**
  - **Add 1 field crew and increase maintenance budget**
  - **0.30% of asset value**
- **Maintain**
  - Reactive/routine maintenance
  - 0.28% of asset value

Capital Improvements

Risk: Not able to address high priority flooding, erosion, and water quality retrofits in a timely manner and capital backlog grows. Cause potential property damage, increase in risk to public health and loss of system performance

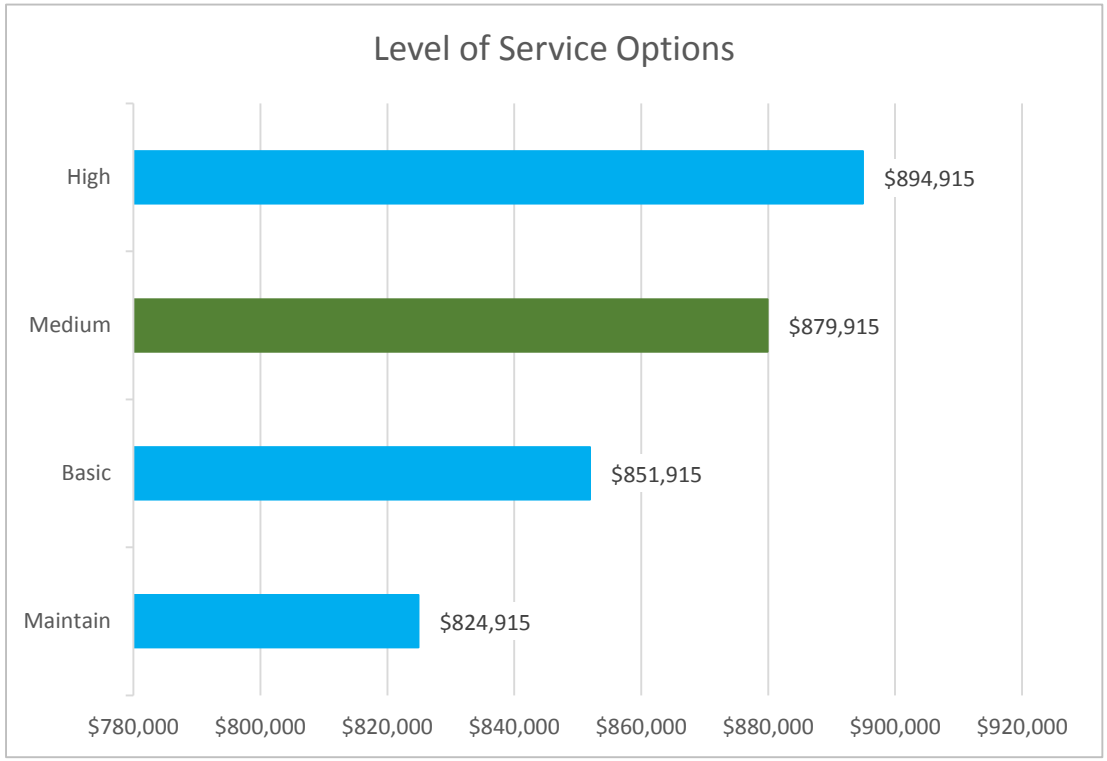


Outcomes

- **High**
  - **Increase spending to reduce backlog in 10 years**
  - **Additional staff resources**
  - **0.50% of asset value**
- **Medium**
  - **Increase spending to reduce backlog in 13 years**
  - **Additional staff resources**
  - **0.38% of asset value**
- **Basic**
  - **Increase spending to reduce backlog in 22 years**
  - **0.23% of asset value**
- **Maintain**
  - 1-2 projects annually
  - 0.04% of asset value

Asset Management

Risk: Backlog grows without capabilities to address in a timely fashion, continuing localized flooding and reduced water quality



Outcomes

- **High**
  - **Builds on Medium , adding 1km of storm sewer replacement annually**
- **Medium**
  - **Increase annual spending to address up to 1% of inspected pipes**
  - **Significant repairs addressed**
- **Basic**
  - **Continue CCTV inspections**
  - **Modest increase in annual spending**
- **Maintain**
  - Continue CCTV inspections
  - Emergency based response

Projected budget
- With improvements to Stormwater Program

2015-2025 Operating and Capital Forecast (based on level of service investments)

Expenditures	2015 Budget (constant 2015 $)	2016 Estimate (constant 2015 $)	Average Annual Increase (2017-2025)
Operating	$5,288,500	$6,031,100	2.8%
Capital	$510,500	$6,810,500	Constant
Total	**$5,799,000**	**$12,841,600**	**1.1%**

Funding Framework Options Assessment

Type of Charge	Rate Options/Basis of Calculation	Ease of Calculation	Linkage between Fee Paid and Benefit Derived Services	Cost of Administration	Users' Control over Charging Mechanism
Property Taxes	Tax rate applied to assessed value	Easy	Low	Low	Medium
Flat Rate per Property	$ / property	Easy	Low	Low	Low
Utility Rate	$ / m^3 of water consumption	Easy	Low	Low	High
Run-off Coefficient by Property Type	$ / unit (varied by type)	Medium	Medium	Medium	Low
	$ / m^3 of water consumption	Medium	Medium	Medium	High
Impervious Area Sampling by Property Type	$ / unit (varied by type)	Medium	Medium	Medium	Low
	$ / m^3 of water consumption	Medium	Medium	Medium	High
Run-off Coefficient by Actual Land Area per Property	$ / impervious acre	Hard	High	Medium/High	Medium
Impervious Area Sampling by Actual Land Area per Property	$ / impervious acre	Hard	High	Medium/High	Medium
Actual Impervious Area per Property	$ / impervious acre	Hard	High	High	High

Typical Annual Stormwater Charges of Other Municipalities

Municipality	Residential (Single-detached)	Non-residential (Small)	Non-residential (Large: > 10 acres)
Aurora	$57.34	$755.57	$755.57
Hamilton[1]	$87.01 (265 m^3 annual water consumption & 0.75-inch metre)	$348.75 (1,000 m^3 annual water consumption & 1-inch metre)	$1,619.18 (4,706 m^3 annual water consumption & 2-inch metre)
Kitchener	$125.76 (Residential Medium = footprint between 106 and 236 m^2)	$240.60	$11,923.44 (based on 30,351 m^2 impervious area)
London	$173.88 ($130.44 if no storm drain within 90 m)	$173.88	$14,468.40
Markham[2]	$47.00	$409.90 (based on $1,413,445 of current value assessment)	$8,204.25 (based on $28,290,520 of current value assessment)
Mississauga[3]	$100.00	$262.17 (based on 700 m^2 impervious area)	$11,367.57 (based on 30,351 m^2 impervious area)
Richmond Hill	$52.38	$152.20	$152.20
St. Thomas[4]	$90.72	$90.96	$12,568.80
Waterloo	$80.88 (Residential Medium)	$207.60	$7,915.08

[1] Combined wastewater and stormwater rates allocated by portion of Hamilton's 2015 Budget
[2] Non-residential rates in Markham are anticipated to be implemented in 2016. Shown rates for non-residential properties have not yet received council approval.
[3] All stormwater rates in Mississauga are anticipated to be implemented in 2016.
[4] St. Thomas' 2014 rates

Please let us know your thoughts….

- **Provide feedback** on the study
- **Identify** ways to manage stormwater on your property
- **Visit** Vaughan.ca/stormwater

Next Steps

Upcoming Events (Tentative Dates)

- Presentation to Finance, Audit and Administration Committee – June 15, 2015
- Final Report – Fourth Quarter 2015