



## **Staff Report for Council Meeting**

**Date of Meeting:** October 13, 2021

**Report Number:** SRPI.21.065

**Department:** Planning and Infrastructure

**Division:** Infrastructure and Engineering Services

**Subject: SRPI.21.065 – Response to January 27, 2021  
Member Motion - Permeable Pavement Solutions to Address  
Climate Change, Secondary Suites and Stormwater  
Management for Driveways, Sidewalks and Parking Lots**

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### **Purpose:**

To report back to Council with a review of the Member Motion brought forward by Councillor Muench entitled “Permeable Pavement Solutions to address Climate Change, Secondary Suites and Stormwater Management for Driveways, Sidewalks and Parking Lots” adopted at the January 27, 2021 Council meeting.

### **Recommendation(s):**

- a) That this report be received for information purposes.

### **Contact Person:**

Dan Terziewski, Director, Infrastructure Planning and Development Engineering

Jeremy Wychreschuk, Manager, Water Resources

### **Report Approval:**

**Submitted by:** Kelvin Kwan, Commissioner of Planning and Infrastructure

Paolo Masaro, Executive Director, Infrastructure and Engineering Services

**Approved by:** Mary-Anne Dempster, City Manager

All reports are electronically reviewed and/or approved by the Division Director, Treasurer (as required), City Solicitor (as required), Commissioner, and City Manager. Details of the reports approval are attached.

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### Background:

At the January 27, 2021 Council Meeting, a Member Motion (see Attachment #1) was brought forward by Ward 2 Councillor Muench in regards to the implementation of permeable pavers as a stormwater management solution for Richmond Hill. This staff report is in response to Council's direction for staff to report back and provide information on the Motion and the comments raised by Council.

Staff from various City Divisions, including Finance, Infrastructure Planning and Development Engineering, Planning, Public Works Operations, Building, and Infrastructure Delivery Services have reviewed the Member Motion and its implications to City planning and development, capital projects, financial sustainability and the function of the City's stormwater management system. This staff report provides Council with a response to the intention of the Member Motion with associated background information for context.

The Member Motion brought forward by Councillor Muench has a number of statements about the desire for staff to implement the "spirit and intent" of the motion. City staff have reviewed the Motion that is focused on three primary areas;

1. To use permeable pavers as a stormwater management solution to ongoing City intensification and future capital projects;
2. To provide credits towards the stormwater rate fee for the installation of permeable pavers to City residents and development companies who install such products on residential, multi-residential and non-residential (commercial and industrial) properties; and
3. To implement incentives/credits towards the stormwater rate fee for the installation of other source control measures.

In order provide information and context to Council regarding the Member Motion and its three primary areas of intent, staff have divided this report into four main sections:

- Stormwater management in the City of Richmond Hill;
- Policies, program and initiatives that guide and support stormwater management and the spirit of the resolution;
- Financial sustainability considerations for stormwater management and implementation of a credit system; and
- Implementation challenges and other considerations.

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### **Stormwater Management in the City of Richmond Hill:**

Stormwater management (SWM) is the implementation of infrastructure and naturally designed systems to mitigate and control the impacts of changes to runoff from rainfall, snowmelt and human activities as well as natural components of the hydrologic cycle. Human activities that change runoff patterns include such actions as modifications to drainage, changes to streams and other conveyance systems, and land use changes such as development and intensification.

#### **Stormwater practices in Ontario have evolved and continue to evolve over time to address the needs of climate change, intensification and best management practices**

Techniques employed to control stormwater have evolved over the past several decades since the early practice of modern stormwater system design. Prior to the 1970's, SWM primarily focused on the design of infrastructure that moved water to a downstream receiving watercourse in the most efficient way possible. This predominately included the construction of storm sewer pipes and drainage channels as well as the straightening and hardening of natural streams.

One of the first major changes of SWM in Ontario included the use of end-of-pipe SWM facilities to reduce downstream flooding. Richmond Hill started building these types of flood control only storm ponds in the late 1970s, which were often integrated right into an existing natural feature such as a stream or wetland.

The practice of SWM further evolved in the early 1990's based on Provincial guidance with respect to "integrated watershed planning" of stormwater systems. This included water treatment and erosion control in storm pond design, and the construction of online facilities within valleyland systems was removed as an option. Natural channel design (where channels are built to mimic creeks and rivers) also became common at this time.

#### **Stormwater in the City of Richmond Hill is managed as a holistic "treatment train" system through a network of on-site control measures, municipal infrastructure and existing natural features**

The current approach to SWM is referred to as the "treatment train", where multiple SWM techniques are implemented one after the other based on the optimal combination of source control, water conveyance systems (channels, sewer pipes, oil-grit separators) and end-of-pipe facilities that provide flood control, water treatment and erosion control.

The latest evolution of the "treatment train" approach includes an increased focus on controlling stormwater at the source through the use of Low Impact Development (LID) infrastructure (sometimes called Green Infrastructure). The intent is to try to contain as much stormwater as possible within a site, and to maintain the water balance of the site

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as close as possible to pre-development levels by making more water go into the ground rather than flow on the surface. LID infrastructure manages water where it hits the ground or melts and reduces the burden of the other downstream stormwater system components.

The City of Richmond Hill currently owns and operates an extensive system of stormwater management infrastructure. The stormwater system includes over 540 km of storm sewers, 17,000+ catchbasins, 90+ SWM facilities, more than 115 oil-grit separator units, 1,300 culverts, 50+ LID and over 150 km of watercourses. The City has an ongoing SWM 10-Year Forecast that is executed annually to deliver storm pond rehabilitation and valleyland restoration projects.

### **Source control is the first step in the stormwater “treatment train”, but the need for the other components of the system cannot be eliminated**

As the first step of the stormwater treatment train, source control through LID infrastructure is designed to primarily service small drainage areas (< 2 hectares). These types of controls generally have two mechanisms: 1) storage, and/or 2) infiltration. Storage controls have the ability to provide some level of peak flow reduction, water balance, volume diversion/flood control and water conservation, while infiltration controls can provide benefits to water balance, groundwater recharge, flood control, water quality treatment and erosion control.

LID infrastructure is typically intended to manage smaller and less intense storm events, so downstream infrastructure is still required to manage larger and more intense storm events to mitigate flooding and property damage. Table 1 below provides some examples of source control types already installed and in-use in Richmond Hill.

**Table 1: Low Impact Development Types Existing in Richmond Hill**

<b>Storage LID</b>	<b>Infiltration LID</b>
Rooftop and parking lot storage	Permeable pavers/pavement
Green roof	Exfiltration pipe
Rain harvesting/sub-surface storm chamber	Infiltration channel or swale
	Rain garden

Since LID infrastructure is typically designed for smaller rainfalls (less than a 2-year storm event), it is important for their designs to have overflow capacity to the larger system such as the storm sewer network or riverine system for when water cannot infiltrate and becomes runoff. Most storm sewer networks are designed to handle a

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larger 5 to 10-year storm event, and other types of infrastructure, such as storm ponds, are designed to handle more extreme storms such as the 100-year storm event or greater. All components of the stormwater system “treatment train” are required and important for safe and efficient stormwater management.

Designers of LID infrastructure also need to consider certain critical scenarios when conditions are not ideal and infiltration capacity is significantly reduced, such as when pore spaces get clogged over time or when rain falls in the winter and the ground becomes frozen such that it no longer permits infiltration (a scenario that is becoming increasingly common due to climate change).

The type of LID chosen for a site is also important and depends on the site-specific conditions of the location. For instance, infiltration controls work best when they are designed to treat mostly clean stormwater (such as from roofs or foundation drains). These controls tend to clog easily when the runoff contains high concentrations of suspended sand and silt (like when they are near a road), which will significantly reduce its effectiveness. It is a SWM best management practice to evaluate all of the different types of LID “tools” in the “tool box” for any site and choose the best-suited option for maximum functional effectiveness and greatest value for the cost.

### **Permeable pavers and pavement is one “tool” in the LID “toolbox”, but all options must be carefully considered to make sure the right technique is implemented**

Permeable pavers and pavements are hard surfaces (concrete, asphalt, paver blocks) that allow some water to infiltrate into the ground rather than immediately turning into surface runoff. As noted in Table 1, permeable pavers/pavement have been used in the City and are one specific subset of this type of source control which can be considered as part of the overall LID “toolbox”. However, the use and applicability of this LID option needs to be carefully considered to ensure efficient SWM for the cost of building the infrastructure.

The design for a permeable paver or pavement system must consider more than just the hard and permeable surface, but also the subsoil bedding and subdrain components underneath as part of the infrastructure. This is a very important parameter since soil conditions in many areas of Richmond Hill tend to have higher percentages of clay, which results in low infiltration capacity and poor performance. Another critical site parameter is groundwater level since many areas of the City (such the Humber River watershed to the north) have high groundwater conditions (at or just below the surface), which would significantly reduce the ability for any water to infiltrate into the ground, making this type of source control ineffective.

Regardless of the design, an overland flow route from a permeable paver surface treatment needs to be installed in order to ensure safe conveyance of flows that exceed the infiltration capacity of the paver and/or media during larger storm events, and to accommodate overflows due to clogging of the porous spaces over time.

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### **Policies, Programs and Initiatives that guide and support Stormwater Management and the spirit of the resolution:**

There are a number of policies, programs, initiatives and practices in place or currently under development at the Province of Ontario, Toronto and Region Conservation Authority (TRCA) and in Richmond Hill to further guide and promote sound stormwater management, and which support and align with the intent of the Member Motion to minimize impacts related to stormwater now and in the future.

#### **The Province of Ontario and TRCA provide policies and guidance for the management of stormwater that gives the City of Richmond Hill direction on the implementation of source control and LID infrastructure**

##### *Provincial Policy Statement*

In 2020, the Province updated the Provincial Policy Statement (PPS), which is the document that provides municipalities with direction on the planning environment of their jurisdiction. This updated document includes planning direction for SWM infrastructure and provides references to source control in parts of Clause 1.6.6.7 when it notes that “Planning for stormwater management shall:

- minimize erosion and changes in water balance, and prepare for the impacts of a changing climate through the effective management of stormwater, including the use of green infrastructure; and
- promote stormwater management best practices, including stormwater attenuation and re-use, water conservation and efficiency, and low impact development.”

This text in the new PPS is very specific about the promotion of minimal changes to water balance (a design component of source control) and the use of LID and green infrastructure.

The PPS also provides the City with direction on land use planning matters of Provincial significance in Ontario. Section 2.2.1 states that planning authorities shall protect, improve or restore the quality and quantity of water.

##### *Ministry of the Environment, Conservation and Parks (MECP) Policies and Manuals*

The Provincial policies related to how stormwater infrastructure is designed and managed in Ontario are set out in the Stormwater Management Planning and Design Manual that was released by MECP. This manual outlines the requirements of a stormwater “treatment train” approach, which includes the use of source control. The manual also provides criteria with respect to flood protection, water quality treatment

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and erosion control that new development and the City must meet when designing new infrastructure.

The MECP is also in the process of drafting a supplementary guideline to their stormwater manual that provides source control requirements for all new SWM systems in Ontario with Runoff Volume Control Targets. This control target will dictate to municipalities, including the City of Richmond Hill, how much water needs to be managed through source control before any excess runoff is controlled by other conveyance or end-of-pipe infrastructure. This supplemental document is expected to be finalized and in-place in 2022 or 2023. Any related City policies and practices will be updated and adjusted as required to conform with this document.

### *Oak Ridges Moraine Conservation Plan*

The Oak Ridges Moraine Conservation Plan contains additional specific policies and guidance on how SWM needs to be designed within the Oak Ridges Moraine. This applies to the northern portion of Richmond Hill that overlaps with the Oak Ridges Moraine natural feature. This document has references to source control in this area, with the inclusion of text regarding the need to “incorporate appropriate low impact development techniques and green infrastructure elements” with new development.

### *Source Water Protection Plan*

The CTC Source Protection Plan is a strategy and suite of policies that outlines how water quality and quantity for municipal drinking water systems will be protected. The majority of the City is located within a Well Head Protection Area (Recharge Management Area). As such, the CTC Source Protection Plan has a water quantity recharge policy (Rec-1) that controls recharge to an aquifer, which requires new development and site alternations under the Planning Act to implement best management practices such as LID with the goal to maintain local water balance and recharge to pre-development levels. This serves to protect, improve or restore vulnerable surface waters and groundwater, and ensure recharge reduction does not become a significant drinking water threat.

Although Richmond Hill has no municipal drinking water sources, staff must have regard for Areas of Highly Vulnerable Aquifers (HVA) and Significant Groundwater Recharge Areas (SGRA) when considering development applications or conducting City capital projects. Aquifers are areas that are more susceptible to contamination moving from the surface into groundwater, and a recharge area is characterized by permeable soils that allow water to seep easily into the ground and flow to an aquifer. The CTC Source Protection Plan is relevant towards the design and implementation of source control measures since the majority of LID infrastructure have infiltration into the ground as the primary SWM mechanism.

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### **The Toronto Region Conservation Authority (TRCA) provides guidance for source control and implements criteria that typically necessitates the construction of LID for new development**

The TRCA is mandated by the Province to implement SWM criteria within their jurisdiction, which includes the City of Richmond Hill. The Conservation Authority's "Stormwater Management Criteria" document was developed in 2012 to provide additional guidance with respect to the TRCA's specific water management strategies for their various watersheds. This document provides specific guidance on the four main criteria applied to the design of SWM infrastructure: quantity, quality, erosion and water balance, all of which pertain to source control.

TRCA is also a part of the Sustainable Technologies Evaluation Program (STEP) with Credit Valley Conservation and Lake Simcoe Region Conservation Authority. STEP works to undertake pilot projects of sustainable technologies and practices within a Canadian context, including several different types of LID techniques, such as permeable pavers. Through this work, STEP has created a resource that is continually updated regarding the different types of LIDs and provides information related to planning, design, construction, inspection, maintenance, lifecycle costs and performance. The City uses the information developed by this group for guidance with SWM infrastructure design and maintenance, including LID and green infrastructure.

### **Based on guidance from the Province and TRCA, the City of Richmond Hill has a number of policies and initiatives that support the spirit of the Member Motion**

Building on the policies and directions from the Province and TRCA, the City has policies, documents, initiatives and programs in place or currently under development to support the "treatment train" approach to SWM and encourage, promote and require the use of LID features to control stormwater at the source.

### **The City's existing Official Plan currently contains policies that promote, encourage and require the use of source control and LID**

The City's current Official Plan (2010) has language referring to source control and LID features for new development in a number of areas. For instance, Clause 3.1.9.2 (Stormwater Management) has a number of references to source control such as "infiltration and retention through permeable surfaces" and "low impact development techniques" as indicated below.

- In areas where soil types and site size would permit, the City shall require on-site infiltration and retention through permeable surfaces, bioswales, and other innovative alternatives to the practice of collecting and piping stormwater runoff.
- Development shall be required to incorporate, where appropriate, low impact development techniques to minimize changes to the water balance on the development site, provide appropriate quality and quantity control of runoff at



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source, consider the watershed plan and its associated water budget and conservation plan objectives and to minimize change to the long-term recharge function to underground aquifers.

- Development shall be required to incorporate low impact development techniques that allow smaller rainfall events to be retained at source on the development site, to provide appropriate groundwater recharge at source. For the purposes of this policy, smaller rainfall events include storms within a 24-hour period with rainfall volumes of 5 mm or less. These storms are recognized to represent 50% of the annual average rainfall volume.
- The City shall require the preparation of comprehensive Master Environmental Servicing Plans, in accordance with Section 3.1.9.3 [Master Environmental Servicing Plans] of this Plan, and Stormwater Management Plans, in accordance with policy 3.1.9.2.8 of this Plan, to minimize stormwater volume and contaminant loads, and maximize infiltration through an integrated treatment approach, which may include techniques such as rainwater harvesting, runoff reduction of solids and materials at source, phosphorus reduction, constructed wetlands, bioretention swales, green roofs, permeable surfaces, clean water collection systems, and the preservation and enhancement of native vegetation cover.
- Local demonstration, pilot or monitoring projects shall be encouraged on public land and private land to increase public understanding of alternative stormwater management works and to test their performance.

Section 3.2.3 (Sustainable Design) of the Official Plan also references stormwater best management practices and source control when it states a requirement that:

- Development have an integrated and innovative approach to water management, be water efficient, and minimize stormwater volumes and contaminant loads and maximize infiltration through an integrated treatment approach. These may include techniques such as rainwater harvesting, runoff reduction of solids and materials at source, constructed wetlands, bioretention swales, green roofs, permeable surfaces, clean water collection systems, and the preservation and enhancement of native vegetation cover.

At present, the City is in the process of updating the Official Plan. As part of this process, staff will work with Council, stakeholders and the public to update and refine the policies of the Plan to continue to encourage, promote and require the use of source control, and to ensure conformity with the Regional Official Plan and other Provincial Plans such as the PPS, CTC Source Protection Plan and the Growth Plan, which all provide direction regarding the management of stormwater.

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### **The City's Environment Strategy provides direction for stormwater management initiatives and programs**

Richmond Hill implemented the Environment Strategy in 2014 with a focus of three categories: 1) Air Quality, 2) Water Resources, and 3) Land Resources. The 'Water Resources' category has the most direction for SWM initiatives, as outlined below.

- Developing a watercourse restoration plan (complete)
- Conducting a Master Drainage Plan (to follow completion of SWM model)
- Implementing the stormwater rate program (ongoing)
- Implementing the SWM 10-year capital program (ongoing)
- Developing a stormwater maintenance program (complete)
- Implementing a SWM monitoring and inspection program (ongoing)
- Updating SWM engineering standards, including LID standards (in process)

Other multi-disciplinary actions contained in the Environment Strategy complement the goals of stormwater management; for example, developing LID design guidelines, applying LID techniques to the construction or renovation of City infrastructure/buildings, and monitoring the effectiveness of LID technologies with stakeholders/partners. There is also direction to enhance the features and functions of our green infrastructure by incorporating ecological restoration with remediation works within our watercourses and valleylands.

Staff continue to implement programs and projects directed by this Strategy, and progress and accomplishments are reported to Council and the public annually. Over the next year, the Environment Strategy will be updated to consolidate actions and incorporate new actions to help address emerging issues and trends, which will continue to take into consideration the subject matter contained in the Member Motion.

### **The Development Approvals process already considers the use of LID features to control stormwater at the source as part of a comprehensive management strategy**

All new developments that are subject to Planning Act approval in Richmond Hill must meet or exceed the requirements of the City as well as external agencies such as MECP and TRCA. Stormwater management is an integral part of the approvals process and is considered for every proposed development.

Currently it is up to the applicant, in consultation with the City, Region and TRCA, to determine the stormwater "tools" or techniques that are best suited for the site in question that meets all of the relevant criteria. As it stands today, the City and external agencies have source control requirements that necessitate the design of LID infrastructure to meet water balance targets. For instance, a number of Site Plan applications over the past few years have installed infiltration galleries as the solution to the source control requirement set by the City and TRCA. Another example includes

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rooftop drain collectors, which have been designed in certain areas of the City to provide clean runoff to adjacent wetland areas so that these areas are not negatively affected by the new development. Permeable pavers would be considered one of the “tools” in this “toolbox”.

### **The City’s Sustainability Metrics help to further ensure source control is considered as part of new development applications**

Another innovative initiative includes the City’s Sustainability Metrics program which was recently updated (SRPI.21.019). Development proposals requiring the submission of either Site Plan or Subdivision approval, including residential (single detached dwellings are exempted), and industrial, commercial and institutional uses must accumulate “points” by committing to certain metrics in order to achieve a score above the mandatory threshold. The initiative provides the developer with different types of options to choose from in order to meet the City’s overall sustainable development objectives, providing developers with the flexibility to meet or exceed the minimum or aspirational targets based on development type and site suitability. There are four metrics specifically related to stormwater management, as listed below.

- Stormwater quantity
- Stormwater quality
- Rainwater harvest and greywater use
- Multi-purpose stormwater management

Green roofs are also included in the metrics and the installation of a green roof can be used in combination with the metric for ‘Reduce Heat Island: Non-roof and Roof’.

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### **The MECP Transfer of Review process requires City staff to ensure that all new stormwater infrastructure in the City meets the Environmental Compliance Approval criteria of the Province**

The City currently has delegated authority from the Province to approve certain stormwater infrastructure through the MECP Transfer of Review process. This allows staff to provide Environmental Compliance Approvals (ECAs) for individual infrastructure components provided they meet the criteria set by the MECP, including LID infrastructure.

The Province is currently in the process of changing the way stormwater infrastructure is approved and maintained in Ontario with a switch to a system-wide ECA. This change is currently rolling out and is expected to be complete in 2022. Although not all of the details are currently available at this time, it is expected that the City will have greater flexibility to approve new stormwater infrastructure more quickly and will have a greater duty to report the status of the SWM system as a whole to the Province on an annual basis. Of key note is that the system-wide ECA includes the approvals and reporting of LID infrastructure as a component of the City's drainage system.

### **The City's Enterprise Asset Management (EAM) Program will track all of the City's stormwater assets and prioritize the needed improvements**

The City has a robust Asset Management Plan that exceeds the requirements of O.Reg. 588/17 and has recently been approved by Council. This plan considers the interrelated strategies of 1) level of service, 2) asset lifecycle, and 3) risk management, to efficiently prioritize and fund the operation and maintenance of City infrastructure. Per the Provincial legislation, stormwater management infrastructure is considered a "core asset", and LID's are included under this category.

O.Reg. 588/17 requires each municipality to report on the resiliency of the stormwater management system to storm events. As enhancements to the stormwater system are planned and constructed, the infrastructure inventory will be updated in the EAM system and incorporated into future updates of the Asset Management Plan.

The City's EAM Program and approach to long-term asset planning enables efficient and appropriate management of infrastructure over the full lifecycle and supports continued corporate financial sustainability.

### **The City is developing a Stormwater Network Model for a "holistic" understanding of the state and function of the entire stormwater system, and will help to identify priority areas for source control**

Council approved the 2019 capital budget business case for the development of a stormwater computer model for the overall City stormwater system. The Stormwater Network Model is currently under development and will capture all SWM system components in the City, including storm sewers, storm ponds, catchbasins, culverts,

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LID, riverine/valleyland areas and wetlands. This computer model is expected to be functional by 2022.

Once the model is complete, it will give staff a better understanding of the state and function of the stormwater system as a whole, determine if there are any deficient areas that need attention and provide a better understanding of system-wide impacts due to changes to the stormwater network from such activities as new development or climate change. The Stormwater Network Model also provides information needed for the Asset Management Plan and will provide staff with the ability to determine whether there is any infrastructure that needs to be improved to mitigate risks to human health, safety, property and the environment.

Since conditions in certain parts of the City are less ideal for certain types of LID due to soil or space constraints, one of the key value-added components of the Stormwater Network Model will be to provide staff with the ability to determine optimal areas of the City where implementation of source control and LID measures (such as permeable pavers) would provide the greatest value to the stormwater system and the lowest risk to the City.

### **An update to the City’s Engineering Standards and Specifications is underway and will include an LID “toolbox”**

The City’s Engineering Standard and Specifications Manual is currently undergoing a major update. As part of this project, the chapters on Stormwater Management, Storm Sewers and Erosion & Sediment Control will be updated. LID standards do not exist within the current Engineering Standard and Specifications Manual, but these will be created as part of this project. The update will include details and requirements for all types of LID options acceptable for implementation in Richmond Hill, including permeable pavers/pavement.

The updated Engineering Standard and Specifications Manual project is expected to be complete by 2022.

### **The City’s stormwater capital projects are designed and implemented based on guidance from all City and external agency policies, plans, programs and standards**

City-owned infrastructure is constructed, managed and maintained to ensure it functions properly as a holistic “treatment train” system and that it is in compliance with Provincial requirements. From this perspective, all of the policies, plans, programs and tools noted in this document are used to guide design of stormwater infrastructure in the City and prioritize capital projects within the 10-year capital project forecast. This forecast is augmented with the development of the EAM Program that helps balance the City’s infrastructure management needs with its financial constraints and risk tolerance.

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Stormwater management infrastructure comprises a significant component of the City's overall 10-year capital project forecast.

### **The use of permeable pavers to expand parking on residential properties will be evaluated through the City's Comprehensive Zoning By-Law review**

City staff are currently undertaking a Comprehensive Zoning By-law review that seeks to develop a single City-wide Zoning By-law. The consideration of changes to such by-laws as the City's existing Front Yard Parking and Landscaping By-law (By-Law 84-03) are included as part of this initiative. The City has retained a consultant to carry out a Residential Parking and Landscape Requirements Technical Paper, which amongst other matters will evaluate the existing permissions for front yard parking and landscaping.

It is recommended that the use of permeable pavers/pavement systems related to zoning matters be considered holistically as part of the Zoning By-law update in combination with the update to the City's Engineering Standards and Specifications Manual.

### **City staff are in the process of implementing a Backwater Valve Subsidy Program**

Council approved funding for a Backwater Valve Subsidy Program as part of the 2021 Water, Wastewater and Stormwater Operating Budget as a direct response to the January 11, 2020 storm event. The program will be offered City-wide and will provide a subsidy of \$1,500 towards the purchase and installation of a backwater valve. Future funding of this program will be considered with future annual water and wastewater rate approvals. It is important to note that this subsidy program is related to protection from sanitary sewer backup risks and is not directly related to stormwater management as the sanitary and stormwater sewer pipe systems in Richmond Hill are not connected.

## **Financial Sustainability Considerations for Stormwater Management and Implementation of a Credit System:**

Fiscal sustainability has always been a key consideration for staff with respect to the ongoing management of stormwater.

### **A Stormwater Rate has been implemented by the City of Richmond Hill to address the growing financial pressures of managing stormwater infrastructure and to reach fiscal sustainability into the future**

Historically, Richmond Hill funded projects and performed maintenance on City-owned stormwater infrastructure using money from the Water Quality Protection Reserve Fund created using proceeds of the sale of Richmond Hill Hydro in 2003. In 2013, it became apparent that the funds set aside for ongoing SWM would be inadequate with respect to the City's ability to operate and maintain its SWM infrastructure in the future. As such,

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Richmond Hill became one of the first municipalities in Ontario and Canada to implement a dedicated stormwater charge to ensure that fiscal resources would be available to manage this infrastructure over the long-term.

At the time, Council approved a by-law that allowed for a two-tier flat rate fee to be charged, with the revenue dedicated to stormwater projects (SRCFS.13.007). The fee approved at the time was a simplified rate structure and did not implement a credit system in order to reduce administrative costs of the program. The structure of the approved stormwater rate was based on the recommendation of a study by Watson & Associates of the known City-owned stormwater infrastructure at the time and was intended to provide a sustainable funding source for operational and capital needs.

The approved implementation strategy of the user fee was to phase-in the charge over a number of years towards a sustainable level so residents had time to adjust to the charge. The forecast provided to Council at the time of approval was for an average annual rate increase of 25% for the first few years, with Years 1 and 2 having increases of 52% and 44%, respectively. However, in the years that followed the by-law implementation, the actual approved increases to the rate were much lower than the original phase-in strategy, with 0% and 10% being approved in the first and second year, respectively, and 9% being approved the following three years.

### **The Stormwater Rate was updated in 2020 to account for new infrastructure**

Due to the lower-than-expected revenue sources and the addition of new stormwater infrastructure that was not contemplated at the time (including LID infrastructure), City staff reviewed the stormwater rate in 2019 to determine what adjustments were necessary to ensure the Water Quality Protection Reserve Fund was not depleted in the near-term. Staff presented an updated rate structure to Council in 2020 (SRCFS.20.001) that would result in a more sustainable funding approach for the City moving forward that takes into account the existing needs of the City-owned SWM system. The new stormwater rate is a multi-tiered fee that takes into consideration property size and land use type, but is still kept simple to keep administration costs down. This new rate structure was approved by Council and is scheduled to be implemented in 2022.

### **The City's stormwater rate is not currently structured to include the implementation of a credit program for the construction of LID infrastructure**

As previously mentioned, none of the rate structures approved by City Council to-date have included the implementation of a credit program for stormwater management or the implementation of LID's in order to manage significant rate increases and administration costs. A typical credit program is normally applied towards the retrofit of existing development, where changes would provide post-development benefit to the City's overall system. However, it is also possible to apply credits to future development.

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The introduction of a credit system would require further evaluation and a fundamental change to the current stormwater rate and fee structure would be needed. The City's current rate structure does not account for the revenue reductions that would result from the implementation of a credit program. Furthermore, the cost impacts or benefits that a credit program would have on the long-term financial sustainability of operating the City's overall stormwater network have not been evaluated.

Any significant change such as the addition of a new credit program would need to be factored into any new rate structure so that the new program does not cause an increased financial gap that would hamper the City's ability to maintain its SWM infrastructure over the long-term and remain in compliance with Provincial approvals. The change would also need to be made carefully to ensure that it does not result in a significant financial burden on taxpayers without achieving an overall net benefit for the City systems.

There are also additional administration, monitoring and enforcement related costs that would need to be taken into consideration with respect to the management of a credit program and factored into the new rate. For example, the implementation of any credit program will require dedicated resources to administer and process the credit requests, as well as monitor and track that the benefits of the new credit system are being realized. There are also additional resources required to enhance and maintain the City's GIS database to allow for efficient processing of credit applications on a site-specific basis. A monitoring program will also need to be established that includes inspection and testing of LID infrastructure to ensure it is in place and functioning properly while the property owner is receiving the fee credit. Additional enforcement resources will also be need to ensure that any credited LID infrastructure is not altered or removed.

In addition, the rate categories within the City's exiting rate structure will need to be re-classified from the current general categories to ones that are more specific to the properties eligible to receive a credit. A new credit program will also have to investigate how warranty and maintenance periods are best implemented with a new rate structure.

### **Many municipalities with a stormwater rate do not include a credit program, and those that do generally only offer credits to non-residential properties**

Benchmarking was conducted to determine whether other similar and nearby municipalities have a credit program as part of their stormwater rate and how it is applied. Of the nine municipalities in York Region, Newmarket is the only municipality to include a credit program as part of their SWM rate with Aurora, Vaughan, Markham and Whitchurch-Stouffville having a SWM rate without a credit program. The City of Mississauga was also considered since the Member Motion specifically references this municipality. Mississauga does offer a credit program, but only for multi-residential and non-residential land uses. A summary of the benchmarking results is found in Table 2.



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**Table 2: Stormwater Credit Program Benchmarking of Nearby Municipalities**

<b>Municipality</b>  * denotes a York Region municipality	<b>Credit Program Offered</b>  (Y/N)	<b>Multi-Residential Credits</b>  (Y/N)	<b>Non-Residential Credits</b>  (Commercial, Industrial and/or Institutional)  (Y/N)	<b>Residential Credits</b>  (Y/N)
Markham*	N	-	-	-
Vaughan*	N	-	-	-
Aurora*	N	-	-	-
Whitchurch-Stouffville*	N	-	-	-
Newmarket*	Y	N	Y	N
Mississauga	Y	Y	Y	N

Most municipalities in Ontario that have a credit program apply their stormwater rate based on spatial mapping/GIS information related to specific properties. This is a different system than Richmond Hill as the City uses general categories only. None of the credit programs specify the type of LID infrastructure or product that is to be used, but they all have a list of eligible LID infrastructure types. The credits offered by municipalities vary with each jurisdiction based on the type of LID with fee reductions ranging from as little as 5% to a maximum of 50%.

Many municipalities have considered incorporating a residential credit program into their fee structure. For instance, Mississauga conducted research into this issue in the mid-2010's and determined that the incentives for residential properties had high administrative costs which likely outweigh any net savings to the City's stormwater program. Mississauga also conducted a review of their overall Stormwater Credit Program in 2019/2020 and noted that based on conversations with other municipalities, there wasn't a positive benefit associated with a residential program due to increased costs of administration, enforcement and program implementation, as well as the complexity of justifying credit amounts and poor uptake of the program.

While it is always possible to implement a credit system as part of a stormwater rate fee, it is advised that one only be added if the benefits outweigh the costs, will provide improvement to the overall SWM system and will result in a net benefit for the City systems.

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### **Changes to the current stormwater rate would require public consultation**

The addition of a credit program to the City's stormwater rate would result in a significant change to the overall rate structure. It is customary for staff to conduct extensive public consultation for such large shifts in policy with other levels of government, the development industry and the residents of Richmond Hill. Public consultation is already underway for other policy shift initiatives such as the update to the Official Plan, the creation of a Comprehensive Zoning By-Law and the update to the Sustainability Metrics. It is strongly recommended that feedback from the public and other stakeholders be received before changing the structure of the stormwater rate and adding a credit program.

### **Implementation Challenges and Other Considerations:**

#### **There are additional maintenance requirements and challenges associated with the use of permeable paving systems that need to be investigated which may increase the City's operating and replacement costs**

Permeable pavers and pavements have operation and maintenance needs that are more specialized and complex when compared to their non-permeable counterparts and other LID infrastructure, which can pose a significant challenge. For instance, snow removal equipment for any permeable paver surface will require a specialized rubber bottom so the surface is not scrapped and damaged over time. Other standard municipal practices may have to be modified to allow for permeable surfaces to be installed on City property. For example, Richmond Hill currently uses a 50% salt/sand mixture on sidewalks and walkways for winter maintenance. The City would either have to change its practice to 100% salt (which would result in significantly more salt entering the environment and causing adverse impacts) or need to conduct more frequent cleaning with a specialized regenerative air street sweeper/vacuum and pressure washers to ensure that the permeable paver systems function as intended and their capacity is not reduced due to clogging.

There is also the concern that structural integrity of a permeable paver surface could degrade over time using winter salting agents. Recent experience with porous concrete products in other municipalities has demonstrated significant degradation over time with road salt usage, leading practitioners to not recommend this type of surface in this setting.

While the few maintenance challenge examples detailed in this section are not individually insurmountable to solve, there are a number of other similar maintenance challenges not listed that would result in a need for new or additional equipment and resources that would increase ongoing operating and replacement costs. These additional costs need to be taken into account as part of any stormwater rate structure update.

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### **Permeable paving systems may also pose potential accessibility challenges and create additional risk and liability for the City**

There may be challenges with the installation of permeable pavers along public pedestrian walkways from an accessibility and AODA compliance standpoint that would need to be resolved. Experience from staff on City capital projects is that surfaces that are as smooth as possible is greatly preferred with respect to pedestrian accessibility. Uneven joints within a permeable paver system can cause issues for users of walkers and wheelchairs due to undulation and settling of pavers, something that is relatively common with this type of product. There has been recent emphasis from the Province to provide as much accessibility to all residents, and certain municipalities such as Toronto having gone as far as removing grade changes in their concrete sidewalks due to issues raised by users of mobility equipment.

This also leads to potential increased risk and liability to the City, as uneven joints from a paver along a walkway can increase the risk of falls and injuries. In order to ensure that this does not happen, more frequent inspection, maintenance and replacement of these paving systems would be required. Although there are currently some City properties with limited areas of pavers, implementing this type of product on all sidewalks and walkways in the municipality represents a significantly higher risk of accidents to residents and with that, a higher liability for the City.

### **Additional investigation is needed before implementing a downspout disconnection program in Richmond Hill**

The Member Motion refers to the implementation of a downspout disconnection program across the City. These types of systems are already planned to be implemented as part of new development within some new secondary plan areas such as North Leslie. However, such a disconnection program cannot be implemented in all areas of the City due to a variety of constraints such as lot grading and proximity to other infrastructure that could be impacted. For example, downspout disconnections cannot be implemented in neighbourhoods where they are connected to rooftop drain collectors that feed clean runoff to adjacent wetland areas. Further investigation will be required to determine which parts of the City can be considered for a downspout disconnection program.

### **Connections between the installation of permeable pavers and Climate Change mitigation needs to be further investigated**

The Member Motion indicates that specifying and requiring permeable pavers in Richmond Hill would result in the City reducing greenhouse gas emissions and help achieve the Net Zero 2050 targets. Although it is known that at the right location under the right design conditions, permeable pavers and pavements can provide some reduced peak flows (increasing the resiliency of the stormwater system to some degree) and provide some recharge to groundwater aquifers, it is less clear how the manufacturing and/or implementation of permeable pavers would reduce greenhouse

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gas emissions and how it compares to other more traditional surfaces such as asphalt and concrete. This subject requires more research and investigation to determine whether this is actually a benefit and if it can be appropriately applied to such programs as the City's Community Energy & Emissions Plan for any level of significant impact towards greenhouse gas reduction. It is noted in the recently Council-approved Climate Change Framework (SRPI.20.029) that green infrastructure (which permeable pavement is one of a suite of complementary solutions) does provide some adaption benefits for urban runoff, but it cannot be the only solution implemented as it could cause other issues if overused.

### **Financial/Staffing/Other Implications:**

Since this staff report simply outlines information for Council in response to a Member Motion, there are no financial or staffing implications associated with this report. However, should Council give direction to implement aspects of the Members Motion, including but not limited to the use of permeable paver systems as well as the implementation of a credit policy and/or other programs and policies, staff will need to report back to Council with any financial and staffing implications based on the direction received from Council.

### **Relationship to Council's Strategic Priorities 2020-2022:**

The discussion in this staff report about the City's stormwater management system, LID infrastructure and the potential addition of a credit program to the stormwater rate directly supports two Council Strategic Priorities (2020-2022) as described below.

- **Balancing Growth and Green:** Stormwater management infrastructure, including LID, is a required measure that facilitates new development in Richmond Hill while protecting or enhancing the natural environment that can allow for a balance between development and continued environment sustainability.
- **Fiscal Responsibility:** The stormwater rate program relates to the financial sustainability of the City's stormwater management system, and sound management and design of this infrastructure translates to fiscal responsibility.

### **Climate Change Considerations:**

This staff report provides background information on Richmond Hill's SWM system and LID infrastructure, as well as comments on the connection of the Member Motion to climate change. There are references to adaption and mitigation of climate change related to these subjects in this document.

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### Conclusion:

This staff report has been prepared in response to the Member Motion brought forward by Ward 2 Councillor Muench at the January 27, 2021 Council meeting of the implementation of permeable pavers as a stormwater management solution for Richmond Hill.

Richmond Hill is an award-winning municipality that has received multiple Project of the Year awards from the Ontario Public Works Association (OPWA) for three storm pond retrofit projects (Pioneer Pond, Rumble Pond and Elgin Mills Greenway Pond), and has a SWM infrastructure management program that has been emulated by many municipalities in Ontario and Canada over the last number of years.

The City has a number of current practices that already satisfy the intent of the Member Motion, as outlined below.

- Richmond Hill manages stormwater as a holistic system using a “treatment train” approach that continues to evolve over time to address the needs of intensification, climate change and best management practices, and relies on the use of Low Impact Development (LID) infrastructure for source control.
- The City currently has a number of different types of LID already implemented such as rain gardens and exfiltration pipes, which are chosen based on site-specific conditions using one or more “tools” in the LID “toolbox”, of which permeable pavers are one of many “tools”.

The City also has a number of policies, programs and initiatives in place or currently underway that promote sound stormwater management, with some examples provided below:

- Official Plan (2010)
- Environment Strategy
- Sustainability Metrics
- Stormwater Network Model
- Asset Management Plan
- Engineering Standards and Specifications Update
- Development applications for new development
- Capital project delivery

Through these and other initiatives, staff continue to evaluate new stormwater management tools and methods on an ongoing basis to ensure best management practices are always implemented. Permeable pavers and pavement systems are one of these tools, but they should be considered holistically as part of the overall stormwater management system, which is best implemented through the City policies, programs, standards and practices that are in place or currently underway.

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Financial sustainability of Richmond Hill's stormwater infrastructure is of paramount importance for Richmond Hill. The City recently updated the stormwater rate in 2019 to account for new infrastructure while keeping the rate structure simple to ensure administration costs remain low. As outlined in this report, there are a number of areas that require further investigation to better understand the financial impacts and changes required to the City's stormwater rate should a credit program be introduced. These include:

- Investigation into a new stormwater rate structure to accommodate a proposed credit program and the challenges such a change would create for the City to the existing structure.
- The need to characterize the increased costs and resources associated with a new credit program associated with such activities as increased administration and enforcement.

There are also challenges with respect to administration, maintenance and enforcement that needs to be considered, as well as the potential for increased accessibility and liability issues.

It is further noted that benchmarking of York Region municipalities with a stormwater rate indicates that most municipalities do not have a credit program and the one that does (Newmarket) only applies credits to non-residential properties.

Ultimately, while it is possible to implement a credit system for residential and non-residential properties in a Richmond Hill, it is strongly advised that such a credit system only be considered if it is determined that there will be net financial benefits to the City and the program will provide a discernible improvement to the overall stormwater management system.

### **Attachments:**

The following attached documents may include scanned images of appendixes, maps and photographs. All attachments have been reviewed and made accessible. If you require an alternative format please call the contact person listed in this document.

- Attachment 1: January 27, 2021 Council Meeting Member Motion

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### Report Approval Details

Document Title:	SRPI.21.065 Permeable paver motion response.docx
Attachments:	- SRPI.21.065 Attachment 1 - Member Motion.pdf
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This report and all of its attachments were approved and signed as outlined below:

**Dan Terzievski - Sep 16, 2021 - 8:48 AM**

**Paolo Masaro - Sep 16, 2021 - 3:20 PM**

**Kelvin Kwan - Sep 17, 2021 - 10:43 AM**

**MaryAnne Dempster - Sep 20, 2021 - 1:11 PM**