

### Findings Summary: Review of Stormwater Evaluation Report

1.	Existing Gaps	Description
a)	Low Impact Development (LID) Standards and Governance Structure	Lack of standards related to the implementation of LIDs which can result in varying degrees of functionality.
b)	Official Plan and Stormwater Management Practices in Parkland and Urbanization Impacts	Stormwater features are generally compatible adjacent to parkland but must not remove the function of providing open space for use by residents. Community pressures to urbanize rural and industrial road cross sections without sidewalks or ditches, which can force additional capacity into the storm sewer or combined sewer systems.
c)	Maintenance, Enforcement, Tracking and Awareness of Private Stormwater Infrastructure	The City has no authority to inspect private stormwater infrastructure approved as part of the site plan process other than as part of the site plan inspection process. There is no assurance that the private infrastructure is performing as designed, or that infrastructure hasn't been altered or removed.
d)	Resources to Manage Stormwater Lot Level Controls on Public Infrastructure	The management of lot level controls are not part of the core responsibilities of the Energy, Fleet & Facilities Management and Engineering Services Divisions and takes resources away from their core programs.
e)	Planning of Stormwater Mitigation in Parkland Assets	New parks are not always draining sufficiently or comprised of good quality fill materials that would allow for natural infiltration processes. During development, parkland is often used for staging or stockpiling, leading to compacted soils and compromised infiltration.
f)	Developing Experience and Increasing Workloads in Unexpected Areas	Limited operational resources in HW that oversee the operation and maintenance of stormwater assets and other drainage related infrastructure. The Project Manager that is the City's Drainage Superintendent appointed by Council has accountability for the operations and maintenance of \$336M of assets which is a portion of the stormwater assets HW is responsible for.

g)	Major/Minor Stormwater Systems	For historical systems, the City is lacking hydraulic modelling analysis of major system drainage elements, such as stormwater management facilities, natural watercourses, open channel drains, overland flow channels, or major system drainage pipes. Public Works is not actively assessing major or minor stormwater system performance during extreme events and there is no Division currently responsible for establishing levels of service standards and strategic planning to mitigate major system flooding.
h)	Asset Management	General operation and maintenance, typically on a reactive basis, is performed on stormwater management facilities, watercourses, municipal drains and outfalls/shorelines, there is no proper asset management program that identifies a capital inspection schedule, responsibility for the capital inspections or responsibility for the management of a repair that requires engineering design and construction. There are many unknowns about the stormwater assets and there is a significant amount of information that needs to be collected before gaps in the program can be analysed.
i)	Regulatory Compliance	The City cannot locate an ECA for 34% or 49 of 143 stormwater management facilities (2020 stormwater management facility inventory), as well as some ECAs for LID features. Stormwater staff will need to work through this information gap to ensure that the stormwater management facilities are monitored and operated within regulatory requirements. Compliance requirements typically dictate the maintenance schedule for each stormwater management facility and some LID features as they are the main driver behind activities, such as pond cleanouts.

j)	Stormwater Management Facilities	Major maintenance of stormwater ponds, such as dredging, and disposal of accumulated sediments is undertaken based on priorities derived from monitoring of sediment accumulation and associated decrease in facility performance rather than on a preventative/proactive approach. Projection that an additional 100 stormwater management facilities will come on-line over the next 20 years as a result of growth. Growth Management has forecasted 20 additional facilities will be assumed by the City by 2022 alone. An increase in the baseline level of service to establish a pond monitoring and inspection program and address repairs is required to keep up with growth.
k)	Watercourse Assessment, Natural Heritage System Enhancements, Erosion Risk Mitigation, Inspection, Maintenance and Inlet/Outlet Monitoring	Physical inspections of watercourses for erosion or inspection of assets located along watercourses is irregular and not undertaken as part of a formal program. There are irregular inspections and no proactive maintenance of the 145km of City-owned watercourse. Hydraulic modelling of the major system and predictive modelling of watercourse performance during wet weather events is not completed by the City on a consistent basis. As a result, the City is limited in its ability to rapidly conduct post flooding studies to identify and address any contributing factors to the flooding event and highlight potential hazards to shoreline assets.
l)	Easements	The City lacks a program for inspection or maintenance of drainage easements. Currently, inspection and maintenance of drainage easements are not completed on a consistent schedule and, typically, only on a reactive basis. Additionally, negotiating a resolution for easement encroachments falls on HW staff which diverts a great deal of staff resources and time.
m)	Municipal Drains	This program has been reactive with no preventative maintenance activities. In failing to invest in the on-going need for erosion protection and restoration, bank failures will impact stormwater quality, channel capacity and private property, resulting in costly investments to deal with emergency repairs.
n)	Stormwater Water Quality Policy Development,	Responsibility within the City for policy development, monitoring and management of

	Monitoring and Management	quality of stormwater or natural watercourses has not been clearly established.
o)	Stormwater Management Facility Capacity Tracking and Allocation for New Growth	There is no comprehensive tracking program that monitors the impacts on the existing downstream stormwater management facilities to ensure they are functioning as originally intended.
p)	Administration	The City lacks a harmonized approach that clearly outlines the roles and responsibilities of each group to ensure that a holistic and consistent coordination of administrative activities is achieved.

2.	Immediate Risks and Needs to the City	Description
a)	SWM Ponds Lacking Assessment	There are a number of SWM ponds that have not been assessed for water quality performance since they were built and may not be performing as intended.
b)	No City-wide Hydraulic Model that is Fully Connected Between the Minor and Major Systems	The City cannot accurately predict overland flow and pipe flow during extreme storms. As a result, the City has insufficient visibility on where these systems are undersized and further, which streets or neighbourhoods are susceptible to flooding.
c)	Missing Asset Information	HW does not have complete information or assessments completed for two (2) stormwater pump stations acquired in 2019. These assets are not captured under a formal AM program. As a result, the condition of these stations is not being recorded and tracked, leaving them susceptible to failure over time.
d)	Ownership and Resources for Capital Inspections	There is a need to define ownership and resources required for capital inspection programs to ensure that stormwater assets are functioning as per original design.
e)	Culverts Less than 3.0m in Diameter	Traditional like-for-like replacements is common practice which poses the challenge that improvements outlined in current design standards and needs identified by local stakeholders are not captured.
3.	Risks from Climate Change and Extreme Weather	Increased forecasts to changes in rainfall intensity, drought conditions, and extreme precipitation can lead to damage from flooding and/or washout of

		private and public infrastructure, and lead to wastewater bypass events in the combined sewage system. Increased occurrences and size of storms are risks to existing assets that may be undersized, therefore leading to public and private infrastructure flooding. There is also a risk that major stormwater paths or systems do not exist in some parts of the City leaving streets and neighbourhoods vulnerable to flooding. The forecasted changes in lake levels identified above will impact shoreline protection assets and the functionality of combined sewage outfalls potentially creating inflow of lake water into the combined sewer system which leads to capacity issues and impacts to the functionality of combined sewer overflow tanks
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4.	Levels of Service that the City Should Strive to Achieve and Funding Requirements	Description
	Levels of Service	The SWMP must strive to achieve the necessary quality and quantity controls for stormwater that protect private and public infrastructure, the natural environment, and maintain compliance with legislation.
	Funding Requirements	The City should allocate between \$16.6M/year to \$20.7M/year toward capital reinvestment to maintain SWM assets in a state of good repair. The capital reinvestment rates are 1-3%. The City should allocate \$15.5M/year toward O&M reinvestment rates. These O&M annual reinvestment rates range from 1-3%. The SWMP has been underfunded by approximately \$10M/year - \$14M/year.

5.	Financing Alternatives	Description
a)	Water, Wastewater and Storm Rate Budget	Currently, the SWMP is principally funded through the combined Water, Wastewater and Storm Rate Budget. This practice could continue, but in order to adequately fund the needs across all programs, water and wastewater rates would need to increase more steeply than current forecasts and additional

		debt financing would likely be required for the capital program.
b)	Stormwater Rate Program	A dedicated stormwater rate would alleviate the challenge of funding the stormwater program from rates collected to support the water and wastewater programs. In addition, implementing a dedicated stormwater rate would introduce an element of fairness in how the City financially supports infrastructure and related programs.
c)	Tax Support Budget	Option to transfer more or all of the costs associated with the City's SWMP to the Tax Support Budget. This would alleviate the stormwater pressure on the Water, Wastewater and Stormwater Rate Budget, and may resolve the concerns about the equitability of collecting revenue to support the SWMP based on the volume of potable drinking water used at a specific property.